

Zoned Out:

How School and Residential Zoning Limit Educational Opportunity

SCP REPORT NO. 6-19 | NOVEMBER 2019

social capital project

A project of the Joint Economic Committee – Republicans | Chairman, Sen. Mike Lee
jec.senate.gov | G-01 Dirksen Senate Office Building Washington, DC 20510 | (202) 224-5171

The primary community a child belongs to outside of her family is her school community. Under the best circumstances the school community positively contributes to a child's socialization, academic outcomes,¹ skill development,² and social mobility. Schools can provide a platform for students and their families to build bonding and bridging social capital, and they act as stabilizing institutions that provide supportive social networks for families.³

About 90 percent of American students are educated at public schools, and 9 percent at private schools.⁴ Public education has traditionally been tied directly to housing through residential assignment policies that assign homes to schools via school attendance zones. School zones are typically designed so that students attend schools near home, and despite growing opportunities to opt out or choose another school via charters, magnets, and public school open enrollment policies, 71 percent of students attend their assigned public school.⁵

Families with children predictably take housing selection seriously, as housing often determines children's access to educational opportunities. A nationally representative survey of homebuyers found half of households with children consider school district quality when selecting a neighborhood during home buying⁶ and a recent study found low-income families with Section 8 housing vouchers cited "better schools" as their primary motive for moving neighborhoods.⁷ However, many Americans say they are prevented from moving to a better neighborhood due to high housing costs.⁸

This paper explores the relationship between housing and public education and finds the average U.S. ZIP code associated with the highest quality (A+) public elementary school has a 4-fold (\$486,104) higher median home price than the average neighborhood associated with the lowest quality (D or less) public elementary schools (\$122,061).

In a cross-city comparison, major cities with more restrictive residential zoning are less effective at providing high quality public education at a low, affordable price. Portland, Oregon features traditional residential assignment policies, restrictive residential zoning, and high, climbing average home values across increasing school quality levels.

In contrast, Houston and Chicago, two major cities with less restrictive residential zoning, do a better job delivering access to high quality public schools than comparison cities with restrictive residential zoning, keeping home prices low and affordability high across school quality levels. As anticipated, cities with open enrollment or districtwide lotteries exhibit flatter relationships between home values and school quality.

Since housing is the traditional gateway to public education, this paper suggests policymakers consider improving access to educational opportunity by minimizing residential zoning while expanding public school choice policies. Reforming residential zoning supports public school choice efforts by permitting a variety of housing throughout school zones, reducing prices, and improving affordability at every school quality level.

BACKGROUND

Housing and education policy are frequently treated separately by policy makers, although they are practically enmeshed. Part of the relationship between housing and schools exists de facto, as students will naturally attend schools that are within commuting distance of their homes and research suggests school quality is partly capitalized into home prices.⁹

However, housing's relationship to schools is also a policy choice: districts have traditionally drawn school boundaries by neighborhood and assigned students to schools by home address, even when other options are more convenient or appealing to families. Meanwhile, residential zoning regulations control the type, size, and amount of homes built in different school zones and segregate cities by income within and across metropolitan areas.¹⁰ Research finds housing characteristics vary systematically across school zones, with larger houses and single family homes more common within high performing school boundaries,¹¹ and larger housing cost gaps exist across high and low quality schools in areas with more restrictive residential zoning.¹²

Education reform efforts have worked to address disparities in opportunity and untether housing from schools in a variety of ways. Charter schools, magnet schools, and districtwide lotteries decouple housing from schools within a specified area. More limited transfer opportunities including attendance waivers are available within districts or between districts in some places.¹³ Educational savings accounts (ESAs) and school vouchers provide private school opportunities outside the traditional public education system.¹⁴

Many of these strategies reduce the link between housing and public education on the margin, but the traditional relationship persists: although 9 percent of K-12 students attend a private school, and 20 percent attend a chosen public school, 71 percent of students still attend their assigned public school.¹⁵ Housing still effectively acts as a gateway to educational opportunity for a majority of K-12 students.

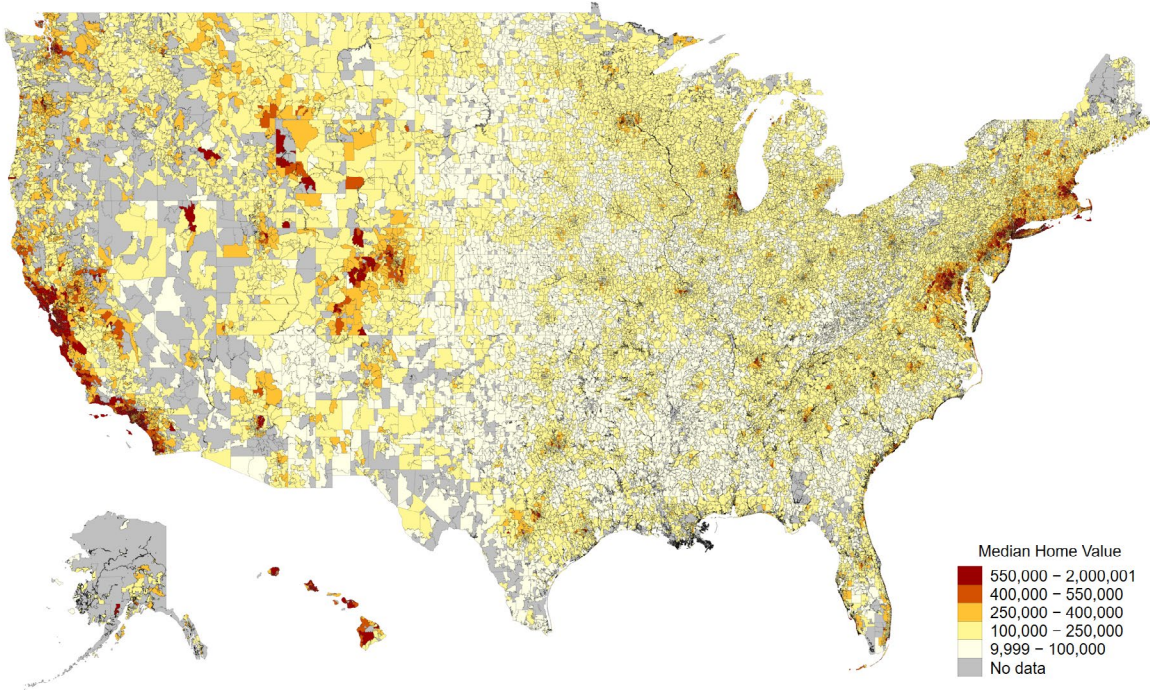
NEW EVIDENCE ON THE RELATIONSHIP BETWEEN HOUSING AND SCHOOLS

This study relies on housing and school data compiled from a variety of public and private data sources.¹⁶ Housing and school data are linked by ZIP code or neighborhood. ZIP codes or neighborhoods that intersect school boundaries constitute unique observations.¹⁷ Letter grades were assigned to schools by Niche.com (an online publisher of school and residential data) and represent various dimensions of each school's quality (Appendix A).

Elementary schools tend to be associated with smaller attendance zones than middle and high schools, and public elementary schools are the sole focus of this analysis.¹⁸ Median home values vary widely across ZIP codes in the United States (Figure 1) and the average ZIP code associated with a high quality public school has

a significantly higher median home value than the average ZIP code associated with a low quality public school (Figure 2 and Table 1), even when regional differences are accounted for.¹⁹

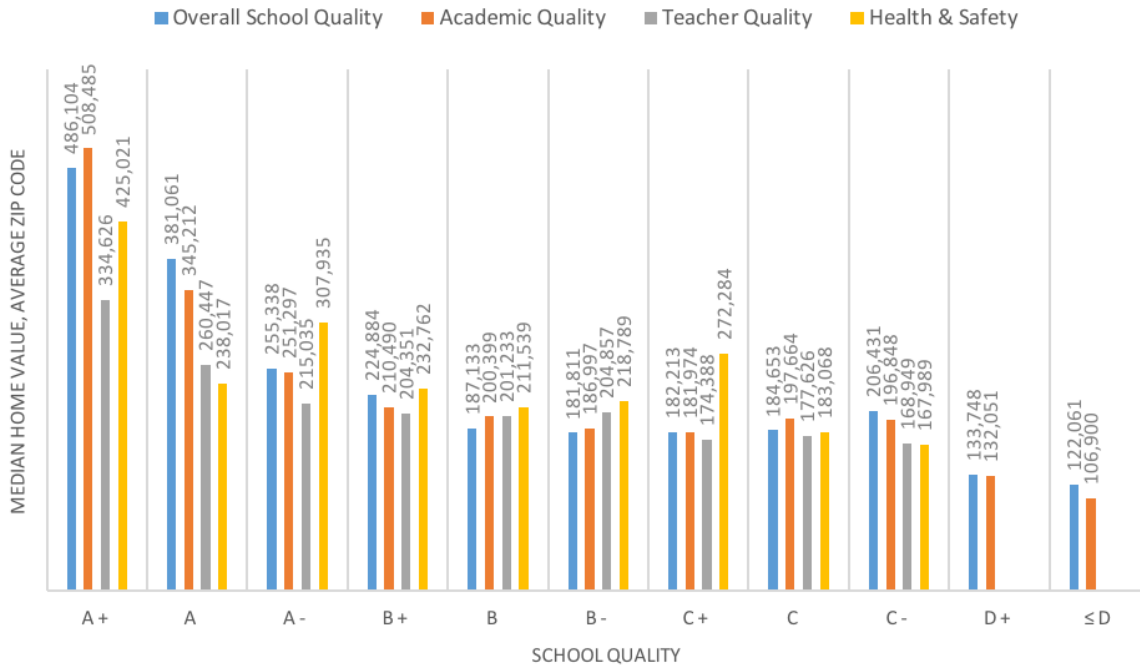
Figure 1. Median home value by ZIP code / ZIP code data coverage



Note: Colored ZIP codes contain one or more ZIP code-school observations and grayed ZIP codes represent areas without ZIP code-school observations.
Data Source: Niche, "K-12 and Place to Live Data." Licensed exclusively for the Joint Economic Committee. 2019.

For example, the average ZIP code associated with an A+ public elementary school has a median home value of \$486,104, which is roughly four times higher than a D or lower public elementary school (\$122,061).²⁰ This relationship between home values and school quality suggests many American households would find B+ or higher quality public schools out of reach; the median home value in the United States is \$200,000.²¹ Median home values follow a similar pattern across continuous measures of overall school quality (Appendix C).²²

Figure 2: School quality varies by home value across U.S. public elementary schools



Note: Home values represent the mean ZIP code within a school-quality category. Note that certain districts with open enrollment policies contain non-binding school attendance zones and these relationships are reflected in this figure and throughout the paper, except in Appendix H. School grade assignment by Niche.com is intended to follow a roughly bell-shaped distribution and the number of zip-school observations in each school-grade category varies by quality measure, see Appendix B for details. Median home values are based on 2017 American Community Survey (ACS) estimates. Data Source: Niche, “K-12 and Place to Live Data.” Licensed exclusively for the Joint Economic Committee. 2019.

Table 1. School quality varies by home value across U.S. public elementary schools

	Overall School Quality	Academic Quality	Teacher Quality	Health & Safety
A+	486,104	508,485	334,626	425,021
A	381,061	345,212	260,447	238,017
A-	255,338	251,297	215,035	307,935
B+	224,884	210,490	204,351	232,762
B	187,133	200,399	201,233	211,539
B-	181,811	186,997	204,857	218,789
C+	182,213	181,974	174,388	272,284
C	184,653	197,664	177,626	183,068
C-	206,431	196,848	168,949	167,989
D+	133,748	132,051		
≤D	122,061	106,900		

Data Source: Niche, “K-12 and Place to Live Data.” Licensed exclusively for the Joint Economic Committee. 2019.

The relationship between median home value and academic and teacher quality follows roughly the same pattern. The average ZIP code's median home value is \$106,900 for schools at the lowest academic quality level, and \$508,485 for schools at the highest.

Median home value doubles across teacher quality. The average ZIP code associated with C- teacher quality has a median home value of \$168,949, while an average ZIP code associated with a school with A+ teacher quality has a median home value of \$334,626.²³

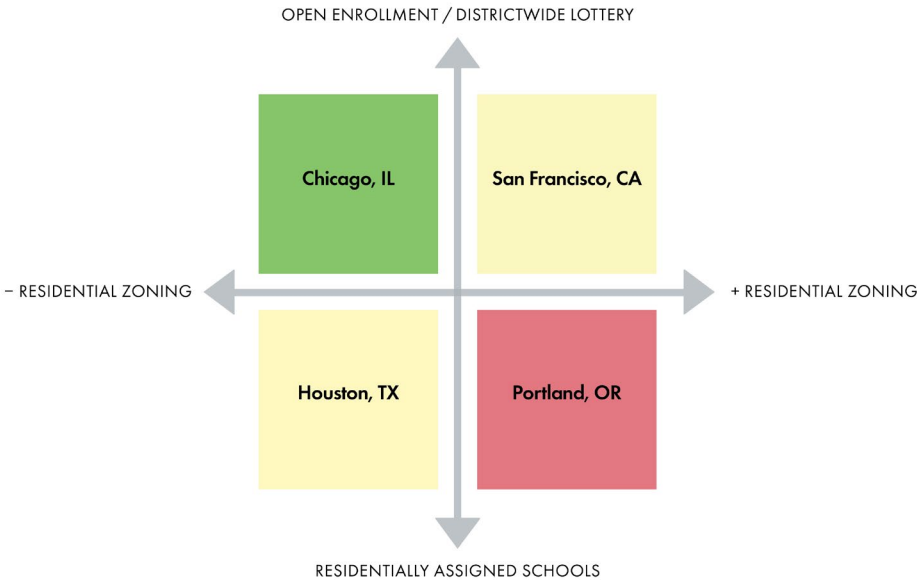
Finally, median home value is flatter across health and safety ratings but with more disparity between the tails. The average ZIP code intersecting a school with the lowest health and safety rating has a median home value of \$167,989, while an average ZIP code intersecting a school with an A+ health and safety has a median home value of \$425,021.

CITY CASE STUDIES

The trend in home values across school quality levels may simply reflect individual choices about where to live, how households value educational amenities, or what type of households' children excel at school. However, past and present school zoning and comprehensive residential zoning suggests it is unlikely the relationship between homes and schools reflects a natural product of free choice.

To test the idea that public policy affects the relationship between home values and school quality, the following case studies exploit differences between cities that vary substantially across two policy dimensions (Figure 3). Cities vary from restrictively zoned to minimally regulated and from traditional residential assignment to districtwide lottery assignment (Appendices D and E).²⁴

Figure 3. Two dimensions of public school access

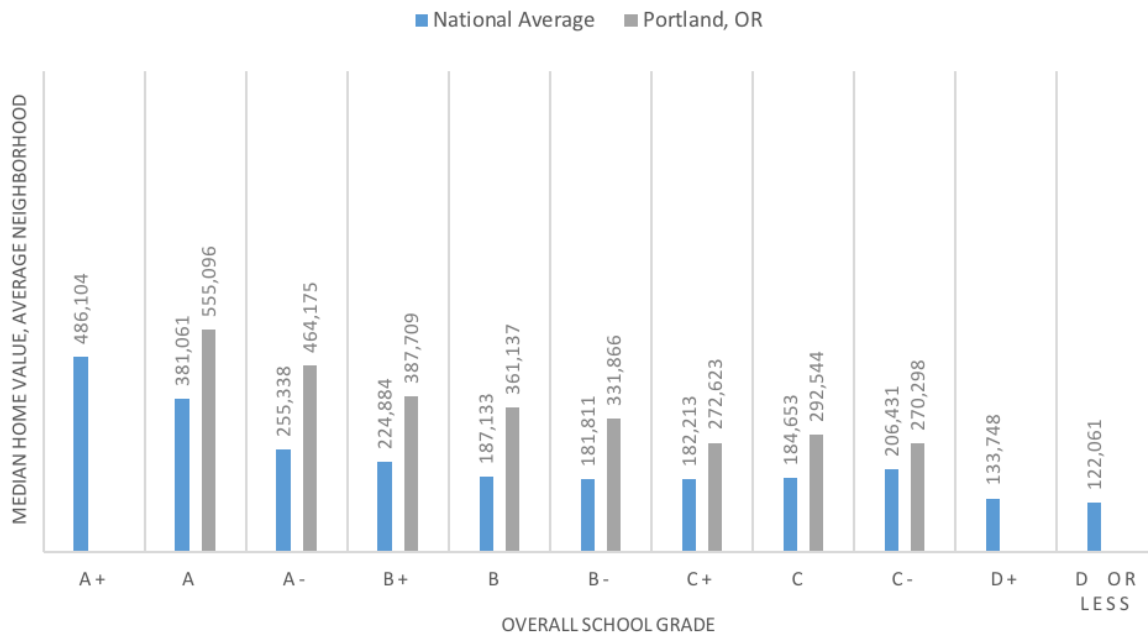


PORTLAND, OREGON: RESIDENTIAL SCHOOL ASSIGNMENT WITH RESTRICTIVE ZONING

Portland, Oregon pairs traditional school assignment policies and limited transfer opportunities with restrictive residential zoning.²⁵ Over three quarters (77 percent) of residential land is zoned for detached single-family homes in Portland and Portland’s urban growth boundary also artificially limits available land.²⁶ Meanwhile, Portland’s population grew almost 12 percent between 2010 and 2018, increasing demand for housing over time.²⁷

Portland should theoretically exhibit greater housing price disparities across low and high quality schools and fare poorly at providing high quality schools at low or affordable prices. In fact, Portland home prices are significantly above national averages at every school quality level (Figure 4), and the average neighborhood median home value associated with an A quality school is \$555,096.

Figure 4. Portland home values are high and increase across school quality levels



Notes: Averages are for neighborhoods within Portland and ZIP codes nationally. Public elementary schools only.
 Data Source: Niche, "K-12 and Place to Live Data." Licensed exclusively for the Joint Economic Committee. 2019.

Portland features increasing average home values across increasing school quality levels, with around \$285,000 difference between home values associated with its highest and lowest quality schools. For policymakers that care about access to high-quality education, Portland arguably represents the worst of both worlds: restrictive zoning which segregates housing by income and pushes home prices up at every quality level plus residentially assigned public schools that partition neighborhoods into school zones less-accessible to families at different income levels.

This policy pairing likely drives inter-district segregation as well, as would-be residents are excluded or deterred from moving to Portland based on high home values associated with even Portland’s low quality public schools.²⁸ Portland’s recently slowing population and job growth may marginally ease price pressures in the future but do not constitute a solution to the problem.

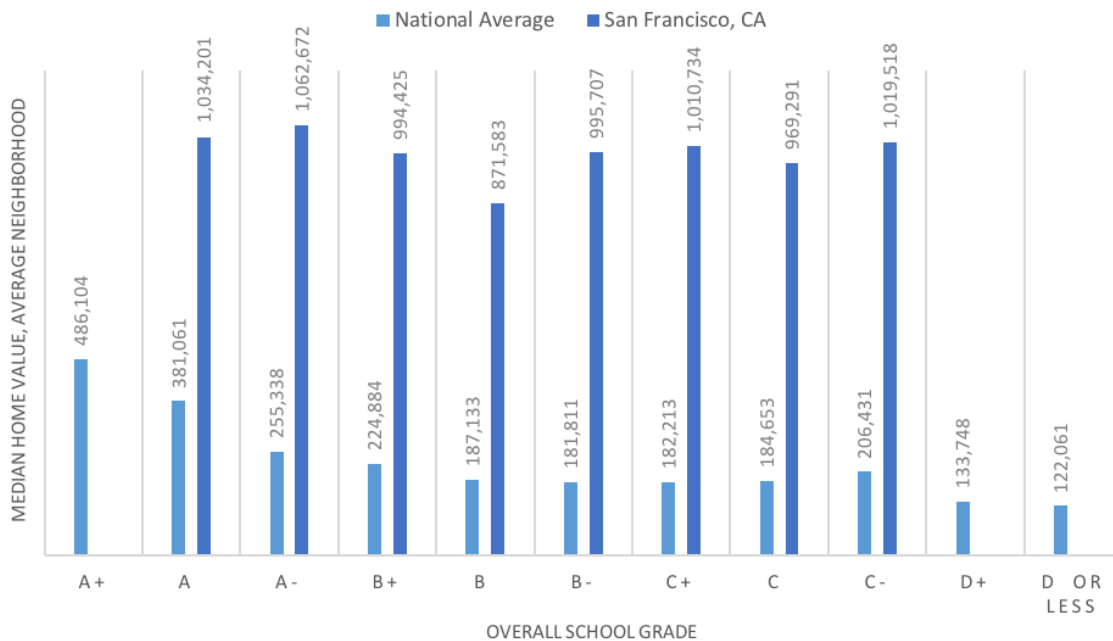
SAN FRANCISCO, CALIFORNIA: DISTRICTWIDE LOTTERY WITH RESTRICTIVE ZONING

San Francisco has a districtwide lottery system that assigns students to schools using an open enrollment application that uses “tiebreakers” to place students at schools when schools are over capacity. It pairs this policy with highly restrictive residential zoning, and strong and growing demand for housing.

Restrictive zoning creates artificial scarcity which creates upward pressure on home prices at every quality level; estimates from past research suggest residential zoning increases the cost of housing by 53 percent in San Francisco.²⁹

San Francisco exhibits a flatter relationship between housing and school quality (Figure 5) and effectively charges one average home price across all quality levels.³⁰ However, the price is so high that public education opportunities are inaccessible to many existing and would-be residents.

Figure 5. San Francisco home values are high and relatively flat across school quality levels



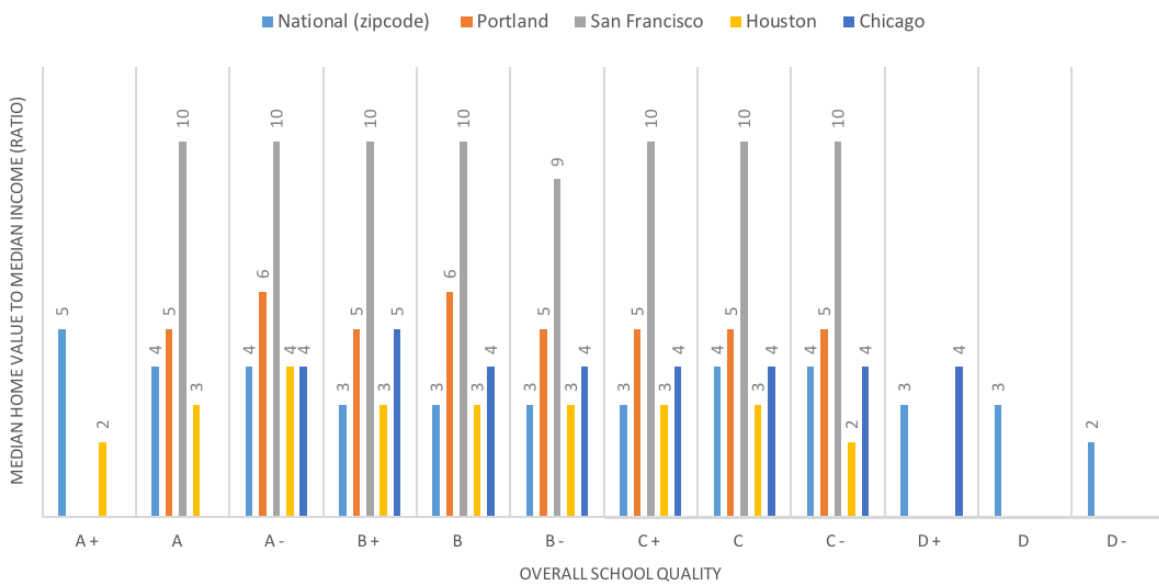
Note: In this figure San Francisco’s neighborhood-school relationships are based on the city’s school attendance areas. However, as a consequence of San Francisco’s districtwide lottery, these attendance zones are non-binding and the functional relationship between schools and neighborhoods in San Francisco may be more accurately represented by Appendix H, Figure 1.

Averages are for neighborhoods within San Francisco and ZIP codes nationally. Public elementary schools only.

Data Source: Niche, “K-12 and Place to Live Data.” Licensed exclusively for the Joint Economic Committee. 2019.

San Francisco’s districtwide lottery would likely be more effective at improving access if city residential zoning policies supported housing affordability, but the average neighborhood’s median home value in San Francisco is approximately \$1 million at every school quality level. The home-value-to-income ratio is much higher in San Francisco at every school quality level than nationally or within any comparison city (Figure 6), which likely makes living in San Francisco unappealing to families. Prices are so high that research suggests minorities and low-income residents have led out-migration from San Francisco, and families with children have led out-migration from the state generally.³¹

Figure 6. Housing affordability varies by city and school quality



Note: Ratios are for neighborhoods within each city and ZIP codes nationally. Ratios are rounded to the nearest whole number. Data Source: Niche, “K-12 and Place to Live Data.” Licensed exclusively for the Joint Economic Committee. 2019.

San Francisco is wavering on its commitment to a districtwide lottery, and the district is poised to adopt a new enrollment system likely to include stronger elements of residential assignment in coming years.³² Criticisms of the current districtwide lottery include that the lottery is creating more demographically patterned enrollment due to information and transportation limitations, despite efforts to address these issues by non-profits and through city bus routes.³³

Even in cities with a wide degree of public school choice, students face barriers in exercising it due to practical considerations like commute time, transportation costs, and social challenges associated with attending a school outside of their neighborhood.

Transportation demands unique to public school choice have strained school budgets in some places. For example, in recent years Boston Public Schools spent a substantial portion of the district’s budget on transportation. Costs are

high partly because a lottery system necessitates moving children to schools across the city in an inefficient fashion. In Boston, older children receive a public transportation pass, but children up to sixth grade use yellow buses which cost the district up to \$10,000 to \$20,000 per student per year.

Moreover, administrators have observed that low-income, late-comer, and immigrant families are less likely than other students to effectively access public school choice options, and are more likely to attend their local neighborhood school irrespective of quality.³⁴ Reforming residential zoning policies could theoretically mitigate some of the challenges associated with open enrollment in San Francisco and Boston by allowing families to not only choose their school, but choose to live closer to their school.

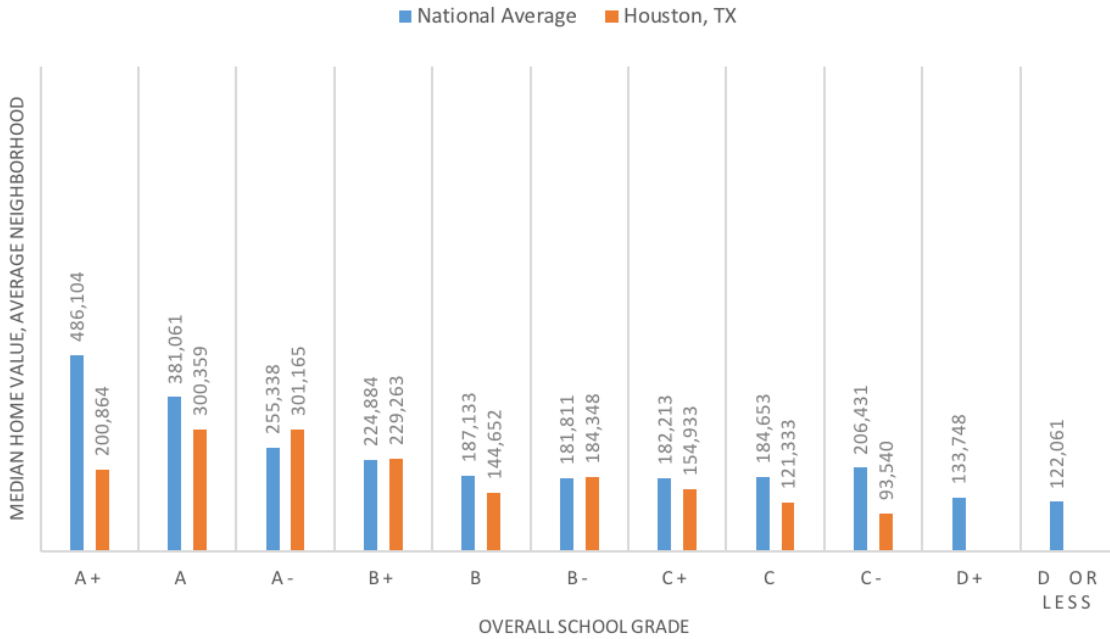
HOUSTON, TEXAS: RESIDENTIAL SCHOOL ASSIGNMENT WITH LIBERAL RESIDENTIAL ZONING

Texas is a lightly zoned state, ranked 49th-most-restrictive,³⁵ and Houston is the only major city without a traditional zoning code. Houston is not regulation-free, and does have minimum lot size regulations, front setbacks, street design regulations, and parking requirements.³⁶ Still, zoning was previously estimated to account for 0 percent of the cost of housing in Houston as a result of its lax regulatory environment, and this makes the city unique in this cross-city comparison.³⁷

Like Portland, schools are traditionally assigned in Houston and limited transfer options are available. Houston also has some charter and magnet schools which provide a lesser degree of public school choice not captured in this analysis.

The Houston metro area has seen remarkable in-migration in recent years, adding more people between 2010 and 2018 than all other metro areas in the US except Dallas.³⁸ In spite of increasing demand, the city has successfully kept home prices low both generally and across its highest school quality levels (Figure 7).

Figure 7. Houston home values are similar to national values, despite substantial population growth

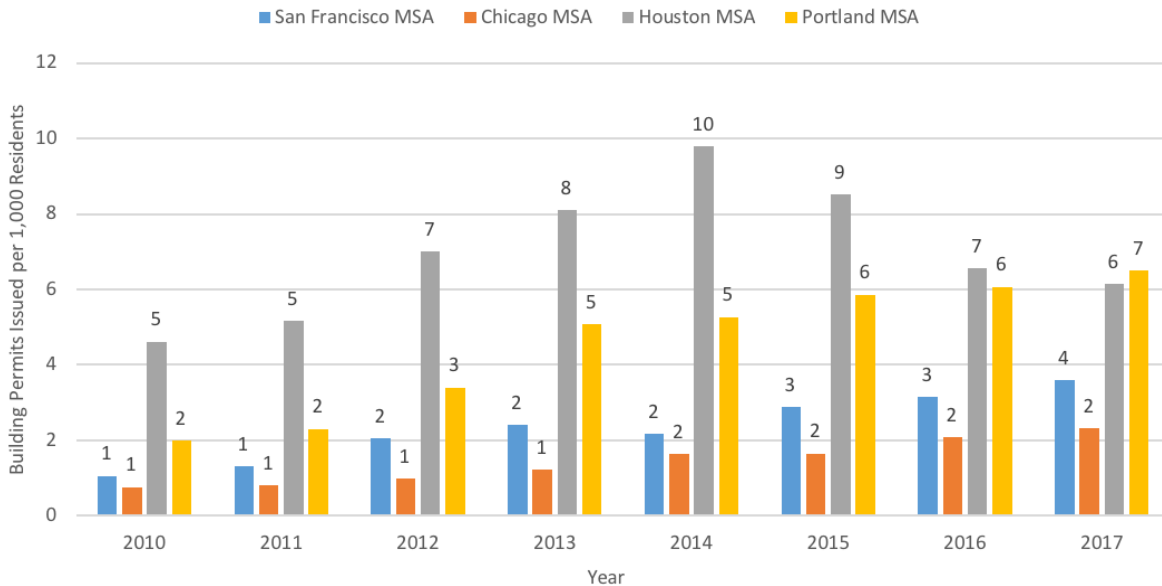


Note: Averages are for neighborhoods within Houston and ZIP codes nationally. Public elementary schools only. There is only one A+ observation. The combined, weighted average of observations in A and A+ categories is \$298,515. Data Source: Niche, "K-12 and Place to Live Data." Licensed exclusively for the Joint Economic Committee. 2019.

In Houston, the average neighborhood associated with an A quality school has a median home value of \$300,359, around \$81,000 less than the national average at that school quality level. At every school quality level, Houston has lower home prices than the other major cities in the analysis, except that Chicago's median home value at the A- level is \$8,000 less.

Houston's success likely hinges on its elastic housing supply which translates to more homes being permitted in the Houston metropolitan area on an annual basis (Figure 8). Economic theory predicts that inelastic supply in the face of growing demand will cause price escalations, and the housing and zoning literature supports this idea.

Figure 8. Houston MSA issues more building permits annually per capita



Note: Hurricane Harvey caused catastrophic damage to the Houston MSA in 2017, likely resulting in fewer housing starts in the Houston MSA the same year.
 Data Source(s): *Building Permits, Annual New Privately Owned Housing Units Authorized in Permit-Issuing Places, 2019*. Distributed by Haver Analytics, Inc.
 Metropolitan and Micropolitan Statistical Area Totals Dataset: *Population and Estimated Components of Change: April 1, 2010 to July 1, 2018, 2019*. Distributed by U.S. Census Bureau. <https://www2.census.gov/programs-surveys/popest/datasets/2010-2018/metro/totals/cbsa-est2018-alldata.csv>

Houston also likely benefits from the unusual land use pattern resulting from its lack of traditional Euclidean zoning, which separates development by type or use. Unlike most cities, Houston’s organic land use pattern intersperses multi-family housing throughout school zones in the Houston metro area.³⁹

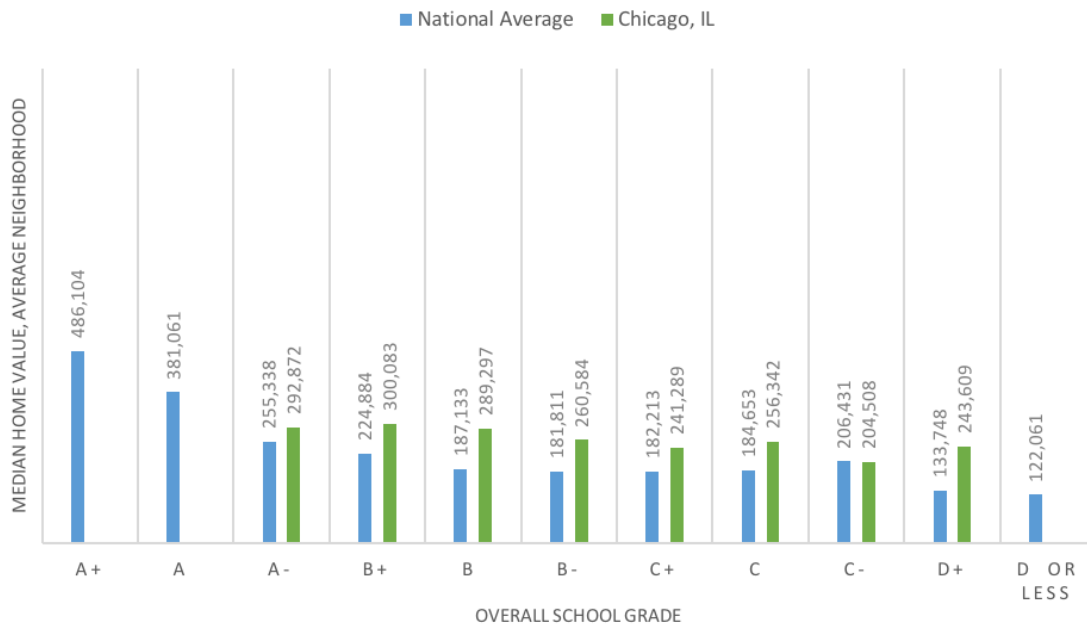
Despite huge immigration inflows over previous decades, Houston is arguably more inclusive and accessible at most school quality levels than San Francisco, Portland, and even Chicago. Houston provides access to highly rated public schools for a much wider range of economic backgrounds, in spite of its choice-limiting residential assignment policies.

CHICAGO, ILLINOIS: OPEN ENROLLMENT WITH MODERATE ZONING

Chicago pairs inclusive open enrollment policies which allow students to apply to non-neighborhood schools through a computerized lottery⁴⁰ with moderate residential zoning supported by historically pro-growth leadership.⁴¹ Chicago’s zoning tax, or the gap between the marginal cost of new construction and the market price of an apartment, was previously estimated at 5.7 percent. For comparison, Chicago’s zoning tax is around one-tenth of the zoning tax in San Francisco.⁴²

This policy pairing seems to improve access across school quality compared to other cities. For example, the relationship between housing prices and school quality in Chicago is flatter than nationally or in comparison cities with traditional residential assignment policies.⁴³ Perhaps the premium to home ownership in neighborhoods with better schools is smaller when all residents have access to all schools, or residential sorting is less likely to take place along school boundaries under open enrollment as a result of school boundaries' reduced significance.

Figure 9. Chicago home values are moderate and mostly flat across school quality



Notes: In this figure Chicago's neighborhood-school relationships are based on the city's school attendance zones. However, as a consequence of Chicago's open enrollment policy, these attendance zones are non-binding and the functional relationship between schools and neighborhoods in Chicago may be more accurately represented by Appendix H, Figure 2.

Averages are for neighborhoods within Chicago and ZIP codes nationally. Public elementary schools only.

Data Source: Niche, "K-12 and Place to Live Data." Licensed exclusively for the Joint Economic Committee. 2019.

Chicago's moderate residential zoning likely helps contain prices overall. The average neighborhood associated with an A- quality school has a median home value of \$292,872, substantially less than Portland or San Francisco and around \$8,000 less than Houston.

Although some of Chicago's affordability across quality levels is due to good policy, some is likely due to poor fiscal health and population outflows. For example, Chicago's pension system is largely thought to be unsustainable and property taxes are growing to support public obligations. Current and future taxes are likely priced into home values, suppressing home values in Chicago overall.⁴⁴

Chicago's affordability is also arguably less impressive than Houston's because Houston has experienced significant and sustained population increases while Chicago has experienced a population decline in recent years.⁴⁵ The city is also less successful in allowing a diversity of housing options across geography than Houston, which may practically reduce access to high performing schools.⁴⁶

However, the city is still a seller's market and Chicago's general pro-growth outlook has arguably kept prices in check historically, and continues to temper home prices today.⁴⁷ As a result, Chicago's open enrollment and moderate zoning policies provide a useful model for cities that want to increase access and inclusivity.

POLICY IMPLICATIONS

Despite public education's promise of being a free, inclusive, and equalizing force, families are faced with the reality that attending a high-performing public school often requires paying more for housing, and many students' educational opportunities are limited as a result. School zoning and residential zoning regulation directly impact the type and price of homes associated with schools, and as a result can positively or negatively impact access to opportunity.

Education policy often highlights the relationship between school zoning and access to opportunity. In this study, residential assignment policies are associated with climbing home values across increasing school quality in Portland and Houston, and open enrollment policies are associated with flatter relationships between home value and school quality in Chicago and San Francisco.

Although open enrollment policies have often been favored by policymakers interested in expanding opportunity, San Francisco's districtwide lottery experience provides a cautionary tale that open enrollment policies are not a panacea. While public school choice is helpful in creating new educational opportunities for students, students are likely to attend schools that are close to home, particularly when they are young, and are unable to attend schools in a district where home prices are too high.⁴⁸

Residential zoning reform could be a powerful tool to make high quality schools and districts more accessible. In this study, cities with less restrictive residential zoning exhibit lower home prices and improved affordability at nearly every school quality level.

Previous research finds that cities with less restrictive zoning produce more varied and affordable housing than restrictively zoned cities. Local reforms including eliminating single family-only zoning, increasing height limits, and reducing minimum lot sizes could increase housing diversity and reduce home prices in districts, whether or not residential assignment policies are in place.

Momentum for residential zoning reform is growing, with places including Minneapolis, Minnesota, Salt Lake City, Utah, and Oregon passing related legislation this past year. Whether these reforms will be effective rests partly on government's ability to meaningfully change the process and incentives that generated restrictive regulation to begin with.⁴⁹

Increasing states' roles is likely necessary to produce effective reform. States should revisit their State Zoning Enabling Acts (SZA), which provide local municipalities with nearly unlimited latitude in producing residential zoning regulation. At the federal level, attaching zoning liberalization requirements to housing, transportation, or educational grant money may send an important message to jurisdictions.

Whatever methods are used, this paper suggests that the merits of zoning liberalization may extend well beyond affordability. Paired with comprehensive open enrollment policies, residential zoning reform may improve educational access and opportunities for students within and between school districts. These changes would build and strengthen communities as greater numbers of families and students are able to participate in the school community they desire and access educational opportunities necessary to succeed long-term.

APPENDIX A. FACTORS CONSIDERED IN NICHE.COM SCHOOL GRADING

Table 1. Overall Quality Grade

Factor	Description	Source	Weight
Academics Grade (See below)	Based on state assessment proficiency, SAT/ACT scores, and survey responses on academics from students and parents.	Multiple Sources	50.0%
Teacher Quality Grade (See below)	Based on teacher salary, teacher absenteeism, state test results, and survey responses on teachers from students and parents.	Multiple Sources	15.0%
Culture & Diversity Grade	Based on racial and economic diversity and survey responses on school culture and diversity from students and parents.	Multiple Sources	10.0%
Parent/Student Surveys on Overall Experience	Niche survey responses scored on a 1-5 scale regarding the overall experience of students and parents in the district.	Self-reported by Niche users	10.0%
Health & Safety Grade (See below)	Based on chronic student absenteeism, suspensions/expulsions, and survey responses on the school environment from students and parents.	Multiple Sources	5.0%
Resources & Facilities Grade	Based on expenses per student, staffing, and survey responses on facilities from students and parents.	Multiple Sources	5.0%
Clubs & Activities Grade	Based on expenses per student and survey responses on clubs and activities from students and parents.	Multiple Sources	2.5%
Sports Grade	Based on the number of sports, participation, and survey responses on athletics and athletic facilities from students and parents.	Multiple Sources	2.5%

Table 2. Academics Grade

Factor	Description	Source	Weight
State Assessment Proficiency	Percentage of students at or above proficiency levels on state assessments. For comparison across states, percentiles within each state were calculated, then compared.	U.S. Department of Education	30.0%
Composite SAT/ACT Score	Average SAT/ACT composite score (normalized to the same scale), as reported by Niche users from this district.	Self-reported by Niche users	15.0%
Top Colleges Score	Average score of colleges that students are most interested in or go on to attend, based on Niche Best Colleges ranking.	Self-reported by Niche users	15.0%
Graduation Rate	Percentage of 12th grade students who graduate.	U.S. Department of Education	10.0%
Parent/Student Surveys on Academics	Niche survey responses scored on a 1-5 scale regarding the academics in the district.	Self-reported by Niche users	10.0%
Student-Teacher Ratio	Ratio of students to full-time teachers. Please note: Student-teacher ratio is not a representation of average class size.	National Center for Education Statistics	10.0%
AP Enrollment	Percentage of students enrolled in at least one AP course.	Civil Rights Data Collection	5.0%
AP Test Pass Rate	Percentage of AP students who pass at least one AP exam.	Civil Rights Data Collection	5.0%

Table 3. Teacher Quality Grade

Factor	Description	Source	Weight
Academics Grade (See above)	Based on state assessment proficiency, SAT/ACT scores, and survey responses on academics from students and parents.	Multiple Sources	30.0%
Parent/Student Surveys on Teachers	Niche survey responses scored on a 1-5 scale regarding teachers in the district.	Self-reported by Niche users	25.0%
Teacher Absenteeism	Percentage of teachers missing 10 or more days for sick or personal leave per school year.	Civil Rights Data Collection	15.0%
Teacher Salary Index	Average teacher salary normalized by Median Household Income by county.	U.S. Department of Education	10.0%
Teachers in First/Second Year	Percentage of teachers in their first or second year of teaching.	Civil Rights Data Collection	10.0%
Average Teacher Salary	Average teacher salary in the district.	National Center for Education Statistics	5.0%
Student-Teacher Ratio	Ratio of students to full-time teachers. Please note: Student-teacher ratio is not a representation of average class size.	National Center for Education Statistics	5.0%

Table 4. Health and Safety Grade

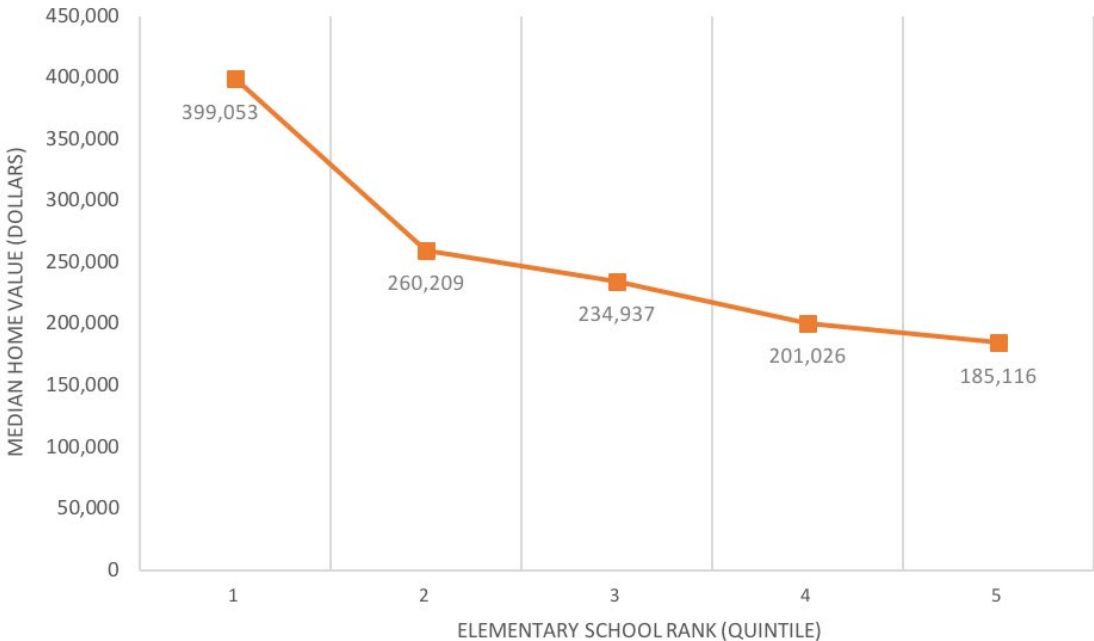
Factor	Description	Source	Weight
Parent/Student Surveys on Health & Safety	Niche survey responses scored on a 1-5 scale regarding safety in the district.	Self-reported by Niche users	50.0%
Expenses per Student	Total expenses divided by the total number of students.	National Center for Education Statistics	10.0%
Student Absenteeism	Percentage of students missing 15 or more days per school year.	Civil Rights Data Collection	10.0%
In-School Suspensions	Percentage of students receiving at least one in-school suspension.	Civil Rights Data Collection	7.5%
Out-of-School Suspensions	Percentage of students receiving at least one out-of-school suspension.	Civil Rights Data Collection	7.5%
Expulsions	Percentage of students expelled from the district.	Civil Rights Data Collection	5.0%
Law Enforcement Referrals	Percentage of students referred to law enforcement.	Civil Rights Data Collection	5.0%
School-Related Arrests	Percentage of students arrested for a school-related incident.	Civil Rights Data Collection	5.0%

Note: for more information on letter grade assignment and methodology see: <https://www.niche.com/about/methodology/best-school-districts/>

APPENDIX B. PERCENT OF ZIP CODE-SCHOOL OBSERVATIONS BY QUALITY LEVEL, U.S. PUBLIC ELEMENTARY SCHOOLS

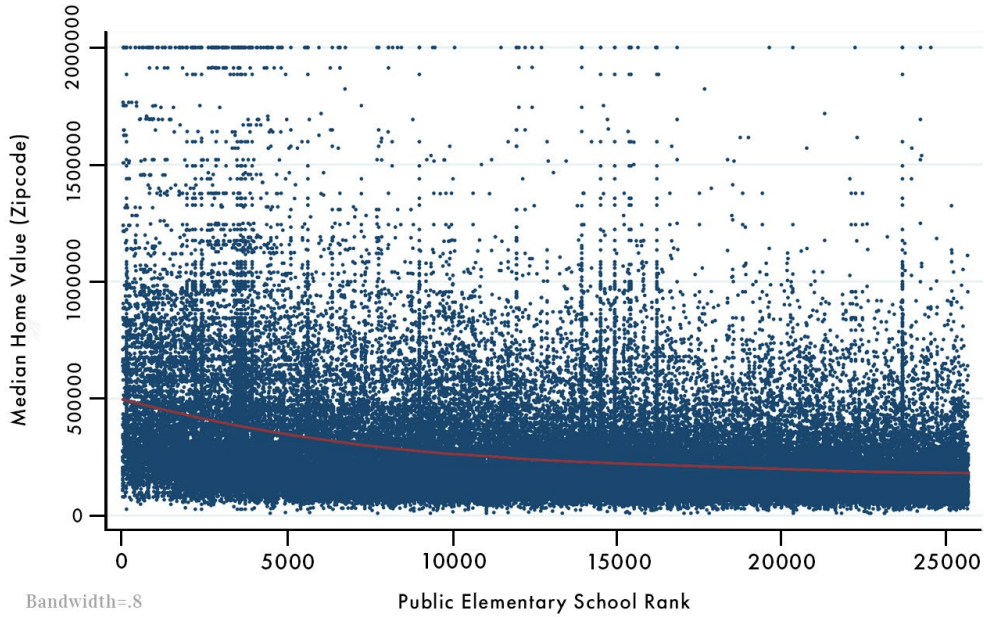
	Overall	Academic	Teacher	Health & Safety
A+	1.4	0.8	8.2	5.3
A	8.4	10.7	17.3	36.5
A-	10.8	12.1	16.7	28.3
B+	13.0	12.2	15.2	13.8
B	16.4	14.4	15.1	5.8
B-	15.7	14.3	11.9	5.9
C+	12.8	11.8	7.1	2.4
C	10.0	11.6	4.7	1.0
C-	9.2	11.8	3.8	0.9
D+	1.9	0.2	-	-
D or less	0.3	-	0.3	-
Total	100.0	100.0	100.0	100.0

APPENDIX C. FIGURE 1. MEDIAN HOME VALUE VARIES BY PUBLIC SCHOOL RANK



Note: Home values represent the mean ZIP code within a school-quality quintile. Note that certain districts with open enrollment policies contain non-binding school attendance areas and these relationships are reflected in this figure and others in the paper. Factors considered in Niche.com school ranking are described in Appendix A. Median home values are based on 2017 American Community Survey (ACS) estimates.

APPENDIX C. FIGURE 2. MEDIAN HOME VALUE VARIES NON-LINEARLY WITH SCHOOL RANK



Note: This figure was generated using lowess smoother, a locally weighted regression of median home value on public elementary school rank. Each data point represents a zip-school observation, with Y axis values indicating the median home value for a zip code associated with a school with X axis value rank.

APPENDIX D. SELECTED CITIES' MEASURES OF ZONING REGULATION

	Zoning Tax ² (Glaeser)	Metro Rank (of 47, Gyourko)	State Rank, Land Use (of 50, Calder)	State Rank, Zoning (of 50, Calder)
Portland, OR	N/A	24 ¹	7	15
San Francisco, CA	53.1%	6	22	38
Houston, TX	0%	38	49	49
Chicago, IL	5.7%	29	48	46

¹ The metropolitan area is Portland-Vancouver, OR-WA, which may bias the measure downward.

² The zoning tax is the gap between the marginal cost of new construction and the market price of an apartment.

Source(s): Glaeser, Edward L., Gyourko, Joseph and Saks, Raven. "Why is Manhattan so expensive? Regulation and the rise in housing prices." *The Journal of Law and Economics* 48, no. 2 (2005): 331-369. <https://www.nber.org/papers/w10124.pdf>
Gyourko, Joseph, Albert Saiz, and Anita Summers. "A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index," December 13, 2006. <https://doi.org/10.18411/d-2016-154>
Brown Calder, Vanessa. "Zoning, Land-Use Planning, and Housing Affordability." *Cato Institute Policy Analysis* 823 (2017). <https://www.cato.org/publications/policy-analysis/zoning-land-use-planning-housing-affordability>

APPENDIX E. SELECTED CITIES' ENROLLMENT POLICIES

	Enrollment Policies	School Enrollment Policies, (rated 0-4)
Portland, OR	Residential assignment with limited transfers	1
San Francisco, CA	Districtwide lottery	4
Houston, TX	Attendance waivers	1
Chicago, IL	Open enrollment	4

Note: Districts are assigned values from 0-4, with limited transfers/attendance waivers awarded 1 point and districtwide lottery or open enrollment awarded 4 points.

Portland scored by author, all other values provided by source.

Source: Wohlstetter, Priscilla, and Zeehandelaar, Dara. "America's Best (and Worst) Cities for School Choice." *Fordham Institute*.

(December 2015). <https://fordhaminstitute.org/sites/default/files/publication/pdfs/1209-americas-best-and-worst-cities-school-choice.pdf>

APPENDIX F. SCHOOL QUALITY BY HOME VALUE COMPARISON (OVERVIEW)

	Home Value, Highest Quality School	Home Value, Lowest Quality School	Home Value Difference, % (A to C school unless noted)	Home Value Difference, \$ (A to C school unless noted)	School Enrollment Policies (rated 0-4)	Zoning Policy Description (Restrictive, Moderate, Liberal)
National ¹	\$486,104	\$122,061	106%	\$196,408	n/a	n/a
Portland, OR	\$555,096	\$270,298	90%	\$262,552	1	R
San Francisco, CA	\$1,034,201	\$1,019,518	7%	\$64,910	4	R
Houston, TX	\$200,864	\$93,540	148%	\$179,026	1	L
Chicago, IL	\$292,872	\$243,609	14% ²	\$36,530 ²	4	M

Note: Home value represents the average neighborhood median home value associated with a given school quality level. Zoning policy description by author.

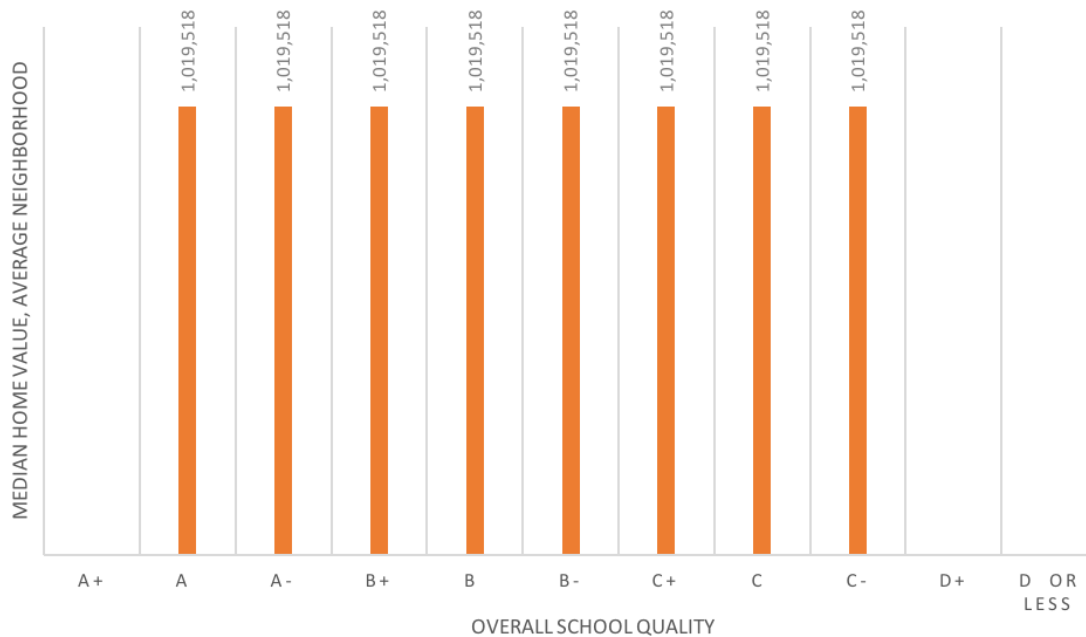
¹ National trend is driven by both intra and inter-district differences, whereas city trends are intra-district only.

² A- to C difference only (no A observations available).

APPENDIX G. SCHOOL QUALITY BY HOME VALUE COMPARISON (DETAIL)

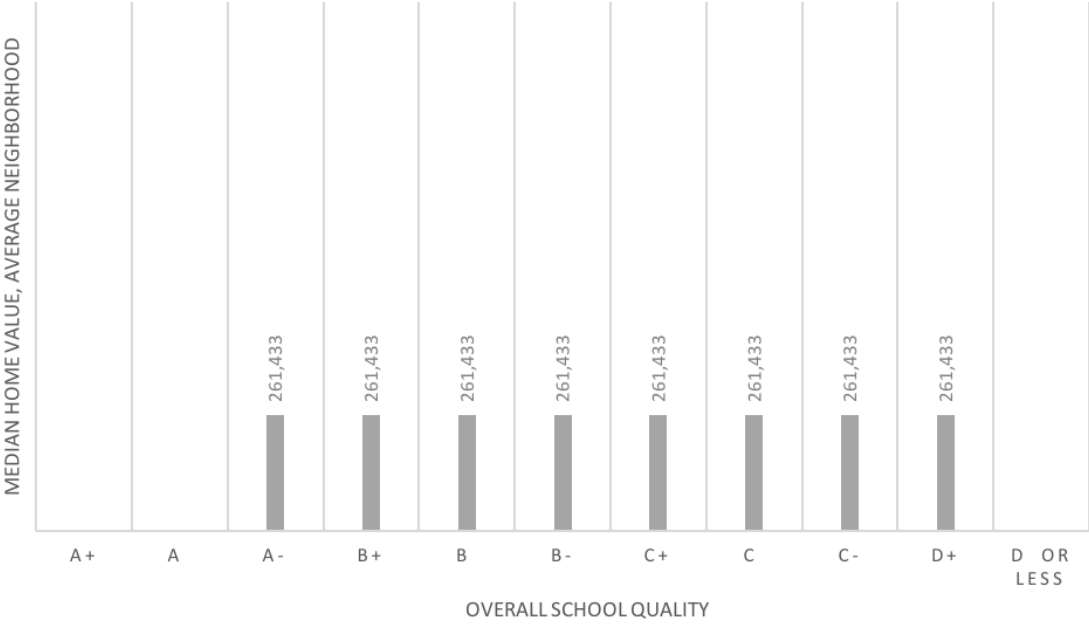
	National	Portland	San Francisco	Houston	Houston
A+	486,104	-	-	200,864	-
A	381,061	555,096	1,034,201	300,359	-
A-	255,338	464,175	1,062,672	301,165	292,872
B+	224,884	387,709	994,425	229,263	300,083
B	187,133	361,137	871,583	144,652	289,297
B-	181,811	331,866	995,707	184,348	260,584
C+	182,213	272,623	1,010,734	154,933	241,289
C	184,653	292,544	969,291	121,333	256,342
C-	206,431	270,298	1,019,518	93,540	204,508
D+	133,748	-	-	-	243,609
≤ D	122,061	-	-	-	-

APPENDIX H. FIGURE 1. SAN FRANCISCO HOME VALUES ARE HIGH AND FLAT ACROSS SCHOOL QUALITY LEVELS



Note: This figure is produced using a single average of all unique neighborhoods associated with a San Francisco public school. It does not rely exclusively on San Francisco's smaller, non-binding attendance areas to determine neighborhood-school relationships, but instead assumes that all neighborhoods intersecting San Francisco public school boundaries are functionally connected with all public schools in San Francisco.

APPENDIX H. FIGURE 2. CHICAGO HOME VALUES ARE MODERATE AND FLAT ACROSS SCHOOL QUALITY



Note: This figure is produced using a single average of all unique neighborhoods associated with a Chicago public school. It does not rely exclusively on Chicago's smaller, non-binding attendance zones to determine neighborhood-school relationships, but instead assumes that all neighborhoods intersecting Chicago public school boundaries are functionally connected with all public schools in Chicago.

Vanessa Brown Calder
Senior Policy Advisor

ENDNOTES

1. Card, David, and Alan B. Krueger. "Does school quality matter? Returns to education and the characteristics of public schools in the United States." *Journal of political Economy* 100, no. 1 (1992): 1-40. <https://www.journals.uchicago.edu/doi/abs/10.1086/261805>
2. Agostinelli, Francesco, Saharkhiz, Morteza, Wiswall, Matthew J. "Home and School Investment in the Development of Children." *National Bureau of Economic Research Working Paper Series* No. 26037. (July 2019). <https://www.nber.org/papers/w26037> Heckman, James J. "Skill formation and the economics of investing in disadvantaged children." *Science* 312, no. 5782 (2006): 1900-1902. <https://science.sciencemag.org/content/312/5782/1900>
3. Bonding social capital develops within social groups, whereas bridging social capital develops between social groups. Social groups include groups defined by religious, class, or racial/ethnic associations.
At school, children have opportunities to meet peers and build relationships through voluntary organizations including clubs, sports, and activities. Parents develop supportive social networks through school communities and volunteer organizations like the PTA.
4. "Back to School Statistics." National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education. <https://nces.ed.gov/fastFacts/display.asp?id=372>
5. U.S. Department of Education, National Center for Education Statistics. "*Digest of Education Statistics, 2017*" (NCES 2018-070). (2019). <https://nces.ed.gov/fastfacts/display.asp?id=6>
6. Dunn, Meredith, Horowitz, Brian, Lautz, Jessica, Schnerre, Anna, Snowden, Brandi. "2018 Profile of Home Buyers and Sellers." *National Association of Realtors*. (October 2018). https://nationalmortgageprofessional.com/sites/default/files/NAR_HBS_2018_10_29_18.pdf
7. Bergman, Peter, Chetty, Raj, DeLuca, Stefanie, Hendren, Nathaniel, Katz, Lawrence F, and Palmer, Christopher. *Creating Moves to Opportunity: Experimental Evidence on Barriers to Neighborhood Choice*. Cambridge, Mass., USA: National Bureau of Economic Research, 2019. <http://www.nber.org/papers/w26164.pdf>
8. Survey research finds about two-thirds of Americans earning less than \$60,000 per year say they are prevented from moving to a better neighborhood due to high housing costs.
Ekins, Emily. "What Americans Think About Poverty, Wealth, and Work: Findings from the Cato Institute 2019 Welfare, Work, and Wealth National Survey" *Cato Publications*. (September 2019). <https://www.cato.org/publications/survey-reports/what-americans-think-about-poverty-wealth-work>
9. For example, moving from a 25th to 75th percentile elementary school (a 1 standard deviation in student test scores) meant paying 10 percent more in home price, or \$14,000 in Mecklenburg County, North Carolina.
Kane, Thomas J, Staiger, Douglas O, and Cellini, Stephanie. *School Quality, Neighborhoods and Housing Prices: The Impacts of School Desegregation*. National Bureau of Economic Research, 2005. <http://www.nber.org/papers/w11347.pdf>
Consistent with this paper's findings, research suggests the house price premium varies non-linearly with school quality, and the price premium is larger for homes associated with high-performing schools.
Chiodo, Abbigail, Rubén Hernández-Murillo, and Michael T. Owyang. "Nonlinear effects of school quality on house prices." *Federal Reserve Bank of St. Louis Review* 92, no. May/June 2010 (2010). <https://files.stlouisfed.org/files/htdocs/publications/review/10/05/Chiodo.pdf>
Recent research suggests high income parents are more likely to invest in their children at home, and this home investment is more important than school investment in a child's early development. This may help explain why higher home values are often associated with higher quality public school outcomes (high home values are correlated with high incomes and therefore higher home investment). Still, educational quality has an impact on skill formation

and can vary outside of home investment, thereby exacerbating or reducing home-based gaps. See: Agostinelli, Francesco, Saharkhiz, Morteza, Wiswall, Matthew J. "Home and School Investment in the Development of Children." *National Bureau of Economic Research Working Paper Series* No. 26037. (July 2019). <https://www.nber.org/papers/w26037>

10. Ganong, Peter, and Daniel Shoag. "Why Has Regional Income Convergence in the U.S. Declined?" *Journal of Urban Economics* 102 (2017): 76–90. <https://doi.org/10.1016/j.jue.2017.07.002>.
Lens, Michael C., and Monkkonen, Paavo. "Do strict land use regulations make metropolitan areas more segregated by income?" *Journal of the American Planning Association* 82, no. 1 (2016): 6-21. <https://www.tandfonline.com/doi/abs/10.1080/01944363.2015.1111163>
Rothwell, Jonathan T., & Massey, Douglas S. "Density zoning and class segregation in U.S. metropolitan areas." *Social science quarterly*, 91(5). (2010).1123–1143. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3632084/>
11. Kane, Thomas J, Staiger, Douglas O, and Cellini, Stephanie. *School Quality, Neighborhoods and Housing Prices: The Impacts of School Desegregation*. National Bureau of Economic Research, 2005. <http://www.nber.org/papers/w1347.pdf>
Figlio, David N., Lucas, Maurice. *What's in a Grade?: School Report Cards and Housing Prices*. National Bureau of Economic Research, 2000. <https://www.nber.org/papers/w8019.pdf>
12. Rothwell, Jonathan. *Housing costs, zoning, and access to high-scoring schools*. Brookings Institution, 2012. https://www.brookings.edu/wp-content/uploads/2016/06/0419_school_inequality_rothwell.pdf
13. For example, California had three inter-district transfer programs which served 2.7% of all 2014–2015 students. Taylor, Mac. "Evaluation of the School District of Choice Program." Legislative Analyst Office. (January 2016). <https://lao.ca.gov/Publications/Report/3331>.
14. School finance equalization policies have also attempted to reduce the link between housing and school resources that result from traditional local property tax collection. However, school financing is a bit of a different issue: how resources are allocated as compared to which school students attend.
Property taxes typically fund 2/3 of school budgets, with most of the remaining funding provided by the state. Property taxes may also encourage restrictive residential zoning in order to control the tax base and ensure higher per capita revenue.
Fischel, William A. *Zoning Rules?: the Economics of Land Use Regulation* Cambridge, Massachusetts: Lincoln Institute of Land Policy, 2015.
15. "Public School Choice Programs." National Center for Education Statistics (NCES) Home Page, a part of the U.S. Department of Education, 2019. <https://nces.ed.gov/fastfacts/display.asp?id=6>.
16. JEC licensed data from Niche.com. The dataset is the product of public and private data including Department of Education (DOE), National Center for Education Statistics (NCES), Civil Rights Data Collection (CRDC), American Community Survey (ACS), and Niche student and parent surveys. For more information, see Appendix A.
17. ZIP codes are used for national estimates, and neighborhoods are used for cross-city comparisons. ZIP codes provide more comprehensive data coverage for national estimates (Figure 1) and neighborhoods provide a more granular unit of analysis for most comparison cities.
Niche's neighborhood data includes approximately 69 million residents located in 59 U.S. metro areas. Ninety-nine percent of 326,865 neighborhood-school observations are located in one of these metro areas. Neighborhoods vary in size from 60 residents to 60,000 and run the spectrum from well-defined and locally-understood boundaries to boundaries subjectively created by third parties.
18. Charter and magnet schools, which receive public funding but lack traditional school zones, are excluded.

19. A model regressing logged median home value on school quality grade dummies and state fixed effects with 185,027 zip-elementary school observations finds an overall $R^2 = 0.51$, F-stat = 3215.00, p-value = 0.00, adjusted $R^2 = 0.51$, root MSE = 0.49.
20. Relationships presented in Figure 2 are intended to provide descriptive information about the housing-school choice landscape families face. There are many variables that may influence the relationship between home values and school quality.
21. Median home values are based on the 2017 American Community Survey (ACS). The median home value in the United States in 2017 was approximately \$200,000, or less than the median home value in an average ZIP code associated with a B+ quality school.
US Census Bureau “2017 American Housing Survey” Table Creator tool “Nation – Value, Purchase Price, and Source of Down payment – Owner-occupied Units” Accessed October 23rd, 2019.
Zillow, Inc. “United States Home Prices & Home Values – United States Market Overview.” Zillow. (2019). <https://www.zillow.com/home-values/>
22. Note that not all school quality measures vary with home prices in the same way. For instance, school resources and facilities grades generally decline as average neighborhood median home value rise, and some other measures don’t follow an obvious pattern. The former relationship may be a consequence of redistributive federal or local programs.
23. Niche.com restricts the range of grade values for teacher quality between A+ and C- for display purposes.
24. Only major U.S. cities with historically strong housing demand are selected for comparison. In some cases selected cities do not provide widespread public school choice through a districtwide lottery, but provide other types of public school choice including magnet schools, charter schools, and attendance waivers. These alternatives can provide opportunities for circumventing the local housing and public school choice set, and are noted in some places though not reflected in estimates.
25. Portland Public Schools (PPS) only guarantees enrollment at assigned neighborhood schools. A limited number (2.8%) of K-8 students used the intra-district lottery to transfer to a non-assigned school during the 2018-2019 school year.
“Enrollment Projections.” Portland Public Schools. Accessed October 30, 2019. <https://www.pps.net/Page/1834>.
“Enrollment and Transfer / Prior Transfer Data.” Portland Public Schools. Accessed October 30, 2019. <https://www.pps.net/Page/1030>.
26. Note that Oregon state lawmakers recently upzoned single family areas to allow middle density housing, but this would not yet have had an effect.
Badger, Emily, and Quoctrung, Bui. “Cities Start to Question an American Ideal: A House With a Yard on Every Lot.” The New York Times. The New York Times, (June 2019). <https://www.nytimes.com/interactive/2019/06/18/upshot/cities-across-america-question-single-family-zoning.html>
“HB 2001.” Oregon Legislative Information System. Oregon State Legislature. Accessed November 8, 2019. <https://olis.leg.state.or.us/liz/2019R1/Measures/Overview/HB2001>.
27. U.S. Census Bureau. “U.S. Census Bureau QuickFacts: Portland City, Oregon.” Census Bureau QuickFacts. Accessed November 8, 2019. <https://www.census.gov/quickfacts/portlandcityoregon>.
28. Portland Public Schools (PPS) allows inter-district transfer enrollment for students that are connected to the district (for example, students that have siblings enrolled in PPS). In addition, PPS allows up to 100 students that do not meet specific criteria to transfer to PPS from an outside district. Inter-district transfers require the approval of sending and receiving districts.
“Enrollment & Transfer / Interdistrict Transfers.” Portland Public Schools. Accessed October 30, 2019. <https://www.pps.net/Page/10391>.

29. Glaeser, Edward L., Gyourko, Joseph and Saks, Raven. "Why is Manhattan so expensive? Regulation and the rise in housing prices." *The Journal of Law and Economics* 48, no. 2 (2005): 331-369. <https://www.nber.org/papers/w10124.pdf>
30. As noted in the text, San Francisco estimates are based on the city's school attendance areas in Figure 5. As a consequence of San Francisco's districtwide lottery, these attendance areas are non-binding and the functional relationship between schools and neighborhoods in San Francisco may be more accurately represented by Appendix H, Figure 1: a single average median home value displayed at each school quality level.
31. Kneebone, Elizabeth and Romem, Issi. "Disparity in Departure: Who Leaves the Bay Area and Where Do They Go?" *Terner Center Blog*. University of California Berkley. (October 2018). http://ternercenter.berkeley.edu/uploads/Disparity_in_Departure.pdf
Garosi, Justin and Uhler, Brian. "California Losing Residents Via Domestic Migration." Legislative Analyst Office. (February 2018). <https://lao.ca.gov/LAOEconTax/Article/Detail/265>.
32. Tucker, Jill. "SF School Board Plans to Replace Much-Criticized Student Assignment System." *SFChronicle.com*. San Francisco Chronicle, December 13, 2018. <https://www.sfchronicle.com/education/article/SF-school-board-plans-to-replace-failing-school-13461014.php?psid=kGeux>.
33. Schwartz, Katrina. "How the San Francisco School Lottery Works, And How It Doesn't." *KQED*, September 27, 2018. <https://www.kqed.org/news/11641238/how-the-san-francisco-school-lottery-works-and-how-it-doesnt-2>.
34. Interview with Robert Havdala, former Senior Director, Boston Public Schools, May 20th 2019.
35. Brown Calder, Vanessa. "Zoning, Land-Use Planning, and Housing Affordability." *Cato Institute Policy Analysis* 823 (2017). <https://www.cato.org/publications/policy-analysis/zoning-land-use-planning-housing-affordability>
36. Note that the city recently eliminated minimum parking requirements in two major neighborhoods. Schmitt, Angie. "Houston Rolling Back Parking Requirements." *Streetsblog USA*, July 19, 2019. <https://usa.streetsblog.org/2019/07/19/houston-rolling-back-parking-requirements/>
Gray, Nolan. "How Houston Regulates Land Use." *Market Urbanism*, September 19, 2016. <https://marketurbanism.com/2016/09/19/how-houston-regulates-land-use/>
37. Glaeser, Edward L., Gyourko, Joseph and Saks, Raven. "Why is Manhattan so expensive? Regulation and the rise in housing prices." *The Journal of Law and Economics* 48, no. 2 (2005): 331-369. <https://www.nber.org/papers/w10124.pdf>
38. US Census Bureau. "Counties in South and West Lead Nation in Population Growth." The United States Census Bureau, April 18, 2019. <https://www.census.gov/newsroom/press-releases/2019/estimates-county-metro.html>
39. Houston-Galveston Planning and Development Department, "Urban Houston Framework" Figure 6: Housing Type. Accessed October 25th, 2019. http://www.houstontx.gov/planning/DevelopRegs/urbanhoustonframework/PDFs/FullReport_UrbanHoustonFramework.pdf
40. "How to Apply." Chicago Public Schools. Accessed October 18, 2019. https://cps.edu/Schools/Enroll_in_a_school/Choose/Application_process/Pages/Understandandcompletetheapplicationprocess.aspx.
41. Glaeser, Edward L. *Triumph of the City?: How Our Greatest Invention Makes Us Richer, Smarter, Greener, Healthier, and Happier* New York: Penguin Press, 2011.
42. Glaeser, Edward L., Gyourko, Joseph and Saks, Raven. "Why is Manhattan so expensive? Regulation and the rise in housing prices." *The Journal of Law and Economics* 48, no. 2 (2005): 331-369. <https://www.nber.org/papers/w10124.pdf>
43. As noted in the text, Figure 9 estimates rely on neighborhood-school relationships generated using Chicago Public School's school attendance zones. As a consequence of Chicago's open

enrollment policy, these attendance zones are non-binding and the functional relationship between schools and neighborhoods may be more accurately represented by Appendix H, Figure 2: a single average median home value displayed at each school quality level.

44. Malanga, Steven. "Chicago's Hemorrhaging Housing Market." City Journal. Manhattan Institute, May 27, 2019. <https://www.city-journal.org/chicago-housing-market>.
45. Reyes, Cecilia, and Lourgos, Angie L. "Chicago Area Drops Population for Fourth Straight Year, Census Data Show; Cook, DuPage and Lake Counties Also Decline." *chicagotribune.com*, April 18, 2019. <https://www.chicagotribune.com/news/ct-met-census-chicago-cook-county-population-decline-20190408-story.html>.
46. Hertz, Daniel Kay. "Chicago's Residential Zoning." CARTO, 2015. https://dkhertz.carto.com/viz/b69edcea-8351-11e4-b9e8-0e9d821ea90d/public_map.
47. Zillow, Inc. "Chicago IL Home Prices & Home Values." Zillow. Accessed October 18, 2019. <https://www.zillow.com/chicago-il/home-values/>.
48. Research finds that in cities with a high degree of public school choice, elementary students commute 3 to 9 minutes to school on average. Unsurprisingly, this is a shorter commute to school than middle or high school students in the study. Even for high school students, the estimated median travel time was 10 to 15 minutes.
Blagg, Kristin, Matthew Chingos, Sean P. Corcoran, Sarah A. Cordes, Joshua Cowen, Patrick Denice, Betheny Gross et al. "The road to school: How far students travel to school in the choice-rich cities of Denver, Detroit, New Orleans, New York City, and Washington, DC." *Urban Institute Student Transportation Working Group*, (2018). <https://www.urban.org/research/publication/road-school-how-far-students-travel-school-choice-rich-cities-denver-detroit-new-orleans-new-york-city-and-washington-dc>
49. Past reforms including accessory dwelling unit (ADU) reform in California were circumvented by uncooperative local governments for years until state governments nearly eliminated local governments' ability to site and permit ADUs. Note that ADUs are secondary dwelling units -- colloquially granny or nanny flats-- that share a property with a primary residence.
Elmendorf, Chris. "Recalibrating Local Politics to Increase the Supply of Housing." *Regulation Magazine*. (Summer 2019). Cato Publications. <https://www.cato.org/sites/cato.org/files/serials/files/regulation/2019/6/reg-v42n2-3.pdf>

[View this report online](#)

social capital project

A project of the Joint Economic Committee – Republicans | Chairman, Sen. Mike Lee
jec.senate.gov | G-01 Dirksen Senate Office Building Washington, DC 20510 | (202) 224-5171