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Toward School Improvement Districts: School Quality & the Equitable Revitalization of Neighborhoods

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Toward School Improvement Districts: School Quality & the Equitable Revitalization of Neighborhoods

Abstract
High housing costs and variation in the willingness to pay for school quality helps foster regional income inequality across space and the relegation of low-income families to neighborhoods with low quality schools. This dynamic in part, explains why Philadelphia's public school system has failed; why its children are under-educated and why despite renewed demand for housing in certain neighborhoods, the City still struggles economically. Nevertheless, this research demonstrates econometrically that Philadelphia households are willing to pay a significant price premium to live in neighborhoods with high quality public schools. This fact is used to motivate a new intervention that leverages the housing investment of the middle-class to realign the supply of and demand for public goods like neighborhood schools. The proposed program repurposes the Improvement District framework to fund new local school quality. The equity component of the plan, it is argued, can potentially break the spatial pattern of income segregation by fostering mixed-income neighborhoods and diminish the threat of displacement which will likely occur as new school quality is capitalized into local home prices. It is concluded that schools are more than drivers of human capital development, they are also engines of neighborhood economic development as well.

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TOWARD SCHOOL IMPROVEMENT DISTRICTS: SCHOOL QUALITY & THE EQUITABLE REVITALIZATION OF NEIGHBORHOODS

Kenneth Steif

A DISSERTATION

in

City & Regional Planning

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ABSTRACT

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High housing costs and variation in the willingness to pay for school quality helps foster regional income inequality across space and the relegation of low-income families to neighborhoods with low quality schools. This dynamic in part, explains why Philadelphia’s public school system has failed; why its children are under-educated and why despite renewed demand for housing in certain neighborhoods, the City still struggles economically. Nevertheless, this research demonstrates econometrically that Philadelphia households are willing to pay a significant price premium to live in neighborhoods with high quality public schools. This fact is used to motivate a new intervention that leverages the housing investment of the middle-class to realign the supply of and demand for public goods like neighborhood schools. The proposed program repurposes the Improvement District framework to fund new local school quality. The equity component of the plan, it is argued, can potentially break the spatial pattern of income segregation by fostering mixed-income neighborhoods and diminish the threat of displacement which will likely occur as new school quality is capitalized in to local home prices. It is concluded that schools are more than drivers of human capital development, they are also engines of neighborhood economic development as well.
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CHAPTER 1: INTRODUCTION

With enough investigation, it becomes clear that education is among the few policy mechanisms that can solve the city’s most chronic dilemma - intergenerational poverty. The dearth of educational opportunities in cities has reached cancerous proportions, perpetuating segregation and stifling upward mobility¹. This research investigates how school quality affects the economic vitality of urban neighborhoods and the people who reside there. Failed schools are often exemplified in cities, working in combination with other symptoms of poverty to paint a vivid portrait of urban decline. Although education is a national agenda topic, failed schools, lackluster academic outcomes and new avenues for reform have generated fierce debate over the future urban education in cities like Philadelphia, Chicago and New Orleans. What dynamics are to blame and what if anything can planning do to remedy the situation?

In 1977, the College Board, the group that administers the Scholastic Aptitude Test (SAT), published a report claiming "No topic related to the programs of the College Board has received more public attention in recent years than the unexplained decline in scores earned by students on..." the SAT. Among a slew of potential causes, the report claimed that two-thirds to three-fourths of overall test score declines can be attributed to an increase in minority student test takers. The authors conclude that "what decline reflects is the incompleteness

¹ Chetty et al., 2013
so far, of the national undertaking to afford meaningful equality of educational opportunity\(^2\)."

In another call to arms, a 1983 report by the U.S. Department of Education entitled "A Nation at Risk" exclaimed, "If an unfriendly foreign power had attempted to impose on America the mediocre education performance that exists today, we might well have viewed it as an act of war. As it stands we have allowed this to happen to ourselves\(^3\)."

That education decline is akin to a foreign act of hostility is more than just colorful rhetoric. Thirty years after “Nation at Risk”, the evidence still suggests that many of our students, even those in the highest performing states still struggle to compete with top performing countries in math and science\(^4\). There are serious economic repercussions of these inadequacies, particularly given the tremendous private returns to education. Across a multitude of studies, the average return for one additional year of education in the U.S. is a staggering 10\(^{\%}\). A decline in this rate of return could easily strangle U.S. economic output and degrade our influence on the international stage.

The economics of agglomeration provide motivation for why this return is critical for the success of cities as well. It takes a critical mass of educated individuals to

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\(^2\) College Board (1977)
\(^3\) National Commission on Excellence in Education (1983)
\(^4\) National Center for Educational Statistics (2013)
produce enough economic activity for a city to prosper. Historically, it has been very difficult to untangle the effect of cities on human capital development. It could be that productive places generate productive workers or that productive places attract productive workers\textsuperscript{6}. We know that there is a positive correlation between city size and learning effects\textsuperscript{7} but there's also casual evidence linking the existence of educational assets in cities with higher wage earners\textsuperscript{8}.

Aside from institutional factors, peer effects play a role as well. Workers in cities with higher proportions of college graduates see their wages increase at a faster rate over time than workers in less educated cities\textsuperscript{9}. This means that independent of your actual job, whether you're a gas station attendant, barista or insurance salesman - your salary is dependent, in part on how well educated other people in your city are.

With this evidence at hand, it is astounding that contemporary urban economic development policy is still focused on attraction strategies defined by buzzwords like ‘Creative Class’ and ‘Innovation Districts’\textsuperscript{10}. While these mechanisms may be effective for luring young, skilled workers to cities, it is disappointing that equal emphasis has not been put on growing human capital at home. In fact, it is

\textsuperscript{6} Henderson (2003)
\textsuperscript{7} Glaeser & Mare (2001)
\textsuperscript{8} Knowing that existence of universities in a city is highly correlated with education outcomes, Moretti (2004) compares city-level outcomes for cities endowed with land grant colleges to those without. The assumption is that "having a university may simply be the effect, not the cause of a skilled populace", but land grant colleges, which established by the Federal Government and were not contingent local city conditions, make a plausible control group. He finds that the presence of a land grant college results in a significant increase in both college graduates and wages.
\textsuperscript{9} Moretti (2012)
\textsuperscript{10} Florida's (2002); Katz & Wagner (2014)
surprising generally, that more emphasis isn’t given to education as a driver of
economic development\textsuperscript{11}.

Some basic employment figures suggest that this may be an oversight on behalf
economic development planners. Nationally, the five largest unified school
districts with respect to spending - New York City, Los Angeles, Chicago, Dade
County, Fl., and Philadelphia, averaged more than $9 billion worth of
expenditures in 2011. These institutions are regional employment powerhouses.
In 2011, Los Angeles, Philadelphia and Chicago employed 63,708; 23,451 and
27,539 teachers and staff respectively\textsuperscript{12}. And while these entities pump billions
in to the economy, public schools in urban areas are still characterized by poor
teacher quality, lackluster teaching environments (physical plant, etc.) large class
sizes, a dearth of technology, low academic achievement and funding levels that
are unable, at least at their current levels, to overcome the burden of
concentrated intergenerational poverty\textsuperscript{13}.

Furthermore, the achievement gap between high and low-income students is
30\%-40\% greater today than it was twenty-five years ago\textsuperscript{14}, and students living in
urban areas exhibit higher dropout rates and lower achievement than their
suburban peers\textsuperscript{15}. These conditions fuel a negative feedback cycle where low

\textsuperscript{11} There is likely more attention paid to higher education as a means of economic development. In the context of this
research, the reference is more to primary and secondary education.
\textsuperscript{12} National Center for Education Statistics (2013)
\textsuperscript{13} Anyon (2005)
\textsuperscript{14} Reardon (2011)
\textsuperscript{15} Roscigno et al (2006)
quality schools yield ill-prepared students who grow up to earn disproportionately lower wages and are forced to live in disadvantaged neighborhoods with low-quality schools. What makes these dynamics even more dangerous is that these outcomes effect both human capital potential of individuals and the economic potential of entire neighborhoods. Without breaking this feedback cycle, the likely fate of these places is either continued stagnation and decline or increased economic inequality.

In Philadelphia, these realities front newspaper and blog pages on a daily basis. The Philadelphia School District is wrestling with a $400 million deficit. To close the gap, in March of 2013, the school district voted to close 23 schools\textsuperscript{16}. The following June, Superintendent William Hite announced the layoffs of 3,700 employees - nearly 20% of the total District workforce, including teachers, secretaries, counselors, assistant principals, secretaries, librarians and others\textsuperscript{17}. At a press conference, Superintendent Hite said, "The School District of Philadelphia must live within its means. We can only spend the revenues that are given to us by the city and the state. This is the harsh reality of how that looks\textsuperscript{18}." This harsh reality looks downright bad for schools across the City. West Philadelphia’s Bryant Elementary was forced to reduce the number of days it kept a school nurse on site to just two days a week. On an off day, September 25th, 2013, Laporcha Massey, a student, complained of breathing problems.

\textsuperscript{16} Hurdle (2013)  
\textsuperscript{17} Mezzacappa (2013)  
\textsuperscript{18} Ibid.
She was sent home then taken to a local hospital by her parents where she later died from asthma complications\textsuperscript{19}. In the wake of the tragedy, just days later, then-Pennsylvania Governor Tom Corbett released $45 million in state aid for Philadelphia schools. Although the governor had previously withheld the money in lieu of concessions from the teacher’s union, the funds could now be used to hire back 400 teachers and staff\textsuperscript{20}.

Forty-five million dollars hardly makes up for the $1 billion dollars of state education financing that was slashed from the governor’s 2011 budget - much of it a consequence of expiring federal stimulus funds\textsuperscript{21}. It was this budget that forced Philadelphia’s School District into its current fiscal crisis, and since then, the State legislature has refused to invest more. Despite the political division that exists between a predominately Republican state legislature and a predominately Democratic Philadelphia caucus, real inequities exist in the State’s school funding formula. According to a recent article in the Washington Post, per-pupil spending in Pennsylvania’s poorest school districts, like Philadelphia, is 33\% lower than spending in the State’s wealthiest districts – the highest differential in the U.S.\textsuperscript{22}. Although state education subsidies to Philadelphia likely spillover into positive economic gains for the entire state economy, it does not preclude the political reality that discourages a Republican officials from redistributing more rural and suburban tax dollars to Philadelphia students.

\textsuperscript{19} Whites-Koditschek (2013)  
\textsuperscript{20} Snyder et al. (2013)  
\textsuperscript{21} Couloumbis (2013)  
\textsuperscript{22} Brown (2015)
We often associate this sort of fiscal redistribution with equity, and although society agrees that education is worth subsidizing, there is clearly less agreement on who should pay for it. Education was not always a public good. The original public school (re)formers had to convince Americans that the human capital benefits of public education outweighed the additional taxation. By touting the positive effect of education on immigrant assimilation, poverty reduction, and labor force improvement, the debate focused not on whether taxes should be used to fund education but on how much\textsuperscript{23}.

The local property tax has been the traditional financing mechanism for schools, but in response to ailing urban economies and burgeoning funding inequality, a push was made in the 1970s toward a more centralized financing model. In Philadelphia’s case, if the spigot of state aid for schools were to be permanently shut, local property taxes alone would not be sufficient for preventing additional school closings and the continued degradation of school quality. Given these fiscal hardships and the City’s legal mandate to provide public education, what alternative models can a city like Philadelphia choose from if not traditional public schools?

One option is charter schools. According to the most current data from the National Center for Education Statistics there are 6,212 charter schools operating

\textsuperscript{23} Katz (2013)
across 40 states nationwide (6% of all schools).\textsuperscript{24} There are 85 currently operating in Philadelphia serving 45% of the overall District enrollment\textsuperscript{25}. Charters introduce choice into the education marketplace and households faced with the prospect of sending their children to a failed neighborhood school may choose a charter if it provides a higher quality alternative. However, school choice does not exist in a vacuum. Oftentimes, a choice for or against a school is a choice for or against an entire neighborhood and when an entire region chooses likewise, these dynamics are powerful enough to carve cities and regions into segregated enclaves.

This dissertation targets school and neighborhood choice as the primary mechanism that reinforces concentrated intergenerational urban poverty. The research in this dissertation goes beyond asserting simply that increased school quality can help end this legacy. It argues that planners can exploit neighborhood choice to “reprogram” the spatial orientation of neighborhoods, the tax revenues they generate and the school quality they produce. There are two main research questions: In order to establish just how important good schools are toward the economic vitality of neighborhoods and to justify a schools-centric intervention, the first question asks how much are Philadelphia home buyers willing to pay for quality schools both Citywide and in the case where a new high quality school was opened in a neighborhood that previously did not have one. The second questions asks, given the role of quality schools in neighborhood

\textsuperscript{24} National Center for Education Statistics (2013)  
\textsuperscript{25} Philadelphia School District (2015)
economic development, is it possible for planners to develop a new placed-based intervention that uses school quality as a means to equitably revitalize neighborhoods?

This dissertation advocates that planners repurpose the Business Improvement District framework to fund local schools, but instead of bounding the District to include a homogenous area (like a downtown, for instance), this intervention suggests the demarcation of a mixed-income neighborhood. It argues that these ‘School Improvement Districts’ can foster both equitable neighborhood economic development and increased human capital development.

The following chapter provides an in-depth literature review that explores the causes of urban and regional income segmentation and how planners can work towards breaking down this pattern. Chapter 3 provides some background on one particular school quality intervention that is later used to address the first research question – the willingness to pay for high quality schools in Philadelphia. Chapter 4 outlines the econometric research design used for research question one and then describes a set of policy-related questions asked of local experts whose experience is relevant to the School Improvement District framework. Chapter 5 presents the results of the school quality econometric study. Chapter 6 simulates the School Improvement District planning process and then discusses relevant planning issues informed by the expert interviews. Finally, Chapter 7 concludes. Three appendices complete the study. The first
describes an analysis that finds a positive relationship between the number of students scoring proficient or advanced on math and reading test scores and student racial diversity in Philadelphia elementary schools. It is intended to help defend the idea that not only can School Improvement Districts effect neighborhood economic development, but that the income mixing they foster can also increase human capital returns, as well. The second appendix is a two-page policy brief that provides some background for interview respondents. The third lists the questions asked of experts who were gracious enough to be interviewed for this project.
Although it may sound like an unusual focal point for motivating a school-related intervention, this literature review is assembled around the following question, ‘why is it that across any given region, income segregation is a major feature of the built environment and what lessons can this outcome teach us when planning productive and equitable neighborhood interventions?’ There are three interrelated streams of literature that help answer this question. The first stream discusses what makes schools productive and argues that their low productivity in Philadelphia has led to a failed public school system and the rise of school choice. It argues that these alternative, market-based models which incentivize across neighborhood mobility, decouple schools from their surrounding neighborhoods which can have dire repercussions for neighborhood economic development. The second strand of literature links school choice to neighborhood choice, and argues that if left unchecked, neighborhood choice produces negative outcomes for those who cannot afford to be choosy. The third stream puts neighborhood choice in the dynamic context of gentrification as a dynamic urban process and describes how government intervention in housing markets is required in order to balance growth and equity. The final section of this review puts all of these pieces together to inform the particulars of a proposed School Improvement District program. Bounding these four threads is a discussion of the current school financing crisis in Philadelphia.
The production of education in the U.S.

Following a severe decline in education outcomes in the 1970s, researchers have been working to identify the drivers of school productivity. Their goal has been to examine how school outcomes are influenced by different school-related expenditures\textsuperscript{26}. The literature that has emerged has a long and varied trajectory. Forming the basis for debate in this field is the finding that positive school outcomes are not so easily explained by traditional measures of school quality\textsuperscript{27}. This conclusion is perhaps unsurprising given the number of relatively intangible variables behind the probability of one’s success in school.

Stanford researcher Erik Hanushek is at the forefront of this debate and has authored several comprehensive reviews on the subject of ‘input-based schooling policies’\textsuperscript{28}. He notes that although real spending per pupil saw an annual average increase of 3.5% between 1890 and 1990, student performance, specifically in the sciences, was lower in 1999 than in 1970. He suggests that, “Eager to improve quality and unable to do it directly, government policy typically moves to what is thought to be the next best thing – providing added resources to schools.” This strategy, he claims, has proven “ineffective.”

\textsuperscript{26} Pritchett & Filmer (1997)
\textsuperscript{27} Betts (1995). Traditional measures of school quality include teacher salaries, teacher quality, student/teacher ratio, teacher experience, enrollment and others.
\textsuperscript{28} Among them includes Hanushek (1989; 2003; 2004)
The literature does conclude that there is no one recipe for achieving success. Additional expenditures can play a role, but what really matters is an understanding of which *value-added* approaches are effective and which need to be revamped\(^{29}\). For example, given their limited resources, should a school district spend money on better teachers or smaller class sizes? School vouchers or charter schools? This understanding, researchers argue, must be driven by strong program evaluations based on testable hypotheses and experimental evidence\(^{30}\). Examples of value-added program evaluations include early childhood education\(^{31}\); the impacts of quality teachers\(^{32}\); teacher bonuses\(^{33}\); and smaller class sizes\(^{34}\).

The impetus for experimental approaches is that the level of resources given to a particular school district, school, classroom or individual student is at least partially a function of student outcomes\(^{35}\). Many of the intangibles that contribute to student success are often difficult to separate from what the student might experience in the classroom. For instance, the neighborhood in which a child grows up has a significant effect on educational attainment\(^{36}\). As traditional public schools are placed-based, these “peer effects” can permeate into the classroom. While the evidence on peer effects in general is mixed, studies have

\(^{29}\) Hattie (2013); Hanushek (2003).  
\(^{30}\) Ellis (2014)  
\(^{31}\) See Reynolds et al. (2002) and Heckman (2006) for a thorough review. Experimental evidences includes the Perry Preschool Program (Schweinhart et al., 2005) and the Abecedarian program (Campbell et al., 2002).  
\(^{33}\) Eberts et al. (2002) and Podgursky & Springer (2007) for reviews; Springer et al. (2011) for experimental evidence.  
\(^{35}\) Houtenville & Conway (2008).  
\(^{36}\) Leventhal & Brooks-Gunn (2000); Ravitch (2011).
found that peers do play a role in outcomes for several important social contexts\textsuperscript{37}. Research presented in Technical Appendix 1 of this dissertation finds that more student diversity at the school-level is associated with positive test score outcomes in Philadelphia elementary schools.

In practice, peer effects mean that the performance of one student is correlated with the average of his peers\textsuperscript{38}, and if this is the case, it can bias our empirical understanding about the role of different value-added interventions. A study might find that good teachers increase their student’s test scores, but it is entirely possible that this result is driven by the socioeconomic makeup of different classrooms. Researchers often attempt to hold both these neighborhood and classroom peer effects constant while identifying program efficacy.

\textit{Charters and school choice}

Given the School District of Philadelphia’s current fiscal crisis, it is unlikely that new, value-added reforms could be introduced in classrooms. In fact, the opposite has been occurring. Its mounting deficit has forced the school district to engage in a wide array of cuts that are effecting not only schools but the neighborhoods that surround those schools as well.

\textsuperscript{37} See Sacerdote (2011) for a review. Hoxby (2000) finds significantly positive peer effect associated with an increase in the number of females in a school cohort. She also finds a significant intra-race peer effect. Gaviria & Raphael (2001) report very large peer effects with respect to drug use, drinking, cigarettes and high school dropout. Methodologically, the concern is that peer effects are highly non-linear. That is, the spillover effect resulting from the presence of an additional student will vary depending on whether that student achieves in the 1st, 2nd, 3rd or 4th quartile (Hoxby & Weingarth, 2005).

\textsuperscript{38} Angrist (2014).
In spring, 2013, school superintendent William Hite laid off 3,800 employees\textsuperscript{39}. The following spring, he threatened that unless the District was awarded $100 million from the State as a short-term fiscal band aid, he would lay-off an additional 810 teachers\textsuperscript{40}. These cuts would increase high school classroom size from 33 students to 41 students on average.

Over the last three decades, a variety of alternative education models have been developed around the country. In Philadelphia, the charter school model has emerged at the center of the City’s school reform agenda – a direct consequence of its current fiscal crisis. Although the original purpose of charter schools was to provide a laboratory for educators to experiment with new value-added models,\textsuperscript{41} in Philadelphia, the motivation is marked by fiscal necessity.

Charters receive the same per-pupil funding as public schools but shift the responsibility of public education away from a centralized bureaucracy like a school district and into the hands of privately managed, independent operators. Unlike traditional public schools in Philadelphia which draw students from the surrounding neighborhood, many charters take students from across the city\textsuperscript{42}.

\textsuperscript{39} Mezzacappa (2013)
\textsuperscript{40} Mezzacappa (2013)
\textsuperscript{41} Center for Public Education (2010).
\textsuperscript{42} There is a small but growing number of charter schools in Philadelphia that are neighborhood based. Although, these programs are only a few years old, the smaller class sizes and tutoring programs have shown promise (Gold et al. 2012; Westervelt, 2013).
The motivation for charters came out of the government entrepreneurism movement of the late 1980s and early 1990s\(^4\). Advocates suggested that public institutions should be retrofitted with private-sector management strategies -- replacing bureaucracy with markets\(^4\). Osborne & Gaebler’s, *Reinventing Government* (1993), touted these ideals suggesting that in order for government to provide a quality product, its "business model" should be informed by several key market-oriented approaches. Chief among these is efficiency; the idea that if we are going to allocate tax dollars to increase social welfare, we should choose a mechanism from which the benefits outweigh the costs. Second, the authors suggest that local community empowerment and local control is more efficient than centralized control; and that inducing firms, households and governments to make "better" choices requires that incentives be properly aligned.

The often-cited rationale for introducing choice into education is that it breeds competition, and forces schools to be more effective and efficient or else risk losing students to more productive schools\(^4\). Since choice works in the business world, some argue, it should also work in education\(^4\). The critical response to this justification is that market oriented solutions are not always best for addressing socioeconomic deficiencies rooted in centuries of inequality\(^4\). Although, it is likely that schools and their consumers will change their behavior given new, choice-generated market incentives, the question is, to what extent

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\(^4\) Osborne & Gaebler (1993)
\(^4\) Katz & Jones (2013)
\(^4\) Jenks (1970); Checci (2006)
\(^4\) Ravitch (2011)
\(^4\) Cucchiara (2013)
will this occur and will it result in Pareto efficient outcomes\textsuperscript{48}? This is an exceedingly difficult question to answer particularly if we consider that some families may not have all the pertinent information that might otherwise lead to a productive choice. In this case, an extra degree of choice is not likely to lead to productive outcomes for their children.

Theory aside, nearly two decades of charter evaluations paints at best, a mixed picture of outcomes. Many evaluations compare charter outcomes to those of traditional public schools without consideration for the heterogeneous nature of charter curricula\textsuperscript{49}. In addition, as before, improperly accounting for the otherwise unobserved traits of students (such as neighborhood and other peer effects) can lead to biased evaluations\textsuperscript{50}.

One of the largest meta-analysis of charter school outcomes characterizes charter school evaluations by their empirical rigor\textsuperscript{51}. When only the strongest studies are included, the authors find no difference between charters and traditional public schools. The authors found that of the 38 states that had charter laws on the books at the time of publication (2004), only 8 states had independent evaluations based upon defensible research designs.

\textsuperscript{48} Checci (2006)  
\textsuperscript{49} Teasley (2009)  
\textsuperscript{50} Eberts & Hollenback (2002)  
\textsuperscript{51} Miron & Nelson (2004)
Since that time, additional evaluations have studied charter outcomes by using a random assignment approach. This strategy compares outcomes for students who won charter admission lotteries to outcomes for those who entered lotteries but lost. This design helps deal with selection bias. Two such studies in New York City and Chicago have shown that students who won lotteries and attended charters performed modestly better than their peers who lost. In a comparable study from Boston, researchers found much more pronounced positive effects for students who won charter lotteries. These studies find that positive outcomes are associated with value-added measures including the number of years a charter has been operational; a longer school year; and smaller class size.

Unlike Boston and New York, the catalyst to move to charters in Philadelphia was not to test innovative models but to address fiscal insolvency. These contextual differences suggest that outcomes from cities like Boston and New York may not be generalizable to Philadelphia. Entrepreneurs looking to take advantage of new market opportunities by opening new schools may be putting additional pressure on the District to approve more charters. In this case, it is important to point out the that research shows that new charter schools are less effective than more established ones.

52 For one, if two students are willing to enter a charter lottery, it shows that there are likely qualitative differences in how their families might value education compared to a student who does not apply for the lottery. This helps to deal with some of the peer effects concerns. Overcoming selection bias with random assignment is covered in detail by Shadish, Cook & Campbell (2002) and Morgan & Winship (2007).
54 Abdulkadiroglu et al. (2011)
55 Chicago is in the same boat as Philadelphia. In May of 2013 Chicago closed 50 neighborhood schools and is looking to replace them with charters according to Lutton (2013).
56 Bifulco & Ladd (2006);
There is one precedent for Philadelphia’s current situation. No other city took to charters as a solution to its crippled school district more than New Orleans which was carrying $250 million in debt before Hurricane Katrina made landfall\textsuperscript{57}. The storm destroyed more than 100 of its 120 schools and forced an estimated 50,000 students to relocate to other schools around the country\textsuperscript{58}. From the rubble emerged charter schools which, as of 2010, comprised 61 of 88 public schools in New Orleans\textsuperscript{59}. In 2014, New Orleans became the nation’s first major urban school district to be comprised entirely of charter schools\textsuperscript{60}.

What do charters have to do with School Improvement Districts? Inherent in school choice is the ability for charters to admit students from across the city. If parents choose to pull a child from a neighborhood school and send the child across town to a charter, the parents are not only choosing against the neighborhood school but the surrounding neighborhood as well. In fact, these choices can have detrimental effects on the broader school financing landscape, on social capital formation and on neighborhood economic development.

Toward the financing issue, consider that each new charter deepens the Philadelphia School District’s already calamitous deficit. Due to the publically funded/privately managed nature of charters, when a student leaves a traditional

\begin{itemize}
  \item \textsuperscript{57} Southern Education Foundation (2009)
  \item \textsuperscript{58} Hill & Hannaway (2013)
  \item \textsuperscript{59} Khadaroo (2010)
  \item \textsuperscript{60} Sanchez (2014)
\end{itemize}
neighborhood public school for a charter, the School District must transfer funding from its budget to that of the charter school. A portion of these losses are fixed costs like the maintenance on buildings, teacher salaries and pensions which can only be offset by cutting costs. This compounds an already dire fiscal situation, as increasing numbers of students who transfer to charters further causes the School District to close neighborhood schools and/or lay off teachers. Not only does this continued degradation widen the District’s fiscal hole but it also lowers demand for neighborhood schools as well\(^6\).

Yet another benefit of neighborhood-anchored public schools is that they are part of a system that promotes and develops social capital\(^6\). The ‘neighborhood unit’ concept first described in the late 1920s advocates for the school as the focal point of a neighborhood, making it the central gathering place for residents to meet, recreate and even organize\(^6\). Evidence also suggests that urban neighborhood schools help promote positive health outcomes and limit a child’s exposure to excessive traffic or crime\(^6\). Not surprisingly, education researchers believe that healthy neighborhood schools are the cornerstone of healthy neighborhoods\(^6\).

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\(^6\) In order to secure $93 million to open Philadelphia schools on time, in July of 2014, the Pennsylvania state legislature approved a $2 per pack cigarette tax in Philadelphia. In order to gain bipartisan support, a last minute amendment was inserted into the bill that would grant the state an opportunity to override any City decision to (dis)allow an organization to open a charter. Thus, in exchange for a short term band-aid, the school district accepted a potentially more disastrous long term liability.

\(^6\) Forest & Kearns (2001); Silver (1985); Perry (1998). Clarence Perry, the architect of the ‘Neighborhood Unit’ concept wrote that he believed his plan could help foster diversity – particularly income diversity.

\(^6\) Williams (1989); Anyon (2005).

\(^6\) This is referring specifically to the US. Department of Transportation's Safe Routes to School program (2013); Smith et al. (2011)

\(^6\) Ravitch (2011).
Lastly, and most critical for this research is that a move to charters may inhibit local economic development generated by neighborhood schools. While well-managed charters may produce positive education outcomes, the induced across-neighborhood mobility might also erode the economic anchor relationship between a traditional public school and its surrounding neighborhood. See Chapter 5 for an explanation of how good schools effect neighborhood housing markets.

There is a large literature on the premium households are willing to pay for quality neighborhood schools. These premiums vary as new data and new statistical techniques emerge over time. Early research found little evidence that school quality was capitalized into neighborhood home prices. Research from the 1970s and 1980s found a positive capitalization effect for both school expenditures and test scores. More contemporary approaches estimate wide-ranging price premiums associated with good schools. A one standard deviation increase in school quality can lead to a home price premium as varied

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66 This literature wrestles with the same question as the education production literature – specifically, what “value-added” characteristics of schools do home buyers value. See Hayes et al. (1996); Brasington (1999) and Clapp et al. (2008). There is also a closely related strand of literature on how home buyers consume school level information and how this affects school choice (Walsh, 2014).

67 Bayer et al. (2007) discuss how much of the literature ignores the fact that attributes like the socioeconomic makeup of neighborhoods can be endogenous to school outcomes. This suggests, as it does in the school value-added literature, that estimating the willingness to pay for good neighborhood schools may be biased by other non-schools neighborhood effects. Chapter 4 discuss how the research design in this dissertation deals with these potential sources of bias.


69 Early examples include Sonstelie & Portney (1980) who employ controls for the internal characteristics of home prices, measures of police protection, neighborhood design features such as cul de sacs and distance to employment centers. Jud & Watts (1981) improve this method by accounting for the racial characteristics of neighborhoods. They suggest that previous studies that have not accounted for race may have over-estimated the effect of schools on home prices.

70 Instrumental variables purport to identify the causal effect of schools on home prices by finding a variable correlated with school quality but not with home prices. Downs & Zabel (2002) instrument on variables they believe influence the level of school inputs but not home prices. Rosenthal (2003) instruments on the random inspection of schools. Examples of across-boundary differences include Black (1999); Gibbons & Machin (2003, 2006); Bayer et al. (2007); Fack & Grenet (2010); Gibbons, Machin & Silva (2013)
as one to ten percent\textsuperscript{71}. These results suggest that the price premium associated with “good schools” in one city is likely not generalizable to others\textsuperscript{72}. A second issue with this literature is that it is cross-sectional which does not help us to understand what how the introduction of school quality where it previously did not exist might affect the neighborhood change process. Finally, while much research relating home prices to public school outcomes exists, just one paper investigates the role of charters and finds very weak evidence of positive capitalization effects\textsuperscript{73}. This dissertation adds to this literature by estimating school quality-driven price premiums in a policy context driven by Philadelphia’s fiscally insolvent public school district.

Aside from the need to balance land use goals and school enrollment projections in the comprehensive planning process, education policy is typically not within the professional purview of city planners. Nevertheless, it is argued that school choice as a dynamic urban process can have serious ramifications on the economic and social wellbeing of neighborhoods. The consequences of choice are further complicated by the fact that not only are city neighborhoods and neighborhood schools in competition with each other – they are in competition with places from across the region as well. Thus, to understand fully, the economic impacts of school choice, we must understand how choice effects regional housing markets. Through a nuanced appreciation of these dynamics,

\textsuperscript{71} See Black & Machin (2011) for a review.
\textsuperscript{72} Also at play could be the fact no single value-added measure of school quality exists.
\textsuperscript{73} Imberman et al. (2015)
planners can begin to craft more productive and equitable neighborhood-level interventions.

Neighborhood Choice

School financing decisions and school choice effect entire neighborhoods. Public schools and their surrounding neighborhoods are fundamentally linked to one another. Intervention in one domain will have effects in the other. To understand this process, one must understand that a neighborhood is not an autonomous entity but a peripheral that exists as part of a larger system of interconnected places in a region. Choice for one place is a choice against another; and millions of choices over forty or fifty years can result in widespread spatial segmentation across an entire region. Upper income families typically live together by choice. While lower income families are similarly clustered, their choices are limited by economic realities that often relegate them to poorly served places. While this outcome sounds bleak, it is only through an understanding of these dynamics that we can begin to think about how to harness the power of neighborhood choice to positively affect the situation.

In his seminal paper, Tiebout focuses on the “consumer-voter” who chooses among a series of regional alternatives, one “which best satisfies his preference pattern for public goods.” As is the case in any market, “The greater the number of communities and the greater the variance among them, the closer the

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74 Tiebout (1956)
consumer will come to fully realizing his preference position\textsuperscript{75}.” Thus, the consumer will exercise his choice for a community that best suits his needs.

There are costs associated with this choice, most notably the cost of public services and amenities\textsuperscript{76}. Households consider these conditions when deciding where to live and how much to pay for housing. Locations that have poor amenities and unattractive fiscal conditions struggle to attract high income residents which is why downtrodden cities are often defined by struggling real estate markets.

The property tax is the principal mechanism by which municipalities fund public services. Communities are free to set property tax rates according to the level of services desired by residents. This system works well if all residents are willing or able to pay an amount exactly equal to the value of the services they consume. It quickly breaks down however, if value-seeking consumer-voters attempt to ‘free-ride’ by paying for less services than they consume\textsuperscript{77}. How does this work? Consider the following stylized example: Imagine a town comprised only of households with school-aged children who all attend the local school. In this town, the zoning code requires that every house be built on 1 acre of land and each household pay $1,000 in taxes annually for the only public service in town -- the school. In this situation everyone pays $1,000 in taxes and receives

\textsuperscript{75} Pg. 418.
\textsuperscript{76} Other costs exist as well. Rosen (1979); Roback (1982) write about the role of quality of life; Gyourko & Tracy (1991) write about the role of fiscal conditions; (Glaeser, 2007) for review.
\textsuperscript{77} Fischel (2006)
$1,000 in school quality. Now imagine that the zoning code is altered to allow the 1 acre plots to be split in half such that each half acre lot now contains its own home with new students to attend the local school. The homeowners on these plots are still receiving $1,000 worth of school quality, but they’re only paying $500 for the privilege.

Given enough half-plotters, the quality of schools may decline because the town is funding more students with less revenue. This might be particularly upsetting for those households paying $1000 in taxes and it might incentivize them to pick up and choose another community where they are assured value in exchange for their taxes. This loss of tax revenue would further degrade school quality in the town.

To prevent free-riders, suburban municipalities often employ fiscal zoning – a standard that ensures each household consumes an amount of taxable land equal to cost of the services they consume. As such, any household that cannot afford to purchase so much land or pay so much in taxes is automatically excluded from locating in that suburb and consuming its services. This may seem unfair, particularly in the realm of education, which is often thought of as a public good. Land use controls like fiscal zoning blur the line between public and private goods and make it possible for a community to exclude. By providing

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78 Hamilton (1975)
79 Public goods, by definition are non-excludable and non-rivalrous. The first constraint is obvious. Non-rivalrous means that many can consume the good at one time (like air or national defense). Although, most consider Samuelson (1954) as the seminal work on public goods, it is Moore (1978) that provides the seminal planning-related work on public goods arguing (p. 388) that “a theory of public goods is simultaneously a theory of the justification of planning.”
schools in a manner best suited to the needs of local residents public education becomes less of a quasi-public good and more of a “club good”\textsuperscript{80}. While fiscal zoning is advantageous to the economic health of a suburban community, it is exclusionary and clearly detrimental to low-income residents who might otherwise benefit from consuming higher quality schools\textsuperscript{81}.

Disinvested communities do not emerge randomly. They are the consequence of a collective action; a preference for certain places by those who can afford to be choosy. Choice, be it at the municipal or neighborhood level is the principal driver of economic segregation. Some context for this assertion is provided below but for now consider that neighborhoods are more than just a physical manifestation of space and certainly more than just a commodity to be bought and sold. Neighborhoods provide the social and economic context in which individuals interact and communicate with each other on an everyday basis.

Roland Benabou observes:

\begin{quote}
The accumulation of human capital underlies the evolution of both income inequality and productivity growth. As demonstrated most vividly by the physical blight and social pathology of inner-city schools, certain essential inputs in this process are of a local nature. They are determined neither at the level of individual families nor that of the whole economy, but at the intermediate level of communities, neighborhoods, firms, or social networks. Not only is this the case with school resources when funding is
\end{quote}

\textsuperscript{80} Buchanan (1965) is the originator of this theory. See Cornes (1996) for a lengthy discussion.

\textsuperscript{81} Hanushek & Yilmaz (2007); Fennel (2006).
decentralized but also with many forms of “social capital”: peer effects, role models, job contracts, norms of social behavior, crime, and so on. 

Through these fiscal and sociological spillovers, the next generation’s distribution of skills and incomes is shaped by the manner in which the current one sorts itself in differentiated clusters82 (Emphasis added).

These shared social experiences can have dire consequences on the economic, health and social wellbeing of residents who live in places of concentrated poverty83. The ability for the middle-class to choose freely limits the development of effective human capital institutions in disadvantaged places, and also perpetuates a neighborhood context which inhibits the ability for students to learn and achieve upward mobility84.

The Tieboutian choice process is one reason why many Philadelphia neighborhoods can no longer support a public school. Between 1950 and 2010, Philadelphia lost nearly a quarter of its population. Several mechanisms were at work including widespread manufacturing loss, and the globalization of employment85. In addition, government sponsored mortgage programs favored greenfield development86, while construction of the federal highway system fostered decentralization87 which enabled city residents to relocate to suburban

83 Sampson et al. (2002); Ioannides (2002); Galster (2012); Jencks and Mayer (1990) for what is likely the seminal paper on “neighborhood effects”.
85 Hill et al. (2012)
86 Squires (2002)
87 Baum-Snow (2007)
locales. As the middle class left cities they took their housing capital with them. This major shift exasperated inner-city segregation creating a ‘spatial mismatch’ between an urbanized labor force and an increasingly suburban employment market. In addition, it perpetuated vacancy by limiting demand in the face of a fixed and durable housing supply. Many cities and neighborhoods were left with neither a sustainable demand for housing nor a sufficient tax-base to support local public services.

Low-income families are attracted to cities like Philadelphia because of the presence of inexpensive housing, public transportation and other low-cost city services. Income diversity in cities makes fiscal zoning as an exclusionary tool politically unfeasible. As a result, free ridership is particularly endemic in many cities – to the point where we just refer to it diversity. Cities are enormously redistributive. A hypothetical family of three living in Philadelphia and earning $75,000 annually pays 15.2% of its income in taxes. This suggests that for every dollar a middle-class family spends in taxes, they receive but a portion of that in the form services, with the balance being allocated to needy residents across the City. This situation arises out of the political realities of urban governance and the responsibility of city governments to provide all residents with basic services. It does so however, at the expense of households who can

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88 Grigsby (1963)
89 Massey & Denton (1993); Jargowsky (1997)
90 Kain (1968, 1992); Ihlanfeldt & Sjoquist (1998)
91 Gyourko & Saiz (2004)
92 Gyourko (1998)
afford to choose other locations in the region. Those who remain, likely do so because they value the agglomeration benefits that only a city can provide. Even in this case however, these residents exercise choice, albeit at the neighborhood level.

Although large tax/service imbalances may exist at the city level, they may be less pronounced at the neighborhood scale. Neighborhoods tend to exhibit a high degree of internal clustering with respect to race, income, home prices and other characteristics. The same search parameters suburban households use to choose among many regional alternatives are used by urban households to choose among neighborhood alternatives. As is the case in suburbs, high neighborhood home prices reflect higher quality services and amenities and higher income residents. There is no fiscal zoning in cities but high housing costs serve as an equally powerful exclusionary mechanism. Just as is the case at the regional level, the symbiotic relationship between quality services and affluent neighborhoods in cities gives rise to serious equity concerns for families and students who live in poor neighborhoods. Notably, middle income families who value urban amenities but long for higher quality schools, have recently begun to raise funds for their local school. For example, non-profit “Friends of” groups have begun popping up all over Philadelphia, soliciting donations from residents on behalf of their neighborhood schools. These groups are comprised largely of middle-class households, and although many members

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94 Saffron (2013)
have school-age children, the number of non-parent members are increasing\textsuperscript{95}. These groups are discussed in more depth in Chapter 6. The motivation for “Friends of” groups is fairly obvious - they are attempting to make up for the City’s inability to fund adequate school quality. Their existence begs the question, why not have urban neighborhoods fund schools entirely on their own?

Try to imagine if a situation did indeed arise where neighborhood residents were entirely responsible for financing their own schools. Imagine if charters did not exist and the Philadelphia School District, forced to close under the weight of its mounting deficit, transformed these Friends of groups into neighborhood quasi-governments that would collect and expend neighborhood taxes on the neighborhood school. In this case, redistribution to other city schools would cease and school financing via property taxes would exclusively be a function of home prices. Those who could afford a neighborhood with a quality school, would likely find value in such a system knowing that a greater proportion of their tax dollars are being spent in their own communities. Those who can afford regional choice might even choose these neighborhoods over suburban townships.

While economists often tout the efficiency that could be achieved by financing neighborhood services exclusively by way of neighborhood taxes, such a system

\textsuperscript{95} Bergman (2013)
would have serious consequences for equity\textsuperscript{96}. This thought experiment does illustrate how the market, if left unchecked could respond to failing neighborhood schools. It also demonstrates how neighborhood dynamics and \textit{laissez-faire} approaches to city planning could lead to the commoditization of education\textsuperscript{97}. No longer would public schooling constitute even a quasi-public good as wholesale exclusion would become a reality.

So the question becomes, can planners design a school quality intervention that harnesses choice, maintains equity and provides middle class households with value in exchange for their tax dollars? More generally, might it possible to design an intervention that uses school quality to induce new neighborhood demand while preventing the displacement of existing residents?

\textit{Affordable housing to mitigate the consequences of neighborhood choice}

Such a design begins with the understanding that free-riders, as they’re known in the suburban context, are an integral component of any urban anti-poverty initiative. Providing the poor with high quality services that they could not otherwise afford is a key tenant of U.S. housing policy. The stated goal of this policy is the provision of “a decent home in a suitable living environment for every American family\textsuperscript{98}.” The framers of this policy recognized the important

\textsuperscript{96}To be more specific, Inman (2008) writes, “neighborhood services should be financed and managed by neighborhood governments, and city-wide services should be financed and managed by city-wide governments.”

\textsuperscript{97}Grace (1989)

\textsuperscript{98}Housing Act of 1949.
intersection of “housing production and related community development.”

Intergenerational urban poverty is often characterized by the social and economic isolation of low-income residents, thus the theory of mixed-income neighborhoods holds that to improve the lives of the poor, we have to completely transform the context in which they live. There are two potential mechanisms for achieving this transformation – the market-based approach which allows the invisible hand to reallocate capital across space as it sees it fit and the government-led approach which alters local housing supply and demand conditions through government intervention. The market-approach raises serious concerns for equity – particularly the fear of residential displacement. Government funded affordable housing may be one way to prevent this fear from becoming a reality.

The market induces neighborhood change either through changing preferences for urban living or new investment opportunities in the built environment. This “gentrification” process reduces income isolation de facto, by encouraging in-sorting of higher income residents into a neighborhood. Given the link between high incomes and home prices, the concern is that gentrification will increase housing burdens for low-income residents – perhaps leading to their displacement from the neighborhood. Some have likened the process of

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99 Ibid.
gentrification to one that transforms cities from 'islands of renewal in seas of decay' to 'islands of decay in seas of renewal'\textsuperscript{102}.

The literature on gentrification-induced displacement is robust – and its conclusions may surprise. Identifying displacement is difficult simply because there is no way to discern, in an absolute sense, gentrified neighborhoods from non-gentrified neighborhoods. Yet for those who have tried, the results show that mobility rates from gentrified neighborhoods are comparatively less pronounced for less-educated, low-income households\textsuperscript{103}. In the face of increased housing costs, one important conclusion is that low-income residents in gentrified neighborhoods value the presence of new, positive local amenities like shops and restaurants – and likely school quality\textsuperscript{104}. There may be some interesting counterfactual explanations for the lack of displacement evidence. One, displacement tipping points may exist but are, at the margins, imperceptible, at least statistically\textsuperscript{105}. In other words, while it may be difficult to conclude generally that gentrification leads to displacement, there may be individual cases where it clearly does.

Thus, some measure of government intervention is required in order to ensure equity and limit displacement in face of new residential demand. Government at all levels has a history of intervening on both ends of the supply and demand

\textsuperscript{102} Berry (1985); Wyly & Hammel (1999)
\textsuperscript{103} Freeman & Braconi; Vigdor 2002
\textsuperscript{104} Freeman (2005); McKinnish et al. (2010)
\textsuperscript{105} Quercia & Galser (2000)
spectrum – and it is worth visiting this history, if only to get a sense of which strategies might help maintain equity within a School Improvement District framework.

The programs informed by U.S. housing policy exist at intersection of housing and community development, but the latter has largely taken a back seat to the former. This is because housing programs, in an effort to maximize the number of developed affordable housing units, have historically allocated subsidy to the cheapest land available\textsuperscript{106}. The cheapest land tends to be that which is devoid of good quality services and amenities\textsuperscript{107}. This supply-side strategy has serious ramifications - a "spatial bias" that has traditionally allocated housing subsidy to low-income neighborhoods with poor quality public services and deficient living environments\textsuperscript{108}. Nevertheless, more than 5 million low-income housing units have been developed throughout the US\textsuperscript{109}. By any measure, it would be difficult to conclude that these strategies have succeeded in ending poverty in U.S. cities.

The Housing Act of 1937 allowed local public housing authorities to construct and maintain housing for low income households and provided a mechanism for slum clearance – something that would become a mainstay of the housing reformers agenda for decades to come\textsuperscript{110}. These developments epitomized top-down, centralized city planning. In many cities, local housing authorities replaced

\textsuperscript{106} Jenks & Mayer (1990)
\textsuperscript{107} Alonso (1964); Muth (1969); Mills (1967); Glaeser (2008)
\textsuperscript{108} Schill & Wachter (1995)
\textsuperscript{109} Schwartz (2006)
\textsuperscript{110} McDonnell (1957)
dilapidated slums with high-rise public housing projects that would later become the face of devastation in primarily African American neighborhoods. These “monstrous high-rise edifices isolated low-income occupants by race and social class and obviated any notion of community.”

The federal government, still focused on supply-side solutions but reeling from the disastrous experiment that was public housing, turned to a new program in the 1990s that sought to replace distressed public housing with mixed-income housing. Dubbed ‘HOPE VI’, the development of new public housing units actually served to displace a large number of tenants into neighborhoods of lesser or equal quality than that of the original housing projects.

Another contemporary supply-side housing development program is the Low-Income Housing Tax Credit (LIHTC) program, which is a federally mandated, state administered program that allows non-profits and developers to apply for tax credits which can be used to offset the costs of affordable rental housing development. Credits are awarded for projects located in Qualified Census Tracts (QCT) - those where 50% of households have incomes 60% of the area median income (AMI). The QCT requirements allocate government subsidy into neighborhoods with poor quality services. Although at first glance, this rule might seem detrimental to fostering community development, it might be a valuable tool.
if it were allocated in a low-valued neighborhood that we knew was going to experience gentrification in the coming years. I return to this point again below.

The federal government has also experimented with demand-side strategies as well. The basic motivation behind these programs is to use government subsidy to allow the urban poor to choose better neighborhoods than they could otherwise afford on their own. Scholars have largely supported the housing voucher program also known as Section 8, which gives rental vouchers to low-income households under the assumption that they will redeem them in a neighborhood with comparatively higher quality public services. Unfortunately, evidence suggests that many participants ultimately do not choose better neighborhoods. Undeterred by these results, policy makers amended the voucher program in the 1990s to allow for inter-city renter mobility. They sought further evidence of mixed-income neighborhood efficacy by engaging in an experiment, Moving to Opportunity (MTO), modeled on Chicago’s Gatreaux program. This program randomly allocated low-income families into three groups. The first was the experimental group which received vouchers to be used explicitly in low-poverty neighborhoods; the second was the Section 8 group which received traditional rental vouchers; and a third group (the control group), received no assistance and typically remained in some form of project-based assistance. Recent evidence suggests that in fact, transplanting a child

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114 Glaser & Gyourko (2008); Landis & McClure (2010)
115 Newman and Schnare (1997); Pendall (2000)
116 Rosenbaum (1995); Katz et al. (2001)
from a high poverty neighborhood to a low poverty one can have dramatic effects on the future earnings of that child\textsuperscript{117}. While better school quality is partially at work here, an evaluation of education outcomes for pre-school aged experimental participants were not significantly different than their control group peers\textsuperscript{118}.

To summarize, the goal of U.S. housing policy has been to provide both housing and community development, yet by all but the most recent measures, the programs motivated by this policy have not helped our city’s most vulnerable citizens break away from the yoke of poverty. One idea that often goes overlooked however, is that randomly allocating individuals to high quality neighborhoods is fundamentally different than allocating high quality, neighborhood-sized interventions to low-income individuals\textsuperscript{119}. This might sound a bit paradoxical, but consider that if individual outcomes are so dependent on the context in which they were born and grew up, simply transplanting that individual to a new neighborhood context may not be enough. In other words, we might observe an entirely different outcome if instead of assigning the urban poor to a suburban context (including better schools) within which they may feel alienated, we allocated aspects of the suburban context to the places where the urban poor live and are familiar with.

\textsuperscript{117} Chetty & Hendren (2015)  
\textsuperscript{118} Gennetian et al. (2012).  
\textsuperscript{119} Sampson (2012)
This idea, although not explicitly stated, is the motivation behind a new series of placed-based interventions laid out by the Obama administration. The Department of Housing & Urban Development’s Choice Neighborhoods Program is based on the realization that successful housing policy is more than just maintaining affordability or replacing/upgrading slums. The Choice Neighborhoods program is more holistic, creating "the conditions necessary for public and private reinvestment in distressed neighborhoods to offer the kinds of amenities and assets, including safety, good schools, and commercial activity, that are important to families' choices about communities." Alongside new housing investment, examples of neighborhood improvement include new retail and transit development; parks urban farms and streetscape programs; performing arts; healthcare clinics and school improvement.

In addition, the federal government has realized that school improvement alone is important enough to warrant its own placed-based program - Promise Neighborhoods. Administered by the Department of Education, its vision is to give students access to "great schools" and "cradle-to-career" solutions toward "transforming communities." Promise Neighborhoods is modeled after the New York City’s Harlem Children’s Zone (HCZ). The HCZ is a comprehensive urban neighborhood and education intervention that combines education programming from early childhood through high school with after-school, college

120 Department of Housing and Urban Development (2013)
121 Department of Housing and Urban Development (2012)
122 Turner & Berube (2009)
prep, community health programs, family counseling and more. Researchers have found that HCZ students perform better than their peers who applied for the HCZ school lottery but lost. They conclude, “High quality schools or community investments coupled with high-quality schools drive these results, but community investment alone cannot.” As of yet, there has been no research on the HCZ and outcomes related to neighborhood economic development.

Given the political polarization that is now commonplace in federal politics, it is unlikely that these sorts of initiatives could be funded at a national scale. Further, these programs are not cheap. The budget for one Choice or Promise Neighborhood implementation grant ranges from $20 to $30 million. The Harlem Children’s Zone’s budget is roughly $50 million per year. In addition, there may be unintended consequences of these placed-based programs particularly if the goal is to “create the conditions necessary for public and private reinvestment.” New services and amenities will be capitalized into neighborhood land prices enriching land owners but likely hurting renters and other low-income residents who might otherwise benefit from the new services. If left unchecked, the unintended consequences of these modern placed-based government programs may be residential displacement.

124 Harlem Children's Zone (2014).
125 Dobbie & Fryer (2011)
126 Ibid.
127 Ibid.
128 Glaeser & Gottlieb (2008).
In summary, transplanting suburban-like contexts into downtrodden urban neighborhoods, particularly high quality education, may be one way to foster mixed-income neighborhoods and perhaps help lift residents out of poverty. As demonstrated in Chapter 5, higher-income households will likely exercise their choice for places with higher quality services like schools which, in the gentrification context, will require government-lead affordable housing to prevent residential displacement. Given these realities and the potency of neighborhood choice to segment people across space, the next and final section introduces a policy prescription that uses the power of school and neighborhood choice to finance new school quality and balance growth with equity.

A unifying policy prescription

If changing preferences for urban living is the new norm, then cities like Philadelphia will almost certainly continue to gentrify. In the face of this reality, planning should strive to find ways to leverage the gentry’s investment toward generating spillovers that can lead to more equitable outcomes. To achieve this requires two related strategies. The first is to harness the power of neighborhood choice to physically redefine the geographic extent of neighborhoods, the services they produce and the mix of individuals who consume them. The second is to realign property taxation and expenditures by ensuring that a greater percentage of neighborhood taxes go to fund a greater share of neighborhood services – in this case schools.
We’ve already discovered that it is neither politically feasible nor equitable to finance neighborhoods services exclusively with neighborhood taxes. In spite of this fact, municipalities, in response to perceived gaps between public service provision and demand for quality public services, have at times, turned to Special Service Districts (SSD)\textsuperscript{129}. SSDs are place-based interventions defined by the Census as "separate entities with substantial administrative and fiscal independence from general purpose local governments\textsuperscript{130}.” Examples of services might include watershed and flood control services, utility provision, and transportation\textsuperscript{131}. Although many SSD’s fund projects by levying additional property taxes, some are financed by user fees\textsuperscript{132}.

An alternative flavor of SSDs is the Improvement District. Although the legal framework for Improvement District adoption varies from state to state, they are generally formed through a local balloting process where approval requires majority consent from residents for whom additional property taxes would be assessed. The incremental increase in tax revenues are then used to fund additional public services. The most ubiquitous form of the Improvement District is the Business Improvement District (BID). These are typically located in commercial areas and fund public safety, sanitation, streetscapes, business marketing and more – all at levels above what municipal governments already

\textsuperscript{129} Brooks (2006) \\
\textsuperscript{130} U.S. Department of Commerce (2005) \\
\textsuperscript{131} Griffith (2007) \\
\textsuperscript{132} Carlton (2007).
Two studies have separately identified 404 and 701 BIDs nationwide respectively.\textsuperscript{134}

Commercial districts are not the only places where Improvement Districts have been proposed. Ellickson (1998) suggests "Block Improvement Districts", because they are comprised of "coterminous informal social networks" that are "scaled to produce the most localized varieties of public goods". He suggests that the "block is far too small a unit for provision of a public good that involves either scale efficiencies or widespread benefits—a service such as elementary education, a sewer system, or police detective work."

At a higher spatial scale, Pennsylvania has authorized ‘Neighborhood Improvement Districts (NID)\textsuperscript{135}. The State Legislature cites as its rationale that, "The General Fund revenue derived from taxes many times is not sufficient to provide adequate municipal services or additional services needed in specific geographic areas within the municipality.\textsuperscript{136}" The act suggests "municipalities should be encouraged to create, where feasible and desired, assessment-based neighborhood improvement districts which would include, but not be limited to, downtown commercial districts." Designated district management associations would initiate and administer programs to promote and enhance more attractive and safer commercial, industrial, residential and mixed-use neighborhoods;

\textsuperscript{133} Mitchell (2001); Griffault, 1999
\textsuperscript{134} Mitchell (1999); Becker (2008). Although there are likely a lot more. Because BIDs are quasi-governmental, there is no central repository for BID-related information.
\textsuperscript{135} Hoyt (2005) and Hoyt & Gopal-Agge (2007)
\textsuperscript{136} Neighborhood Improvement District Act, P.L. 949, No. 130 (2000)
economic growth; increased employment opportunities; and improved commercial, industrial, business districts and business climates.”

A Pennsylvania NID requires the consent of at least 60% of District property owners and allows for the “acquisition, development, construction, improvement, rehabilitation, operation and/or maintenance of any building,” including the use of eminent domain. In addition, Pennsylvania NID’s have the power to issue bonds. The 60% consent threshold ensures that Improvement Districts are democratic – if households are not interested in new services, they do not have to vote for the District. This suggests that the probability of a District winning the consent of the voting majority is dependent on how the District is drawn. A NID to fund elderly services in a neighborhood comprised of twenty-somethings is likely to fail. By contrast, a NID to fund schools in an area predominately comprised of families with school-aged children might succeed.

Special Service and Improvement Districts don’t just rely on choice to segment people across space – they plan segmentation explicitly. Researchers have found a very direct association between Improvement Districts and real estate prices\(^\text{137}\), which is not surprising given the willingness of businesses and households to pay for high quality services. Chapter of 5 of this dissertation finds

\(^{137}\text{Ellen et al. (2007) estimate a hedonic price regression comparing in-BID prices with out of BID prices in the same zip-code. They find that commercial property prices increase in very large BIDs but see only marginal gains in smaller BIDs. Through a very detailed pre and post analysis of voting and real estate transactions in California, Brooks and Strange (2011) find that larger property owners are more supportive of bid adoption than smaller property owners; that properties who vote in support of BIDs see higher post-BID adoption price appreciation; and finally that “the collective action of a BID, while likely a welfare improvement, is not a Pareto improvement.”}\)
that households are willing to pay a premium for high quality schools. In combination, this evidence suggests that an Improvement District for schools would successfully foster new neighborhood economic development. What about equity, however?

The key difference between say, a Business Improvement District which typically encompasses a homogenous area of the city (i.e. a downtown) and a School Improvement District, is that the boundaries of the latter would be drawn to encompass a mixed-income neighborhood. This allows local political leaders to manipulate the *de facto* spatial segmentation that results from neighborhood choice. It also allows gives them the ability to alter the supply of and demand for public services which could potentially lead to a more equitable income distribution.

Indeed, Improvement Districts mean tax increases, and although the new tax rate is flat, the tax is made more progressive by the fact that the tax liability is a function of home price\(^\text{138}\). Thus, the tax liability of lower valued homes is less than that on higher valued homes. Although all in-District residents receive an equal share of the new school quality, the costs are more equitably distributed.

This framework also helps to ensure a large quantity of affordable housing - at least initially. There is a distinction here worth noting. By nature, low priced

\(^{138}\text{Technically, it is a function of a house's property tax assessment.}\)
housing is affordable, but if the new services increase the willingness to pay for in-District housing, we should expect the price of housing to increase as neighborhood amenities improve. It is for this reason that local political leaders can bundle a School Improvement District with the development of government subsidized affordable housing. Of all the programs discussed above, the Low-Income Housing Tax Credit is best suited for this purpose. The Qualified Census Tract requirements of the LIHTC program require that the subsidy is allocated to the lower-valued section of a School Improvement District. This would insert affordable housing today into a neighborhood that could improve in the years to come. Thus, bundling LIHTC and School Improvement Districts could be a proactive way to ensure that low-income residents, particularly renters, can access school improvements even if they cannot afford market prices. There are additional decision factors related to the potential location of School Improvement Districts that will be discussed in Chapter 4.

This literature review asked why it is that segmentation and segregation is such a lasting feature of the urban and regional landscape. Highlighting Philadelphia’s school reform agenda, including a move to charter schools, helps underscore how choice can have direct consequences on the economy of neighborhoods. This relationship is explained by the broader dynamics of neighborhood choice which, if left unchecked, can relegate the poor to disadvantaged neighborhoods with low quality public services. While the processes of gentrification and displacement may shuffle the segmentation tapestry, housing subsidies are
needed to prevent further isolation of the urban poor. It is then argued that the power of choice can be harnessed to rewire neighborhoods such that public service spillovers generated by the wealthy can be leveraged to help the poor. One solution, it is argued, are Improvement Districts for funding increased school quality. The innovation that may potentially overcome income segmentation is to bound the District to include an income diverse neighborhood in order to drive both growth and equity.
Anchor institutions like universities and health care providers (the so-called “Eds. & Meds”) have, over the last fifteen years, become major players in the urban economic development realm\textsuperscript{139}. These organizations are often large employers; procure massive quantities of goods and services from across their regions; own large swatches of valuable city land and are the major drivers of human capital development in their respective cities.

In places like Philadelphia, Baltimore and New York, the economic strength of anchor institutions allowed them to weather the urban decline that chased many residents and businesses out of cities. In these and other places, anchor institutions have carried the torch of urban revitalization by capitalizing on the symbiotic relationship between themselves and their surrounding neighborhoods\textsuperscript{140}.

The University of Pennsylvania has a long history of planned interventions in West Philadelphia. In the era of Urban Renewal, Penn leveraged Section 112, 2:1 matching federal grants for real estate acquisition, development and redevelopment\textsuperscript{141}. Penn’s development activities throughout this time were

\textsuperscript{139} Adams (2003)
\textsuperscript{140} Ehlenz & Birch (2014)
\textsuperscript{141} Cohen (1998) provides a thorough review of Penn’s redevelopment activities at this time.
largely improvements to the physical plant, but later, in 1996 when a graduate student was murdered just off campus, the University had an ‘all options on the table’ approach to redevelopment. They could relocate the entire campus to the suburbs; physically wall itself off from the City or invest its own capital into the surrounding neighborhood.

Penn chose the latter, announcing the West Philadelphia Initiatives program in 1996. The stated goal of the program was to stimulate neighborhood investment by focusing on four major components of neighborhood revitalization: Housing, safety, economic development and schooling\textsuperscript{142}. In partnership with the area’s other major academic institutions, the University created the not-for-profit University City District (UCD), whose primary mission continues to be “community revitalization”, working “within a place-based, data-driven framework to invest in world-class public spaces, address crime and public safety, bring life to commercial corridors, connect low-income residents to careers, and promote job growth and innovation\textsuperscript{143}.” The University also engaged in a widespread real estate investment program by purchasing and improving both single family and rental properties and making significant mortgage guarantees to University-affiliated borrowers\textsuperscript{144}.

\textsuperscript{142} Kromer and Kerman (2004)
\textsuperscript{143} UCD (2012)
\textsuperscript{144} Rodin (2007)
In 2001, Penn helped finance the construction of the Penn Alexander School (PAS), a public elementary school, providing the land, $24 million worth of capital expenditure and an ongoing annual student subsidy of roughly $700,000. The University also raised additional funding from the William Penn Foundation, major benefactors and former University president Judith Rodin to fund an endowment. In partnership with the School District of Philadelphia, the school opened in two phases, 2001 and 2004. Any student living with the school catchment boundary (Figure 3.1) is granted admission and in turn the University provides a $1,330 per pupil subsidy\textsuperscript{145}.

\textsuperscript{145} School District of Philadelphia (2012)
The school has proven so successful that a January 2012 article from the Philadelphia Inquirer reported that more than 70 people camped out in line in the cold for 2 days hoping to register their child for kindergarten. Said one parent, “The school was the only reason we bought our house”\textsuperscript{146}. In 2013, the

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{PennAlexanderCatchment.png}
\caption{The Penn Alexander School catchment}
\end{figure}

\textsuperscript{146} Hill (2012)
University changed its admissions rules. No longer does living in the catchment guarantee a seat in a class – now a lottery process dictates admission\textsuperscript{147}.

According to the Pennsylvania Department of Education, compared to the Philadelphia school district as a whole, Penn Alexander ranks in the 90\textsuperscript{th} percentile for attendance. 92\% of 5\textsuperscript{th} graders are proficient or better in state math tests relative to 56\% in the district and 76\% in the state. 84\% of 5\textsuperscript{th} graders are proficient or better in state reading tests relative to 46\% in the district and 67\% in the state. Simply put, students at PAS are out performing their peers in other schools throughout the district and the state and by 2014, test scores had the school ranked as the top Kindergarten through eighth grade school in Philadelphia\textsuperscript{148}.

The success of the Penn Alexander School makes it an ideal case for testing how much home buyers are willing to pay for new school quality where it previously did not exist. Chapter 5 presents these estimates, concluding that school-quality driven home price premiums are substantial and that good schools can drive neighborhood economic development. Indeed Penn’s stated goal for its school intervention was ‘neighborhood revitalization’, and although they were successful in stimulating the local economy, they also created a new middle-class choice opportunity in the region. A cursory comparison of Census counts between 2000 and 2010 for the ten block groups with centroids inside the

\textsuperscript{147} Mezzacappa (2013)  
\textsuperscript{148} DiSanto (2014)
catchment show that although the total population increased 14%, the number of African Americans declined 43% and the number of Whites increased 48%. With this sea change in the demographic character of the neighborhood, it should come as no surprise that many local residents became concerned with Penn’s ability to induce change and alter the socioeconomic fabric of the neighborhood\textsuperscript{149}.

From a policy perspective, it is helpful to ask if the Penn Alexander treatment was Pareto optimal - that is, were all residents made better off and none made worse off? Clearly, homeowners who were able to sell their homes at a price which capitalized the school price premium were made better off. Renters, who saw rent increases however, may have been displaced as a result of the intervention. Thus, while the University succeeded in creating a neighborhood of choice, they may have failed to ensure equity.

This conclusion should not come as a surprise however. Not all cities have an Ivy League university or equivalent private entities with the incentive to invest millions of dollars into local neighborhoods the way Penn has. Even if they did, as this case illustrates, investors typically have few incentives to plan for equity. City elected officials do have this incentive however, and what’s more, they have a political mandate to provide it as well. The Penn Alexander story should suffice in convincing elected officials that school quality can help drive neighborhood

\textsuperscript{149} Etienne (2012)
investment. What is needed is both a public financing mechanism and means to generate equity - precisely what School Improvement Districts are designed to do.
Chapter 4: Research Design

This dissertation poses two questions. First, what is the willingness to pay for good schools in Philadelphia and second, is the School Improvement District framework economically and politically feasible? If so, what candidate locations in Philadelphia may be best suited for such interventions? To address these questions, I engage in four separate but related analyses. The first two address the first research question, the results of which appear in Chapter 5. The latter two questions are used to inform a broader analysis and discussion of the School Improvement District planning process. These results appear in Chapter 6.

Analysis 1 uses a quasi-experimental research design to estimate the willingness of Philadelphia home buyers to pay for good schools. This analysis pools five years’ worth of test score and home price data to test the hypothesis that test scores are capitalized into Philadelphia home prices. However, given that these estimations are for one point in time, they do not provide useful insights as to what would happen if a new high quality school were to be introduced where one previously did not exist, or how neighborhood demand might increase over time in response. To provide more realistic estimates along these lines, Analysis 2 adopts a similar research design to evaluate the price premiums associated with the introduction of a new, high quality school – Penn Alexander. These estimated price premiums allow an estimate of the property tax increase that could potentially result from a School Improvement District. The results of analysis 1 & 2 appear in Chapter 5.
Analysis 3 uses this information alongside a spatial analytical site-suitability model to engage in a hypothetical School Improvement District planning process in Philadelphia. A cartographic model is developed within a Geographic Information Systems (GIS) framework. This model allows an exploration of areas in Philadelphia where School Improvement Districts may be feasible on an economic, demographic and political basis. The results of analysis 3 appears in Chapter 6.

Finally, Analysis 4 augments the analytical results with interviews from key Philadelphia stakeholders whose experience is directly related to the planning, operation and financing of School Improvement Districts.

**Analysis 1: Estimating the willingness to pay for good schools in Philadelphia**

The purpose of the statistical models described below is to provide an estimate that can be interpreted as the ‘average increase in home prices associated with a specified increase in test scores’. Another way to think about this estimation is that it represents the willingness to pay, on behalf of your average Philadelphia
home buyer for an increase in public school quality\textsuperscript{150}. As discussed in Chapter 3, researchers have for many years, sought ways to estimate the willingness to pay for a variety of neighborhood amenities and services. Examples include parks, crime, transit and of course, schools\textsuperscript{151}.

The basic strategy for identifying this willingness to pay is to estimate a statistical model that decomposes the sale price of a home into the value of its physical attributes (number of bedrooms, bathrooms, etc.) together with the value of neighborhood attributes, including local school quality\textsuperscript{152}. An example of this kind of model is given in Equation 4.1:

$$\text{(4.1) \hspace{1cm} } \log(\text{price}_{ic}) = \beta_0 + X_{ic} \beta_1 + N_{ic} \beta_2 + \text{testScore}_{ic} \beta_3 + \epsilon_{ic}$$

where the log price of a home sale $i$ in school catchment $c$ is hypothesized to be a linear function of relevant internal house characteristics (such as the number of bedrooms and bathrooms, $X_i = (x_{i1}, ..., x_{ik})$); together with a vector of neighborhood amenities, $N_i = (n_{i1}, ..., n_{im})$, (such as distance to crime, parks or transit); and most importantly, testScore$_c$, reflecting the test score quality in catchment $c$. All other influences on the log of price are conveyed in a residual error term, \( \epsilon_{ic} \).

\textsuperscript{150} Bransington (2009) finds that test scores are among the more important school quality measures valued by home buyers. Others include expenditures per pupil and pupil/teacher ratio. As such, I use test scores here as a proxy for school quality.


\textsuperscript{152} This flavor of statistical model is commonly referred to as the ‘hedonic’ model. The often-cited seminal paper regarding the hedonic model is Rosen (1974).
One shortcoming of Equation 4.1 is that there is no way to measure the extent to which differences among home prices are influenced by differences in school outcomes independent of either housing attributes or other neighborhood amenities. The assumption is that $\beta$, reflects only the test score effect on home price with all else being held constant. In reality, good schools are likely correlated with low crime rates or low instances of housing vacancy which would bias the school price premium estimate.

It was first realized by Black (1999) that this limitation can be overcome by exploiting the exogeneity of school catchment boundaries with respect to test score outcomes. In particular, while the economic fortunes of neighborhoods may change over time, school catchment boundaries largely remain fixed in place\textsuperscript{153}.

To explain this innovation, consider the following example. In Philadelphia, the school catchment area a student lives in determines which public school she attends. Figure 4.1 illustrates these catchment areas citywide. Suppose that two homes across the street from one another are separated by a school catchment boundary. Considering their immediate adjacency, it can be assumed that these houses are part of the same neighborhood. So by controlling only for differences in the internal characteristics of each home, all other price differences between

\textsuperscript{153} School attendance boundaries have changed in Philadelphia since the School District was recently forced to close more than a dozen schools. However, this analysis estimates premiums before the bulk of these schools were closed.
them can be attributed to catchment area differences (ie. school quality). In Sandra Black’s words, “the fact that test scores make a discrete jump at attendance district boundaries while neighborhoods continue to change in a smooth manner allows me to isolate the relationship between test scores and house prices.”
Figure 4.1: Elementary school catchment areas
This empirical technique is known as a “boundary discontinuity” design, and is a close cousin of the more well-known “regression discontinuity” design\(^{154}\). The basic idea is to compare outcomes on either immediate side of a threshold at which a particular intervention is assigned. The design is quasi-experimental in nature because it assumes that a household catchment decision is independent of everything but school quality\(^{155}\).

Thus, within the context of the statistical model, we no longer have to control for the infinite number of possible neighborhood-related drivers of price. Instead, we form two groups of home sales – those in immediate proximity to one side of the boundary and another in immediate proximity to opposite side. The basic idea then, is to relate across-boundary differences in home prices with across-boundary differences in test scores controlling for the internal characteristics of homes.

\[
(4.2) \quad \log(price_{ic}) = \beta_0 + X'_{ic} \beta_1 + Years'_{ic} \beta_2 + Bound_{ic} \beta_3 + testScore_{ic} \beta_4 + \epsilon_{ic}
\]

In 4.2 the vector of neighborhood controls is replaced by a vector of school catchment boundary fixed effects, \(Bound_{ic} = [\ldots, b_j(ic), \ldots]\)\(^{156}\). In addition, a vector of year fixed effects, \(Year_{ic} = [\ldots, y_j(ic), \ldots]\)\(^{157}\), allows five years of test score and home

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\(^{154}\) Thistlethwaite & Campbell (1960); Hahn et al. (2001); Lee & Lemieux (2010)

\(^{155}\) The “as good as random” assumption may be violated here if the sorting preferences of individuals are non-random – that is, if Blacks and Whites, for instance, place a heterogeneous premium on “good schools”. See Bayer et al. (2010).

\(^{156}\) Here \(b_j(ic) = 1\) if house \(ic\) is closest to boundary \(b_j\) and is zero otherwise

\(^{157}\) Here \(y_j(ic) = 1\) if house sale, \(ic\), occurs in year \(y_j\) and is zero otherwise.
price data to be pooled. Increasing the sample size by including multiple years of data is an important feature of the model.

Here it is critical to note the importance of how far each home sale observation is from a given catchment boundary. The goal is to compare home price and test score differences for homes on either immediate side of the catchment thus ensuring a robust substitutability of homes used in the sample. Thus Equation 4.2 can be estimated at different distance bandwidths around each boundary in order to assess how decreasing substitutability might bias the results. The large sample size allows estimations using five bandwidths at 250ft intervals between 500ft and 1500ft from the boundary\textsuperscript{158}. Figure 4.2 illustrates these distances.

\textsuperscript{158} To estimate across-boundary differences in her 1999 paper, Black limits her sample to home sales within 0.35, 0.2 and 0.15 miles (approximately 1850, 1050 and 800 feet respectively) of the boundary. She finds that the price premium associated with an increase in test scores does not change significantly depending on the distance to the boundary. Using five years of data to estimate 4.2 allows for price differences to be estimated for home within 0.05 miles of the boundary or roughly 250 feet. To put this in context, it allows for estimations using home sales at within one block of each catchment boundary. This is an important improvement of the model presented here.
Distances from Philadelphia elementary school catchment boundaries

Figure 4.2: Distances from catchment boundaries
The model hypothesizes that school quality, as measured by test scores, is a significant causal driver of home prices in Philadelphia\textsuperscript{159}. If the testScore coefficient in Equation 4.2 is significantly positive, then this hypothesis is upheld. Of course, this hypothesis can only be tested if there are enough adjacent catchment areas with substantially different test scores. If test scores were largely homogenous citywide, then the boundary approach would be insufficient for detecting sharp home price discontinuities at the boundaries.

There are some revealing statistics to suggest that schools citywide are of homogenously low quality. Figure 4.3 maps 3\textsuperscript{rd} grade reading test scores for each catchment citywide in 2012. According to the most current data from the Pennsylvania Department of Education, Philadelphia 3\textsuperscript{rd} graders rank 10\textsuperscript{th} out 499 school districts statewide in the percent of students scoring proficient on state tests. An ever worse statistic reflecting Philadelphia school quality is that only four Philadelphia schools, Penn Alexander among them, rank among the top 300 in the percent of 3\textsuperscript{rd} grade test takers scoring advanced on reading tests\textsuperscript{160}.

Chapter 5 to investigates the spatial differences in prices when for instance, poor schools border each other; good schools border poor ones, etc. However, given that Philadelphia test scores are so low and that so many low score catchments are adjacent to one another, it is likely that the TestScore coefficient will be underestimated. This weakness provides motivation for the analysis described

\textsuperscript{160} There are roughly 1500 elementary schools statewide.
below which estimates school drive price premiums by exploiting a “shock” to the neighborhood economy – the introduction of a high quality school, Penn Alexander, where one previously did not exist.
Figure 4.3: Mean test scores by school catchment: ‘No Data’ refers to non-traditional public school catchments including neighborhood charters.
Analysis 2: Home price premiums associated with the Penn Alexander School

Chapter 3 describes how the Penn Alexander Schools is a clear oasis among Philadelphia’s vast school quality desert. Not only is it a choice school in the city but it’s a school of regional and state choice as well. As such, the primary hypothesis of Analysis 2 is that the introduction of this school was, as the University intended, a catalyst for neighborhood revitalization, and led to an increase in neighborhood home prices. The secondary hypothesis is that this home price premium increased over time as more and more home buyers sorted into the neighborhood to access the new school amenity.

The research design for Analysis 2 is similar in theory to that of Analysis 1. Instead of using test scores as an indicator of school quality however, based on metrics provided in Chapter 3, I assume ex ante that Penn Alexander is a “good school”, and simply seek to estimate the price premium associated with this assumption. To give some relative weight to the Penn Alexander price premium, a group of comparison or control sales are needed. Ideally, these control sales should be identical to those in the Penn Alexander catchment accept for the fact that they did not receive the school “treatment”. As was the case in Analysis 1, the most influential confounding factors here are non-school neighborhood effects and to control for these, as before, the design assumes that houses on either side of the catchment boundary are part of the same neighborhood. Thus
after controlling for the internal characteristics of homes, the Penn Alexander price premium is simply the average difference between homes immediately adjacent to the boundary and in the catchment (the treatment group) and those just on the other side of the boundary but not in the catchment (the control group). In order to ensure a robust enough sample size, home sales with 1000ft (roughly 2 blocks) from the catchment are included.

Because Analysis 1 pools five years of test score and price data into one model, it provides just one price premium estimate – an average across all five years. The model assumes that although prices may change due to exogenous effects (like macro changes in the Citywide housing market), the price premium for high quality schools can be treated as stationary over time. In this case, the Penn Alexander case however, we consider a nonstationary model in which a new, high-quality school opens and information about new educational opportunity slowly resonates throughout the region. This environment allows for the more realistic possibility that housing demand in the neighborhood increases over time. To capture these effects, Analysis 2 includes eleven years of home price data beginning the year before the school opened. In particular, the model estimates home price trajectories for control and treatment groups over this time period. The hypotheses is that prices increase faster within the Penn Alexander treatment group, and thus the price premium increases over time as well.

Equation 4.3 provides the formal model.
\( (4.3) \quad \log(\text{price}_i) = \beta_0 + X_i' \beta_1 + \text{Years}_i' \beta_2 + \text{catch}_i \beta_3 + \text{catch} \times \text{Years}_i' \beta_4 + \epsilon_i \)

Where the log price of home \( i \) is a function of \( X_i \), a vector of internal characteristics; \( \text{Years}_i \), a vector of fixed effects representing the year of the sale; \( \text{catch} \times \text{Years}_i \), an interaction between year fixed effects and a catchment fixed effect which represents whether home \( i \) is inside the Penn Alexander catchment or not. This is the variable of interest and can be interpreted as the average price premium associated with a home bought inside of the Penn Alexander catchment in a given year, relative to the baseline year and the control group. In other words, these coefficients represent the average willingness to pay for a home with Penn Alexander access in a given year. Finally, \( \epsilon_i \) is a residual error term, which is assumed to be independent and identically distributed.

If the year by catchment fixed effects are statistically significant, the estimations they yield will help inform School Improvement District planning process because they represent how demand for the new amenity increases over time. It also helps us to understand, unlike Analysis 1, how much home buyers are willing to pay for a high quality school in an area where one previously did not exist. Finally, the analysis provides the opportunity for cost/benefit calculations. From a planning perspective, this understanding might help inform how much new economic activity a School Improvement District might generate given some amount of up-front investment. This is especially important particularly if the
program asks households to voluntarily increase their own taxes to fund new school quality.

These estimations along with those from Analysis 1 will be used for the School Improvement District feasibility study. As discussed at length in Chapter 2, while home price appreciation and neighborhood revitalization are an important part of the School Improvement District – a successful feasibility study will hinge on whether Districts can plan for equity in the face of expected real estate appreciation.

Analysis 3: Planning School Improvement Districts

This section describes a potential methodology Philadelphia could use to assess School Improvement District feasibility by way of a Geographic Information System (GIS)-based, land-use site suitability model. The basic workflow is to create spatial “decision factors” and then overlay them atop each other to create a ‘site suitability index’. This yields a suitability score for each school catchment area citywide. Narrowing the search to only the most suitable catchments, it then becomes possible to estimate how much additional tax revenue/burden would be generated if a School Improvement District was created.

These methods are reviewed in Malczewski (2004).
The suitability analysis considers decisions factors that will likely lead to a positive electoral outcome for the District as well as ensuring economic and equitable development outcomes. Each factor is encoded as a raster map – a cartographic representation not unlike a weather map where data is represented by an array of pixels or grid cells. Individual factors are scaled such that each runs from 1-10 where a value of ‘10’ represents highest suitability. This framework allows us to compare or overlay say, neighborhood income encoded in dollars with the supply of local vacant land encoded in units of density. The scaling process allows for the possibility that planners may wish to weigh certain factors more than others while also ensuring that the final site suitability index is not skewed by any one decision factor. Figure 4.4 illustrates the weighted overlay technique.

![Figure 4.4: The weighted overlay technique.](image)

Chapter 3 suggests planners can foster equity by redefining neighborhood boundaries and with them the supply of and demand for public services – services like education. Creating entirely new school catchment “neighborhoods” is beyond the scope of this analysis, thus existing school catchment boundaries are used. A map of catchments are overlaid atop the final site suitability index.
and the average suitability score is calculated for each catchment. Finally, the highest scoring catchments (defined as 5th quintile average suitability score) are used to estimate the amount of tax revenues/burdens that could be generated if we assume a School Improvement District raised residential property tax rates. The next section describes the motivation behind the individual decision factors used for this analysis.

**Decision factors**

The majority of the decision factors included in the analysis deal with equity. Chapter 3 suggests that a growth/equity balance can be achieved if planners either choose an income diverse area or actually manipulate the spatial bounds of a neighborhood in order to control the supply of and demand for public services. The implications of drawing School Improvement District boundaries to include a mixed-income neighborhood extend to education achievement as well.

Research presented in Technical Appendix 1 asks whether there is a statistically significant relationship between the number of students scoring proficient or advanced on math and reading test scores and racial diversity at the school level\textsuperscript{162}. The statistical models estimated in Technical Appendix 1 are robust, and conclude that a 10% increase in racial diversity, leads to roughly a 1.7% - 2% increase in the number of students who score proficient or advanced on education achievement as well.

\textsuperscript{162} The analysis controls for other non-student neighborhood and school effects
standardized tests\textsuperscript{163}. These results suggest that planning a diverse School Improvement District is not only a good idea from an equity standpoint but from education productivity standpoint as well.

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<td>Kernel density of vacant land</td>
<td>1-10</td>
<td>PWD\textsuperscript{**}</td>
</tr>
<tr>
<td>10</td>
<td>LIHTC</td>
<td>Count of Low-Income Housing Tax Credit Units by block group</td>
<td>1-10</td>
<td>HUD</td>
</tr>
<tr>
<td>11</td>
<td>CDCs</td>
<td>Distance to nearest Neighborhood Community Development Corp.</td>
<td>1-10</td>
<td>PACDC\textsuperscript{*}</td>
</tr>
<tr>
<td>12</td>
<td>Elementary Schools</td>
<td>Distance to nearest elementary school</td>
<td>1-10</td>
<td>OpenDataPhilly</td>
</tr>
<tr>
<td>13</td>
<td>Children Under Age 9</td>
<td>Count of children under age 9 by block group</td>
<td>1-10</td>
<td>Census</td>
</tr>
</tbody>
</table>

\textsuperscript{*} Philadelphia Association of Community Development Corporations  
\textsuperscript{**} Philadelphia Water Department

Table 4.1: Decision Factors

Each decision factor is summarized in table 4.1 above. Decision factors 1-7 aim to capture racial and economic diversity at the neighborhood level. Decision factor 1 is a racial ‘diversity index’ calculated at the Census block group level\textsuperscript{164}. This index can be used not only to analyze how many Whites are in an area, but how the proportion of Whites compares with the proportion of other races as well. Decision factor 2 tries to get a sense of diversity not only for each individual block group but for each block group and its adjacent neighboring block groups. This is referred to as the ‘spatial lag’ of diversity.

\textsuperscript{163} These estimations should not be construed as causal in nature. More information is provided in Technical Appendix 1.  
\textsuperscript{164} More info on how the Diversity Index is calculated can be found in Technical Appendix 1.
Decision factor 3 is concerned with income diversity. Ideally, we would have data on actual income breakdowns by block group so that we could calculate income diversity much like race above. In lieu of these data, decision factor 3 is concerned with middle income (4th-6th deciles) block groups and decision factor 4 takes the spatial lag of median household income.

The next three decision factors use single-family home sale prices as proxy for economic diversity. Decision factor 5 indicates middle priced neighborhoods (4th-6th deciles); decision factor 6 is the lag of sale prices; and decision factor 7 is the standard deviation of home sale prices by block group. This last factor gives a good indication of whether a neighborhood contains economic diversity or not.

Chapter 2 discussed the importance of affordable housing development, particularly the use of Low Income Housing Tax Credits which allocates housing subsidy to high poverty neighborhoods. These ‘Qualified Census Tracts’ (QCT), are tracts where 50% of households have incomes 60% of the area median income. Decision factor 8 includes areas that are inside QCTs or immediately adjacent to them.

Low Income Housing Tax Credits cannot be used to cover land acquisition costs\(^{165}\), thus developers of tax credit housing, typically local community development non-profits, rely on the stock of vacant land. Philadelphia has an

\(^{165}\) Schwartz (2006).
abundance of vacant land\textsuperscript{166}. As ownership of land is a prerequisite when applying for tax credits, decision factor 9 describes the density of vacant land parcels throughout Philadelphia. To get a sense of where existing affordable housing opportunities exist, decision factor 10 describes the current stock of Low Income Housing Tax Credits units in Philadelphia.

While land acquisition is important, of equal if not greater importance is the institutional knowledge required to put together a tax credit application – the “Qualified Allocation Plan”. There are a handful of community non-profits in Philadelphia, many of which are neighborhood-based, that have a proven track record of successfully competing for tax credits. While partnering with one of these groups is important for the development of affordable housing, it is also vital for administrative purposes as well. Consider that a well-funded and well-managed community non-profit has the experience and know-how to manage projects at the neighborhood as well as organize and advocate on the behalf of local residents. An Improvement District is a non-profit entity that requires a small administrative staff. It is in the best interest of the District to minimize administrative overhead by partnering with an existing non-profit to help reduce these costs. As such, decision factor 11 considers the spatial location of community development non-profits in Philadelphia.

\textsuperscript{166} By some estimates this stock includes 40,000 land parcels throughout Philadelphia (City of Philadelphia, 2014).
Decision factor 12 is about locating an appropriate school facility. Although it may be feasible to float a bond toward the construction of a new school, the preferred option is the adaptive reuse of an existing school facility. Decision factor 12 encodes the distance to the nearest elementary school.

Finally, according to Pennsylvania's Neighborhood Improvement District legislation any proposed School Improvement District requires the consent of at least 60% of area property owners. The suggests that proposed District boundaries must include residents who are likely to vote for the legislation – in this case, families with school-aged children (Decision factor 13) – defined as the number of households with children under 9 years old. Residents who do not fit this demographic profile are not likely to vote for a tax increase from which they receive no benefit.

The last step uses parcel level tax assessment data to estimate how much revenues could be raised if the School Improvement District imposed a property tax increase of 0.25% moving rates from 1.34% to 1.59%. This analysis shows the amount of new funds that could be raised for school improvement in total and the average additional tax burden for families living in a potential District.

**Analysis 4: Interviews with experts**
Although the site-suitability analysis is critical to the planning process, there are other important considerations that cannot be quantified. This section outlines three interviews conducted with professionals whose experience is relevant for planning School Improvement Districts\textsuperscript{167}. A brief introduction is provided for each interviewee which is then followed by a list of questions. Appendix 2 is a School Improvement District policy brief that was sent out to each interviewee. Appendix 3 includes the specific questions asked to each interviewee.

Paul Levy, President & CEO, Center City District Philadelphia

The Center City District is a non-profit Business Improvement District representing Philadelphia’s central business district. Its revenues topped $20 million in 2013. Their expenditures range from streetscaping and public safety to marketing and research\textsuperscript{168}. They are currently servicing a $21 million bond, part of which is being used to finance Dilworth Park – a new, 120,000 square foot park bordering City Hall in the heart of downtown Philadelphia. This organization is widely regarded as one of the largest and most comprehensive Business Improvement Districts in the world\textsuperscript{169} - and Paul Levy is at the helm. There are likely few other experts anywhere in the U.S. who can speak better to the financing and administrative requirements of School Improvement Districts.

\textsuperscript{167} Interviews were requested from four individuals but only three responded.
\textsuperscript{168} Center City District (2013)
\textsuperscript{169} Morcol (2010).
Dennis Culhane, Professor, Penn School of Social Work

As discussed in Chapter 3, the University of Pennsylvania conducted a large-scale planning process for its West Philadelphia Initiatives program. To assess the feasibility of a number of placed-based interventions including the Penn Alexander School, The Cartographic Modeling Lab led by Professor Dennis Culhane used data and analytics to predict the potential housing demand for the new school. This interview discusses this planning process including strengths and weaknesses. In addition, given the school’s success as a catalyst for neighborhood change, the interview will also ask if Professor Culhane could do it again, would he reformulate the plan to include additional equity.

Ivy Olesh, President of the Friends of Chester Arthur

Ivy Olesh is the president of one of the foremost “Friends of” groups in Philadelphia. The Friends of Chester Arthur is a non-profit “committed to partnering with the staff, teachers and students (of Chester Arthur)...in order to foster a robust learning environment for neighborhood children." This interview will focus on why these “Friends of” groups have proliferated in recent years and why neighborhood residents are willing to donate to their local school.

\footnote{Friends of Chester Arthur (2014).}
Kira Strong, Vice President of Community and Economic Development, People’s Emergency Center (PEC)

PEC is a community development non-profit located in the Mantua section of Philadelphia and Kira Strong is their Vice President of Community and Economic Development. PEC’s service area makes it unique among Philadelphia’s many community developers. While one in four housing units are vacant in Mantua and 98% of students at the local elementary school are designated low-income\textsuperscript{171}, its neighbor, Drexel University has been a catalyst for gentrification in recent years. In the summer of 2014, Drexel announced that it plans to open a new public school which would serve Mantua in part. For these reasons, PEC will emerge as a unique case study for how to plan for equity in the midst of growth. Questions for Kira Strong deal exclusively with how affordable housing provision might make a real difference in the lives of local residents and school children in particular.

This chapter introduced a comprehensive research design for estimating the willingness to pay for school quality in Philadelphia and how to harness this dynamic to plan School Improvement Districts. Chapters 5 and 6 present and discuss the results of these research questions.

\textsuperscript{171} Kilpatrick (2014).
Analysis 1: Estimating the willingness to pay for good schools in Philadelphia

The objective of this analysis is that school quality as measured by test scores is a significant driver of home prices. The research design suggests that this should be reflected as sharp discontinuities in home prices and test scores across school catchment boundaries.

Before testing this hypothesis, it is useful to see if these patterns can be visualized. To do so, a visualization is presented that (i) groups all home sales by their nearest boundaries; (ii) groups sales once again by whether they are on the “high” or “low” test score side of the boundary; and lastly, (iii) averages sale prices over all “low-side” and “high-side” groups. These two averages are visualized in Figure 5.1 below - the average difference between high and low side prices is roughly $10,000.

This average price difference may be small in instances where “high” and “low” test scores are actually reflecting two relatively low test score school catchments.

\[172\] These data include all years, adjusted for inflation. Only catchment boundaries with test scores on either side are included.

\[173\] Of course, in this form, additional controls are not included.
abutting one another. To identify more interesting across-catchment differences, sales are further decomposed into test score quartiles as seen in Figure 5.2. Note column 4 displays price differences in instances where sale prices in first quartile test score catchments are directly compared to those in the fourth quartile. Compare these results to column 1 which illustrates price differences when two first quartile catchments abut one another. More generally, Figure 5.2 shows that as quartile differences in test scores increase so do average price differences.

Figures 5.1 and 5.2 illustrate the possibility that comparatively low test scores differences on either side of catchment boundaries may depress the estimated home price effect from Equation 4.2.
Figure 5.1: Home price differences for observations on either the high or low test score side of a catchment boundary.
Figure 5.2: Home price differences for observations on either the high or low test score side of a catchment boundary broken out by test score quartiles.
Table 5.1 presents summary statistics for the entire dataset. Unfortunately, Philadelphia assessor data is unreliable when it comes to hedonic variables like number of bedrooms, bathrooms and other measures of home quality. Thus, it's best to think of the below results not as ‘quality-adjusted’ but ‘size-adjusted’ estimations. Table 5.2 presents the results estimated from the model in expression 4.2. Each column represents a separate regression on subsets of observations for different distance bandwidths around the catchment boundary. Again, the assumption is that by restricting the regression to observations closer to the catchment boundary, one can separate test score effects from other non-school amenity effects.

Although catchment boundaries allow the model to account for spatial variation at very small spatial scales, it is possible that significance levels are being over-inflated due to spatial autocorrelation. Because memory allocation in standard statistical packages will not allow for the estimation of spatial regression and associated models with such large sample sizes and so many fixed effects, I rely on clustered standard errors (CSE) (Angrist & Pischke, 2009). The motivation for CSE is very similar to that of spatial autoregressive models in that it corrects for otherwise biased standard errors in instances where the data share hierarchical spatial dependencies.
‘Reading test score’ is the variable of interest. It is interpreted as the average home price premium associated with a specified increase in test scores. This coefficient increases dramatically as observations farther from the catchment boundary are included. In fact, the price premium nearly doubles between the 500ft and the 1500ft regressions. There are two reasons for this outcome and both are related to the fact test scores are the only reflection of catchment level variation in the model. First, referring to Figure 4.2, consider that homes 1500 feet from the boundary are practically in the center of the school catchment which means that the model is picking up effects that may have nothing to with catchment boundaries. Second, consider how prices may differ for homes immediately adjacent to the boundary compared to homes each 1500 feet from the boundary – homes which may effectively be in two different neighborhoods.

For the 500ft bandwidth, the model estimates the following relationships: First, after controlling for housing attributes, years and catchment effects, school quality as measured by test scores has a statistically significant effect on home prices. Second, the results estimate that a 100 point increase in test scores is

<table>
<thead>
<tr>
<th>Statistic</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale Year</td>
<td>72,518</td>
<td>2009.881</td>
<td>1.42</td>
<td>2008</td>
<td>2011</td>
</tr>
<tr>
<td>Sale Price</td>
<td>72,518</td>
<td>124,949.50</td>
<td>207,500.60</td>
<td>1.000</td>
<td>30,000,000</td>
</tr>
<tr>
<td>Frontage</td>
<td>72,518</td>
<td>2,146.11</td>
<td>19,333.81</td>
<td>0</td>
<td>4,937,200</td>
</tr>
<tr>
<td>Depth</td>
<td>72,518</td>
<td>8,122.15</td>
<td>9,183.73</td>
<td>0</td>
<td>1,031,700</td>
</tr>
<tr>
<td>Garage Dummy</td>
<td>72,518</td>
<td>0.362</td>
<td>0.481</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total Liveable Area</td>
<td>72,518</td>
<td>1,313.53</td>
<td>1,156.08</td>
<td>0</td>
<td>272,160</td>
</tr>
<tr>
<td>Reading Test Score</td>
<td>72,518</td>
<td>1,259.03</td>
<td>64.646</td>
<td>1,112</td>
<td>1,464</td>
</tr>
</tbody>
</table>

Table 5.1: Summary statistics.
expected to lead to a 4.58% increase in home prices which is $5,888 at the 2012 mean home price of $126,644. To put it another way, a one standard deviation shift in test scores – roughly 63 points in 2012, leads to a 2.89% increase in home prices $3,660 increase in home prices at the 2012 mean.

While there is of course a degree of uncertainty in these results, the 95% confidence bounds on this estimation suggest that the price premium could be as low as $5,262 or as high as $14,459 at the 2012 mean. This relatively high upper bound suggests that homes in higher quality school catchments can fetch a significantly higher home price premium.

Finally, it should be noted that results for individual boundary effects have not be included in Table 5.2. Not only are they too numerous to list, but more importantly, their individual interpretations are not useful given our present research question. However, from a spatial point of view, it is of interest to examine the pattern of statistically significant boundary effects – where jumps in housing prices are most substantial. To do so, each catchment boundary which is statistically significant (at the 0.05 level) has been highlighted in Figure 5.3 below. Here the black lines represent statistically significant boundaries. The northern boundary of the Penn Alexander catchment is a commercial corridor, and because of a reduced sample of home sales along that boundary, the model finds it statistically insignificant at the 0.05 level.
Exterior condition fixed effects are omitted for space. Standard errors are reported below coefficients. The 'felm' R package used to estimate this regression does not report an intercept. This package is expressly designed to estimate regressions with many fixed effects – hence its use. Estimates are reported for clustered standard errors (CSE) at the neighborhood level. When the same model is estimated without CSE, the total liveable area variable is reported as significant at the 0.05 level. The non-significance here may have to do with historical development patterns - that is, if neighborhoods segment home types into homogenous groups clustering standard errors in this way should decrease their overall statistical significance.

### Table 5.2: Results estimated from the model in Equation 4.2

<table>
<thead>
<tr>
<th></th>
<th>500ft</th>
<th>750ft</th>
<th>1000ft</th>
<th>1250ft</th>
<th>1500ft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Liveable Area</td>
<td>0.0000298</td>
<td>0.0000411</td>
<td>0.0000477</td>
<td>0.0000531</td>
<td>0.0000573</td>
</tr>
<tr>
<td></td>
<td>0.0000263</td>
<td>0.0000353</td>
<td>0.0000395</td>
<td>0.0000435</td>
<td>0.0000465</td>
</tr>
<tr>
<td>Frontage</td>
<td>0.0000003</td>
<td>0.0000003</td>
<td>0.0000003</td>
<td>0.0000001</td>
<td>0.0000001</td>
</tr>
<tr>
<td></td>
<td>0.000001</td>
<td>0.0000001</td>
<td>0.0000001</td>
<td>0.0000001</td>
<td>0.0000002</td>
</tr>
<tr>
<td>Depth</td>
<td>0.0000041*</td>
<td>0.0000031**</td>
<td>0.0000031***</td>
<td>0.0000031***</td>
<td>0.0000033***</td>
</tr>
<tr>
<td></td>
<td>0.0000023</td>
<td>0.0000013</td>
<td>0.0000011</td>
<td>0.0000011</td>
<td>0.0000011</td>
</tr>
<tr>
<td>Garage Dummy</td>
<td>0.2065105***</td>
<td>0.1998242***</td>
<td>0.1969910***</td>
<td>0.1929513***</td>
<td>0.1907499***</td>
</tr>
<tr>
<td></td>
<td>0.0316825</td>
<td>0.0302367</td>
<td>0.027058</td>
<td>0.0259327</td>
<td>0.0259275</td>
</tr>
<tr>
<td>Sale Year (2009)</td>
<td>-0.1124482***</td>
<td>-0.1119023***</td>
<td>-0.1174749***</td>
<td>-0.1126425***</td>
<td>-0.1097761***</td>
</tr>
<tr>
<td></td>
<td>0.0166661</td>
<td>0.0134783</td>
<td>0.0120855</td>
<td>0.0116743</td>
<td>0.0114842</td>
</tr>
<tr>
<td>Sale Year (2010)</td>
<td>-0.1017444***</td>
<td>-0.1076550***</td>
<td>-0.1167053***</td>
<td>-0.1174039***</td>
<td>-0.1179258***</td>
</tr>
<tr>
<td></td>
<td>0.0201808</td>
<td>0.0167677</td>
<td>0.0159088</td>
<td>0.0155872</td>
<td>0.015719</td>
</tr>
<tr>
<td>Sale Year (2011)</td>
<td>-0.1110404***</td>
<td>-0.1268929***</td>
<td>-0.1271880***</td>
<td>-0.1264679***</td>
<td>-0.1228530***</td>
</tr>
<tr>
<td></td>
<td>0.0233449</td>
<td>0.0208581</td>
<td>0.0221583</td>
<td>0.0209677</td>
<td>0.0223901</td>
</tr>
<tr>
<td>Sale Year (2012)</td>
<td>-0.0979924***</td>
<td>-0.1017292***</td>
<td>-0.1040960***</td>
<td>-0.1073044***</td>
<td>-0.1094640***</td>
</tr>
<tr>
<td></td>
<td>0.0315415</td>
<td>0.0284266</td>
<td>0.0265719</td>
<td>0.0248543</td>
<td>0.0253191</td>
</tr>
<tr>
<td>Reading Test Score</td>
<td>0.0004576**</td>
<td>0.0005774**</td>
<td>0.0007021***</td>
<td>0.0007867***</td>
<td>0.0008605***</td>
</tr>
<tr>
<td></td>
<td>0.0002153</td>
<td>0.0002511</td>
<td>0.0002614</td>
<td>0.0002662</td>
<td>0.0002712</td>
</tr>
<tr>
<td>Observations</td>
<td>33,099</td>
<td>46,052</td>
<td>55,847</td>
<td>61,872</td>
<td>65,831</td>
</tr>
<tr>
<td>R²</td>
<td>0.5255314</td>
<td>0.5204444</td>
<td>0.5210495</td>
<td>0.5194824</td>
<td>0.517392</td>
</tr>
<tr>
<td>Adjusted R²</td>
<td>0.519301</td>
<td>0.5157547</td>
<td>0.5171502</td>
<td>0.5159541</td>
<td>0.5140629</td>
</tr>
<tr>
<td>Residual Std. Error</td>
<td>0.9204207</td>
<td>0.918482</td>
<td>0.9111492</td>
<td>0.9050261</td>
<td>0.9030642</td>
</tr>
</tbody>
</table>

Significance codes: ***p<0.01; **p<0.05; *p<0.1

Exterior condition fixed effects are omitted for space. Standard errors are reported below coefficients. The ‘felm’ R package used to estimate this regression does not report an intercept. This package is expressly designed to estimate regressions with many fixed effects – hence its use. Estimates are reported for clustered standard errors (CSE) at the neighborhood level. When the same model is estimated without CSE, the total liveable area variable is reported as significant at the 0.05 level. The non-significance here may have to do with historical development patterns - that is, if neighborhoods segment home types into homogenous groups clustering standard errors in this way should decrease their overall statistical significance.
Figure 5.3: Statistically significant boundary fixed effects overlaid on mean test scores.

*Boundary fixed effects reported for the regression described in T.2.1. These are home sales within 500 feet of the boundary. **A boundary is considered significant if its fixed effect coefficient has a p-value less than or equal to 0.05.
How do these results compare to other studies that have employed the same method? Table 5.3 adopts a table from Black & Machin (2009), to show the results for four different cities around the world. The results in Philadelphia are similar to those elsewhere, although it should be emphasized that the Philadelphia estimations are likely less biased in the sense that the model is estimated from observations within 500ft of the boundary. Black (1999) uses observations within roughly 1,850 ft. of the boundary while Davidoff & Leigh (2008) use observations within nearly 3000 feet. As previously mentioned, Table 5.1 shows how volatile these estimates can be at distances beyond the immediate catchment boundary.

<table>
<thead>
<tr>
<th>Author</th>
<th>Location</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black (1999)</td>
<td>Boston, MA</td>
<td>A 1 SD increase in school quality leads to a 5% increase in prices.</td>
</tr>
<tr>
<td>Davidoff &amp; Leigh (2008)</td>
<td>Australian Capital Territory, Australia</td>
<td>A 1 SD increase in school quality leads to a 3.5% increase in prices.</td>
</tr>
<tr>
<td>Fiva &amp; Kikeboen (2008)</td>
<td>Oslo, Norway</td>
<td>A 1 SD increase in school quality leads to a 1.5% increase in prices.</td>
</tr>
<tr>
<td>Fack &amp; Grenet (2010)</td>
<td>Paris, France</td>
<td>A 1 SD increase in school quality leads to a 2% increase in prices.</td>
</tr>
</tbody>
</table>

Table 5.3: Findings from other papers using similar research designs.

The present analysis shows that there is a significant willingness to pay for quality schools in Philadelphia. Although the model includes five years of test score and price data, the estimates are still cross-sectional in nature - which is to say that the model provides little insight in to how price premiums may have adjusted to the Philadelphia School District’s decline. Figure 5.4 shows the pairwise regressions between mean single family home sale prices and mean 3rd grade reading test scores over the five years included in the analysis. The increasing R-Squared values suggest that the price/test score relationship is
becoming sharper as more schools close and wealthier home buyers bid up prices in the few neighborhoods where good schools remain.

As previously mentioned, willingness to pay for quality schooling as estimated in the above analysis is likely biased downward by the overall poor quality of schools Citywide. In other words, the potentially significant price premiums associated with the City’s “best” schools may be overwhelmed by the relatively low average premiums across the entire City. Thus an alternative approach to estimating the price premiums associated with good schools would be to observe changes in home prices when a neighborhood is “shocked” by the introduction of a very high quality school. Penn Alexander is widely regarded by housing consumers to be such a school, and motivates our analysis of this case below.
Analysis 2: Estimating the willingness to pay for the Penn Alexander School

The research design used to estimate the willingness to pay for the Penn Alexander School is similar in spirit to the one used to derive estimates Citywide. The difference is that unlike the Citywide case, this analysis provides an opportunity to understand how the housing market responds to the introduction of a good school where one previously did not exist. This method is deemed to be more relevant for the financing and implementation of School Improvement Districts.
As in the Citywide case, it is the school catchment boundary that provides the means by which causal effects can be identified. This boundary is not simply an historical artifact of household demand, nor a pre-existing attendance boundary that has been in place for several decades. Rather, it represents a planned intervention that once enacted, proceeded to change the way in which households interacted with their community. In the year before the school opened, students on either side of the catchment boundary did not go to separate schools. Then suddenly, with the opening of Penn Alexander, students on one side of the boundary were permitted to attend the new University-subsidized elementary school while their peers across the street were forced to remain at their previous institution.

By visualizing the spatial and temporal pattern of home sale prices over time with respect to this catchment boundary, we can begin to see how it has become a significant dividing line between neighbors. Figure 5.5 traces the annual movement of inflation-adjusted mean price per square foot of homes inside and outside of the Penn Alexander catchment by year. Note that initially there is little difference between prices prior to the school's construction in the year 2000. However, while the overall trend for all prices throughout the study period is upward, prices inside of the catchment increased at a faster rate than those just outside. More over, the continued separation of the two lines over time serves to underscore the strong effect that school's introduction had on the local housing market.
Figure 5.6 plots inflation adjusted home sale prices as a function of distance to the catchment boundary by year (negative distances are outside of the catchment and positive distances are inside. Each line represents associated regressions of prices on distances for each year. Here again, we see that prices on either side of the boundary were roughly similar before the school opened, but diverged dramatically in subsequent years. Notice that prices on either side of the boundary were roughly the same before and in the year the school opened. In the immediate years to follow however, prices diverged dramatically.

Figure 5.5: Mean price per square foot of home inside and outside the Penn Alexander catchment. Error bars represent the standard error around the mean price per square foot.
Figure 5.6: Inflation adjusted home prices as a function of distance to the Penn Alexander catchment by year

Table 5.4 displays the summary statistics for the data used in the regression portion of this analysis.

<table>
<thead>
<tr>
<th>Statistic</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale Year</td>
<td>1,070</td>
<td>2,005.09</td>
<td>3.184</td>
<td>2,000</td>
<td>2,011</td>
</tr>
<tr>
<td>Sale Price</td>
<td>1,070</td>
<td>246,452.00</td>
<td>173,077.30</td>
<td>1120</td>
<td>1,190,000</td>
</tr>
<tr>
<td>Frontage</td>
<td>1,070</td>
<td>2,005.86</td>
<td>816.336</td>
<td>1,200</td>
<td>11,000</td>
</tr>
<tr>
<td>Depth</td>
<td>1,070</td>
<td>9,404.91</td>
<td>2,467.89</td>
<td>2,200</td>
<td>20,800</td>
</tr>
<tr>
<td>Garage Dummy</td>
<td>1,070</td>
<td>0.255</td>
<td>0.438</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Total Liveable Area</td>
<td>1,070</td>
<td>2,062.26</td>
<td>764.62</td>
<td>0</td>
<td>6,857</td>
</tr>
<tr>
<td>Distance to Catchment Boundary</td>
<td>1,070</td>
<td>524.365</td>
<td>299.66</td>
<td>33.31</td>
<td>1,068.49</td>
</tr>
</tbody>
</table>

Table 5.4: Home prices as a function of distance to the Penn Alexander catchment by year
Table 5.5 presents the results of the regression described in Equation 4.3. The variables of greatest interest are the year by catchment interaction effects which are interpreted as the average price premium associated with a home purchased inside of the Penn Alexander catchment in a given year, relative to the baseline year and the control group – where the baseline year is 2000 (a year before the school opened) and the control group includes those homes immediately outside of the catchment.

Column 1 of Table 5.5 shows that in 2001, the year the school opened, there was little statistical difference in (non-transformed) prices on either side of the catchment relative to prices in 2000 – a year before the school opened. From 2002 onward, all year-by-catchment effects are statistically significant. By 2011, on average, the Penn Alexander price premium is estimated to be on average, more than $132,000 – a statistically significant result that constitutes more than 30% of the average in-catchment home price.

The estimated price premiums are shown in Figure 5.7 along with their 95% confidence intervals. While the interval widths are substantial, the degree of uncertainty may reflect the lack of individual housing attribute data used in the study. Nevertheless, the overall trend in these results is still apparent. Many of the year by catchment interactions using the log transformed prices lack statistical significance, but the 2011 coefficient suggests on average, a home inside the catchment sells for more than 48% than its neighbor outside the
catchment. It also worth mentioning that while the larger U.S. housing market suffered dramatically in 2008, prices quickly leveled out in the Penn Alexander catchment suggesting that there may be a connection between quality education amenities and price resiliency.

Figure 5.7: Non-transformed annual price premium estimations and their 95% confidence intervals
### Table 5.5: Results of the regression described in Equation 4.3

<table>
<thead>
<tr>
<th></th>
<th>No Transformation</th>
<th>Log Transformation</th>
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</thead>
<tbody>
<tr>
<td>Total Livable Area</td>
<td>86.92</td>
<td>0.0005399</td>
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<tr>
<td></td>
<td>15.17548</td>
<td>0.00016</td>
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<tr>
<td>Frontage</td>
<td>24.52***</td>
<td>0.00008</td>
</tr>
<tr>
<td></td>
<td>9.45222</td>
<td>0.00007</td>
</tr>
<tr>
<td>Depth</td>
<td>5.82**</td>
<td>0.0000673</td>
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<td></td>
<td>2.56762</td>
<td>0.00003</td>
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<tr>
<td>Garage Dummy</td>
<td>43,417***</td>
<td>0.4193685***</td>
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<td></td>
<td>16254.00000</td>
<td>0.10188</td>
</tr>
<tr>
<td>2001 * catch</td>
<td>12981.25000</td>
<td>0.4398805</td>
</tr>
<tr>
<td></td>
<td>15465.30000</td>
<td>0.25739</td>
</tr>
<tr>
<td>2002 * catch</td>
<td>77,300***</td>
<td>0.5969798***</td>
</tr>
<tr>
<td></td>
<td>20766.57000</td>
<td>0.20437</td>
</tr>
<tr>
<td>2003 * catch</td>
<td>64,154***</td>
<td>0.5614161**</td>
</tr>
<tr>
<td></td>
<td>20066.06000</td>
<td>0.24330</td>
</tr>
<tr>
<td>2004 * catch</td>
<td>81,074**</td>
<td>0.6010603***</td>
</tr>
<tr>
<td></td>
<td>41160.55000</td>
<td>0.22108</td>
</tr>
<tr>
<td>2005 * catch</td>
<td>106,681***</td>
<td>0.4273816**</td>
</tr>
<tr>
<td></td>
<td>32485.82000</td>
<td>0.21338</td>
</tr>
<tr>
<td>2006 * catch</td>
<td>96,428***</td>
<td>0.4784539**</td>
</tr>
<tr>
<td></td>
<td>34437.55000</td>
<td>0.23726</td>
</tr>
<tr>
<td>2007 * catch</td>
<td>194,387***</td>
<td>0.7334490***</td>
</tr>
<tr>
<td></td>
<td>25904.33000</td>
<td>0.25656</td>
</tr>
<tr>
<td>2008 * catch</td>
<td>125,6550***</td>
<td>-0.22402</td>
</tr>
<tr>
<td></td>
<td>39012.31000</td>
<td>0.56649</td>
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<tr>
<td>2009 * catch</td>
<td>130,505***</td>
<td>0.5346393**</td>
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<tr>
<td></td>
<td>32993.26000</td>
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</tr>
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<td>2010 * catch</td>
<td>142,658***</td>
<td>0.7383199**</td>
</tr>
<tr>
<td></td>
<td>20695.29000</td>
<td>0.29358</td>
</tr>
<tr>
<td>2011 * catch</td>
<td>132,366***</td>
<td>0.3924133**</td>
</tr>
<tr>
<td></td>
<td>19814.61000</td>
<td>0.18635</td>
</tr>
<tr>
<td>Observations</td>
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<td>1,065</td>
</tr>
<tr>
<td>R^2</td>
<td>0.55</td>
<td>0.4</td>
</tr>
<tr>
<td>Adjusted R^2</td>
<td>0.53</td>
<td>0.39</td>
</tr>
<tr>
<td>Residual Std. Error</td>
<td>117876</td>
<td>0.912179</td>
</tr>
</tbody>
</table>

Significance codes: ***p<0.01; **p<0.05; *p<0.1

Estimates are reported for clustered standard errors (CSE) at the tract level. Exterior condition and individual year fixed effects are omitted for space. Year * catch represents an interaction between year & catchment fixed effects. Standard errors reported below coefficients. The 'felm' package used to estimate this regression does not report an intercept.

Table 5.5: Results of the regression described in Equation 4.3
These findings suggest that despite the Philadelphia School District's ongoing fiscal hardship, households are still willing to pay a significant premium for housing in quality school catchments. These results are likely driven by household preferences for quality schools and the unique agglomeration benefits associated with living in a city like Philadelphia. Thus, it is possible that households from across the region are sorting into the City to consume agglomeration benefits while subsequently bidding up prices for houses in the few quality school catchments that remain.

The economic development implications of these results cannot be understated. As discussed in Chapter 3, The University of Pennsylvania spent $24 million on capital construction costs. In addition, Penn provides a $1,330 subsidy for each one of their approximately 500 students. Although the school opened in two phases, 2001 and 2004, assuming that the subsidy included all 500 students from 2001 to 2011, then Penn spent $665,000 per year and $7.315 million throughout the study period. Combined with the costs for construction, the total cost of the school intervention was $31.315 million.

There are 681 single family homes in the PAS catchment area. Multiplied by the 2011 price premium estimate of roughly $132,000 yields nearly a $90 million dollar benefit to the single-family home market (these numbers would be higher if the rental market was included). According to this back-of-the-envelope
cost/benefit comparison, the estimated total benefit of the school tripled the University’s costs.

This result suggests that perhaps policy makers may have overlooked school quality as an economic development mechanism in disinvested urban communities. Chapter 6 uses these results as the primary motivation for School Improvement Districts.
CHAPTER 6: PLANNING SCHOOL IMPROVEMENT DISTRICTS

This chapter discusses how planners could successfully plan School Improvement Districts. There are two sections. The first is a largely data-driven process that involves the creation of cartographic decision factors which when overlaid generate a site suitability index. This index is then used to identify the economic viability of School Improvement Districts across existing school catchments. The second section further informs the planning process compiling and expounding on responses from local experts with experience managing organizations similar to School Improvement Districts.

Data driven

To begin, the decision factors outlined in Chapter 4 are each compiled and encoded as vector shapefiles. Figure 6.1 visualizes these decision factors. Most are derived from Census block groups and contain continuous values. Examples include decision factor 1 (the Diversity Index) and decision factor 13 (the count of children under the age of 9). Other factors like the Qualified Census Tracts are encoded with binary values – either a tract is "qualified" or not. Finally, two decision factors are created from point geographies – Neighborhood CDC’s and Elementary Schools.
In order to enable the weighted overlay procedure, these vector decision factors are then encoded as raster maps. These maps are displayed in Figure 6.2. Many of the variables that originated from block groups still resemble their vector appearance. Note however that the point decision factors such as Neighborhood CDC’s and Elementary Schools are encoded so that every location on the map is represented by its distance to the nearest point (e.g. elementary school).

Each raster decision factor shares the following qualities: (i) all have the same number of pixels; (ii) all pixels share the same length and width dimensions; and (iii) all factors have values that range from ‘1’ through ‘10’. This framework allows the set of decision factors to be perfectly overlaid atop one another and to perform simple mathematical operations on the entire “stack” of decision factors.

In order to calculate the site suitability index, the following equation is used:

Site suitability index = Diversity + Lag of Diversity + St. Dev. Sale Price + Lag of Sale Price + CDCs + LIHTC + Elementary Schools + Vacant Land + (Children Under Age 9 * 2) + (Middle Sale Price * 2) + (Middle Income * 2)

In this example, three decision factors are weighted with twice as much influence as the other ten. Weighting schemes can be left to the analyst’s discretion – as it is here. Or, given the flexible nature of this analysis, it’s often useful to take this technology in front of a group of community stakeholders who can weigh the factors as they see fit, visualize the resulting suitability index and then reiterate. The results from the site suitability index calculate from the above equation are shown in Figure 6.3, along with the mean suitability score by school catchment.
Figure 6.1: Site suitability decision factors in vector GIS form
Figure 6.2: Site suitability decision factors in raster GIS form
Figure 6.3: Final site suitability index and mean index by school catchment
The final site suitability analysis suggests that the low/medium scoring areas include Philadelphia’s central business district, the University City neighborhood (where the Penn Alexander School is located) and other more wealthy sections of the city in the northwest and northeast. Figure 6.4 shows the top quintile school catchments with respect to their site suitability score.
Once the most suitable areas have been delineated, the City’s tax assessment data can be used to calculate how much additional tax revenue can be expected from a School Improvement District in a given catchment, and how much of an increased tax burden this might mean for local homeowners. In this scenario, we assume that the School Improvement District brings with it an additional millage of 0.25%, increasing the real estate tax rate from 1.35% to 1.59%. Tax assessment data is publicly available in Philadelphia, and it includes assessed values for all residential properties Citywide. These data were joined to the school catchments and used to calculate the statistics shown in Table 6.1.

Table 6.1: Estimated new tax revenues/burdens generated from most suitable school catchments (5th Quintile)
The column labeled ‘Total Difference in Rateables Btwn. 1.34% and 1.59%’ gives an estimate of how much new property tax revenue could be generated for District use. While these numbers range dramatically, a useful benchmark is provided by the Penn Alexander case, where the University of Pennsylvania contributes $1,330 for each of the Penn Alexander School’s students. This means that the school is able to raise an additional $665,000 annually. Table 6.1 shows that 9 of the 34 schools listed could potentially raise that much in the way of new funds in its first year of operation. These results suggest that within the context of the present analysis, School Improvement Districts are at least economically feasible in Philadelphia.

The column labeled ‘Total per Household Difference in Rateables Btwn. 1.34% and 1.59%’ provides an estimate of the average per household tax burden increase. Recall that one of the key factors involved in the planning of School Improvement Districts is that they would straddle lower and middle income neighborhoods. If this condition is met, then the actual tax burden would vary considerably depending on the value of a given home in a given catchment. For households with school age children, these modest additional tax burdens should not be enough to dissuade them from approving a School Improvement District. If the District is successful, the additional capitalization benefits would also prove enticing.
The Penn Alexander case shows that introducing new school quality where it did not previously exist can lead to dramatic growth in local land and housing prices. It is worth pointing out some distinctions however, between the Penn Alexander case and School Improvement Districts. In the Penn Alexander case, households do not pay for the additional school quality – the University of Pennsylvania does. Thus, the value (an estimated $132,000) that home buyers place on the school is directly capitalized into home values. This same capitalization effect could not be expected for the School Improvement District case because any positive school quality capitalization effect will be partially offset by the negative capitalization of a tax increase.

Aside from the work of Oates (1969)\textsuperscript{174}, there appear to be no attempts in the literature to estimate in a general sense, the negative capitalization effect associated with a tax increase. This difficulty may stem from the fact that tax rates are endogenous with both public service provision and home prices. Nevertheless, we can expect that prices (and therefore District revenues) will increase over time along with demand for in-District housing. Unfortunately, our inability to estimate these capitalization effects, makes it difficult to quantify such increases. It is likely however, that if these Districts are planned adequately using these and other strategies as discussed above, the economic multipliers (for both in-District residents and the City at-large) associated with School

\textsuperscript{174} Oates estimates negative capitalization rate associated with an increase in taxes without an equilibrium increase in public service provision. He does so at the state level, and outside the context of a natural or quasi-experiment.
Improvement Districts should vastly outweigh the costs associated with any marginal tax increase.

*Experience driven*

To create a successful comprehensive plan for School Improvement Districts, concerns must be addressed at three spatial levels: The first is the neighborhood where planners must draw the boundaries of the Improvement District to raise enough new tax revenue, ensure an appropriate residential economic mix, and also provide enough housing such that the demand for the school does not eventually outweigh the supply of classroom seats. The second level is District administration. While these schools are managed by broader municipal school districts, administrators at the city level are ill-prepared to market, manage and oversee an Improvement District. Thus, the comprehensive plan must consider the most effective and efficient way to administer School Improvement Districts. The final level is the school where new funds will be invested. Although this dissertation does provide some literature on school reform strategies particularly in cities, the preference for a given reform strategy and its consequent execution is more the expertise of educators rather than planners. Having said, this chapter is closed with some more general thoughts about how District revenues might be expended.
Penn Alexander was among the first examples of placed-based school interventions at the elementary level and as such it provides an important blueprint for planning School Improvement Districts. Although, it is important to remember that Penn Alexander was heavily subsidized by a University and not neighborhood residents, there are important lessons to be learned when it comes to comprehensive planning. For one, although getting the neighborhood on board with the new school was a requirement for the University of Pennsylvania, University administrators prioritized community feedback. Dennis Culhane, a professor who led much of the planning for the school recalls “closed-door meeting among senior administrators”, which later expanded to established neighborhood non-profits and finally the broader community\textsuperscript{175}. Culhane recalls census data on school-age children was used to model the “population composition that might result” from Penn Alexander, but made no direct mention about how the school catchment boundary was delineated.

Since equity plays such an important role in the School Improvement District framework, I asked Culhane if affordable housing was considered during the planning stage. Since the neighborhood had experienced had such high rates of vacancy, he explained, there was not a lot of concern over affordable housing or residential displacement. In fact, Culhane notes, “the more explicit goal was to get people moving into the neighborhood and investing in it, not to preserve affordability.”

\textsuperscript{175} Culhane (2014).
Eventually, toward year two and three of the program, attention did turn to the preservation of affordable rental housing. “The idea”, Culhane said, “was and is to hold onto a significant enough share of the rental market and to sit on the rents…, so as to put downward pressure on other rental properties.” This idea clearly draws a parallel to the strategy of going after Low Income Housing Tax Credits before School Improvement District capitalization effects really begin to take hold.

It is interesting to consider how far Philadelphia has come since the 1990s when the Penn Alexander School was first being planned. Today, equity and limiting residential displacement is a major policy concern within the City’s affordable development community. I asked Culhane whether or not University officials back then were concerned over residential displacement. He responded:

“Not really. The vacancy rate…was so significant in the West Philadelphia area, and the need for middle class and professional families so great for the tax base, that I don’t think people seriously thought that Philadelphia would be experiencing displacement. So, I don’t think there was a sense, other than through (affordable rental program), that there was much of a moral compulsion to worry about price increases. Most people saw that increased values, including out west of University City would increase wealth and asset growth among working class families, and it did…It was
probably the first time in decades that people had equity with which to draw upon for improving their homes.

It is clear that the University was acutely aware that the provision of quality schooling amenities would catalyze neighborhood economic development, although it is interesting that displacement seemed a non-issue at the time. Since then, as Chapter makes clear, Penn’s intervention has increased housing costs dramatically.

Two important lessons emerge from the School Improvement District planning process. First, given the magnitude increase in neighborhood demand associated with providing school quality where it previously did not exist, it is vital that affordable housing be constructed, not three years into the intervention but well before the school first opens its doors. In the Penn Alexander case, the University has the financial wherewithal to step in and purchase rental housing to set aside as affordable. In the School Improvement District case, planners must develop affordable housing while land prices are still at their pre-revitalization levels. This is because subsidies like the Low Income Housing Tax Credit program can only be used in low-income communities. The takeaway is clear – invest in affordable housing before the neighborhood appreciates in value.

The second takeaway is that an initial, bounded, placed-based investment ensures hyper-local economic multipliers. If planners wish to ensure that these
multipliers are equitably distributed, they’re going to have pay great attention to how the boundaries of these interventions are initially demarcated. Great detail and attention will have to paid to the planning, development and administration of School Improvement Districts to ensure both productive and equitable outcomes.

The democratic nature of Improvement Districts – the idea that a majority vote among neighborhood residents is needed for passage, requires that District administrators plan, advertise and meet with residents in an effort to court potential voters. The organization responsible for School Improvement District administration is going to have to be persuasive in order to convince households, even those with school age children to vote to increase their own taxes. Paul Levy, President of the Center City District, Philadelphia’s Business Improvement District (BID) recalls the time when he had to initially convince voters of the tax increase benefits. He told me, “it’s all about self-enlightened interest…Are you willing to pay $x dollars more per week to receive the direct benefits of your payment to the District?"

If business is the target of a BID, then promising cleaner/safer streets and business marketing is a benefit that all commercial entities inside the BID can take advantage of. However, schooling is a service that a disproportionate number of residents will value directly. Everyone else must be convinced to vote for the District solely on the argument that new school quality will bring with it

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176 Levy (2015)
increased home values. Levy’s greatest concern is that residents will complain that they pay enough taxes already – and that despite the fact that 55% of their tax dollars currently go to schools, most schools have largely failed.

Only a coordinated and well-financed advocacy campaign and comprehensive planning process can overcome this sentiment. When asked what he thought was the greatest administrative concern for starting a small Improvement District, Levy was quick to point out that someone has to “fund the upfront planning, analysis, outreach and communications stage”. This means that foundation support will likely be needed to fund the creation of a 501(c)(3). As this new organization begins to plan and meet with communities, it must decide how it is going to expend new revenues. In this regard, Levy made an interesting point that the greatest draw for taxpayers would be to fund “external curb appeal improvements, because that way everyone benefits from an upgrade in the neighborhood, even those without kids.” A playground might be a good example of an improvement that the whole neighborhood could benefit from.

In contrast, Ivy Olesh, President of the Friends of Chester Arthur (FoCA) elementary school disagrees with Levy. Although, this “Friends of” non-profit raised $150,000 from corporate and individual donations to build a new playground, funding improvements inside of the school is equally important, she argues. As discussed in Chapter 2, these “Friends of” groups represent an innovative approach to school financing and likely the closest cousin to School
Improvement Districts among comparable placed-based interventions. When asked what the organization’s purpose is, Olesh replied:

“FoCA is an all-volunteer 501(c)(3)…formed by…community members to support Arthur, a public, K-8 school…FoCA aims to raise money for Arthur…(It) has a proven track record of being a good steward of finds to ensure that everything raised is going to support the programs and initiatives critical to Arthur’s success…(FoCA also) helps the school market it successes to the large community around Arthur177.”

I asked Olesh why she thought that these “Friends of” groups had proliferated in recent years. She said they have a low barrier for entry but that they can affect key changes on micro levels. Not that raising thousands of dollars for external improvements to the school does not represent important change, but I was more curious about how an external group could finance internal change particularly given the fact that her group has no agency within the School District of Philadelphia. Olesh pointed out that to her, the two most important value-added drivers of school quality are a good principal and great teachers, both of which her group influenced. When one principal retired, Olesh sat on the selection committee providing input on a replacement. FoCA, Olesh claims, “funds teacher projects - bringing in programs that support the work they do and hopefully making their jobs a bit easier.” Working one on one with the principal

177 Olesh (2015)
and teachers to fund targeted professional development might be an interesting avenue for a School Improvement District. There is experimental evidence to suggest, as documented in Chapter 2, that improving teacher quality, particularly in the early childhood years, can provide important value-added benefits to a child’s education.

It would be interesting to conduct a survey of parents in a potential School Improvement District to discover which interventions, either internal or external they would be more willing to fund with their tax dollars. Of course, what differentiates “Friends of” groups from Improvement Districts, is that donations to the former is voluntary while tax payments to the latter would be required by law. Notably, many who donate to FoCA do not have school-aged children. Olesh claims that residents who donate do so because they are either “happy to see good things happening for (Philadelphia schools); want their kids to be able to attend the school; already have kids there; want their home prices to rise; or want more residents to move into the neighborhood.” Clearly, there is a diversity of motivations for residents to donate to the school. Among all these reasons, however, Olesh points out that people are willing to donate because “we have a neighborhood catchment.” She relays an anecdote where a parent’s group from a Philadelphia high school asked her to come and speak about how FoCA fundraises because the high school group was “struggling to engage stakeholders”. This high school accepts students from across the city and is not therefore, anchored to their local neighborhood as Chester Arthur is.
Parents who donate to Chester Arthur realize that their investment catalyzes additional neighborhood effects, while donations to an unanchored high school yields none. If this understanding is innate among homeowners, then it will surely be easier to convince voters of the efficacy of School Improvement District.

The School Improvement District planning process is vital to the success of this program. The quantitative approaches outlined in this chapter can help as first pass – a filter, to highlight areas in the City where residents may be more inclined to vote for a District and where, at least economically, it has the greatest chance of succeeding. This exercise however, does not help overcome the massive political hurdle confronting the successful implementation of these Districts – namely the attitude that “I already pay property tax for schools! Why should I pay more?” It is hard to argue with this logic. In a city like Philadelphia, where the School District runs massive deficits and begs for bailouts from both the City and the State, why should anyone believe that more money will truly make a difference? I touch more on this point in the concluding chapter.

In the end, I’m not sure which will be the greatest selling point: That children will receive a better education or that the value of housing assets will increase over time. Given the direct relationship between home values and tax liabilities, planners will have to come up with a clear and concise presentation that informs
homeowners not only of the potential home appreciation but also how they can leverage their assets to make additional investments in their own future.
CHAPTER 7: CONCLUSION

When a member of the audience at the 2014 Education Research Association’s annual conference asked Mark Gleason, the Executive Director of the Philadelphia School Partnership (PSP), why Philadelphia public schools don’t get the funds they need, he responded emphatically, “Because it’s not about the funds!” Gleason’s organization, PSP, finances talent-centric approaches to education reform – developing high quality teachers and better assessment tools, among other strategies. Their goal is to raise $100 million dollars to invest in the expansion, transformation and opening of high quality schools in Philadelphia.

The argument that Gleason was underscoring was that taxpayers should not invest their limited financial resources in schools that have significant structural failures. The problem with this argument however, is that it confounds the issue of financing with a host of other structural failures discussed in Chapter 2 including poverty-induced negative peer effects or a lack of value-added quality such as good teachers. One can argue that investing in Philadelphia schools is a sunk cost fallacy but how can one really discern the true cause of failure if the schools can’t even afford to fund nurses and assistant principals? Poverty likely

\[\text{Hangley (2014)}\]
\[\text{Ibid.}\]
\[\text{PSP (2015)}\]
makes it more costly to educate a student from an impoverished neighborhood than a student who comes from a suburb.

While Gleason himself might lament the role of financing, the actions of his organization suggests otherwise. In the winter of 2015, PSP offered the School District of Philadelphia $35 million to lessen the financial burden of adding new charters to the portfolio of schools in Philadelphia\textsuperscript{181}. As described in Chapter 2, this money would go to offset fixed costs that remain on the District’s books when a student moves from a District school to a charter. Examples might include teacher salaries or the maintenance of school buildings. PSP’s offer proved contentious in the run up to a meeting of the School Reform Commission, whose job it was, as the state-mandated administrator of the Philadelphia School District, to vote yea or nay on applications for 39 new charter schools\textsuperscript{182}. Facing pressure from a mostly Republican state legislature to approve the new charters and pressure from Philadelphia school reformers to oppose, the School Reform Commission ultimately approved 5 of the 39 charter applicants\textsuperscript{183}. A little more than a week later, Pennsylvania’s recently elected Democratic governor, Tom Wolf ousted Bill Green from his position as chair of the School Reform Commission. The governor cited as his motivation, Green’s support for additional charters\textsuperscript{184}.

\textsuperscript{181} Graham & Woodall (2015)  
\textsuperscript{182} Graham (2015)  
\textsuperscript{183} Woodall & Graham (2015)  
\textsuperscript{184} Mezzacappa (2015)
This anecdote – the latest in a saga, makes it apparent that school financing is critical and has implications well beyond the education of Philadelphia’s children. If the financing situation remains as is and Philadelphia has to rely solely on City resources, the likely outcome is that traditional public schools will close in all but the most well off neighborhoods (like that which surrounds the Penn Alexander School); charters will proliferate in their place; and if these schools do not prove a better alternative than District schools, human capital growth in Philadelphia will continue to languish. Of course, as this dissertation makes clear, there are wide-ranging economic implications as well.

As discussed in Chapter 1, at a national level, lackluster education outcomes have significant negative repercussions for future earnings potential. At a city level – and in particularly for cities that rely on growing talent at home in addition to attracting it from abroad, an under-educated workforce will inhibit productivity otherwise associated with strong agglomeration economies. Finally, at the neighborhood level, as mentioned Chapter 1, low education has a negative feedback effect – where low quality schools yield ill-prepared students who go on to earn disproportionally lower wages and then have no choice but to live in disadvantaged neighborhoods with poor quality schools.

This dissertation demonstrates that school quality is a public good that can have a tremendous impact on neighborhoods. The answer to research question one regarding the willingness to pay for quality schools is an emphatic “yes”. Chapter
5 shows how investment in quality schools where this quality previously did not exist can be a major catalyst for neighborhood economic development. One of the principal conclusions of this research is that school quality is one of the greatest untapped economic development tools available to cities.

Increasing the level of school financing at the neighborhood level may be one strategy for saving traditional public education while providing a new opportunity to foster local economic development. While commitments from external organizations like universities or “Friends of” groups are welcome, a more systematic approach from cities will be required in order improve both neighborhoods and schools.

One potential source of new property tax revenue is to rely on the changing preferences for urban living that has encouraged many middle class families to return to city neighborhoods. While gentrification represents a market approach for raising additional revenue, it is unlikely to lead to equity. A second option is for planners to harness their knowledge of comprehensive planning, neighborhood planning and public finance to rewire the “circuits” that underlie the economic relationships in neighborhoods.

Chapter 2 discusses at length, the relationship between the financing of local public goods and the spatial organization of cities and neighborhoods in the U.S. It is argued that ‘neighborhood choice’ is the principal driver of segregation and
perpetuated urban poverty and how fiscal zoning and high housing costs are used to lock out low-income residents in suburbs and cities respectively. It suggests that given the persistent within-neighborhood clustering of economic and social characteristics, planners must redefine the boundaries of neighborhoods in order to equitably distribute public goods to a wide range of income levels.

If low-income neighborhoods yield relatively lower property tax revenues from which services like schools are financed, and the opposite is true for higher-income neighborhoods, then allow adjacent rich and poor neighborhoods to pool their property taxes to jointly fund public goods. At some (yet unknown) neighborhood size and ratio of rich and poor households, the following outcomes may be achievable: First, newly generated tax revenues can support a noticeable upgrade in public services. Second, when the new public services are capitalized into home prices, there will already be a large enough supply of affordable housing to effectively temper displacement pressures. Finally, because property taxes are a function of home prices, new tax liabilities would be equitably distributed across all rungs of the income ladder. In addition to these features, there is also ample opportunity for additional equity to be created by focusing affordable housing subsidies in these places as well. I discuss a variety of these programs in Chapter 2 and argue that affordable housing subsidies could have the greatest impact if they’re used to construct housing on land that is
inexpensive today but will appreciate in the future in the face of new housing demand.

Improvement Districts are one option that planners could use to rewire neighborhoods in order to finance new school quality and the equitable revitalization of neighborhoods. There is no reason that Improvement Districts should only be used in downtowns and commercial corridors to bolster demand for local businesses. It could be repurposed to support any number of public services like parks, local transit or even job-training. It is the program’s electoral requirement that makes it appealing but also makes it politically difficult to achieve.

There is another placed-based program that is worth mentioning as an alternative to School Improvement Districts. Tax-increment financing (TIF) allows cities to float a bond for neighborhood improvement and then repay the debt over time using the incremental increase in property taxes generated by the improvements. The School Improvement District planning process and the spatial structure of the program could both easily be adopted to fund ‘School TIFs’. While these two programs would be very similar in most respects, what really sets them apart, aside from how they raise new revenues, is the political process underlying their authorization.
While Neighborhood Improvement Districts in Pennsylvania require the consent of 60% of neighborhood taxpayers, tax-increment financing schemes require the consent of city officials – namely City Council. At first glance, it may appear that TIFs are easier to enact because they require fewer yea votes. Except, in a city like Philadelphia, where each council person is the master of their own councilmanic domain, one council person is unlikely to authorize new citywide debt obligations to support a project outside of their own district. While the 60% hurdle for Improvement Districts appears steep, outside council members are unable to meddle in the electoral process.

Comprehensive planning, like the process described in Chapter 6 can play a critical role in mitigating the political hurdles that might come with the Improvement District electoral process. Planning is about the conception, evaluation and advocacy of placed-based interventions - an all-encompassing exercise that extends far beyond mere urban design. It’s about understanding how people interact with the intangible, non-built environment characteristics of places. It’s about how they value certain public goods and how they translate this valuation into a willingness to consume a place. Hopefully this dissertation has demonstrated a particular and applied use of these dynamics to plan a new and unique program. Nevertheless, it is much more difficult to plan for situations where the quality of these intangibles change and these placed-based dynamics shift over time. In these instances, planners have largely failed thus far, to put
forth viable strategies that provide equity in the face of gentrification. Look no further than New York City and San Francisco as evidence of this fact.

If gentrification is the new norm, then in order to alleviate concerns of displacement, planners have two options: First, they can topple regulatory barriers and NIMBY objections to ensure that the supply of housing keeps up with demand. This is the market-oriented approach. The second option is for planners to rewire neighborhoods in order to alter the supply of and demand for local public goods. This will likely help create a range of affordability options and limit displacement in the face of new neighborhood investment. This strategy can be coupled with traditional affordable housing schemes and to ensure better outcomes for low-income residents, officials should forecast neighborhood change and then construct affordable housing today in neighborhoods that will appreciate in the future.

Planners must develop new ideas for cities experiencing rapid growth. Decades after suburban living became the norm, planners now curse low-density living and struggle to find ways to retrofit suburbs to make them more inclusive and efficient. If the planning community fails to address shifting demand for urban living, then they should expect to feel the same sort of remorse three or four decades from now. Capital is mobile and the market will always allocate it to places where the potential for a return is greatest. This shift marks a rare
opportunity to capture this capital and reinvest it toward the betterment of those less fortunate among us.
APPENDIX 1: SCHOOL OUTCOMES & RACIAL DIVERSITY

This appendix asks whether there is a statistically significant relationship between the number of students scoring proficient or advanced on math and reading test scores and student racial diversity at the school level controlling for other non-student neighborhood and school effects.

The data comes from the School District of Philadelphia’s Open Data Initiative\(^\text{185}\) and includes standardized test scores in reading and math for the school year 2011-2012. The data include a percentage breakdown of race, data on enrollment and truancy, special education services and percentage of the student body classified as low-income. A school zip code is provided which can help control for across neighborhood differences. The largest source of omitted variation in the data is at the teacher level.

The empirical strategy attempts to identify the role of diversity by estimating a series of regressions with varying controls. Diversity is defined in using the \textit{Simpson’s D} statistic which was developed for quantifying species diversity in ecosystems\(^\text{186}\). The statistic is formalized as follows:

\[
D = 1 - \frac{\sum n(n - 1)}{N(N - 1)}
\]

\(^{185}\) School District of Philadelphia (2014)

\(^{186}\) Simpson (1949)
Where $N$ represents the total number of species (or in this case students), and $n$ represents the count of students per race. Simpson’s $D$ is scaled between ‘0’ and ‘1’ where a value of ‘1’ represents the highest level of diversity. The School District does not report raw counts of students by race, just percentages, therefore the diversity measure is per 100 students. For each school, students are broken down into 6 separate categories: African American, White, Asian, Latino, Pacific Islander and American Indian. Figure T.1.1 displays the distribution of $D$ for all schools. Figure T.1.2 displays the distribution of percentage white. Figure T.1.3 displays the spatial distribution of school diversity.

Comparing across Figures T.1.1 and T.1.2, it becomes clear that the diversity statistic is describing more than just the number of white students in a given school. Percentage white is included as a robustness test for the models below.

![Figure T.1.1: Histogram of school diversity for school year 2011-2012](image)
Figure T.1.2: Histogram of percent white for school year 2011-2012
Figure T.1.3: Spatial distribution of Diversity ($D$) statistic for elementary schools in Philadelphia
Data

The data consists of 236 non-charter, elementary, middle and high schools from around Philadelphia in the year 2011-2012. Table T.1.1 provides summary statistics.

There are two dependent variables in the below regressions. ‘readingScore’ and ‘mathScore’ describe the percentage of students who scored proficient or advanced on Pennsylvania System of School Assessment (PSSA) reading and math tests respectively. The PSSA is Pennsylvania’s standardized assessment test\textsuperscript{187}. The School District aggregates test score data to the school level averaged for all students in a school regardless of whether they took the test in the 3\textsuperscript{rd}, 8\textsuperscript{th} or 11\textsuperscript{th} grades. Figures T.1.4 and T.1.5 display the distribution of math and reading scores respectively for the 2011-2012 school year. Although both variables exhibit a normal tendency, reading scores are clearly more left skewed.

\textsuperscript{187} Pennsylvania Department of Education (2014)
Table T.1.1: Summary statistics for school year 2011-2012

<table>
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<tr>
<th>Statistic</th>
<th>Description</th>
<th>N</th>
<th>Mean</th>
<th>St. Dev.</th>
<th>Min</th>
<th>Max</th>
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<td>Percent of students receiving special education services</td>
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<td>0.9</td>
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<td>SCH_ESOL_SERVICES</td>
<td>Percent of students receiving english language services</td>
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<td>8.292</td>
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<td>39</td>
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<td>SCH_ATTENDANCE</td>
<td>Percent of registered student in attendance</td>
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<td>77</td>
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<td>SCH_ENROLLMENT</td>
<td>Total enrollment</td>
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<td>356.398</td>
<td>176</td>
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<td>SCH_STUDENT_ENTERED</td>
<td>Total number of students entering at the start of the year</td>
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<td>17.982</td>
<td>0</td>
<td>93</td>
</tr>
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<td>Total number of students who withdrew by the end of the year</td>
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<td>19.657</td>
<td>0</td>
<td>157</td>
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<td>readingScore</td>
<td>Percentage of students who scored proficient or advanced on PSSA tests</td>
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<td>44.462</td>
<td>19.133</td>
<td>12</td>
<td>98</td>
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<tr>
<td>mathScore</td>
<td>Percentage of students who scored proficient of advanced on PSSA tests</td>
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<td>48.407</td>
<td>20.142</td>
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<td>AFRICAN_AMERICAN</td>
<td>Percentage of African American students</td>
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<td>22.287</td>
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<td>WHITE</td>
<td>Percentage of White students</td>
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<td>19.158</td>
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<td>ASIAN</td>
<td>Percentage of Asian students</td>
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<td>5.867</td>
<td>9.865</td>
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<td>93</td>
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<td>LATINO</td>
<td>Percentage of Latino students</td>
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<td>PACIFIC_ISLANDER</td>
<td>Percentage of Pacific Islander students</td>
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<td>0</td>
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<tr>
<td>AMERICAN_INDIAN</td>
<td>Percentage of American Indian students</td>
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<td>SCH_LOW_INCOME_FAMILY</td>
<td>Percentage of low income students</td>
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<td>Diversity D statistic</td>
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<td>Elem</td>
<td>Elementary school fixed effect</td>
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<td>0.467</td>
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</table>

Figure T.1.4: Distribution of percent scoring proficient or advanced on PSSA math tests, 2011-2012
Methods

To test the hypothesis that racial diversity plays a statistically significant role in school outcomes, several versions of the following regression is estimated:

\[ Score_i = \alpha + \beta_1 \text{SpecialEd}_i + \beta_2 \text{ESL}_i + \beta_3 \text{Attend}_i + \beta_4 \text{Enroll}_i + \beta_5 \text{LowInc}_i \]

\[ + \beta_6 \text{Elem}_i + \beta_7 \sum_{z=1}^{Z} \text{Zip}_z(i) + \beta_8 \text{Diversity}_i + \epsilon_i \]

where \( Score \) is the percent of students across each school, \( i \), who scored either proficient or advanced on the PSSA reading or math test; \( \text{SpecialEd} \) and \( \text{ESL} \) are the number of students in school, \( i \), who receive special education and English as a second language services respectively; \( \text{Enroll} \) is the number of students in
school, \( i \), who are registered to attend that school; \( \text{LowInc} \) is the percentage of students who qualify as low-income; \( \text{Attend} \) is the attendance of students in school, \( i \), reported as a percentage; \( \text{Elem} \) is an elementary school fixed effect; \( \sum_{z=1}^{Z} \text{Zip}_z(i) \) is a vector of zip code fixed effects; and \( \text{Diversity} \) is the coefficient of interest, representing the \( D \) statistic as described above. In later specifications, as a robustness test, Diversity is replaced with percent non-white.

The motivation of the research design is to identify diversity effects while holding constant as many possible confounders as the data allow. Many of the included variables deal with school level variation – chief among them is the low income control. The zip code fixed effects are included to account for across neighborhood effects.

For each outcome, a total of eight regressions are estimated beginning with the diversity variable and then adding additional controls in subsequent regressions. The hope is that the estimated coefficient on Diversity stabilizes as more controls are added.

**Results**

Tables T.1.2 and T.1.3 present regression outputs for reading and math scores respectively. The linear combination of independent variables explain nearly 80% of the variation in the percentage of students who score proficient or advanced on
the PSSA reading test. All coefficient signs appear reasonable. Figure T.1.6 presents a residual vs. predicted plot for regression 8 (with zip code fixed effects). This plot suggests that it is unlikely that any systematic variation has been omitted from the model.

The interpretation for the latter two regressions (with and without zip code fixed effects respectively) is that all else equal, a 10% increase in the diversity $D$ statistic, leads to roughly a 1.7% - 2% increase in the number of students who score proficient or advanced on the test. This result is statistically significant. Entrance of the zip code fixed effects renders the special education and school enrollment variables insignificant, but they also decrease the coefficient on the percent low income variable as expected.

With respect to the math score regressions, the linear combination of independent variables explain nearly 74% of the variation in the percentage of students who score proficient or advanced on the PSSA math test. Figure T.1.7 presents a residual vs. predicted plot for regression 8 (with zip code fixed effects). Like the reading score regression, this plot suggests that it is unlikely that any systematic variation has been omitted from the model.

The interpretation of the latter two regressions suggest that all else equal, a 10% increase in the diversity $D$ statistic leads to a roughly a 1.6% - 1.8% increase in the

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188 Although all variables are untransformed, the data are in percentages, hence the interpretation is as well.
number of students who score proficient or advanced on the test. These results are statistically significant.

As a check for robustness, Tables T.1.4 and T.1.5 rerun the regressions substituting the diversity variable for percent white. The models explain 74% and 78% in the number students scoring proficient or advanced on reading and math tests respectively. For the reading and math tests regressions, all else equal, a 10% increase in percent white leads to roughly a 1.6% and 1.9% increase in the number of students who score proficient or advanced on the test.

Conclusions

This analysis presented here asks whether school racial diversity is correlated with the percentage of students who score proficient or advanced on test outcomes. Attempting to identify the diversity effect using a series of school level controls gathered from an open dataset provided by the Philadelphia School District, this analysis finds that racial diversity has a marginal yet statistically significant positive effect on outcomes.

Surprisingly, percent white also leads to a marginal response to the percentage of students scoring proficient or advanced on tests\textsuperscript{189}.

\textsuperscript{189} Additional tests were undertaken (not included) where percent white was log transformed. Figure T.1.2 shows percent white is right skewed but transforming it does not lead to a particularly normal distribution. The regression results were mostly comparable to the non-transformed results.
These results are cross-sectional and correlative in nature and should not be interpreted as causal – particularly considering that these tests ignore the form and function of potential school-level peer effects. However, they do provide additional motivation for the School Improvement District concept. Namely, that drawing District boundaries to include a diverse mix of students may improve outcomes across the board.

It would be ideal to rerun these tests focused not on racial diversity but income diversity, although these data are not released by the School District. Despite the unavailability of these data, both the low-income and neighborhood variables are important controls in the analysis presented here.
<table>
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<td>R²</td>
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Significance: * .01; ** .001; *** .000 Standard errors listed below each coefficient
†Coefficients for zip code fixed effects are omitted

Table T.1.2: Regression summary for reading scores
### Table T.1.3: Regression summary for math scores

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<th>Dependent Variable: Math Score</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
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<td>SCH_SPEC_ED_SERVICES</td>
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Significance: * .01; ** .001; *** .000

Standard errors listed below each coefficient

†Coefficients for zip code fixed effects are omitted

### Figure T.1.6: Residual vs. predicted plot for Reading Score regression 8 (with zip code fixed effects)
Figure T.1.7: Residual vs. predicted plot for Math Score regression 8 (with zip code fixed effects)
Table T.1.4: Regression summary for reading scores using percent white as coefficient of interest

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<th>Dependent Variable: Reading Score</th>
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APPENDIX 2: SCHOOL IMPROVEMENT DISTRICTS POLICY BRIEF

Summary:

Philadelphia’s public schools are wrestling with the realities of fiscal insolvency. To close a $400 million deficit, the City recently closed 23 schools and laid off nearly 20% of the total District workforce. While the human capital repercussions will be felt for generations to come, there will also be significant neighborhood economic impacts as well. The research accompanying this project concludes emphatically that despite Philadelphia being a school quality ‘desert’, good schools still fetch a premium and great schools have the power to transform a neighborhood.

This document briefly outlines the motivation and design of an original program idea called School Improvement Districts – bounded areas whose residents vote to increase their own taxes and use the incremental increase to fund new school quality in their own neighborhoods. While the program is placed-based and thus intended to be used as a tool for neighborhood development, a principle focus on equity will ensure that vital human capital spillovers are generated as well.

Motivation:
The charter school movement in Philadelphia will continue to gain momentum and the exodus from District schools will hasten particularly in the wake of recent state legislation. The economics of this transformation will further degrade school quality by forcing the District to mitigate its fixed costs by issuing more layoffs and closing more schools. Although at face value, charters are not poor alternatives, unlike New York and Chicago which saw charter growth as a means of education innovation, in Philadelphia, their emergence is mainly in response to market forces.

Why is this a problem for neighborhoods? District schools are anchored to local neighborhoods - thus a decline in District school demand will lead to a corresponding decline in neighborhood demand. If we capitalize on this mechanism but in reverse, the question becomes – can we leverage demand for schools, particularly in “gentrifying” neighborhoods, to foster positive human capital and neighborhood economic development outcomes. Can this be done equitably?

**Supporting research:**

How might we identify the extent to which schools play a role in neighborhood demand? The research that accompanies this project estimates the willingness to pay for public schools by Philadelphia home buyers by way of a quasi-experiment – relating (in a regression framework) differences in test scores with
differences in home prices for home sales on either immediate side of school attendance catchments. This framework can identify school related home price premiums separate from other non-school neighborhood amenities.

In Philadelphia, despite the current school crisis and a portfolio of under-performing schools, a one standard deviation increase in test scores leads to nearly a 3% increase in home prices on average. In addition to the citywide analysis, this research also tested the local economic development effects of introducing a high-quality school in a neighborhood that previously lacked school quality. Using the University-subsidized, Penn Alexander School as a case study, a decade after the school’s debut, the research estimates that the average home buyer was willing to pay a 40% (nearly $140k) home price premium to purchase a house in the school’s attendance catchment.

These results suggest that good schools can be a major driver of economic development in Philadelphia.

**Policy Description:**

The Improvement District mechanism is used to fund increased service provision typically in downtowns toward the benefit of local business. In 2000, Pennsylvania enacted legislation approving ‘Neighborhood Improvement Districts’ suggesting that, “…taxes many times are not sufficient to provide
adequate municipal services...” and that, "municipalities should be encouraged to create, where feasible...assessment-based neighborhood improvement districts...” administered by, “…district management associations…that promote and enhance more attractive and safer...neighborhoods; economic growth; increased employment opportunities; and improved commercial, industrial, business districts and business climates.” It is believed that this legislation provides the legal framework to support School Improvement Districts.

School Improvement Districts would allow local residents to vote to increase their own taxes and put the incremental difference toward their local school. It is envisioned that these Districts would be managed by a local community development non-profit that has the experience and staff to manage such an entity. Because the new school quality will be capitalized into local home prices, this program must be accompanied by a series of equity interventions that will encourage housing affordability. The most important means to achieve equity is to draw the District boundary to encompass a mixed-income neighborhood which would give planners greater control over the supply of and demand for public services like schools. Although the Improvement District tax rate is flat, the tax is made more progressive by the fact that the tax liability is a function of home price. Thus, the tax liability of lower valued homes will be less than that on higher valued homes. Although all in-District residents will receive an equal share of the new school quality, the costs will be more equitably distributed. The second major equity component would use the promise of new school quality to
win low income housing tax credits which can then be used to build affordable housing in the neighborhood before the new school drives economic and demographic neighborhood change and possible displacement.

**Conclusion**

Education is routinely seen as the most important mechanism for elevating children out of poverty. It is incumbent upon planners to break the negative feedback cycle where low quality schools yield ill-prepared students who grow up to earn disproportionately lower wages and are forced to live in disadvantaged neighborhoods with low-quality schools. To incentivize officials to adopt policies effective in this regard, the proposed program considers schools not only as drivers of human capital development but as engines of economic development as well. School Improvement Districts may provide one policy mechanism to bolster education outcomes while simultaneously driving the equitable revitalization of neighborhoods.
APPENDIX 3: INTERVIEW QUESTIONS

Dennis Culhane, Professor, Penn School of Social Work

1. What did the West Philadelphia Initiatives planning process entail?
2. Was affordable housing development considered a component of the plan? Why or why not?
3. How did you project future housing demand in the neighborhood?
4. Did University officials ever consider the possibility that the intervention could lead to residential displacement?
5. Did any city officials (politicians or otherwise) express any concern over the University exerting its considerable financial might to revitalize the neighborhood?
6. What was the response of local residents and did this response vary according to the resident’s class or race?
7. What are the lessons that we can learn from Penn Alexander when trying to plan similar interventions in other neighborhoods?

Paul Levy, President & CEO, Center City District Philadelphia

1. Are you ever asked by businesses who pay the Improvement District tax if they can opt out? What is their motivation and how do you address their concerns?
2. How have you been successful in convincing Improvement District taxpayers that the services Center City District provides help make a difference?

3. Talk about the “marketing” process that helped convince local businesses to vote for the Improvement District legislation.

4. Who sets the District tax rate? How often does this change?

5. How did you make the move in 2009 from charging only businesses to charging residents as well?

6. How are budget expenditure decisions made?

7. Do you think the Improvement District model can be adopted to fund schools? If so, what are the key considerations?

8. What are the administrative concerns particularly as it relates to starting a small Improvement District?

Ivy Olesh, President of the Friends of Chester Arthur

1. What is the purpose of the Friends of Chester Arthur?

2. Why do you think that these “Friends of” groups have grown in popularity in recent years?

2. How do you convince both parents and non-parents to donate? Do any neighborhood businesses donate?

3. Is the free-rider problem ever an issue?

4. Who/by what process are budgetary decisions made?
5. Do neighborhood residents ever express concerns over equity? What are they?

6. What drivers of school quality cannot be paid for by the Friends of group but instrumental in the success of Chester Arthur?

7. Do you think the majority of residents would vote to make their donations more formal in the form of a tax increase?

8. Do you think the success of the school has spilled over into other aspects of the neighborhood economy? If so, what?

Kira Strong, Vice President of Community and Economic Development, People’s Emergency Center (PEC)

1. To what do you owe the success of your affordable housing programs?

2. Does PEC have a comprehensive plan in place to address equity? What are the specifics?

3. How do you leverage the encroaching University-driven neighborhood change when applying for Low Income Housing Tax Credits?

4. Discuss the extent of PEC’s partnership with Drexel University?

5. Would an organization like PEC (given the appropriate funding) make an adequate home for District administration?

6. Do you consider education (of any kind) to play an important role in community development?

7. How do you plan to provide equity in the face of Drexel’s new school given the Penn Alexander story?


Levy, Paul. Planning the Center City District, February 2015.


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