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Affordable Housing in High Opportunity Areas: Insights for Fair Housing Advocates

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Affordable Housing in High Opportunity Areas:

Insights for Fair Housing Advocates

A thesis submitted in partial satisfaction of the requirements for the degree Master of Urban and Regional Planning

by

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ABSTRACT OF THE THESIS

Affordable Housing in High Opportunity Areas:

Insights for Fair Housing Advocates

by

Emmanuel Kimon Proussaloglou

Master of Urban and Regional Planning

University of California, Los Angeles, 2023

Professor Paavo Monkkonen, Chair

The Low Income Housing Tax Credit (LIHTC) program is responsible for the lion's share of new affordable housing development in the United States. Since 1986, LIHTC has funded the construction of approximately 2.5 million units. A disproportionate number of these units, 90%[1], have been built in disadvantaged neighborhoods, despite the recent efforts of policymakers to direct construction to so-called high opportunity areas – census tracts with low poverty levels that provide economic and educational opportunities for residents.

In this thesis, I ask whether there are statistically significant differences between LIHTC projects built in high opportunity areas compared with projects built elsewhere. Theory suggests that there will be, as high opportunity areas are often zoned for single-family housing and have

[1] Author analysis of National Housing Preservation Database LIHTC data. 90% is the average share of units that are not high opportunity per the three different definitions of opportunity outlined in the methods section.

particularly restrictive anti-development residents and building regulations. I answer this question using data from the Department of Housing and Urban Development (HUD), the National Housing Preservation Database (NHPD), the Federal Housing and Finance Administration (FHFA), the US Census (ACS 5-year estimates), and metro area parcel databases.

My findings show statistically significant differences between LIHTC projects built in high-opportunity tracts and those built elsewhere within metropolitan areas. I categorize the differences along three dimensions – physical, administrative, and geographic. Physically, high opportunity-sited projects have more units, and these units are more likely to be predominantly studio/1 bedroom while noticeably avoiding predominantly 3-or-more bedroom units. These projects are also more likely to be new construction buildings and to have 100% of their units designated affordable (particularly 9% financed projects) rather than being mixed between affordable and market rate. Simultaneously, they are more likely to be on large lots, built at low residential densities, physically low in height, contextually designed, and characterized by welcoming and varied street facades, all characteristics that help allay anti-development sentiments.

Administratively, projects built in high opportunity areas are more likely to be targeted towards elderly/disabled populations, financed using 4% tax credits, owned by for-profit companies, and built after 2016 or before 2002 (particularly 4% financed projects). In recent years the positive high opportunity associations for number of units and 4% financing have fallen away.

Geographically, these projects are more likely to be sited on the West coast in populous Metropolitan Statistical Areas (MSAs) with either high home values or low home values, while avoiding MSAs in the middle of the home value distribution.

Much of the existing literature on LIHTC focuses on evaluating policies that impact where affordable housing is built, ignoring what kinds of buildings are built in different neighborhood contexts. This paper fills this gap by investigating the granular physical and administrative characteristics of projects at the individual address level. Accepting the complicated regulatory framework as given, understanding the projects that have successfully navigated through it can offer timely insights relevant to practitioners today. We know that high opportunity neighborhoods have particularly significant economic, health, and educational impacts on residents. This research can help guide future high opportunity development.

This thesis of Emmanuel Kimon Proussaloglou is approved.

Richard Sander

Dana Cuff

Anastasia Loukaitou-Sideris

Paavo Monkkonen, Committee Chair

University of California, Los Angeles

2023

I would like to thank the UCLA Lewis Center for Regional Policy Studies for their generous support of my research as a Lewis Center Fellow.

I would also like to thank my incredible committee for shaping me as a student over the past few years and for guiding this research over the past year.

I dedicate this thesis to my family and friends. Thank you for the constant support and love.

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1. Introduction

The so-called "economic development" approach has dominated the LIHTC program since its inception in 1986. This approach sites projects in disadvantaged areas to act as a conduit for further neighborhood investment. However, in recent years proponents of the "fair housing" model of affordable housing have argued that building affordable units in high opportunity areas should be a policy priority. The fair housing approach to affordable housing is predicated on the idea that where one lives is fundamentally important to one's future economic outlook.[1]

The fact that housing prices vary so dramatically in and of itself suggests that the power of where we live, and its impact on many other parts of life, is commonly understood. Demand in culturally vibrant metropolitan centers drives land and housing prices up, and housing prices in the carefully groomed, verdant, wealthy, and highly educated areas in these metros rise even higher. The Federal Home Loan Mortgage Corporation (colloquially known as Freddie Mac) estimates that 56 million Americans live in high opportunity census tracts (~18% of the US population), and that approximately 200,000 LIHTC units (~7% of LIHTC units nationwide) [2] are sited in these areas (Freddie Mac Multifamily, 2018).

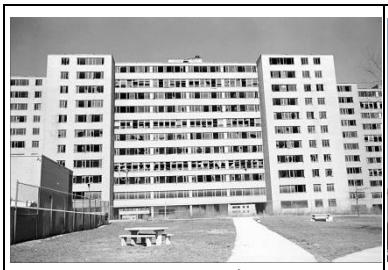
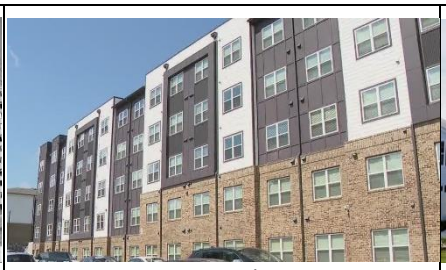
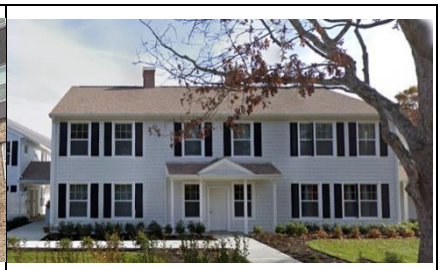
That 93% of LIHTC units and 82% of the US population are not located in high opportunity areas is unsurprising; it is by design. Zoning laws, local land use control, NIMBYism, high construction costs, high land costs, lack of available parcels, and limited subsidies are all factors that make it especially difficult to build in high opportunity places. Many of these barriers are inextricably linked with the single-family zoning designation. This type of

[1] See "Neighborhood Opportunity Matters" in the Literature Review
[2] Per my data the share of high opportunity LIHTC units is approximately 10%

zoning is underpinned by racist practices and has contributed to deep inequities in access to housing (Rothstein, 2017) (Sander et al., 2018). Nonetheless, it has become part and parcel of the American dream and the white picket fence image associated with it, and much of the most desirable land in US cities is zoned single-family (Arshad, 2021). In California for example, more than 80 percent of high opportunity tracts are comprised predominantly of single-family homes (C. Reid & Kneebone, 2017). Single family zones preclude all other types of housing development, leading to low density – often expensive – communities with aggressively pro status-quo residents who fight development and anything that might change the "character of the neighborhood." (McNee & Pojani, 2022).

A common stereotype about affordable housing in the US is that it all looks like the towering apartment block public housing of Pruitt-Igoe (Major, 2017). The size and scale of many early public housing projects, and their very public failures, remain embedded in the American psyche. Current media coverage of affordable housing construction highlights similarly large and high-density projects (Fox 5 Atlanta Digital Team, 2022). These projects are celebrated because of the large number of sorely needed housing units they provide, but they also reinforce the assumption that affordable housing could not possibly fit into lower-density neighborhoods. This isn't true.

Figure 1. Three Affordable Housing Projects of Different Scales

		
2,870 units	182 units	64 units

Pruitt-Igoe Saint Louis, MO	Parkside Atlanta, GA	Sandy Hollow Cove Southampton, NY

Much of the existing LIHTC literature focuses on demystifying the complexities of the program, explaining why it is hard to build in high opportunity areas, identifying inefficiencies, or critiquing the predominantly low opportunity siting of LIHTC projects. Very little of this literature looks specifically at the characteristics of the buildings themselves. Some affordable housing projects are successful at providing housing in high opportunity areas - roughly 12% of LIHTC projects nationwide[3] - and these projects can offer invaluable lessons for successfully building others.

To investigate high opportunity LIHTC funded projects I use LIHTC project data from the National Housing Preservation Database. While the LIHTC program does not cover the full universe of affordable housing options, it is by far the largest source of new affordable units in the country. Furthermore, it is a robust funding program that has survived numerous presidential administrations and is supported by members of both political parties. It's not perfect, but to study affordable housing in this country requires studying the LIHTC program's impacts. To test for differences between projects built in high opportunity areas and those built elsewhere, I use FHFA and HUD opportunity data and definitions. To test the impact of design and parcel level differences on opportunity siting, I use publicly accessible accessors parcel data. And to test for geographic differences, I use ACS 5-year estimates from 2020.

[3] Author analysis of National Housing Preservation Database LIHTC data. 12% is the average share of high opportunity projects using three different definitions of opportunity outlined in the methods section.

I find that there are significant differences between projects built in high opportunity areas and those built elsewhere. I categorize the differences along three dimensions – physical, administrative, and geographic. Physically, high opportunity-sited projects have more units, and these units are more likely to be predominantly studio/1 bedroom (particularly 4% financed projects) while noticeably avoiding predominantly 3 or more bedroom units. These projects are also more likely to be new construction buildings and to have 100% of their units designated affordable (particularly 9% financed projects), rather than being mixed between affordable and market rate. Simultaneously, they are more likely to be on large lots, built at low residential densities, physically low in height, contextually designed, and characterized by welcoming and varied street facades, all characteristics that help allay anti-development sentiments.

Administratively, projects built in high opportunity areas are more likely to be targeted towards elderly/disabled populations, financed using 4% tax credits, owned by for-profit companies, and built after 2016 or before 2002 (particularly 4% financed projects). In recent years the positive high opportunity associations for number of units and 4% financing have fallen away.

Geographically, these projects are more likely to be sited on the West coast in populous MSAs with either high home values or low home values, while avoiding MSAs in the middle of the home value distribution.

2. Background

In this section I give a brief overview of the history of affordable housing in the US from the 1930's to the 2000s.

American affordable housing policy started in earnest with the New Deal. From the 1930's through to the 1970's, the federal government stepped in to directly build (1930-40s) and

fully finance (1940-1970s) public housing, constructing projects under the auspices of the Housing Division of the Public Works Administration, the Reconstruction Finance Corporation, and various state housing authorities. These public housing projects, some of which still stand today, combined "the older traditions of American philanthropic housing, apartment house layout, and Beaux- Arts planning… with new ideas of housing developed by European modernists." (Pommer, 1978) Much of this housing was built in minority areas as this period was also characterized by efforts at "urban redevelopment," a euphemism for slum clearance coined in the 1949 Housing Act ("Provisions of the Housing Act of 1949," 1949). Urban redevelopment, later known as urban renewal, destroyed housing stock in largely non-white urban areas to build new units for new tenants, displacing existing residents and undermining hopes that public housing would lead to racial integration (Amunategui, 2022). The siting, design, and lack of support that characterized this housing generated intense criticism and led to policy changes in the 1970s (Bristol, 1991).

The new generation of policies from the 1970s revolved around breaking up developments into "scattered- site" housing, with the hope that "expanding housing choice through the dispersal of housing assistance" would provide more housing options for residents in more integrated neighborhoods (Dawkins, 2011). The Section 8 program (1974) and the Housing Choice Voucher program (1983) followed this ethos of decentralization and offered recipients the possibility of housing in new neighborhoods that did not have public housing.

In 1986, as part of the Reagan Administration's overhaul of the tax code, national affordable housing policy took another significant turn. The 1986 bill created the Low-Income Housing Tax Credit (LIHTC) which is now, by some margin, the most significant driver of new affordable housing development in the country (*About the LIHTC*, 2016). The program's reach is

so significant that between 1987 and 2006 LIHTC units accounted for nearly one third of all multifamily housing constructed, affordable or otherwise (Eriksen & Rosenthal, 2010). The tax credit operates under the auspices of the IRS, which allocates credits roughly proportional to population to state allocation boards. Each state allocation board then determines how their tax credits will be allocated through "qualified allocation plans" (QAPs) that are updated and published annually, providing instructions for developers who apply for tax credits to offset development costs.

For reference, the number of units associated with each federal assisted housing program as of 2019 are as follows (Sander, 2021). Housing Choice Vouchers account for 2.48 million units, the Low-Income Housing Tax Credit accounts for 2.45 million units, Project-based Section 8 accounts for 1.38 million units, and Public Housing accounts for 907,000 units.

3. Literature Review

In this literature review I touch on the changing role of the LIHTC program and its two major funding streams, research describing LIHTC project location practices and how policy influences siting, the impact of neighborhood opportunity levels on resident outcomes, the difficulties with developing in high opportunity areas, and the impact that design can have on construction success.

The Role of the Low-Income Housing Tax Credit

Since its inception in 1986 the LIHTC program has funded over 2.5 million units, and it is the only government program that currently adds substantial numbers of new affordable units to America's housing stock. The LIHTC program represents the major "supply side" component of US housing policy and operates alongside the major "demand side" component: Housing

Choice Vouchers (HCVs). In contrast to the LIHTC program which funds the construction or acquisition and rehabilitation of housing projects, HCVs heavily subsidize rent for low-income tenants in the private market to ensure that it is affordable to them.

Historically these programs have been viewed through different lenses. In 1968, the Kerner Commission report that preceded the Fair Housing Act called first for a "comprehensive and enforceable federal open housing law," (fair housing approach) and second for the "enrichment" of the black ghetto (community development approach) (Julian, 2008). In the decades that followed the HCV program took up the mantle of fair housing and the LIHTC program championed community development. Operating separately, the "divided fair housing and community development movements have not succeeded in either dismantling the vestiges of segregation in communities of color or in creating an open and inclusive society." (Julian, 2008)

Both programs shape our affordable housing system. Research from as far back as 1992 has shown that vouchers are less expensive, more efficient, and more flexible than LIHTC funded housing (*The Cost-Effectiveness of the Low-Income Housing Tax Credit Compared With Housing Vouchers*, 1992) (Deng, 2005) (Fisher et al., 2014) (Basolo & Nguyen, 2005). However, evidence from the Moving to Opportunity program highlights difficulties faced by voucher holders navigating the complex and segregated housing market, especially in high opportunity neighborhoods (Edin et al., 2008). If LIHTC units existed in these communities, prospective tenants would have had a greater number of stable, high-quality units available to them. As Khadduri succinctly summarizes, "LIHTC is most valuable when it does things that choice-based housing vouchers cannot do or do as well." (Khadduri, 2013)

The LIHTC program is split into two funding streams, the 4% tax credit and the 9% tax credit. Most scholarly research has either failed to differentiate between the two programs or has focused exclusively on the 9% program as it provides the most funding and is most heavily regulated by state QAPs. 9% tax credits fund up to 70% of the eligible costs of a prospective project, while 4% credits fund up to 30% of these costs and are often combined with tax-exempt bonds[4] (*About the LIHTC*, 2016). Owing to the difference in funding amount, 9% financing is predominantly used for new construction projects while 4% financing is split evenly between new construction and rehabilitation/acquisition projects.[5] 4% credits do not count towards state tax credit caps so their use is associated with more market driven projects. Though they are subject to the same income restrictions as 9% projects, applications for 4% projects have historically not been competitively allocated – all applicants that qualified received funding. As such, the QAP siting incentives that influence 9% project location do not apply to them (Kuai, 2023). Owing to the overprescription of 9% tax credits and the establishment of a 4% credit minimum rate in 2020, interest in the 4% program has grown in recent years (Gallegos, 2021) (Shelburne, 2022). Increased 4% demand has increased demand for the limited number of tax-exempt bonds – making 4% siting increasingly competitive (Kuai, 2023). This new competition creates opportunities for states to influence 4% project siting.

LIHTC project location and policy

Research has consistently shown that LIHTC projects are predominantly located in disadvantaged metro areas with high poverty rates, weak labor markets, high pollution levels, poor health outcomes, low performing schools, and subsequently dire economic outlooks for

[4] Approximately 80% of 4% financed projects use tax exempt bonds to fill in their financing gap (Kuai, 2023).
[5] Author data analysis of National Housing Preservation Database LIHTC data.

residents (Meyer, 2020) (G. C. Galster, 2013) (Ellen et al., 2018) (Dawkins, 2013) (Kawitsky et al., 2013).

When compared to market rate housing, 34% of LIHTC units are located in high poverty areas vs 18% of market rate units. LIHTC units are also underrepresented in low poverty areas: 15% vs 28% of market rate units (Fischer, 2018). This poverty concentration has the knock on effect of deepening economic, educational, and racial segregation ("The Low-Income Housing Tax Credit in New Jersey," 2010). This issue rose all the way to the US Supreme Court in 2015 with Texas Department of Housing & Community Affairs v. Inclusive Communities Project Inc. "Evidence presented at trial showed that 92.29% of LIHTC-financed units in Dallas were developed in census tracts with less than 50% of white residents." (McClure et al., 2020)

A 2011 report from the Department of Housing and Urban Development reviews much of the literature and offers explanations for LIHTC siting patterns (Dawkins, 2011). The reports notes that prioritization of "neighborhood revitalization" through the use of "qualified census tracts" (QCTs), the lack of enforcement of the required accompanying "community revitalization plans," point systems that reward the linking of funds to HOPE VI/public housing redevelopment or Community Development Block Grants, non-profit project set asides, and policies that prioritize projects that have received local government backing all act to concentrate LIHTC projects in low opportunity neighborhoods.

Policy can also effectively shift project location in a positive way. A 2015 study covering QAPs in 21 states found that changes in these documents have statistically significant impacts on LIHTC siting patterns (Ellen et al., 2015). This is in part driven by developers "chasing points," a view shared by the majority of "experts and practitioners in the LIHTC program." (Khadduri, 2013) A forthcoming paper by Owens and Smith finds additional evidence of this. After a

change in California's QAP that incentivized family projects in high opportunity areas, the number of developer applications for this project type increased by over 50% and "the total number of LIHTC-funded family housing units in higher-resource areas was 60% higher in the four years after the incentives were adopted compared to the four years prior." (Owens & Smith, 2023)

Research also shows that project siting characteristics vary across the country. Recent work from Sander and the Inclusivity Institute tracks the "relative exposure to poverty" of residents in assisted housing projects in America's 100 largest metro areas. They find dramatic differences likely owing to varied state policies. For example, the average LIHTC resident living in Greenville, SC lives in a census tract with a poverty rate that is 6% higher than the poverty rate of an average non-LIHTC resident's census tract (15.9% vs 15%). In Charlotte, NC, the average LIHTC resident lives in a census tract with a poverty rate that is 270% higher than the poverty rate of an average non-LIHTC resident's census tract (40.5% vs 15%) (Sander, 2021). The level to which states are overprescribed in their 9% tax credit program also varies by state, from 3:1 to 10:1 (Shelburne, 2022).

Neighborhood opportunity matters

Housing unit location has consistently been shown to impact cognitive development, school performance, mental health, long-term physical health, and economic prospects for residents (Sand & Rice, 2014). These effects are particularly salient for children (Chetty & Hendren, 2015) (Chetty et al., 2022).

Two seminal real-world experiments, the Gautreaux Mobility Program (1976-1998) (U.S. District Court for the Northern District of Illinois, 1969) and the Moving to Opportunity program

(1994-1998) (*Moving to Opportunity for Fair Housing*, 2017), kickstarted much of this research. Both programs involved the relocation of low-income residents to "higher opportunity neighborhoods"; analysis that followed the residents involved has largely shown improved economic mobility and future earnings for those who made such moves compared to those who remained (Chetty et al., 2015).

There is no one accepted definition of what makes a place "high opportunity," but various researchers have used various definitions and found comparable results. For example, an Urban Institute report from 2012 defined high opportunity census tracts based on poverty rate, labor force participation rate, low-wage job proximity, population share with bachelor's degree or higher, and population share non-Hispanic white. Their report found statistically significant relationships between moves to high opportunity tracts and reduced anxiety, higher adult employment levels and income, improved physical health, and increased college enrollment (Turner et al., 2012). Harvard's Opportunity Insights group leaned on poverty rate as an opportunity indicator and made the startling finding that "moving a child out of public housing to a low-poverty area when young (at age 8 on average) … will increase the child's total lifetime earnings by about $302,000." (Chetty et al., 2015)

In 2018, researchers from Freddie Mac gathered definitions from the Federal Housing and Finance Administration (FHFA), Enterprise Community Partners, and Opportunity Insights and parsed each one to better understand their criteria (Freddie Mac Multifamily, 2018). Other researchers have used the Department of Housing and Urban Development's (HUD) Affirmatively Furthering Fair Housing indicators, identifying tracts with multiple high indicator scores as high opportunity (McClure et al., 2020). Furthermore, state qualified allocation plans each set their own definition for opportunity. The FHFA analyzed QAPs nationwide and

identified 27 states that explicitly prioritize development in high opportunity areas (*Overview of the 2022 High Opportunity Area File*, 2022). These states are listed in Table 1, and the most used criteria are listed in Table 2.

Table 1. States with Opportunity Language in their QAP

States (Region)					
Alaska (West)	District of Columbia (Southeast)	Iowa (Midwest)	Minnesota (Midwest)	Pennsylvania (Northeast)	West Virginia (Southeast)
Arkansas (Southeast)	Florida (Southeast)	Louisiana (Southeast)	Mississippi (Southeast)	South Dakota (Midwest)	Wisconsin (Midwest)
California (West)	Idaho (West)	Maine (Northeast)	New York (Northeast)	Utah (West)	
Connecticut (Northeast)	Illinois (Midwest)	Maryland (Southeast)	Ohio (Midwest)	Virginia (Southeast)	
Delaware (Southeast)	Indiana (Midwest)	Massachusetts (Northeast)	Oregon (West)	Washington (West)	

Source: (Freddie Mac Multifamily, 2018)

Table 2. Most Common Attributes of High Opportunity

Criteria	**Number of QAPs that mention these criteria in their high opportunity definitions**
Schools performing above the state average	14
Poverty rate below the state average	12
Unemployment rate below the state average	8
Local job availability	7
High tract median income	6
Close geographic access to healthcare	5
Local high-quality job availability	4
Close geographic access to higher education	3
Limited assisted housing already existing in the census tract	3
Access to transit/walkability	3

Source: Author analysis of (Freddie Mac Multifamily, 2018)

Making a physical move from a low opportunity area to a high opportunity area often facilitates both racial and economic integration. This is because people of one race tend to live in communities with people of the same race (Loh et al., 2020) and because the United States remains highly segregated. When achieved across a metro area, housing integration has been shown to have significant positive effects on both the "out" group (racial minority and/or poor) and the "in" group (white and/or non-poor) (Sander et al., 2018). In 2016, Trounstine found that cities with high levels of neighborhood diversity have higher levels of public expenditure. Other researchers have found that increased racial integration lowers crime rates across all neighborhood regardless of racial composition (Trounstine, 2016) (Sander et al., 2018).

Opportunity might also mean different things to different residents. A recent study by Reid based on LIHTC tenant interviews suggests that quantitative opportunity maps don't capture the nuances of what makes neighborhoods high or low opportunity for residents (C. K. Reid, 2019). Furthermore, scholars have found that LIHTC projects are located in "neighborhoods with higher poverty rates, weaker labor markets, more polluted environments, and lower performing schools, but *better* transit access." (Ellen et al., 2018) For some working residents transit access might supersede all other considerations, while for others access to high quality education for example might be most important.

Why is it so hard to build affordable housing in high opportunity neighborhoods?

According to the Terner Center, the LIHTC program is directly implicated in the lack of high opportunity housing construction ("The Cost of Building Housing Series," 2020). LIHTC projects involve complex financing deals that require layering multiple funding sources, often on

the order of 4 to 8 funding streams. It is not uncommon to see even more than that (C. Reid, 2020). The LIHTC program has only increased in complexity over its lifetime, and this complexity doubles the cost of units from ~$200,000 to upwards of $400,000 in high demand housing markets like Los Angeles. High costs incentivize developers to build larger buildings to reduce their cost per unit, but larger buildings face more significant pushback. Community opposition and stringent local governmental design regulations increase the total cost of LIHTC projects by 12% (C. Reid, 2020).

The physical characteristics of high opportunity neighborhoods severely restrict the possibilities for building. Local control of zoning decentralizes housing policy decisions and has been shown to negatively impact multifamily building permitting (Mast, 2022). The single-family zone in particular restricts development, inefficiently uses available land, and precludes the multifamily projects LIHTC normally funds. (Weiss, 2002) (Trounstine, 2018) (Manville et al., 2020).

The association between opportunity and single-family zoning is striking. In California, "of the 1,568 census tracts designated as "Highest Resource…more than 80 percent are comprised predominantly of single-family homes, and in more than half (56 percent) of Highest Resource tracts, multifamily buildings with 10 or more units make up less than 10 percent of the housing stock." (C. Reid & Kneebone, 2017) This fundamental construction barrier is widespread too, as much of the land in metro areas across the country, on the order of 75% of it, is zoned R-1 (Arshad, 2021).

Anti-development residents in high opportunity areas also often manage to restrict building. Fischel's book, "The Homevoter Hypothesis," highlights the phenomenon of Not-In-My-Backyardism (NIMBYism). NIMBY beliefs grow out of concern for protecting and

increasing the value of "the homeowners principle asset – his home," and they are most common in high opportunity areas (Fischel, 2005) However, substantial research has demonstrated that the biggest NIMBY fear, that higher density housing construction will negatively impact property values, is unfounded (G. Galster, 2002). In 2005 the Furman Center published a literature review titled "Don't Put it Here," where they demonstrate this growing consensus (*Don't Put It Here!*, 2005). And a real-world experiment in Auckland, New Zealand suggests that increasing zoned density potential raises property values while simultaneously lowering per-unit housing costs (Greenaway-McGrevy et al., 2021).

Does building design play a role?

Numerous studies have demonstrated an association between qualities of well-designed architecture and improved resident wellbeing, and architectural approaches like New Urbanism emphasize the "public realm" where "people can live healthy and happy lives." (Zambrano-Barragan et al., 2022) (Evans et al., 2003) (Wells, 2000) (Moule & Polyzoides, 2005) (*What Is New Urbanism?*, 2015).

A recent seminar on workforce housing in California enumerated actionable principles for high quality building design: acknowledge context, prioritize sustainability, create shared spaces indoors and out, hide parking, activate the street, and be attentive to material choice and detailing (Laborde-Ruiz, 2023). Other researchers discuss how activating building facades with "a few big…visual shifts…and a mixture of higher- and lower-cost materials" can add dynamism to the exterior of a building, while reusing, rotating, stacking, and alternating a limited palette of elements can avoid monotony and keep costs down (Hoyt & Schuetz, 2020).

There is also anecdotal evidence that thoughtful design can help affordable housing succeed in neighborhoods otherwise opposed to its construction. For example, in New Berlin, Wisconsin, residents were vehemently opposed to the City Center at Deer Creek affordable housing project - "If I wanted to live by low-cost housing people I would have stayed in Milwaukee County." Post construction, some residents like John Blaguski regretted their opposition. "The 102 unit project is not the nuisance he had envisioned. When he drives by, he hardly notices it…'Does that look like low-income housing to you?'" (Eligon, 2020) The project that was built is contextual, landscaped, and inviting. It has a varied and well-appointed façade, pitched roofs, balconies for every unit, and parking hidden from the street. While aesthetically different, a high-density low-rise project in Santa Monica, California offers another example. The architects describe the design as responding to "neighbors [who] were vocal about development on this yet unbuilt lot. That anxiety was the impetus to see how maximum density could economically be achieved with massing that continued the detached house grain" (*Ashland Apartments*, 2019).

These projects represent buildings at two ends of the spectrum of so-called "Missing Middle" housing. Built at 17-75 dwelling units per acre, this type of housing fills the gap between single-family and high-density multifamily buildings (Badger, 2022). These densities can be accommodated in 2-4 story configurations, contextually matching most high opportunity built fabrics (Opticos Design, n.d.).

4. Conceptual Model

The preceding discussion makes five things clear. First, the LIHTC program is a major affordable housing provider in the US. Second, living in high opportunity areas is associated with positive economic and health outcomes for residents. Third, most LIHTC projects are not

sited in high opportunity areas. Fourth, using good design to pre-emptively guard against community concerns can help successfully build projects, especially in neighborhoods that oppose them. And fifth, the reasons for LIHTCs low opportunity siting are numerous and deep seated. However, we also know that some LIHTC projects have been built in high opportunity neighborhoods bucking the deleterious trends in LIHTC project siting writ large.

Academic literature on attitudes towards new development, as well as my personal experience at community meetings, leads to several hypotheses about the characteristics of affordable housing projects in high opportunity areas compared to those in other neighborhoods. I outline twelve hypotheses below.

First, LIHTC projects in high opportunity areas have fewer units than the average LIHTC project. Small buildings likely hold fewer units, and the zoning code of these neighborhoods might already allow for small multifamily buildings. If not, smaller buildings would require a less significant zoning variance. They might also garner less fervent community opposition as they hold fewer low-income residents.

Second, they are designed to look and feel like the frequently low-density high opportunity residential fabric. Good building and site design play a role here, and I expect to see high opportunity sited projects characterized by few stories, street setbacks, facade variation, social space, welcoming ground levels, and contextual features.

Third, they are explicitly targeted at “elderly or disabled” populations. These populations are perceived as un-threatening, and they don’t put pressure on other local institutions like schools. Furthermore, many states have identified these groups as deserving of large percentages of their LIHTC funds.

Fourth, they have predominantly studio or 1-bedroom units. More of these units can be built in a small building envelope and senior/disabled populations are often given these unit types.

Fifth, they are mixed income. In contrast to a fully affordable project, mixing affordable and market rate units might minimize neighbors' property value concerns and bring in wealthier tenants.

Sixth, the developers that build them are likely to be for-profit. Non-profit developers may be tied to specific underprivileged communities, while for-profit developers might see high opportunity (high AMI) places as more lucrative investments.

Seventh, they are new construction rather than acquisition and rehabilitation. New construction projects likely use higher quality materials, and developers control all aspects of the project to direct them towards specific populations.

Eighth, they have been built recently likely owing to high opportunity language being inserted into QAPs in the past decade or so.

Ninth, they are 9% financed. 9% financing usually supports new construction, and the larger credit amount would be especially helpful in high-cost areas.

Tenth, they are in the West and Northeast owing to their significant housing issues and subsequent focus on housing policy.

Eleventh, they are in high cost MSAs. High median home values indicate that there is housing demand likely related to employment, educational, and cultural opportunities. As such, I would expect more of the tracts in these MSAs to be high opportunity.

Twelfth, they are in populous MSAs for the same reasons.

Taken together, these hypotheses constitute a theory as to how LIHTC projects built in high opportunity areas differ from those built elsewhere. Now I turn to testing these hypotheses.

5. Methodology

I compiled the data used in this analysis from nine sources listed below.

Table 3. Data Sources

The National Housing Preservation Database published by the Public and Affordable Housing Research Corporation and the National Low Income Housing Coalition. This database is an address level inventory of all assisted housing projects in the country. The database was updated in October, 2022 and on 10/18/2022 at 1:37pm the database had 81,536 entries. Each project is identified by assistance type. Projects funded using any program other than LIHTC were removed. https://preservationdatabase.org/
2018 MSA CSBA Codes published by the US Census Bureau. This analysis focuses on census tracts in Metropolitan Statistical Areas (MSAs).[6] Observations that fell outside of MSA boundaries were dropped. (https://www.census.gov/geographies/reference-files/time-series/demo/metro-micro/delineation-files.html)
2021 MSA CBSA Population data published by the US Census Bureau. https://www.census.gov/data/tables/time-series/demo/popest/2020s-total-metro-and-micro-statistical-areas.html

[6] I limited this analysis to just projects located in so called "metropolitan" census tracts. These places are categorized as Metropolitan Statistical Areas (MSAs) and a full definition can be found here: https://www.census.gov/programs-surveys/metro-micro/about.html

ACS-5 Year estimates for 2020 on population demographics and household characteristics published by the US Census Bureau. https://data.census.gov/
Federal Housing and Finance Administration data on opportunity (2022), land prices, and parcel sizes (2020). https://www.fhfa.gov/DataTools/Downloads/Pages/Duty-to-Serve-Eligibility-Data.aspx https://www.fhfa.gov/PolicyProgramsResearch/Research/Pages/wp1901.aspx
US Department of Housing and Urban Development affirmatively furthering fair housing indicators. These indicators cover: Low Poverty, School Proficiency, Jobs Proximity, Labor Market Engagement, Low Transportation Cost, Transit Trips, and Environmental Health. https://www.hud.gov/sites/dfiles/FHEO/documents/AFFH-T-Data-Documentation-AFFHT0003a-September-2017.pdf
Southern California Association of Governors parcel level land use data for Southern California. The data was last updated in February, 2021. https://rdp.scag.ca.gov/mapping/rest/services/Housing/2019_Annual_Land_Use_NAD83/MapServer
New York State parcel level land use data from 31 counties that make their data publicly available. https://gis.ny.gov/parcels
New Jersey parcel level land use data from across the state. The data was last updated on December 16th, 2022. https://www.arcgis.com/home/item.html?id=d543ddcc1e6844319ffa826fee52fccf
Colorado's Arapahoe, Adams, Denver, and Jefferson county parcel data. https://www.arapahoegov.com/1151/GIS-Data-Download, https://data-adcogov.opendata.arcgis.com/,

https://www.arcgis.com/home/group.html?id=31a0c1babcc84c80b4ebcff5fecb159b#overview, https://www.jeffco.us/739/GIS-Mapping

After combining datasets, removing faulty project entries, keeping only metropolitan observations, targeting my analysis towards LIHTC projects, and creating additional analytical variables, my database includes 25,260 observations (Appendix 1). Each observation represents one LIHTC project.

There is no one agreed upon definition for what makes a place "high opportunity." To ensure the robustness of my conclusions about the associations between variables and high opportunity project siting, I subsequently used three different "high opportunity" definitions with varying levels of strictness (see Appendix 2 for maps). I regressed against all three definitions in the analysis.

The first and broadest definition is based on Affirmatively Furthering Fair Housing Indicators published by HUD. Five of the seven indicators are reported at the census tract level and two are reported at the census block level. For those two indicators: School Proficiency and Jobs Proximity, a median value from the relevant census blocks was calculated to aggregate the observations to the tract level. For example, if a census tract held three blocks each with a School Proficiency score of 5, 12, and 20 respectively, the tract level school proficiency score was reported as 12 (median of the blocks). I divided all seven tract level indicators into quintiles, and labeled a tract as high opportunity if it fell into the top two quintiles in four or more of the seven indicators. 18,369 tracts nationwide (21.8%) are high opportunity using this metric.

The intermediate definition is based on the Federal Housing and Finance Administration's high opportunity database. There are two ways for a census tract to be categorized as high opportunity using the FHFA's definition. Since 2016 HUD has been designating certain tracts in the country as Difficult to Develop (DDA) based off their ratio of land costs to Area Median Income (AMI). If a tract is both identified as a Difficult to Develop Area by HUD and has a tract poverty rate of 10% or less, it is labeled as high opportunity. Furthermore, if the tract is both identified as high opportunity by its state's QAP and has a poverty rate below 10%, it is labeled as high opportunity. If a tract qualifies as high opportunity under either, or both, of these definitions, it is labeled as high opportunity in my database. 13,902 tracts nationwide (16.4%) are high opportunity using this metric. This is the definition utilized in the results section.

The strictest definition is a combination of the preceding two. If a tract qualifies as high opportunity using the HUD AFFH indicators and qualifies as high opportunity under the QAP/poverty rate portion of the FHFA definition, then it qualifies as high opportunity under this final definition. 67% of the tracts identified as high opportunity under the HUD AFFH definition also are high opportunity under the full FHFA definition. Restricting the FHFA definition to just those identified as high opportunity by their state's QAPs reduces the overlap. 6,042 tracts nationwide (7.2%) are high opportunity using this metric

As introduced in the literature review, there are significant differences between 4% and 9% financing within the LIHTC program. These programs were analyzed separately. Housing finance practitioners also assert that the LIHTC program changed significantly after the Great Recession of 2008. Projects opened since 2009 were analyzed separately. Furthermore, numerous early regression results pointed to new construction projects being more highly associated with

opportunity than acquisition and rehabilitation projects. New construction projects were thus analyzed separately.

Finally, the share of high opportunity tracts in a state is highly tied to the number of high opportunity projects that are built in that state. To account for this, I calculated the share of tracts labeled as high opportunity using each of the three definitions in each state. I used the median value of these three opportunity shares to characterize each state. Subsequently, the top 1/3 of states with the highest opportunity shares were analyzed separately (Table 4). State fixed effects are included in all regressions to ensure that the national regressions are not unduly influenced.

Table 4. 16 States with the Highest Proportion of High Opportunity Tracts

States (Region)			
Alaska (West)	Hawaii (West)	Minnesota (Midwest)	Utah (West)
California (West)	Illinois (Midwest)	New Jersey (Northeast)	Vermont (Northeast)
Connecticut (Northeast)	Maryland (Southeast)	New York (Northeast)	Virginia (Southeast)
District of Columbia (Southeast)	Massachusetts (Northeast)	South Dakota (Midwest)	Wisconsin (Midwest)

Count of States with the Highest Opportunity Share by Region				
West	Southwest	Midwest	Southeast	Northeast
4	0	4	3	5

The various permutations of regression analysis are listed in Table 5. The outputs for each regression can be found in the appendix.

Table 5. Regression Combinations

Dataset	Full Dataset	New Construction 4% and 9%	New Construction 9%	New Construction 4%
Data Subset	All Years and States			
Regression 1	AFFH Opportunity	AFFH Opportunity	AFFH Opportunity	AFFH Opportunity
Regression 2	FHFA Opportunity	FHFA Opportunity	FHFA Opportunity	FHFA Opportunity
Regression 3	AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity
Data Subset		Post 2009 Only		
Regression 4		AFFH Opportunity	AFFH Opportunity	AFFH Opportunity
Regression 5		FHFA Opportunity	FHFA Opportunity	FHFA Opportunity
Regression 6		AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity
Data Subset		Highest Opportunity States only		
Regression 7		AFFH Opportunity	AFFH Opportunity	AFFH Opportunity
Regression 8		FHFA Opportunity	FHFA Opportunity	FHFA Opportunity
Regression 9		AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity	AFFH + FHFA QAP Opportunity

As each opportunity definition is coded as a categorical 1 or 0 variable, I ran logistic regressions. The independent variables were the same for every regression and they are listed and explained in Table 6 below:

Table 6. Variable Names and Descriptions

Variable Name	Description
Log Total Building Units - log_LIHTC_TotalUnits	To avoid outliers having a big impact on the regression results I took the log() of the total number of units in the project. For mixed income projects, this includes the market rate units too. On average, 94% of the total units

	in projects in the database are LIHTC restricted. Total number of units irrespective of affordability most directly dictates building form.
Predominant Unit Type - i.MainBedroomType	NHPD reports data on the count of various types of units in LIHTC projects. These unit types are: - studio or 1 bedroom - 2 bedroom - 3 or more bedrooms To create categories I first calculated the ratio of each unit type within each project. I then found the 80th percentile of the distribution for each unit type ratio. These values were as follows: - 85.7% studio/1 bedroom - 60.2% 2 bedroom - 48.9% 3 bedrooms or more If a project has a proportion of a particular unit type equal to or greater than any of these, it was flagged. 1. High proportion of studio/1 bedroom 2. High proportion of 2 bedroom 3. High proportion of 3+ bedroom 4. No high proportion – Mixed
Project Target Tenancy - i.TargetTenancyCombined	As part of the LIHTC application process developers often designate a particular population as the target population for the development. 1. Elderly or Disabled 2. Family 3. Other
Construction Type - i.finalcombinedconstruction	LIHTC funds can be used to fund "new construction" or "acquisition and rehabilitation" projects. 1. New Construction 2. Acquisition and Rehabilitation 3. Both
LIHTC Financing Type - i.finalcombinedfinancing	Within LIHTC there are two major funding streams: the 4% tax credit and the 9% tax credit. 1. 4% financing 2. 9% financing 3. 4 and 9% combined

	There are seven total financing categories in the NHPD data, but all others are minimally important and represent various combinations of these two major funding steams. As such, the rest are left undiscussed and unreported.
Project Owner Type - i.OwnerTypeBuckets	The NHPD database reports "owner type" for each LIHTC project. I am using "owner type" as a proxy for developer type. While the relationship is likely not one-to-one, it may be reasonable to assume that non-profit owners are owning/operating buildings developed by non-profit developers and vice versa. 1. For-Profit 2. Non-Profit 3. Other
Project Age - i.projectagebuckets	1. 0-7 years old (built in 2016 or later – this is important as HUD's Difficult to Develop designation became tract based in 2016.) 2. 8-14 years old (built from 2009-2015) 3. 15-21 years old (built from 2002-2008) 4. 22-28 years old (built from 1995-2001) 5. 29+ years old (built from 1986-1994)
Are all units assisted - i.AllAssisted	0. <100% LIHTC units 1. 100% LIHTC units
MSA Population Size - i.MSAsizecategory	Population size cutoffs were set at the 25th, 35th, and 50th percentiles of the data. 1. Less than or equal to 550,000 residents 2. Between 550,000 and 850,000 residents 3. Between 850,000 and 2,000,000 residents 4. Greater than 2,000,000 residents
Geographic Region of the Project - i.RegionNum	(*United States Regions*, n.d.): 1. West 2. Southwest 3. Midwest 4. Southeast 5. Northeast
Median Home Value in MSA - i.MSAMedianHomeValueBuckets	Housing price cutoffs were set at the 33rd and 66th percentiles of MSA median home values: 1. Less than or equal to $179,100

	2. Between $179,100 and $412,400 3. Greater than $412,400
State - i.StateNumeric	To reduce the impact of state variation I regressed all 50 states as fixed effects

Three different dependent variables were tested:

HUD AFFH Indicators High Opportunity - AFFH_HighOpp	0. Not High Opportunity 1. High Opportunity
FHFA High Opportunity - FHFA_HighOpp	0. Not High Opportunity 1. High Opportunity
AFFH and FHFA QAP Only Overlap High Opportunity - AFFHandFHFAQAPHighOpp	0. Not High Opportunity 1. High Opportunity

I ran regressions using these independent and dependent variables for the full database as well as "New Construction," "Post 2009," "Highest Opportunity States," "9%," and "4%" projects specifically and in various combinations (see Appendix 3).

To further investigate the regression results, and to understand the effect that design decisions can have on project siting, I conducted a visual analysis in three MSAs: Los Angeles-Long Beach-Anaheim, New York-Newark-Jersey City, and Denver-Aurora-Lakewood. For each MSA, I generated project lists for new construction 4% and 9% projects in high opportunity areas as well as non-high opportunity areas using the FHFA definition. I then randomly selected projects from these lists and used Google street-view to capture a representative street facing facade for each project. I generated a database of project elevations that is discussed in the results section (Appendix 4).

Subsequently, I gathered parcel level data from each city's accessor databases and merged it into the larger project database. This data includes information on parcel area, and in some cases, building footprint information as well. I combined parcel area and NHPD unit counts to generate DU/acre values for all projects in the three chosen MSAs. For one project from each location and financing type subset I referenced Google images, project websites, and architectural documentation to evaluate the quality of the project's design. These projects were chosen primarily to match the median DU/acre density from the project list, and secondarily to match lot size and number of unit values. For example, for 9% non-high opportunity projects in Denver the median residential density is 51.03 DU/acre. The project chosen for study, Juan Diego Apartments at 2447 W Dunkeld Pl, Denver, CO is built at 54.67 DU/acre.

It is difficult to choose a strict set of criteria for what constitutes good design, and it is complicated to try and objectify qualities that are based for many on emotion. However, the design of a project is the outward face that it presents to a community, and previous scholarship suggests that the design of a project affects how it is received. As community reception and government approval are important to getting a project built, it is important to test this theory even at a simplified level.

To do so, I winnow down the qualities of good design to the following six criteria pulled from concepts outlined in the literature review[7]: Contextually appropriate design (0-2), parking

[7] I scored projects using the following criteria:
Contextual: If the project blends into the neighborhood from above (1). If it also blends in from the street (2)
Parking: If parking spots are partially hidden from the street (1). If parking spots are fully hidden (2).
Facade: If there is some material/color variety on the facade (1). If there is also variety in 3D form (2).
Shared Space: If there is any shared outdoor space (1). If it is also generous and nicely landscaped (2).
Ground Floor: If the ground floor has living units or active retail (1). If it is also setback from the street, landscaped, and has porosity (2).
Interiors: If the units are new and well kept (1). If they also have unique materials or architectural features (2).

strategy (0-2), materially and geometrically varied facade (0-2), quality outdoor shared space (0-2), inviting ground floor (0-2), interior unit quality (0-2).

6. Results

In this section I first compare descriptive statistics for various subsets of the data. I then describe regressions results for the full dataset, new construction projects, 9% new construction projects, and 4% new construction projects. For most analyses I run multiple tests looking at all projects of that type, only those in the highest opportunity states, and only those opened after 2009. The regression results vary which suggests that there are differences between programs. Some of the results contradict my hypotheses. A summary of each regression outcome follows the related tables. I then finish by describing a visual analysis I conducted of 240 affordable housing projects across the country.

Table 7. Descriptive Statistics of Dataset

	Full LIHTC Dataset	**New Construction Only**	**Highest Opportunity States Only**	**Post 2009 Only**
LIHTC Projects	25,260	14,481	10,629	9,328
% HUD AFFH High Opportunity	21.1%	23.9%	28.9%	23.0%
% FHFA High Opportunity	11.4%	13.7%	18.5%	12.3%
% FHFA QAP and HUD High Opportunity	3.8%	4.4%	7.5%	4.0%
Physical				
Median # Assisted Units	59	57	59	63
% Targeted towards Elderly/Disabled	24.7%	26.9%	22.8%	28.5%
% Targeted towards Family	39.8%	38.7%	42.5%	41.9%

% Mostly Studio / 1 Bed	20.8%	17.2%	24.0%	23.2%
% Mostly 2 Bed	20.8%	19.5%	17.6%	18.0%
% Mostly 3 Bed	18.1%	21.6%	15.9%	12.8%
% No Predominant Unit Type	40.3%	41.7%	42.5%	46.0%
% Fully Assisted	40.9%	58.5%	42.7%	55.6%
Administrative				
% For Profit Owner	70.9%	71.3%	66.9%	66.2%
% Non-Profit Owner	21.8%	23.7%	24.8%	24.4%
% Post 2016	13.7%	14.6%	13.6%	37.1%
% 2009 - 2016	23.2%	22.0%	26.9%	62.9%
% 2002 - 2009	30.8%	32.2%	30.2%	N/A
% 1995 - 2002	23.2%	23.2%	21.9%	N/A
% 1986 - 1995	9.1%	8.1%	7.5%	N/A
Geographic				
% West	24.3%	27.8%	37.9%	27.1%
% Southwest	7.6%	7.4%	N/A	8.0%
% Midwest	23.0%	21.5%	12.8%	20.0%
% Southeast	24.4%	25.9%	10.7%	23.4%
% Northeast	20.7%	17.5%	38.3%	21.5%
% in MSA with Median Housing Cost < 179,100	26.1%	24.7%	7.1%	24.1%

% in MSA with Median Housing Cost > 179,100 and < 412,400	48.4%	51.0%	37.9%	46.6%
% in MSA with Median Housing Cost > 412,400	25.5%	24.4%	55.0%	29.3%
Median Tract/MSA Poverty Rate	1.51	1.36	1.52	1.48
Median Project Tract Population Density	6.32	5.22	11.7	6.74
Median Project Tract Housing Unit Density	2.51	2.05	4.27	2.66

There are four major takeaways. First, as expected the states with the largest proportion of their tracts labeled as high opportunity also have elevated proportions of high opportunity LIHTC projects – state fixed effects were controlled for in all regressions. Second, projects funded since 2009, and new construction projects writ large, are more likely to be fully assisted. Third, since the financial crisis of 2008, 2009-2016 was a more prolific building period than 2016-2023. And fourth, projects built since 2009 have the lowest share of predominantly 3+ bedroom units.

Table 8: Descriptive Statistics of 9% and 4% New Construction Projects

	9% New Construction Only	**4% New Construction Only**
LIHTC Projects	8,096	3,639
% HUD AFFH High Opportunity	23.4%	28.3%
% FHFA High Opportunity	13.9%	17.0%
% FHFA QAP and HUD High Opportunity	4.9%	5.1%
Physical		

Median # Assisted Units	50	84
% Targeted towards Elderly/Disabled	26.7%	27.8%
% Targeted towards Family	40.3%	44.3%
% Mostly Studio / 1 Bed	16.5%	18.9%
% Mostly 2 Bed	19.8%	15.0%
% Mostly 3 Bed	24.8%	12.7%
% No Predominant Unit Type	39.0%	53.4%
% Fully Assisted	59.7%	45.0%
Administrative		
% For Profit Owner	67.1%	77.9%
% Non-Profit Owner	28.1%	17.1%
% Post 2016	14.0%	18.0%
% 2009 - 2016	20.4%	19.6%
% 2002 - 2009	31.7%	36.7%
% 1995 - 2002	26.8%	19.4%
% 1986 - 1995	7.0%	6.4%
Geographic		
% West	29.8%	36.0%
% Southwest	8.2%	8.9%
% Midwest	21.2%	12.6%

% Southeast	26.8%	19.3%
% Northeast	14.0%	23.3%
% in MSA with Median Housing Cost < 179,100	26.3%	14.2%
% in MSA with Median Housing Cost > 179,100 and < 412,400	51.8%	45.7%
% in MSA with Median Housing Cost > 412,400	21.9%	40.1%
Median Tract/MSA Poverty Rate	1.369	1.318
Median Project Tract Population Density	4.939	7.195
Median Project Tract Housing Unit Density	1.967	2.735

Comparing 4% and 9% funded projects uncovers substantial differences. Most importantly, a larger share of 4% funded new construction projects are found in high opportunity areas. 4% funded projects house substantially more units, these units are mixed between bedroom types, and they are less likely to be fully assisted. They are also more likely to be for-profit owned and built since 2016. Geographically, they are more heavily concentrated in the West and Northeast, and they are far more likely to be in high cost MSAs (40.1% vs 21.9%). 4% projects are also found in slightly lower poverty tracts with higher population and housing unit densities. This is to say, the 4% and 9% programs are funding substantially different types of new construction projects, and projects receiving 4% funding seem to be more commonly located in expensive urban areas.

The following logit regression results highlight the variables that are most associated with high opportunity siting. For consistency and ease of reporting, the FHFA definition of opportunity is the definition used in this section.[8] Regressions using other opportunity definitions can be found in the appendix.

The first regression reported below includes the full database of 25,260 LIHTC funded projects. An explanation of the independent variables used can be found in Table 6 in the methods section. The regression output table is shown in Table 9.

Full Dataset:

Table 9: Full Dataset Regression Results

	(2)
	FHFA
VARIABLES	Full Dataset
Log Total Building Units	0.073*
	[0.038]
Predominant Unit Type 1. Studio/1 bedroom is base	
2. Two bedroom	0.149
	[0.091]
3. Three or more bedrooms	-0.112
	[0.101]
4. Mixed	0.048
	[0.075]
Project Target Tenancy 1. Elderly/disabled is base	
2. Family	-0.382***
	[0.073]
3. Other	-0.285***
	[0.077]

[8] See Methodology page 22 for the definition.

Construction Type 1. New construction is base	
2. Acquisition and rehabilitation	-0.755***
	[0.064]
3. Both	-0.837***
	[0.215]

LIHTC Financing Type 1. 4% is base	
2. 9%	-0.176***
	[0.063]
3. 4% and 9% Combined	-0.195
	[0.122]

Project Owner Type 1. For-profit is base	
2. Non-Profit	-0.207***
	[0.066]
3. Other	0.042
	[0.103]

Project Age 1. 2016-2023 is base	
2. 2009-2015	-0.207**
	[0.085]
3. 2002-2008	-0.198**
	[0.079]
4. 1995-2001	-0.003
	[0.086]
5. 1986-1994	-0.082
	[0.147]

Are all units assisted 1. <100% assisted is base	
2. 100% Assisted	0.117*
	[0.062]

MSA Population Size 1. <= 550,000 residents is base	
2. 550,001 - 850,000 residents	0.397***
	[0.111]
3. 850,001 - 2,000,000 residents	0.488***
	[0.120]

4. 2,000,001+ residents	0.294***
	[0.089]

Geographic Region of Project 1. West is base	
2. Southwest	-3.209***
	[0.389]
3. Midwest	-0.695*
	[0.370]
4. Southeast	-3.907***
	[0.620]
5. Northeast	-1.602***
	[0.463]

Median Home Value in MSA 1. <179,100 is base	
2. 179,101 - 412,400	-0.228**
	[0.108]
3. 412,401+	0.585***
	[0.145]

Constant	0.759*
	[0.410]

Observations	16,420
Pseudo R2	0.149

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Table 10. Full Dataset Regression Interpretation

Log Total Building Units	An increase in the number of units is positively associated with high opportunity siting.
Predominant Unit Type	The base of this categorical variable is "Predominantly studio/1 bedroom" unit projects. • There are no significant results, but predominantly 3 or more bedrooms has a negative coefficient.
Project Target Tenancy	The base of this categorical variable is "Elderly/Disabled" target tenancy. • Relative to "Family" and "Other" target tenancies, "Elderly/Disabled" projects are strongly positively associated with high opportunity siting.

Construction Type	The base of this categorical variable is "New Construction." • Relative to "Acquisition and Rehabilitation" and "Other" building types, "New Construction" projects are strongly positively associated with high opportunity siting.
LIHTC Financing Type	The base of this categorical variable is "4% Financing." • Relative to "9%" financing, "4%" is strongly positively associated with high opportunity siting.
Project Owner Type	The base of this categorical variable is "For-Profit." • Relative to "Non-profit," "For-Profit" owners are strongly positively associated with high opportunity siting.
Project Age	The base of this categorical variable is 2016-Present. • "2016-Present," "1995-2002," and "1986-1994" are more positively associated with high opportunity siting than "2002-2008," and "2009-2015."
Are all units assisted?	The base of this categorical variable is <100% assisted • Projects that are 100% assisted are positively associated with high opportunity siting.
MSA Population Size	The base of this categorical variable is <550,000 people. • MSAs with "550-850,000," "850-2,000,000," and "2,000,000+" people are positively associated with opportunity siting.
Geographic Region of Project	The base of this categorical variable is "West" • Relative to "Southwest," "Midwest," "Southeast," and "Northeast," projects located in the Western United States are strongly positively associated with high opportunity siting.
Median Home Value in MSA	The base of this categorical variable is "$179,100" • Relative to the base, MSAs with median home values greater than $412,400 are strongly positively associated with high opportunity siting. MSAs with median home values between $179,100 and $412,400 are negatively associated with high opportunity siting.

In summary, the results suggest that LIHTC projects sited in high opportunity areas physically have many units, do not have a predominant unit type, are newly constructed, and are

100% assisted. Administratively they are 4% financed, elderly/disabled targeted, for-profit owned, and recently opened (or opened before 2002). And geographically they are located in populous, Western MSAs with either cheap or expensive housing but rarely in between.

The following tables describe the regression results for three distinct datasets: new construction projects of both financing types, only 9% newly constructed projects, and only 4% newly constructed projects. The FHFA dependent variable, independent variables, and the "base" for interpreting regression results remain the same throughout.

New Construction:

For these analyses I also tested only projects in the highest opportunity states and only projects opened since 2009. This process is described in the methods section. The results for all subset regressions of newly constructed projects are shown in Table 11 below.

Table 11: New Construction Regression Results

	(2)	(5)	(8)
	FHFA	FHFA	FHFA
VARIABLES	All States and Years	Highest Opportunity States	Post 2009
Log Total Building Units	0.177***	0.080	0.008
	[0.052]	[0.066]	[0.070]
Predominant Unit Type 1. Studio/1 bedroom is base			
2. Two bedroom	0.122	0.101	0.294**
	[0.116]	[0.148]	[0.147]
3. Three or more bedrooms	-0.112	-0.299*	-0.075
	[0.121]	[0.153]	[0.180]
4. Mixed	0.048	-0.063	0.132
	[0.093]	[0.113]	[0.115]
Project Target Tenancy 1. Elderly/disabled is base			

2. Family	-0.392***	-0.506***	-0.394***
	[0.087]	[0.110]	[0.111]
3. Other	-0.264***	-0.332***	-0.318***
	[0.090]	[0.116]	[0.123]
Construction Type 1. New construction is base	-	-	-
2. Acquisition and rehabilitation	-	-	-
3. Both	-	-	-
LIHTC Financing Type 1. 4% is base			
2. 9%	-0.104	-0.172*	0.007
	[0.075]	[0.093]	[0.105]
3. 4% and 9% Combined	-0.362*	-1.220	-0.280
	[0.218]	[0.794]	[0.234]
Project Owner Type 1. For-profit is base			
2. Non-Profit	-0.293***	-0.213**	-0.075
	[0.079]	[0.098]	[0.100]
3. Other	-0.320*	-0.417*	0.002
	[0.171]	[0.230]	[0.149]
Project Age 1. 2016-2023 is base			
2. 2009-2015	-0.238**	-0.313**	-0.252***
	[0.106]	[0.127]	[0.089]
3. 2002-2008	-0.161*	-0.203*	
	[0.097]	[0.121]	
4. 1995-2001	0.147	0.172	
	[0.105]	[0.135]	
5. 1986-1994	0.037	-0.024	
	[0.168]	[0.226]	
Are all units assisted 1. <100% assisted is base			
2. 100% Assisted	0.175**	0.116	0.339***
MSA Population Size 1. <= 550,000 residents is base	[0.076]	[0.099]	[0.107]

2. 550,001 - 850,000 residents	0.419***	0.602***	0.365**
	[0.131]	[0.204]	[0.185]
3. 850,001 - 2,000,000 residents	0.580***	0.620***	0.209
	[0.143]	[0.181]	[0.207]
4. 2,000,001+ residents	0.298***	0.200	0.296**
	[0.103]	[0.135]	[0.143]
Geographic Region of Project 1. West is base			
2. Southwest	-3.388***		-4.852***
	[0.449]		[1.119]
3. Midwest	-0.798*	-0.824*	-2.715**
	[0.434]	[0.444]	[1.146]
4. Southeast	-4.469***	-2.922***	-6.564***
	[0.826]	[0.467]	[1.491]
5. Northeast	-1.309**	-1.388**	-3.445***
	[0.540]	[0.546]	[1.171]
Median Home Value in MSA 1. <179,100 is base			
2. 179,101 - 412,400	-0.425***	-0.488**	-0.466**
	[0.128]	[0.203]	[0.187]
3. 412,401+	0.378**	0.379	0.335
	[0.172]	[0.231]	[0.237]
Constant	0.407	1.061*	2.783**
	[0.486]	[0.547]	[1.151]
Observations	9,954	4,152	6,043
Pseudo R2	0.162	0.0924	0.131

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Results that differ from the full database regression are discussed below:

Table 12: New Construction Regression Interpretation

Log Total Building Units	An increase in the number of units is positively associated with high opportunity siting. However, the association weakens when looking only at the highest opportunity states and falls again when looking only at recent projects.
Predominant Unit Type	Relative to the base, predominantly two-bedroom unit projects are positively associated with high opportunity

	siting in recent years. Predominantly three-bedroom unit projects are negatively associated with high opportunity siting in the highest opportunity states.
Construction Type	N/A
LIHTC Financing Type	9% financing remains negatively associated with high opportunity siting, but the coefficient becomes slightly positive in recent years.
Project Age	"2016-Present," is more positively associated with high opportunity siting than "2009-2015" and "2002-2008"
Are all units assisted?	Projects that are 100% assisted are positively associated with high opportunity siting. The significance falls away when only looking at the highest opportunity states.
Median Home Value in MSA	Relative to the base, MSAs with median home values greater than $412,400 are positively associated with high opportunity siting, but in recent years the association has dropped in significance. MSAs with median home values between $179,100 and $412,400 are strongly negatively associated with high opportunity siting.

The differences from the full dataset regression are italicized below. The results suggest that new construction projects in high opportunity areas physically have many units *(though less so in the highest opportunity states and less again in recent projects), trend towards predominantly two-bedroom units while avoiding predominantly three-bedroom units*, and are 100% assisted. Administratively they are 4% financed *(though 9% is improving in recent years),* elderly/disabled targeted, for-profit owned, and recently opened (or opened before 2002). And geographically they are located in populous, Western MSAs with either cheap or expensive housing but rarely in between.

9% New Construction:

The results for all subset regressions of newly constructed 9% financed projects are shown in Table 13 below.

Table 13: 9% New Construction Regression Results

	(2)	(5)	(8)
	FHFA	FHFA	FHFA
VARIABLES	Dataset	Highest Opportunity States	Post 2009
Log Total Building Units	0.157**	0.039	0.228
	[0.075]	[0.095]	[0.164]
Predominant Unit Type 1. Studio/1 bedroom is base			
2. Two bedroom	0.198	0.276	-0.173
	[0.154]	[0.195]	[0.256]
3. Three or more bedrooms	-0.043	-0.240	-0.165
	[0.157]	[0.196]	[0.284]
4. Mixed	-0.015	-0.167	-0.154
	[0.128]	[0.154]	[0.190]
Project Target Tenancy 1. Elderly/disabled is base			
2. Family	-0.463***	-0.659***	-0.249
	[0.120]	[0.153]	[0.179]
3. Other	-0.288**	-0.531***	-0.288
	[0.120]	[0.158]	[0.192]
Construction Type 1. New construction is base	-	-	-
2. Acquisition and rehabilitation	-	-	-
3. Both	-	-	-
LIHTC Financing Type 1. 4% is base			
2. 9%	-	-	-
3. 4% and 9% Combined	-	-	-
Project Owner Type 1. For-profit is base			
2. Non-Profit	-0.415***	-0.417***	-0.378**
	[0.100]	[0.123]	[0.160]
3. Other	-0.212	-0.451	-0.190

	[0.217]	[0.290]	[0.324]

Project Age 1. 2016-2023 is base			
2. 2009-2015	-0.355**	-0.401**	-0.343**
	[0.138]	[0.166]	[0.147]
3. 2002-2008	-0.512***	-0.631***	
	[0.132]	[0.165]	
4. 1995-2001	-0.180	-0.154	
	[0.141]	[0.179]	
5. 1986-1994	-0.144	-0.215	
	[0.220]	[0.295]	

Are all units assisted 1. <100% assisted is base			
2. 100% Assisted	0.265***	0.198	0.579***
	[0.100]	[0.126]	[0.175]

MSA Population Size 1. <= 550,000 residents is base			
2. 550,001 - 850,000 residents	0.361**	0.687***	0.168
	[0.165]	[0.255]	[0.294]
3. 850,001 - 2,000,000 residents	0.588***	0.666***	0.550*
	[0.168]	[0.215]	[0.298]
4. 2,000,001+ residents	0.287**	0.228	0.512**
	[0.142]	[0.179]	[0.249]

Geographic Region of Project 1. West is base			
2. Southwest	-3.671***		-4.493***
	[0.528]		[1.192]
3. Midwest	-1.073**	-1.122**	-2.127*
	[0.504]	[0.520]	[1.152]
4. Southeast	-5.390***	-3.387***	-4.593***
	[1.119]	[0.555]	[1.184]
5. Northeast	-1.271**	-1.471**	-2.511**
	[0.631]	[0.642]	[1.268]

Median Home Value in MSA 1. <179,100 is base			
2. 179,101 - 412,400	-0.363**	-0.134	-0.484*
	[0.159]	[0.237]	[0.283]
3. 412,401+	0.369	0.568**	0.048
	[0.226]	[0.287]	[0.384]

Constant	1.030*	1.649**	2.100
	[0.593]	[0.678]	[1.341]
Observations	5,758	2,530	1,929
Pseudo R2	0.188	0.141	0.162

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

The results are as follows:

Table 14: 9% New Construction Regression Interpretation

Log Total Building Units	An increase in the number of units is positively associated with high opportunity siting. However, the association is weakest when looking only at the highest opportunity states.
Predominant Unit Type	There are no significant results, but predominantly 3 or more bedrooms has a negative coefficient throughout.
Project Target Tenancy	Relative to "Family" and "Other" target tenancies, "Elderly/Disabled" projects are strongly positively associated with high opportunity siting.
Construction Type	N/A
LIHTC Financing Type	N/A
Project Owner Type	"For-profit" owners are more positively associated with high opportunity siting than "Non-profit" owners.
Project Age	"2016-Present" is strongly positively associated with high opportunity siting, especially when compared to "2002-2008," and "2009-2015."
Are all units assisted?	Projects that are 100% assisted are strongly positively associated with high opportunity siting.
MSA Population Size	MSAs with "550-850,000," "850-2,000,000," and "2,000,000+" people are positively associated with opportunity siting.
Geographic Region of Project	Relative to "Southwest," "Midwest," "Southeast," and "Northeast," projects located in the Western United States are strongly positively associated with high opportunity siting.
Median Home Value in MSA	Relative to the base, MSAs with median home values greater than $412,400 are positively associated with high opportunity siting, especially in the highest opportunity states. MSAs with median home values between $179,100 and $412,400 are negatively associated with high opportunity siting.

The results suggest that new construction 9% projects in high opportunity areas physically have many units (though less so in the highest opportunity states), do not have a

predominant unit type, and are 100% assisted. Administratively they are elderly/disabled targeted, for-profit owned, and recently opened. And geographically they are located in populous, Western MSAs with either cheap or expensive housing but rarely in between.

4% New Construction:

The results for all subset regressions of newly constructed 4% financed projects are shown below in Table 15.

Table 15: 4% New Construction Regression Results

	(2)	(5)	(8)
	FHFA	FHFA	FHFA
VARIABLES	Dataset	Highest Opportunity States	Post 2009
Log Total Building Units	0.189**	0.216**	-0.065
	[0.087]	[0.106]	[0.168]
Predominant Unit Type 1. Studio/1 bedroom is base			
2. Two bedroom	-0.353	-0.273	0.606
	[0.220]	[0.268]	[0.406]
3. Three or more bedrooms	-0.585**	-0.721**	-0.668
	[0.245]	[0.303]	[0.526]
4. Mixed	-0.020	-0.049	0.381
	[0.160]	[0.189]	[0.278]
Project Target Tenancy 1. Elderly/disabled is base			
2. Family	-0.166	-0.108	-0.238
	[0.146]	[0.176]	[0.247]
3. Other	-0.164	-0.002	-0.114
	[0.165]	[0.199]	[0.266]
Construction Type 1. New construction is base	-	-	-
2. Acquisition and rehabilitation	-	-	-

3. Both	-	-	-

LIHTC Financing Type 1. 4% is base			
2. 9%	-	-	-
3. 4% and 9% Combined	-	-	-

Project Owner Type 1. For-profit is base			
2. Non-Profit	-0.201	0.014	-0.104
	[0.159]	[0.193]	[0.220]
3. Other	-0.495	-0.355	-0.489
	[0.335]	[0.464]	[0.527]

Project Age 1. 2016-2023 is base			
2. 2009-2015	-0.287	-0.462**	-0.341*
	[0.186]	[0.215]	[0.200]
3. 2002-2008	0.146	0.113	
	[0.163]	[0.199]	
4. 1995-2001	0.476***	0.580**	
	[0.183]	[0.234]	
5. 1986-1994	0.689**	0.968**	
	[0.315]	[0.467]	

Are all units assisted 1. <100% assisted is base			
2. 100% Assisted	-0.056	-0.076	0.237
	[0.146]	[0.200]	[0.268]

MSA Population Size 1. <= 550,000 residents is base			
2. 550,001 - 850,000 residents	0.676**	0.379	0.121
	[0.272]	[0.383]	[0.538]
3. 850,001 - 2,000,000 residents	0.897***	0.933**	-15.225
	[0.320]	[0.409]	[1,513.615]
4. 2,000,001+ residents	0.621***	0.336	0.394
	[0.187]	[0.238]	[0.326]

Geographic Region of Project 1. West is base			

2. Southwest	-2.447**		-1.268
	[0.989]		[0.773]
3. Midwest	-0.127	-0.267	0.799
	[0.978]	[0.995]	[0.562]
4. Southeast	-2.476*	-2.238**	-1.099
	[1.393]	[1.028]	[1.162]
5. Northeast	-0.742	-0.689	-1.147**
	[1.184]	[1.199]	[0.458]
Median Home Value in MSA 1. <179,100 is base			
2. 179,101 - 412,400	-0.385	-1.028**	-1.211*
	[0.292]	[0.492]	[0.726]
3. 412,401+	0.538	0.255	-0.561
	[0.342]	[0.525]	[0.779]
Constant	-1.131	-0.810	-0.781
	[1.018]	[1.155]	[1.162]
Observations	2,709	1,396	910
Pseudo R2	0.114	0.0803	0.110

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

Results that differ from the 9% regression are discussed below:

Table 16: 4% New Construction Regression Interpretation

Log Total Building Units	An increase in the number of units is positively associated with high opportunity siting. However, the association becomes negative post 2009.
Predominant Unit Type	Studio/1 bedroom units appear associated with high opportunity siting owing to all other types having negative coefficients. Predominantly three-bedroom unit projects are strongly negatively associated with high opportunity siting.
Project Target Tenancy	There is no target tenancy particularly associated with high opportunity siting though family and other have negative coefficients throughout.
Project Owner Type	There is no significant owner type finding.
Project Age	1986-1994" and "1995-2001," are strongly associated with high opportunity siting. Compared to "2009-2015," projects built since 2016 and between "2002-2008" are more highly associated with high opportunity siting.

Are all units assisted?	There is no significant association between 100% assisted projects and high opportunity siting.
Geographic Region of Project	The West still performs better than other regions, but the results are less significant.
Median Home Value in MSA	Relative to the base, MSAs with median home values between $179,100 and $412,400 are negatively associated with high opportunity siting.

The differences between 4% and 9% new construction regression results are italicized. The results suggest that 4% projects in high opportunity areas physically have many units *(though less so in recent years),* particularly avoid predominantly 3-bedroom unit types, and are *not 100% assisted*. Administratively they are *not targeted towards a particular population*, *do not have particular owner type*, and are recently opened (*or opened before 2002*). And geographically they are located in populous, Western MSAs with either cheap or expensive housing but rarely in between.

Each of the statistical tests reveal nuances relevant to practitioners using specific financing, interested in new construction projects, working in particularly high opportunity states, or benchmarking against only recently built projects. To summarize all analyses, Table 17 reports the average coefficient sign and significance level across regressions. These values give a sense for the trends that remain stable throughout, and they inform the conclusions made below.

Table 17. Combined Regression Results

	AFFH Opportunity Definition		FHFA Opportunity Definition		FHFA QAP + AFFH Opportunity Definition	
	Av. Coefficient Sign	Av. P-Value	Av. Coefficient Sign	Av. P-Value	Av. Coefficient Sign	Av. P-Value
Log Total Building Units	+	**	+		-	

Predominant Unit Type 1. Studio/1 bedroom is base						
2. Two Bedroom	-	***	+		-	
3. Three or more bedrooms	-	***	-		-	*
4. Mixed	-	**	+		-	
Project Target Tenancy 1. Elderly/disabled is base						
2. Family	-	**	-	***	-	***
3. Other	-	**	-	**	-	
Construction Type 1. New construction is base						
2. Acquisition and rehabilitation	-	***	-	***	-	***
3. Both	-	***	-	***	-	*
LIHTC Financing Type 1. 4% is base						
2. 9%	-		-		+	
3. 4% and 9% Combined	+		-		+	
Project Owner Type 1. For-profit is base						
2. Non-profit	-		-	**	-	**
3. Other	-	*	-		-	
Project Age 1. 2016-2023 is base						
2. 2009-2015	-		-	**	-	
3. 2002-2014	+		-	*	+	
4. 1995-2001	+	***	+		+	*
5. 1986-1994	+	*	+		-	
Are all units assisted 1. <100% assisted is base						
2. 100% assisted	+		+	*	+	
MSA Population Size 1. <= 550,000 residents is base						
2. 550,001 - 850,000 residents	+		+	*	+	*

3. 850,001 - 2,000,000 residents	+		-	**	-	*
4. 2,000,001+ residents	+		+	**	+	***
Geographic Region of Project 1. West is base						
2. Southwest	-	**	-	***		
3. Midwest	+		-		+	
4. Southeast	-		-	***	-	*
5. Northeast	+	**	-	**	-	***
Median Home Value in MSA 1. <179,100 is base						
2. 179,101 - 412,400	+		-	**	-	
3. 412,401+	+	***	+		-	

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

Physical Characteristics:

1. LIHTC projects located in high opportunity areas have more units than other LIHTC projects.
2. They are predominantly studio/1 bedroom and almost certainly not predominantly 3-bedroom units.
3. They are 100% assisted.
4. They are new construction rather than acquisition and rehabilitation.

Administratively:

5. They are targeted towards elderly/disabled populations.
6. They do not have a strongly preferred financing type, but 4% funded projects seem more successful at high opportunity siting.
7. They are owned by for-profit companies.
8. They were built after 2016 or before 2002.

Geographically:

9. They are found in the most populous MSAs.
10. They are found in either low cost or high cost MSAs but not the middle.
11. They are found in the Western United States.

Design Analysis:

Of the original twelve hypotheses, the statistical analyses suggest that six are true, two are mostly true, two are mostly wrong, one is thoroughly wrong, and one is un-answered. The remainder of this section focuses on the final two hypotheses: the incorrect and un-answered ones.

The incorrect hypothesis was that projects with fewer units would be associated with high opportunity siting; the statistical analyses suggest the opposite. To better understand this unexpected result, I investigated 3 MSAs in depth: Los Angeles-Long Beach-Anaheim, New York-Newark-Jersey City, and Denver-Aurora-Lakewood. The LA and NYC MSAs are the two most populous in the country with a combined 32 million residents. Including Denver, this MSA specific analysis covers 35.7 million people (16.25% of the US urbanized population). I analyze Denver's MSA to avoid biasing results towards two uniquely large and expensive places. This three-city survey should provide reliable conclusions that can be generalized for metro areas across the country.

The methodology section explains the details, but I utilized parcel level data, Google street view, and a visual design based analysis to further understand the unique characteristics of high opportunity sited projects. These results offer one compelling explanation as to how projects with larger unit counts are more highly associated with high opportunity siting.

Focusing on the Los Angeles-Long Beach-Anaheim MSA, the median 9% financed high opportunity project has 49 units, is located on a 2.04 acre site, is built at 33.89 DU/acre, and has a building footprint to lot size ratio of .37.[9] In a visual analysis of 25 of these projects, 96% are 3 stories or less and 52% have the suburban iconography of a gabled roof.

The median 9% financed non-high opportunity project in LA's MSA has 49 units, is located on a .55 acre site, is built at 67.61 DU/acre, and has a building footprint to lot size ratio of 1.31. In a visual analysis of 25 of these projects, 40% are 3 stories or less and 20% have the suburban iconography of a gabled roof.

These differences are dramatic. Comparing the elevations[10] of all 50 projects suggests that high opportunity projects more commonly look low density, visually match the single-family houses nearby, and are built on larger more landscaped lots. However, they still manage to provide at least same number, or more in the case of New York City and Denver, of affordable units as their more densely built low opportunity counterparts. This result is remarkably stable in each of the three different cities. A summary of these results is shown in Table 18.

Table 18. Design Analysis 9% Results

	9% High LA - All 32 Projects		9% High NYC - 43 Projects		9% High Denver - 12 Projects	
Share of Projects High Opp	7%		15%		11%	
	Value	Median	Value	Median	Value	Median
% in Major Metro	9%		5%		42%	
% For-profit	69%		37%		83%	
% Post DDA Change	22%		12%		17%	
Tract over MSA pov rate		59%		55%		118%
% Single Family Tract		42%		53%		49%

[9] The Los Angeles MSA parcel data had detailed building footprint information. This statistic is reported for LA MSA summary tables only.

[10] "Elevation" is a term commonly used by architects. It means the "street facing facade." ie. what you see if you are looking directly at a building from the street.

% 10+ Units Tract		22%		19%		22%
Tract Housing Unit Density		2.73		3.67		2.40
Tract Population Density		8.06		9.97		6.24
Number of Units		49		60		64
Lot Size (Acre)		2.04		1.94		2.32
DU/Acre		33.89		34.12		22.58
Building Footprint		23,206				
Unbuilt sq ft		62,382				
Ratio of Bldg ftpt to Unbuilt		0.37				

	9% High LA - 25 Projects		9% High NYC - 25 Projects		9% High Denver - 10 Projects	
Number of Units		50		65		64.8
% 3 Stories or Less	96%		76%		70%	
% Gabled	52%		72%		50%	

	9% Low LA - All 420 Projects		9% Low NYC - 236 Projects		9% Low Denver - 100 Projects	
	Value	Median	Value	Median	Value	Median
% in Major Metro	50%		19%		58%	
% For-profit	67%		17%		79%	
% Post DDA Change	12%		14%		20%	
Tract over MSA pov rate		167%		204%		198%
% Single Family Tract		26%		2%		36%
% 10+ Units Tract		38%		67%		37%
Tract Housing Unit Density		8.32		36.42		3.87
Tract Population Density		27.29		92.88		10.01
Number of Units		49		56		60
Lot Size (Acre)		0.55		0.29		1.03
DU/Acre		67.61		168.10		51.03
Building Footprint		13,485				
Unbuilt sq ft		10,313				
Ratio of Bldg ftpt to Unbuilt		1.31				

	9% Low LA - 25 Projects		9% Low NYC - 25 Projects		9% Low Denver - 10 Projects	
Number of Units		49		52		56.5
% 3 Stories or Less	40%		12%		40%	

% Gabled	20%		8%		20%	

4% financed projects show similar trends. While 4% projects in New York are unusually dense, the high opportunity area impact on number of units, parcel size, project density, project height, and project iconography results remains consistent in each city. As the form and development patterns of these places differ substantially from each other, the stability of these findings across cities and across funding streams is particularly noteworthy. A summary of the 4% results is shown in Table 19.

Table 19. Design Analysis 4% Results

	4% High LA - All 33 Projects		4% High NYC - 69 Projects		4% High Denver - 17 Projects	
Share of Projects High Opp	18%		17%		27%	
	Value	Median	Value	Median	Value	Median
% in Major Metro	3%		54%		24%	
% For-profit	88%		68%		88%	
% Post DDA Change	15%		17%		47%	
Tract over MSA pov rate		60%		59%		45%
% Single Family Tract		47%		1%		67%
% 10+ Units Tract		16%		88%		12%
Tract Housing Unit Density		2.62		39.55		1.03
Tract Population Density		7.69		87.56		3.24
Number of Units		122		170		156
Lot Size (Acre)		3.97		0.49		3.84
DU/Acre		36.60		388.08		218.59
Building Footprint		46,783				
Unbuilt sq ft		111,882				
Ratio of Bldg ftpt to Unbuilt		0.42				

	4% High LA - 25 Projects		4% High NYC - 25 Projects		4% High Denver - 10 Projects	
Number of Units		119		53		184
% 3 Stories or Less	76%		20%		80%	
% Gabled	44%		24%		80%	

	4% Low LA - 151 Projects		4% Low NYC - 343 Projects		4% Low Denver - 47 Projects	
	Value	Median	Value	Median	Value	Median
% in Major Metro	38%		24%		53%	
% For-profit	64%		52%		87%	
% Post DDA Change	9%		26%		55%	
Tract over MSA pov rate		163%		225%		134%
% Single Family Tract		26%		1%		45%
% 10+ Units Tract		46%		82%		24%
Tract Housing Unit Density		7.37		39.18		2.91
Tract Population Density		22.42		93.89		6.78
Number of Units		71		107		108
Lot Size (Acre)		1.05		0.49		1.72
DU/Acre		63.68		218.59		45.45
Building Footprint		21,708				
Unbuilt sq ft		16,833				
Ratio of Bldg ftpt to Unbuilt		1.29				

	4% Low LA - 25 Projects		4% Low NYC - 25 Projects		4% Low Denver - 10 Projects	
Number of Units		64		83		125
% 3 Stories or Less	40%		4%		40%	
% Gabled	24%		4%		30%	

To address the un-answered hypothesis about project design qualities, I selected 12 projects - four from each MSA with one from each financing and opportunity level combination. All 12 projects had some of the identified good design attributes[11] (the worst score was a 6/12), undermining the notion that affordable housing projects are all poorly designed and built. However, the design statistics differed when separating projects in high opportunity areas from

[11] See Methodology page 28.

those built elsewhere. On average, high opportunity projects score higher on the design scale than low opportunity projects (9/12 vs 7/12 for 9% projects and 9/12 vs 8/12 for 4% projects), and they show marked improvement in the "Facade" and "Ground Floor" categories, both of which define the character of a project from the street. Low opportunity projects do appear better at hiding their parking when compared to high opportunity projects (likely owing to their denser urban location and limited parking spaces). However, if you remove parking strategy as a consideration the improved design scores of the high opportunity projects are more distinct (8/10 vs 5/10 for 9% projects and 8/10 vs 7/10 for 4% projects). The scores and project addresses are summarized in Table 20, and an example of the scoring process for the highest scoring project is shown in Figure 2.

Table 20: Design Score Analysis

	9% High LA	9% High NYC	9% High Denver	9% High
	17911 Bushard St, Fountain Valley CA	161 Sandy Hollow Rd, Southampton NY	15650 E Alameda Pkwy, Aurora CO	All
	Score	Score	Score	Average Scores
Contextual	2	2	1	1.7
Parking	1	1	0	0.7
Facade	1	2	2	1.7
Shared Space	2	2	2	2.0
Ground Floor	2	2	1	1.7
Interiors	1	1	2	1.3
Total	9	10	8	9

	9% Low LA	9% Low NYC	9% Low Denver	9% Low
	3671 S Western Ave, Los Angeles CA	437 Herkimer St, Brooklyn NY	2447 W Dunkeld Pl, Denver CO	All
	Score	Score	Score	Average Scores
Contextual	1	2	2	1.7
Parking	2	2	2	2.0

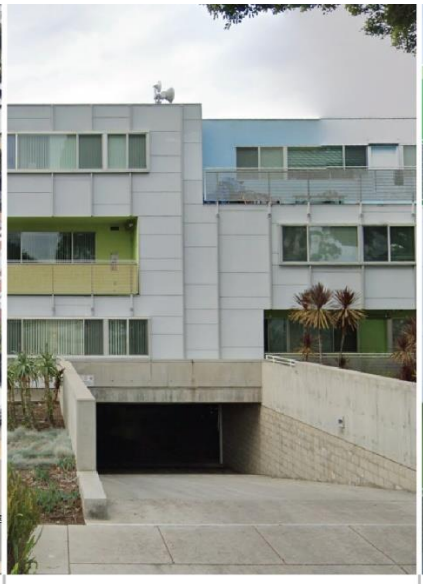
Facade	2	0	2	1.3
Shared Space	1	1	0	0.7
Ground Floor	0	0	1	0.3
Interiors	2	1	1	1.3
Total	8	6	8	7

	4% High LA	4% High NYC	4% High Denver	4% High
	2423 Centinela Ave, Santa Monica CA	180 W 20th St, New York NY	4775 Argonne St, Denver CO	All
	Score	Score	Score	Average Scores
Contextual	2	2	2	2.0
Parking	2	2	0	1.3
Facade	2	2	1	1.7
Shared Space	2	1	1	1.3
Ground Floor	2	1	1	1.3
Interiors	2	2	1	1.7
Total	12	10	6	9

	4% Low LA	4% Low NYC	4% Low Denver	4% Low
	745 W 3rd St, Long Beach CA	4278 3rd Ave, Bronx NY	1555 Xavier St, Denver CO	All
	Score	Score	Score	Average Scores
Contextual	2	2	2	2.0
Parking	2	2	1	1.7
Facade	1	0	1	0.7
Shared Space	2	2	2	2.0
Ground Floor	2	0	0	0.7
Interiors	2	1	1	1.3
Total	11	7	7	8

Figure 2: 2423 Centinela Ave, Santa Monica CA: 12/12 design score (Daly, 2007)

Contextual: Similar height and aerial organization as neighbors



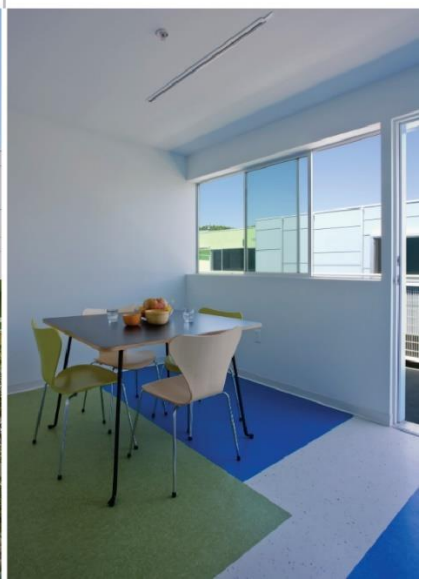
Parking: Fully hidden from the street

Facade: Materially and geometrically varied

Shared Space: Generous, landscaped, and playful

Ground Floor: Landscaped, setback, active, and porous

Interiors: Bright and well appointed



Taken together with the MSA level analyses, a consistent story emerges about the impact of intentional design decisions on high opportunity siting. Projects built in high opportunity areas hold the same or more units than those built elsewhere, and they do so in low density, low in height, aesthetically varied, inviting, communal, and contextually appropriate buildings on large and landscaped sites. These characteristics are unique to high opportunity sited projects, and these projects show more qualities of good design than projects sited elsewhere. This suggests

that rather than pure unit count, it is more-so the perception of scale, density, mass, and the design strategies for balancing these factors that impact high opportunity success.

7. Discussion

This research focuses on the small set of affordable housing projects that have been built in high opportunity areas nationwide. The analyses, both quantitative and image based, suggest that there are salient characteristics that differentiate these projects from those built elsewhere.

Physical Characteristics:

1. They have more units than other LIHTC projects.

High opportunity projects seem to characteristically be sited on large lots – lot sizes that are more readily available in the often high-opportunity suburbs – and built at low densities. The low-density buildings appear short and unimposing from the street, but the large lot areas allow for the same if not more units than are held in multilevel towers on smaller urban sites. The success of 4% projects at high opportunity siting, especially from 1986-2002, contributes to this relationship as 4% projects characteristically have more units (Table 8). Developers are also incentivized to produce many units because of the assumed difficulty and soft costs faced when securing high opportunity entitlements. While not statistically significant, since 2009 the association between number of units and 4% financing has changed sign, indicating that smaller unit counts are increasingly associated with projects sited with 4% financed projects in high opportunity areas. One explanation for this is the large lots 4% developers have historically preferred are harder to come by today.

2. They have predominantly studio/1-bedroom units while avoiding predominantly 3-bedroom units.

This finding is tied to the number of units as well as the target tenancy and aesthetic conclusions. There are minimum standards that developers must achieve for LIHTC funded projects. For example, California's QAP states "One-bedroom Low-Income Units must include at least 450 square feet…two-bedroom Low-Income Units must include at least 700 square feet of living space…" (*California Tax Credit Allocation Committee Regulations Implementing the Federal and State Low Income Housing Tax Credit Laws*, 2023). To fit the same or more units into smaller buildings, developers are incentivized to produce smaller units. Furthermore, 3+ bedroom units are associated with family-oriented projects which subsequent results demonstrate are not found in many high opportunity places.

3. They are new construction rather than acquisition and rehabilitation.

New construction projects look "new" which might help make an affordable housing project more palatable to a community. Furthermore, new construction projects allow for full developer control. Acquisition and rehabilitation projects can be beautiful, but the existing conditions limit the types of units they can build and the amenities they can offer. On the other hand, new construction projects require either empty land or the demolition of an existing building which can be disruptive to neighbors. In any case, the regression results strongly suggest a positive new construction association with high opportunity area siting.

4. They are 100% assisted.

In the 9% program, the higher the percent assisted the more money a developer is eligible to request from the allocation agency up to a limit of 70% of eligible project costs. Furthermore, 9% tax credits are allocated via points systems, and higher proportions of assisted units generate more points for a prospective project. The 4% program operates differently. It has a maximum

eligible project cost value of 30%, and there are fewer states that allocate 4% credits using a points system. These different structures help explain why fully assisted projects are associated with high opportunity siting in the full dataset, but when only looking at 4% projects this association falls away.

5. They seem to be lower in height and less imposing than other LIHTC projects, matching the context of the surrounding community.
6. They seem to have more intentionally designed features that create especially welcoming and varied street facing facades.
7. They seem to be built on large lots at lower densities than other LIHTC projects.

These findings all tell a visual story about the added difficulty of developing affordable housing in high opportunity areas. High opportunity places hold many single-family homes and are characterized by conservative zoning codes. High opportunity single-family residents are also more often against development, and more successful at stopping it, than those who live in multifamily buildings in lower opportunity places. Projects that succeed at getting built in high opportunity communities are especially well designed, welcoming, aesthetically pleasing, and contextually appropriate. These design characteristics seem to help appease neighbors and convince local government officials to approve construction.

Administrative Characteristics:

1. They are targeted towards elderly/disabled populations.

Elderly and disabled tenants are as un-threatening a population imaginable. They are also less likely to increase enrollment at a local school district or to increase street traffic, helping to appease the more objective concerns sometimes raised at community meetings. Furthermore,

these tenants can be served with smaller apartments allowing for more units to be built on a given parcel. 4% financed projects located in high opportunity areas are negatively associated with family and other tenant populations, but the tenancy results never rise to the level of statistically significant. The 9% program on the other hand shows a clear preference towards elderly/disabled populations. QAP regulations might be driving this as 9% financed projects can improve their funding chances by targeting these populations unlike 4% financed projects.

2. They do not have a predominant financing type, but 4% financed projects seem more successful at high opportunity siting.

This finding was unexpected. As 9% financing is the more generous financing source, I assumed it would be associated with high opportunity siting. However, 4% financed projects historically have been successful at high opportunity siting especially from 1986-2002. One explanation for this could be that 9% tax credits are overprescribed in every state in the country. This has been the case since early in the LITHC program (Olsen, 2003). Until recently, the 4% tax credit, which is often paired with tax exempt bonds, has been uncompetitive meaning that every eligible applicant received the funding. As 9% credits were used up in the most in-demand markets, developers might have turned to the more easily achievable 4% credits to build in these places. It is also worth noting that the "Difficult to Develop" area designation from HUD has been in use since 1990 and that it used to be loosely designated at the metro level (Eriksen, 2017). If a project is in a DDA area (DDA census tract since 2016) it is eligible for a 30% increase in tax credit subsidy. 4% developers are pre-disposed to producing many units and building in high AMI places to offset their lower initial subsidy. Large, suburban, high-opportunity sites tick all of these boxes. It is important to note that when looking only at projects built after 2009, the 9% tax credit has become positively correlated with opportunity. This

suggests that the numerous intentional changes aimed at supporting high opportunity siting of 9% financed projects are having some impact. However, this positive association is not yet statistically significant, 4% financing remains an important tool for high opportunity area development.

3. They are owned by for-profit companies.

High opportunity census tracts have relatively high AMI levels. As rents in LIHTC projects are set by referencing local AMI, projects in more affluent areas can charge higher rents. It follows that for-profit companies would be most interested in high opportunity projects as they are a more lucrative investment. Furthermore, non-profits would be less likely to own high opportunity sited projects as non-profits are often tied to a particular disadvantaged neighborhood. As mentioned in the methodology, it might be reasonable to assume that non-profit owners are working with non-profit developers and for-profit owners the inverse. If this is the case, then for-profit developers are building more projects in high opportunity places than non-profit developers. This is consistently true for 9% financed projects, but the association is weaker for 4% financed projects.

4. They were built after 2016 or before 2002.

This finding points to the two competing financing trends mentioned previously. Prior to 2002, 4% financed projects were particularly effective at high opportunity siting. Since 2009, there has been a shift towards prioritizing high opportunity siting in Qualified Allocation Plans nationwide. This might explain why the relationship between 9% financing and high opportunity siting is now positive and getting more robust. Furthermore, HUD changed their criteria for difficult to develop areas to be census tract based in 2016. This shift was intended to specifically

target high opportunity places and it may be contributing to improved recent siting patterns as well. For 9% financed projects, post 2016 construction is most highly associated with high opportunity. For 4% financed projects, pre-2002 construction is most highly associated with high opportunity.

Geographic Characteristics:

1. They are found in the most populous MSAs.

More populated MSAs are in-demand MSAs, and a strong demand for housing likely indicates abundant employment, educational, and quality of life opportunities. Strong demand also suggests that AMI levels could be relatively high which would help financially support development. More populous MSAs also likely have more land and more high opportunity census tracts. California and New York for example, home to the two largest MSAs in the country, also fall in the top 1/3 of states in terms of their share of high opportunity tracts. A higher high opportunity share makes siting in a high opportunity area more likely.

2. They are found in the Western United States.

California is a major producer of LIHTC housing, so this one state alone might be driving the West coast superiority. The West also holds a good chunk of the highest opportunity states and states with opportunity specific QAPs in the US. For 9% financed projects, the West is significantly better than any other region in the country. For 4% projects, the West is also most highly associated with high opportunity sited projects though the association is less robust.

3. They are found in either low cost or high costs MSAs, but not in the middle.

Land cost is a major cost in affordable housing development. If an MSA is expensive enough there might be government incentives available or high enough rents to offset costs and make a project viable. Furthermore, expensive MSAs likely have a higher proportion of high opportunity tracts which makes siting in these tracts more achievable. The other route to project viability makes use of cheap land. Low cost MSAs have lower land costs and more available land to develop on. Likely suffering from both cost and availability challenges without the governmental benefits or high rents, MSAs in the middle of the home value distribution have less high opportunity success.

8. Conclusion

With increased attention on the need to produce more affordable housing units, and to equitably distribute that housing in high opportunity areas, it is more important than ever to understand the dynamics of high opportunity siting. This paper looks at existing LIHTC projects sited in high opportunity areas and compares their characteristics to the larger universe of LIHTC projects sited elsewhere. I find evidence of distinctive qualities in high opportunity sited projects.

A nuanced discussion of the results and the differences between financing types and time periods is outlined above. However, summarizing results across analyses paints a clear picture. Physically, LIHTC projects sited in high opportunity areas have more units, have predominantly studio/1 bedroom units while characteristically avoiding predominantly 3-bedroom units, are new construction rather than acquisition and rehabilitation, are 100% assisted, are lower in height, more contextual, characterized by more varied and welcoming street facades, and are built on larger lots at lower densities than LIHTC projects built elsewhere. Administratively, they are targeted towards elderly/disabled populations, do not have a predominantly financing type but are more highly associated with 4% financing, are owned by for-profit companies, and were

built after 2016 or before 2002. Geographically, they are found in the most populous MSAs, in either low cost or high cost MSAs but not the middle, and in the western region of the US.

These results are a jumping off point to address many of the "why" questions baked into this work. Initial hypotheses for the trends observed are listed in the discussion section, but more work needs to be done to convincingly assert their accuracy and to better understand the levers that drive high opportunity siting. Some of this future work might include a systematic review of building design and its association with high opportunity siting, an analysis of high opportunity definitions using tenant surveys to develop a more holistic view of the term, a qualitative survey of 4% vs 9% developers to better understand their incentives and decision making structures, a targeted analysis of the DDA definitional change and its impacts, or a deep dive into a particular MSA to tease out its political dynamics and how they affect LIHTC project design and siting patterns.

Until that work is done, this research sheds light on the types of projects that have moved through the existing regulatory system and the added challenges in high opportunity areas to offer impactful and sorely needed affordable housing. These insights can offer guidance to practitioners actively weighing developments and designing projects in high opportunity areas today. They can also help inform policy changes that incentivize the types of projects that I show have historically not been developed in these places (ex. family targeted), or policy changes that invest further into project types that have already shown a knack for success. This research can help fair housing advocates better understand, and hopefully better build, affordable housing in high opportunity areas.

9. Appendix

Appendix 1. Data Dictionary

Variable Name	Description
NHPDPropertyID	Identification number used by the NHPD
PropertyName	Name of the project
PropertyAddress	Address of the project
City	City in which the project is located
State	State in which the project is located
Zip	Zip in which the project is located
CBSACode	CBSA Code (Census geography that identifies MSAs) in which the project is located
CBSAType	CBSA Type (All are Metropolitan Statistical Areas in the dataset)
County	County in which the project is located
CountyCode	Numeric county code
CensusTract	11 digit Census Tract number in which the project is located
CongressionalDistrict	Congressional district in which the project is located
Latitude	Latitude
Longitude	Longitude
PropertyStatus	Description of whether the affordability covenant of the project is active or not
ActiveSubsidies	Number of active subsidies that apply to the project (ie. LIHTC affordability covenant)
Owner	Name of project owner
OwnerType	Categorical variables identifying the project owner as for profit, non-profit etc.
StudioOneBedroomUnits	Number of such units in the project
TwoBedroomUnits	Number of such units in the project
ThreePlusBedroomUnits	Number of such units in the project

TargetTenantType	Population targeted by the project in their LIHTC application
FairMarketRent_2BR	Fair market rent for a 2 bedroom unit in the tract as calculated by HUD
NumberActiveLihtc	Number of active LIHTC subsidies specifically that apply to the project
LIHTC_1_ID	NHPD LIHTC identification data for the earliest LIHTC funding. If there are two LIHTC fund amounts that apply to the same project then LIHTC_2 has information as well
LIHTC_1_Status	
LIHTC_1_ProgramName	
LIHTC_1_StartDate	
LIHTC_1_EndDate	
LIHTC_1_AssistedUnits	
LIHTC_1_ConstructionType	
LIHTC_1_InacStatusDesc	
LIHTC_2_ID	NHPD LIHTC identification data for projects with two separate LIHTC allocations
LIHTC_2_Status	
LIHTC_2_ProgramName	
LIHTC_2_StartDate	
LIHTC_2_EndDate	
LIHTC_2_AssistedUnits	
LIHTC_2_ConstructionType	
LIHTC_2_InacStatusDesc	
OldNHPDPropertyID	Secondary NHPD property ID
FHFAHIGH_OPPScores	FHFA database opportunity score
LIHTC_Assistedunits_Combined	Number of LIHTC assisted units in the project
AssistedRatio	Percent of total units that are LIHTC units
TargetTenancyCombined	Categorical variable identifying the population group targeted in the LIHTC application 1) Elderly/Disabled 2) Family 3) Other

twostage	Flag as to whether the same address has two different LIHTC allocations
combinedconstruction	Variable describing the type of construction used for that LIHTC funded stage
finalcombinedconstruction	Categorical variable identifying the type of construction used in the project. Summarized across multiple stages if applicable 1) New Construction 2) Acquisition and Rehab 3) Both
combinedfinancing	Variable describing the type of financing used for that LIHTC funded stage
finalcombinedfinancing	Categorical variable identifying the type of financing used in the project. Summarized across multiple stages if applicable 1) 4% tax credit 2) 9% tax credit 3) Tax Credit Exchange Program 4) 4% and 9% 5) 4% and TCEP 6) 9% and TCEP 7) 4%, 9%, and TCEP
studio1bedratio	Ratio of studio/1 bed units over total units for which room information is known
twobedratio	Ratio of 2 bed units over total units for which room information is known
threeormorebedratio	Ratio of 3+ bed units over total units for which room information is known
LIHTC_Assistedunits_Combined	Number of assisted units in the project
LIHTC_TotalUnits	The total number of units in the project
log_LIHTC_Assistedunits_Combined	Log of the number of LIHTC assisted units in the project
log_LIHTC_TotalUnits	Log of the total number of units in the project

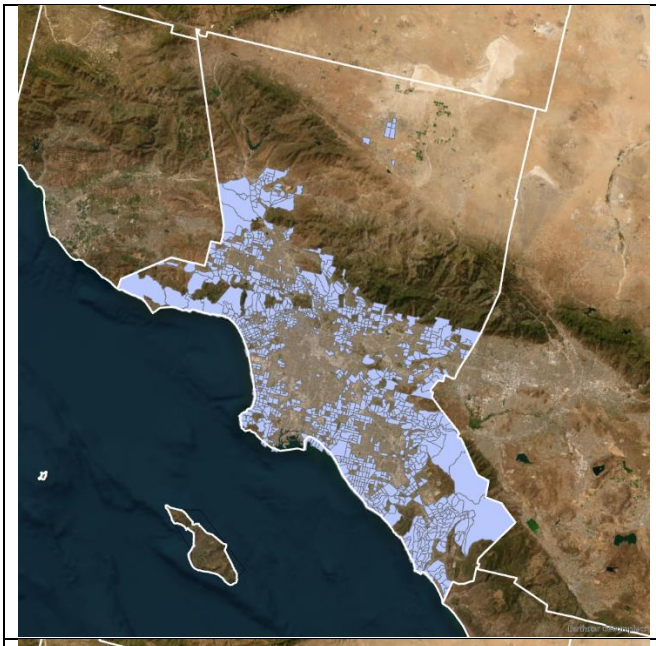
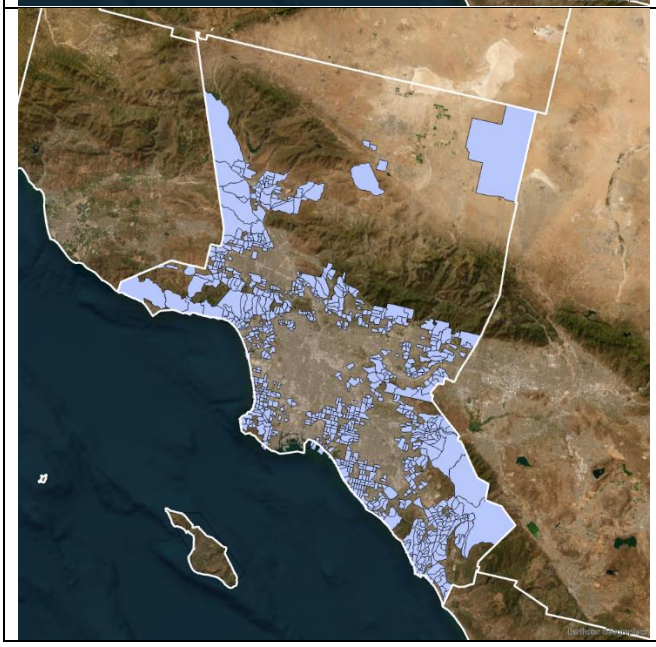
project_year	Year the project was completed. Year of first LIHTC project completion if applicable
StateNumeric	Numeric variable identifying the state in which the project is built
size_category	Categorical variable describing the size of the project in terms of number of units 1) <= 35 units 2) > 35 units 3) > 71 units
CBSATitle	Formal name of the MSA in which the project is located
MetropolitanMicropolitanStatis	CBSA Type (All are Metropolitan Statistical Areas in the dataset)
PrincipalCityName	Name of the principal city in the MSA
MSAPopulationCount	Number of people in the MSA
MSApovertyrate	Poverty rate of the MSA
CensusTractPovertyRate	Poverty rate of the census tract
MSAsizecategory	Categorical variable describing the population size of the MSA in which the project is located 1) <550,000 people 2) 550-850,000 people 3) 850-2 million people 4) 2 million + people
projectage	Number of years between 2023 and project_year
logprojectage	Log of this age value
tractovermsapovrate	Tract poverty rate divided by MSA poverty rate for the individual project
Region	Region of the country in which the project is located 1) West 2) Southwest 3) Midwest 4) Southeast 5) Northeast

RegionNum	Numeric variable identifying the region in which the project is located
Election	What political party the state voted for in >2 of the last 4 presidential elections
ElectionNum	Numeric variable identifying the state's presidential political preference 0) Democrat 1) Republican
TractTotalHousingUnits	Number of housing units in the census tract
TractMedianOOHomeValue	Median owner-occupied home value in the tract
MSATotalHousingUnits	Number of housing units in the MSA
MSAMedianOOHomeValue	Median owner-occupied home value in the MSA
AllAssisted	Flag as to whether all units are LIHTC funded affordable or whether less than 100% are 0) Not 100% assisted 1) All assisted
MSAMedianHomeValueBuckets	Categorical variable describing the median value of homes in a given MSA 1) <$179,100 2) $179,100 > X < $412,400 3) >$412,400
tractovermsahomevalue	Ratio of tract median home value to MSA median home value
OwnerTypeBuckets	Categorical variable describing the building owner 1) For profit 2) Non-profit 3) Other
projectagebuckets	Categorical variable describing the age of the building 1) 2016 - present (Post DDA's shift to tract level identification) 2) 7-13 years old 3) 14-20 years old

	4) 21-27 years old 5) 28+ years old
EstimateOccupiedhousingunits	Number of owner occupied housing units in the tract
PercentSingleFamily	Percent of housing that is single family (Stand alone detached) in the tract
PercentDuplex	Percent of housing that is 2 units in the tract
Percent3or4units	Percent of housing that is 3 or 4 units in the tract
Percent5to9units	Percent of housing that is 5 to 9 units in the tract
Percent10units	Percent of housing that is 10+ units in the tract
TractPopulation	Population count in the tract
LandArea_Acres	Land area of the tract in acres
Housingunitdensity	Number of housing units in the tract/land area in acres of the tract
Populationdensity	Population in the tract/land area in acres of the tract
PovertyIndex	HUD AFFH Indicator
SchoolProficiencyIndex	HUD AFFH Indicator
JobsProximityIndex	HUD AFFH Indicator
LabormarketengagementIndex	HUD AFFH Indicator
TransitcostIndex	HUD AFFH Indicator
TransittripsIndex	HUD AFFH Indicator
EnvirohazardIndex	HUD AFFH Indicator
AFFHSumintop40p	Sum of indicators (0-7) for which a given tract scores in the top two quintiles of the indicators
AFFHSumintop40pNum	Numerical variable to represent the number of indicators for which a given tract scores in the top two quintiles of the indicators
AFFH_HighOpp	Flag as to whether the project is in a census tract with 4 or more top two quintile indicator scores

FHFAQAPandDDA	Flag as to whether the census tract is identified as high opportunity by both the QAP and DDA strategy employed by the FHFA
AFFHandFHFAHighOpp	Flag as to whether the census tract is identified as high opportunity by both the FHFA's DDA and QAP analysis and the AFFH indicators
AFFHandFHFAQAPHighOpp	Flag as to whether the census tract is identified as high opportunity by both the FHFA's QAP analysis and the AFFH indicators
FHFA_HighOpp	Flag as to whether the census tract is identified as high opportunity per the FHFA database
MainBedroomType	Categorical variable describing the main unit type in the project 1) Mostly studio/1 bed 2) Mostly 2 bed 3) Mostly 3 bed 4) No predominant unit type
LIHTC_TotalUnits	Total units in the project including affordable and market rate

Appendix 2: GIS Maps of Los Angeles-Long Beach-Anaheim, CA MSA

	AFFH HUD Indicator Definition: 1,143 Tracts (44% of LA MSA tracts)
	FHFA DDA and QAP Indicator Definition: 816 tracts (32% of LA MSA tracts)

	Both AFFH HUD Indicators and FHFA QAP Indicator Only: 383 tracts (15% of LA MSA tracts)

Appendix 3. Regression Results

Full Dataset

	(1)	(2)	(3)
	AFFH	FHFA	AFFH and FHFA QAP
VARIABLES	Full Dataset	Full Dataset	Full Dataset
Log Total Building Units	0.113***	0.073*	-0.032
	[0.032]	[0.038]	[0.061]
Predominant Unit Type 1. Studio/1 bedroom is base			
2. Two bedroom	-0.368***	0.149	-0.068
	[0.080]	[0.091]	[0.144]
3. Three or more bedrooms	-0.594***	-0.112	-0.324*
	[0.091]	[0.101]	[0.167]
4. Mixed	-0.283***	0.048	-0.075
	[0.066]	[0.075]	[0.116]
Project Target Tenancy 1. Elderly/disabled is base			
2. Family	-0.341***	-0.382***	-0.595***
	[0.066]	[0.073]	[0.120]
3. Other	-0.315***	-0.285***	-0.270**
	[0.069]	[0.077]	[0.120]
Construction Type 1. New construction is base			
2. Acquisition and rehabilitation	-0.544***	-0.755***	-0.762***
	[0.054]	[0.064]	[0.103]
3. Both	-0.551***	-0.837***	-0.584*
	[0.162]	[0.215]	[0.325]
LIHTC Financing Type 1. 4% is base			
2. 9%	-0.105*	-0.176***	-0.120
	[0.057]	[0.063]	[0.105]
3. 4% and 9% Combined	-0.015	-0.195	-0.001
	[0.100]	[0.122]	[0.200]
Project Owner Type 1. For-profit is base			
2. Non-Profit	-0.068	-0.207***	-0.286***

	[0.059]	[0.066]	[0.106]
3. Other	-0.123	0.042	-0.149
	[0.093]	[0.103]	[0.179]
Project Age 1. 2016-2023 is base			
2. 2009-2015	-0.057	-0.207**	-0.113
	[0.078]	[0.085]	[0.140]
3. 2002-2008	-0.134*	-0.198**	-0.164
	[0.072]	[0.079]	[0.131]
4. 1995-2001	0.141*	-0.003	0.132
	[0.079]	[0.086]	[0.144]
5. 1986-1994	0.114	-0.082	-0.493*
	[0.131]	[0.147]	[0.293]
Are all units assisted 1. <100% assisted is base			
2. 100% Assisted	-0.063	0.117*	0.071
	[0.056]	[0.062]	[0.099]
MSA Population Size 1. <= 550,000 residents is base			
2. 550,001 - 850,000 residents	0.009	0.397***	0.750***
	[0.110]	[0.111]	[0.205]
3. 850,001 - 2,000,000 residents	-0.096	0.488***	0.535**
	[0.108]	[0.120]	[0.218]
4. 2,000,001+ residents	-0.014	0.294***	0.662***
	[0.076]	[0.089]	[0.174]
Geographic Region of Project 1. West is base			
2. Southwest	-1.375***	-3.209***	
	[0.439]	[0.389]	
3. Midwest	0.792*	-0.695*	-0.541
	[0.419]	[0.370]	[0.441]
4. Southeast	-1.037**	-3.907***	-3.310***
	[0.526]	[0.620]	[0.831]
5. Northeast	1.221**	-1.602***	-3.456***
	[0.474]	[0.463]	[0.528]
Median Home Value in MSA 1. <179,100 is base			
2. 179,101 - 412,400	0.555***	-0.228**	-0.193
	[0.091]	[0.108]	[0.192]

3. 412,401+	1.714***	0.585***	0.585**
	[0.131]	[0.145]	[0.242]
Constant	-0.957**	0.759*	-0.010
	[0.438]	[0.410]	[0.545]
Observations	12,960	16,420	11,131
Pseudo R2	0.136	0.149	0.141

Standard errors in brackets
*** p<0.01, ** p<0.05, * p<0.1

New Construction Only:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP
VARIABLES	All States and Years	All States and Years	All States and Years	Highest Opportunity States	Highest Opportunity States	Highest Opportunity States	Post 2009	Post 2009	Post 2009
Log Total Building Units	0.215***	0.177***	0.038	0.241***	0.080	-0.005	0.015	0.008	-0.240**
	[0.049]	[0.052]	[0.087]	[0.069]	[0.066]	[0.098]	[0.060]	[0.070]	[0.110]
Predominant Unit Type 1. Studio/1 bedroom is base									
2. Two bedroom	-0.189*	0.122	-0.060	-0.478***	0.101	-0.101	-0.577***	0.294**	0.100
	[0.108]	[0.116]	[0.183]	[0.157]	[0.148]	[0.207]	[0.132]	[0.147]	[0.229]
3. Three or more bedrooms	-0.511***	-0.112	-0.418**	-0.726***	-0.299*	-0.538**	-0.459***	-0.075	-0.388
	[0.115]	[0.121]	[0.204]	[0.160]	[0.153]	[0.233]	[0.155]	[0.180]	[0.304]
4. Mixed	-0.073	0.048	0.023	-0.310***	-0.063	-0.068	-0.352***	0.132	-0.078
	[0.087]	[0.093]	[0.144]	[0.115]	[0.113]	[0.159]	[0.099]	[0.115]	[0.179]
Project Target Tenancy 1. Elderly/disabled is base									
2. Family	-0.362***	-0.392***	-0.632***	-0.276**	-0.506***	-0.626***	-0.372***	-0.394***	-0.445**
	[0.084]	[0.087]	[0.145]	[0.116]	[0.110]	[0.162]	[0.100]	[0.111]	[0.182]
3. Other	-0.300***	-0.264***	-0.257*	-0.287**	-0.332***	-0.244	-0.377***	-0.318***	-0.141
	[0.086]	[0.090]	[0.140]	[0.122]	[0.116]	[0.160]	[0.108]	[0.123]	[0.192]
Construction Type 1. New construction is base	-	-	-	-	-	-	-	-	-
2. Acquisition and rehabilitation	-	-	-	-	-	-	-	-	-
3. Both	-	-	-	-	-	-	-	-	-

LIHTC Financing Type 1. 4% is base									
2. 9%	0.055	-0.104	0.157	-0.142	-0.172*	0.030	0.012	0.007	0.155
	[0.073]	[0.075]	[0.127]	[0.098]	[0.093]	[0.141]	[0.096]	[0.105]	[0.171]
TCEP	0.103	-0.176	0.369	0.067	-0.233	0.399	0.026	-0.006	0.079
	[0.192]	[0.219]	[0.370]	[0.272]	[0.289]	[0.439]	[0.170]	[0.191]	[0.316]
3. 4% and 9% Combined	-0.072	-0.362*	-0.312	0.574	-1.220	-1.054	-0.131	-0.280	-0.057
	[0.188]	[0.218]	[0.406]	[0.662]	[0.794]	[1.071]	[0.182]	[0.234]	[0.380]

Project Owner Type 1. For-profit is base									
2. Non-Profit	-0.129*	-0.293***	-0.524***	-0.036	-0.213**	-0.386***	0.124	-0.075	-0.205
	[0.075]	[0.079]	[0.130]	[0.102]	[0.098]	[0.145]	[0.092]	[0.100]	[0.158]
3. Other	-0.408***	-0.320*	-0.219	-0.523**	-0.417*	-0.494	-0.139	0.002	-0.284
	[0.156]	[0.171]	[0.267]	[0.241]	[0.230]	[0.361]	[0.136]	[0.149]	[0.269]

Project Age 1. 2016-2023 is base									
2. 2009-2015	-0.018	-0.238**	-0.007	-0.028	-0.313**	-0.164	-0.074	-0.252***	-0.267*
	[0.101]	[0.106]	[0.177]	[0.130]	[0.127]	[0.192]	[0.080]	[0.089]	[0.144]
3. 2002-2008	-0.004	-0.161*	0.080	0.079	-0.203*	0.003			
	[0.094]	[0.097]	[0.165]	[0.127]	[0.121]	[0.179]			
4. 1995-2001	0.427***	0.147	0.513***	0.661***	0.172	0.480**			
	[0.101]	[0.105]	[0.178]	[0.146]	[0.135]	[0.198]			
5. 1986-1994	0.314*	0.037	-0.109	0.507**	-0.024	-0.137			
	[0.161]	[0.168]	[0.322]	[0.240]	[0.226]	[0.367]			

Are all units assisted 1. <100% assisted is base									
2. 100% Assisted	0.007	0.175**	0.155	0.133	0.116	0.086	-0.091	0.339***	0.261

MSA Population Size 1. <= 550,000 residents is base	[0.074]	[0.076]	[0.122]	[0.106]	[0.099]	[0.136]	[0.094]	[0.107]	[0.172]
2. 550,001 - 850,000 residents	-0.132	0.419***	0.695***	0.912***	0.602***	1.002***	-0.120	0.365**	0.470
	[0.136]	[0.131]	[0.243]	[0.218]	[0.204]	[0.302]	[0.178]	[0.185]	[0.356]
3. 850,001 - 2,000,000 residents	0.020	0.580***	0.698***	0.554***	0.620***	0.817***	0.185	0.209	0.594
	[0.137]	[0.143]	[0.251]	[0.200]	[0.181]	[0.276]	[0.176]	[0.207]	[0.375]
4. 2,000,001+ residents	-0.007	0.298***	0.725***	0.465***	0.200	0.715***	-0.010	0.296**	0.932***
	[0.093]	[0.103]	[0.203]	[0.148]	[0.135]	[0.231]	[0.120]	[0.143]	[0.290]
Geographic Region of Project 1. West is base									
2. Southwest	-1.690***	-3.388***					-0.184	-4.852***	
	[0.526]	[0.449]					[1.151]	[1.119]	
3. Midwest	0.676	-0.798*	-0.759	0.108	-0.824*	-0.726	1.220	-2.715**	0.377
	[0.497]	[0.434]	[0.533]	[0.512]	[0.444]	[0.545]	[1.169]	[1.146]	[1.196]
4. Southeast	-1.086*	-4.469***	-3.478***	-0.582	-2.922***	-2.944***	0.141	-6.564***	-2.968*
	[0.638]	[0.826]	[1.127]	[0.523]	[0.467]	[0.639]	[1.204]	[1.491]	[1.521]
5. Northeast	2.156***	-1.309**	-3.184***	2.191***	-1.388**	-1.695***	1.869	-3.445***	-2.583**
	[0.606]	[0.540]	[0.623]	[0.615]	[0.546]	[0.554]	[1.176]	[1.171]	[1.216]
Median Home Value in MSA 1. <179,100 is base									
2. 179,101 - 412,400	0.419***	-0.425***	-0.194	-0.259	-0.488**	0.181	0.388***	-0.466**	-0.672**
	[0.114]	[0.128]	[0.220]	[0.231]	[0.203]	[0.295]	[0.149]	[0.187]	[0.314]
3. 412,401+	1.545***	0.378**	0.402	1.068***	0.379	0.606*	1.327***	0.335	-0.146
	[0.163]	[0.172]	[0.281]	[0.259]	[0.231]	[0.337]	[0.203]	[0.237]	[0.390]
Constant	-1.856***	0.407	-0.993	-1.188*	1.061*	-1.009	-1.331	2.783**	0.196
	[0.528]	[0.486]	[0.670]	[0.611]	[0.547]	[0.724]	[1.160]	[1.151]	[1.274]

Observations	7,615	9,954	6,677	3,109	4,152	4,012	4,909	6,043	4,289
Pseudo R2	0.163	0.162	0.161	0.0992	0.0924	0.140	0.113	0.131	0.119

Standard errors in brackets

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

9% New Construction Only:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP
VARIABLES	Dataset	Dataset	Dataset	Highest Opportunity States	Highest Opportunity States	Highest Opportunity States	Post 2009	Post 2009	Post 2009
Log Total Building Units	0.205***	0.157**	0.125	0.270***	0.039	-0.015	0.260*	0.228	0.379
	[0.066]	[0.075]	[0.125]	[0.097]	[0.095]	[0.142]	[0.146]	[0.164]	[0.267]
Predominant Unit Type 1. Studio/1 bedroom is base									
2. Two bedroom	-0.247*	0.198	-0.145	-0.224	0.276	-0.161	-0.627***	-0.173	-0.652
	[0.142]	[0.154]	[0.236]	[0.206]	[0.195]	[0.266]	[0.229]	[0.256]	[0.407]
3. Three or more bedrooms	-0.535***	-0.043	-0.423*	-0.491**	-0.240	-0.602**	-0.616**	-0.165	-0.788*
	[0.145]	[0.157]	[0.248]	[0.204]	[0.196]	[0.280]	[0.254]	[0.284]	[0.469]
4. Mixed	-0.122	-0.015	-0.105	-0.187	-0.167	-0.224	-0.366**	-0.154	-0.522*
	[0.115]	[0.128]	[0.191]	[0.155]	[0.154]	[0.213]	[0.168]	[0.190]	[0.283]
Project Target Tenancy 1. Elderly/disabled is base									
2. Family	-0.316***	-0.463***	-0.567***	-0.428***	-0.659***	-0.614***	-0.302*	-0.249	-0.335
	[0.111]	[0.120]	[0.193]	[0.156]	[0.153]	[0.216]	[0.160]	[0.179]	[0.286]
3. Other	-0.408***	-0.288**	-0.450**	-0.655***	-0.531***	-0.615***	-0.478***	-0.288	-0.370
	[0.111]	[0.120]	[0.184]	[0.164]	[0.158]	[0.215]	[0.175]	[0.192]	[0.290]
Construction Type 1. New construction is base	-	-	-	-	-	-	-	-	-
2. Acquisition and rehabilitation	-	-	-	-	-	-	-	-	-
3. Both	-	-	-	-	-	-	-	-	-

LIHTC Financing Type 1. 4% is base									
2. 9%	-	-	-	-	-	-	-	-	-
3. 4% and 9% Combined	-	-	-	-	-	-	-	-	-

Project Owner Type 1. For-profit is base									
2. Non-Profit	-0.033	-0.415***	-0.524***	0.040	-0.417***	-0.382**	0.069	-0.378**	-0.503**
	[0.093]	[0.100]	[0.157]	[0.127]	[0.123]	[0.173]	[0.153]	[0.160]	[0.240]
3. Other	-0.226	-0.212	-0.267	-0.475	-0.451	-0.327	-0.599*	-0.190	-0.276
	[0.198]	[0.217]	[0.329]	[0.311]	[0.290]	[0.416]	[0.325]	[0.324]	[0.503]

Project Age 1. 2016-2023 is base									
2. 2009-2015	-0.135	-0.355**	-0.049	-0.112	-0.401**	-0.274	-0.093	-0.343**	-0.087
	[0.127]	[0.138]	[0.219]	[0.170]	[0.166]	[0.240]	[0.133]	[0.147]	[0.228]
3. 2002-2008	-0.283**	-0.512***	-0.411*	-0.319*	-0.631***	-0.556**			
	[0.123]	[0.132]	[0.218]	[0.170]	[0.165]	[0.237]			
4. 1995-2001	0.244*	-0.180	0.263	0.462**	-0.154	0.248			
	[0.129]	[0.141]	[0.229]	[0.189]	[0.179]	[0.254]			
5. 1986-1994	0.399**	-0.144	-0.303	0.817***	-0.215	-0.290			
	[0.202]	[0.220]	[0.414]	[0.299]	[0.295]	[0.477]			

Are all units assisted 1. <100% assisted is base									
2. 100% Assisted	0.096	0.265***	0.365**	0.200	0.198	0.312*	0.031	0.579***	0.294
	[0.096]	[0.100]	[0.154]	[0.134]	[0.126]	[0.171]	[0.165]	[0.175]	[0.266]

MSA Population Size 1. <= 550,000 residents is base									
2. 550,001 - 850,000 residents	-0.116	0.361**	0.498*	0.989***	0.687***	0.774**	-0.455*	0.168	-0.461
	[0.163]	[0.165]	[0.287]	[0.264]	[0.255]	[0.354]	[0.259]	[0.294]	[0.597]
3. 850,001 - 2,000,000 residents	0.109	0.588***	0.728***	0.462**	0.666***	0.768**	0.169	0.550*	0.801
	[0.160]	[0.168]	[0.280]	[0.229]	[0.215]	[0.305]	[0.274]	[0.298]	[0.554]
4. 2,000,001+ residents	0.027	0.287**	0.567**	0.309	0.228	0.494*	0.071	0.512**	1.522***
	[0.124]	[0.142]	[0.243]	[0.191]	[0.179]	[0.264]	[0.200]	[0.249]	[0.496]

Geographic Region of Project 1. West is base									
2. Southwest	-1.447**	-3.671***					-2.287**	-4.493***	
	[0.610]	[0.528]					[1.092]	[1.192]	
3. Midwest	0.758	-1.073**	-0.495	0.261	-1.122**	-0.384	-1.217	-2.127*	1.735**
	[0.582]	[0.504]	[0.639]	[0.603]	[0.520]	[0.654]	[1.035]	[1.152]	[0.795]
4. Southeast	-1.281*	-5.390***	-3.238***	-0.878	-3.387***	-2.837***	-3.363**	-4.593***	0.308
	[0.761]	[1.119]	[1.184]	[0.622]	[0.555]	[0.757]	[1.400]	[1.184]	[0.691]
5. Northeast	2.105***	-1.271**	-2.805***	2.121***	-1.471**	-1.530**	0.212	-2.511**	-1.561*
	[0.750]	[0.631]	[0.782]	[0.764]	[0.642]	[0.676]	[1.182]	[1.268]	[0.811]

Median Home Value in MSA 1. <179,100 is base									
2. 179,101 - 412,400	0.376***	-0.363**	-0.193	-0.138	-0.134	0.438	0.161	-0.484*	-0.700
	[0.139]	[0.159]	[0.261]	[0.257]	[0.237]	[0.337]	[0.219]	[0.283]	[0.473]
3. 412,401+	1.289***	0.369	0.228	0.993***	0.568**	0.615	0.585*	0.048	-1.084*
	[0.208]	[0.226]	[0.345]	[0.310]	[0.287]	[0.400]	[0.324]	[0.384]	[0.614]

Constant	-1.521**	1.030*	-0.948	-1.253*	1.649**	-0.780	0.097	2.100	-3.266**
	[0.636]	[0.593]	[0.847]	[0.747]	[0.678]	[0.913]	[1.156]	[1.341]	[1.335]

Observations	4,649	5,758	3,852	1,897	2,530	2,459	1,641	1,929	1,329
Pseudo R2	0.161	0.188	0.182	0.109	0.141	0.175	0.114	0.162	0.159

Standard errors in brackets

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

4% New Construction Only:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP	AFFH	FHFA	AFFH and FHFA QAP
VARIABLES	Dataset	Dataset	Dataset	Highest Opportunity States	Highest Opportunity States	Highest Opportunity States	Post 2009	Post 2009	Post 2009
Log Total Building Units	0.153*	0.189**	-0.072	0.139	0.216**	0.019	-0.143	-0.065	-0.778***
	[0.088]	[0.087]	[0.142]	[0.116]	[0.106]	[0.153]	[0.169]	[0.168]	[0.299]
Predominant Unit Type 1. Studio/1 bedroom is base									
2. Two bedroom	-0.506**	-0.353	-0.303	-1.207***	-0.273	-0.343	-0.823**	0.606	0.008
	[0.217]	[0.220]	[0.367]	[0.294]	[0.268]	[0.391]	[0.420]	[0.406]	[0.776]
3. Three or more bedrooms	-0.868***	-0.585**	-0.812	-1.678***	-0.721**	-0.772	-0.638	-0.668	
	[0.240]	[0.245]	[0.503]	[0.335]	[0.303]	[0.556]	[0.482]	[0.526]	
4. Mixed	-0.119	-0.020	0.114	-0.603***	-0.049	0.033	-0.276	0.381	0.429
	[0.160]	[0.160]	[0.252]	[0.203]	[0.189]	[0.273]	[0.264]	[0.278]	[0.467]
Project Target Tenancy 1. Elderly/disabled is base									
2. Family	-0.167	-0.166	-0.553**	0.206	-0.108	-0.504*	-0.196	-0.238	-0.604
	[0.151]	[0.146]	[0.251]	[0.200]	[0.176]	[0.273]	[0.259]	[0.247]	[0.471]
3. Other	0.034	-0.164	0.098	0.419*	-0.002	0.289	-0.132	-0.114	0.266
	[0.169]	[0.165]	[0.258]	[0.219]	[0.199]	[0.279]	[0.269]	[0.266]	[0.463]
Construction Type 1. New construction is base	-	-	-	-	-	-	-	-	-
2. Acquisition and rehabilitation	-	-	-	-	-	-	-	-	-
3. Both	-	-	-	-	-	-	-	-	-

LIHTC Financing Type 1. 4% is base									
2. 9%	-	-	-	-	-	-	-	-	-
3. 4% and 9% Combined	-	-	-	-	-	-	-	-	-

Project Owner Type 1. For-profit is base									
2. Non-Profit	-0.307**	-0.201	-0.366	-0.213	0.014	-0.294	-0.172	-0.104	-0.273
	[0.153]	[0.159]	[0.278]	[0.201]	[0.193]	[0.308]	[0.222]	[0.220]	[0.415]
3. Other	-0.718**	-0.495	-0.001	-1.205**	-0.355	-1.596	-0.611	-0.489	-0.770
	[0.312]	[0.335]	[0.531]	[0.561]	[0.464]	[1.100]	[0.518]	[0.527]	[1.130]

Project Age 1. 2016-2023 is base									
2. 2009-2015	0.029	-0.287	-0.342	-0.103	-0.462**	-0.319	-0.045	-0.341*	-0.457
	[0.187]	[0.186]	[0.344]	[0.218]	[0.215]	[0.355]	[0.204]	[0.200]	[0.365]
3. 2002-2008	0.406**	0.146	0.698**	0.467**	0.113	0.626**			
	[0.167]	[0.163]	[0.283]	[0.207]	[0.199]	[0.305]			
4. 1995-2001	0.830***	0.476***	0.901***	1.299***	0.580**	0.844**			
	[0.190]	[0.183]	[0.323]	[0.265]	[0.234]	[0.351]			
5. 1986-1994	0.524	0.689**	0.742	0.244	0.968**	0.383			
	[0.342]	[0.315]	[0.607]	[0.631]	[0.467]	[0.706]			

Are all units assisted 1. <100% assisted is base									
2. 100% Assisted	-0.184	-0.056	-0.170	-0.158	-0.076	-0.299	-0.218	0.237	0.215
	[0.148]	[0.146]	[0.256]	[0.212]	[0.200]	[0.287]	[0.262]	[0.268]	[0.468]

MSA Population Size 1. <= 550,000 residents is base									
2. 550,001 - 850,000 residents	-0.354	0.676**	1.494**	0.213	0.379	1.596**	-0.605	0.121	0.532
	[0.313]	[0.272]	[0.620]	[0.471]	[0.383]	[0.670]	[0.723]	[0.538]	[1.498]
3. 850,001 - 2,000,000 residents	-0.401	0.897***	0.965	0.798	0.933**	0.950	0.225	-15.225	-11.989
	[0.328]	[0.320]	[0.706]	[0.525]	[0.409]	[0.721]	[0.753]	[1,513.615]	[947.286]
4. 2,000,001+ residents	0.076	0.621***	1.507***	0.775***	0.336	1.377**	0.149	0.394	1.622
	[0.174]	[0.187]	[0.525]	[0.270]	[0.238]	[0.574]	[0.326]	[0.326]	[1.012]

Geographic Region of Project 1. West is base									
2. Southwest	-2.512**	-2.447**					-1.873	-1.268	
	[1.163]	[0.989]					[1.145]	[0.773]	
3. Midwest	0.255	-0.127	-1.578	-0.523	-0.267	-1.699	1.024*	0.799	1.223
	[1.002]	[0.978]	[1.095]	[1.049]	[0.995]	[1.098]	[0.593]	[0.562]	[1.015]
4. Southeast	0.671	-2.476*	-4.106***	-0.656	-2.238**	-4.048***	0.591	-1.099	0.324
	[0.976]	[1.393]	[1.299]	[1.069]	[1.028]	[1.326]	[0.770]	[1.162]	[0.897]
5. Northeast	2.487**	-0.742	-4.352***	2.669**	-0.689	-3.041***	2.367**	-1.147**	-0.641
	[1.139]	[1.184]	[1.229]	[1.199]	[1.199]	[1.139]	[1.144]	[0.458]	[0.532]

Median Home Value in MSA 1. <179,100 is base									
2. 179,101 - 412,400	0.846***	-0.385	0.237	-0.512	-1.028**	-0.821	2.329	-1.211*	-1.555
	[0.279]	[0.292]	[0.642]	[0.695]	[0.492]	[0.778]	[1.449]	[0.726]	[1.576]
3. 412,401+	2.221***	0.538	0.931	1.482**	0.255	-0.084	3.665**	-0.561	-1.045
	[0.346]	[0.342]	[0.713]	[0.719]	[0.525]	[0.819]	[1.453]	[0.779]	[1.761]

Constant	-2.297**	-1.131	-1.152	-0.698	-0.810	-0.315	-2.676	-0.781	0.536
	[1.008]	[1.018]	[1.307]	[1.300]	[1.155]	[1.434]	[1.713]	[1.162]	[1.940]

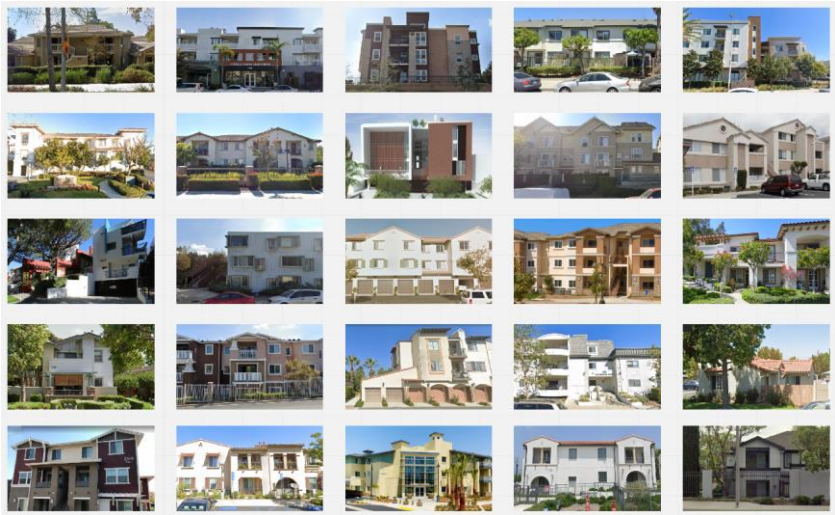
Observations	1,960	2,709	2,136	1,045	1,396	1,353	700	910	618
Pseudo R2	0.154	0.114	0.159	0.144	0.0803	0.127	0.136	0.110	0.121

Standard errors in brackets

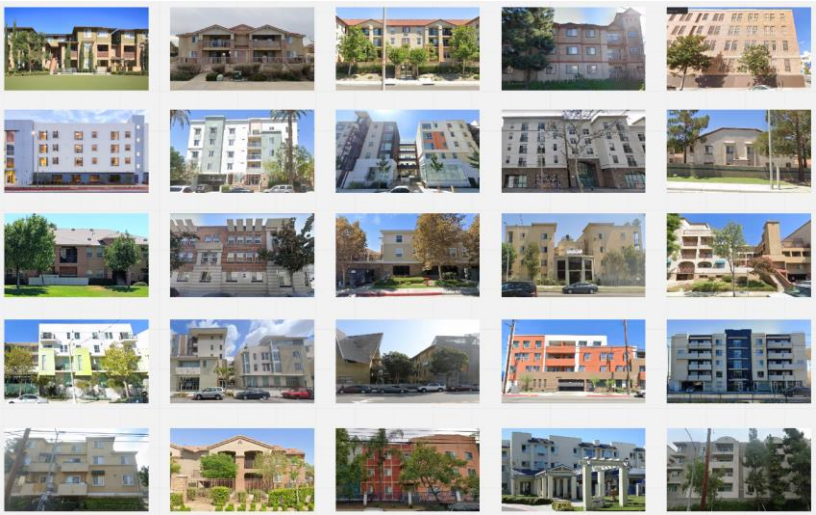
*** p<0.01, ** p<0.05, * p<0.1

Appendix 4. Project Elevations

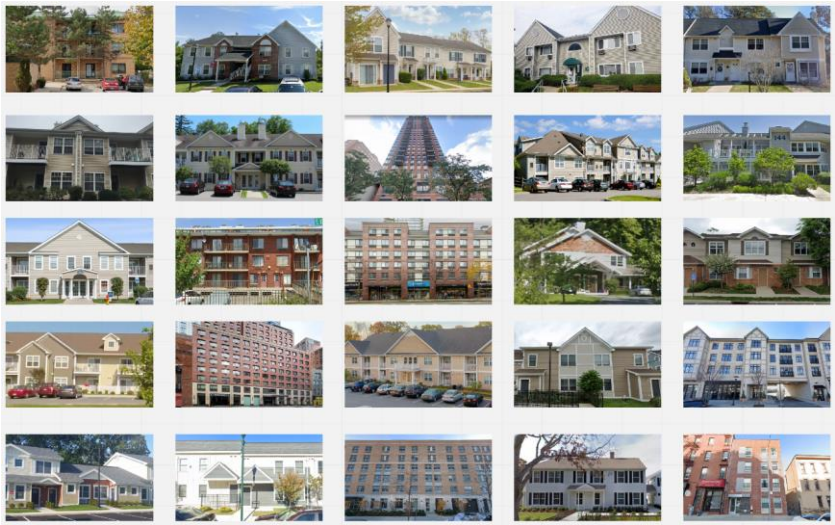
9% High Opportunity LA



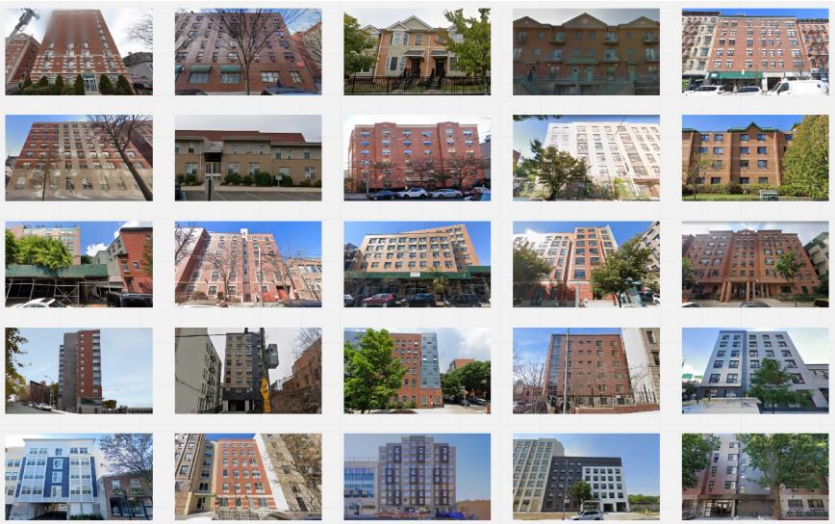
9% LA Elsewhere

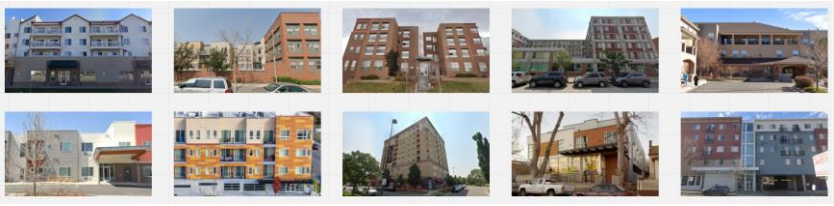


9% High Opportunity NYC

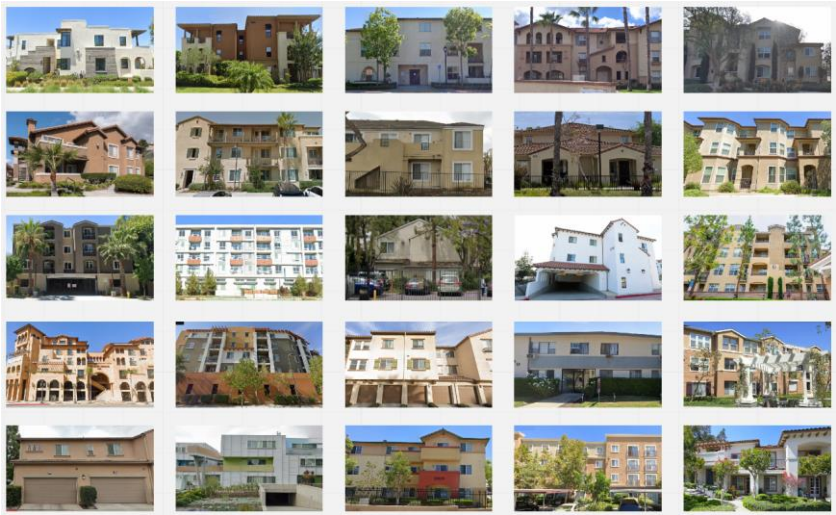
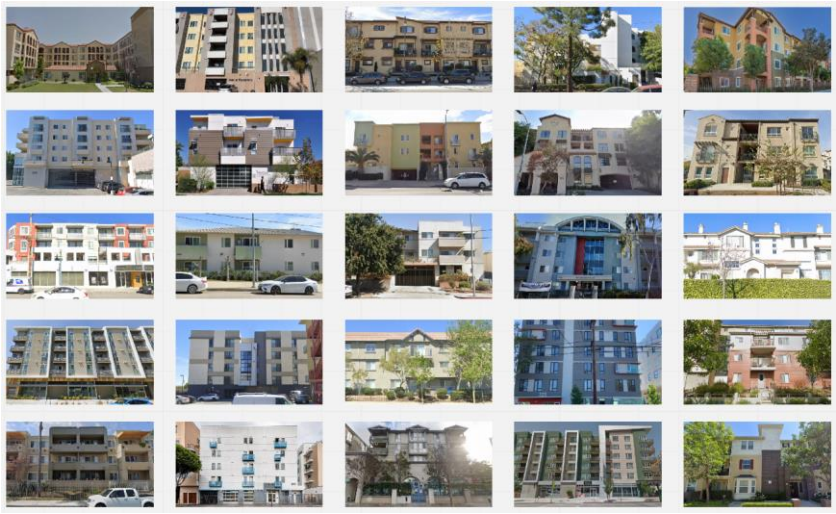
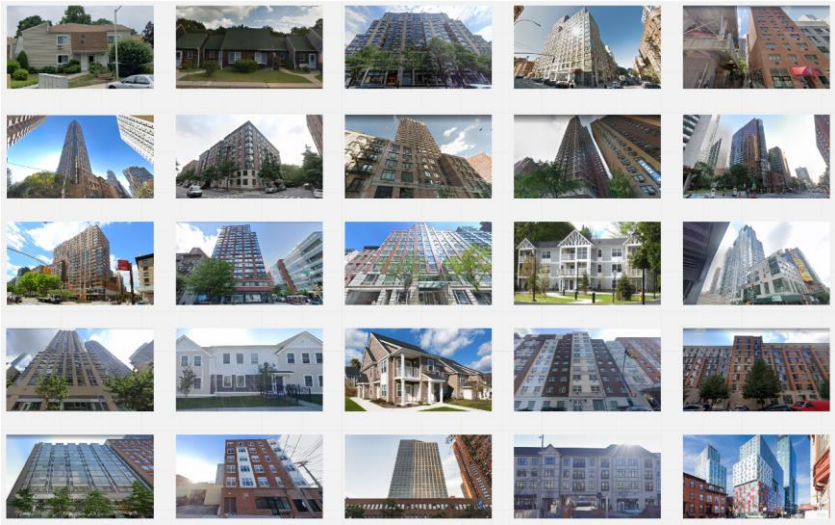
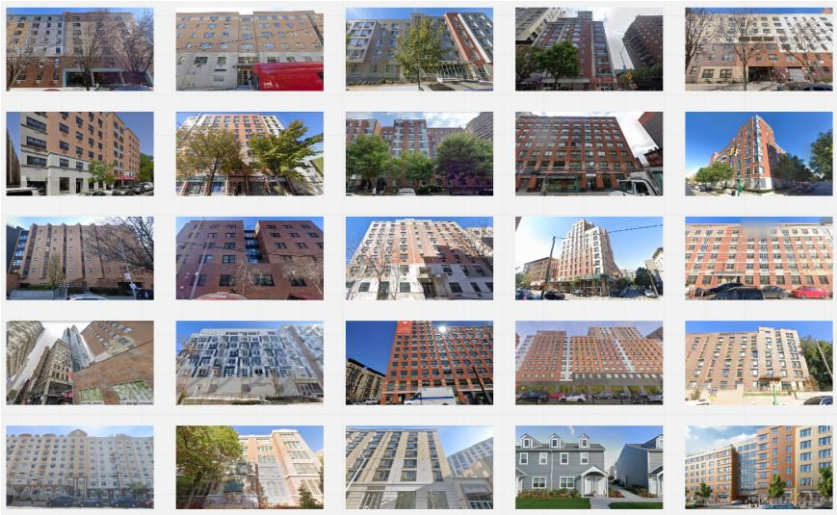


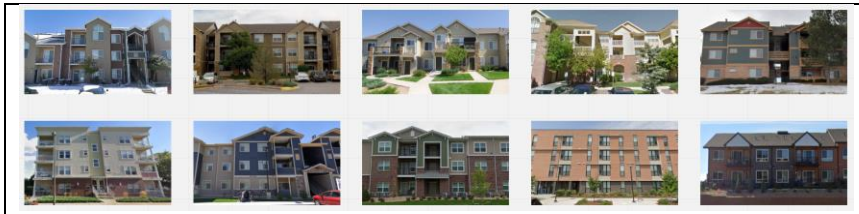
9% NYC Elsewhere

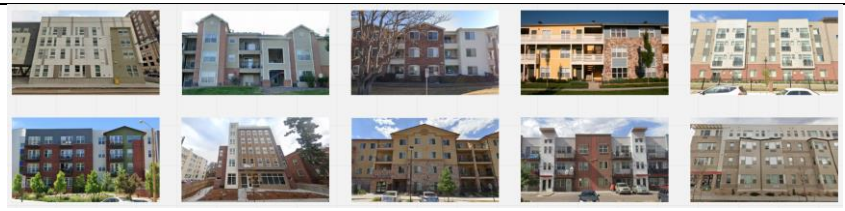


9% High Opportunity Denver[12]	9% Denver Elsewhere
	

[12] Denver has only 12 high opportunity 9% financed projects. As such, in Denver I took 10 project samples rather than the standard 25 projects.

4% High Opportunity LA 	4% LA Elsewhere 
4% High Opportunity NYC 	4% NYC Elsewhere 
4% High Opportunity Denver	4% Denver Elsewhere





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