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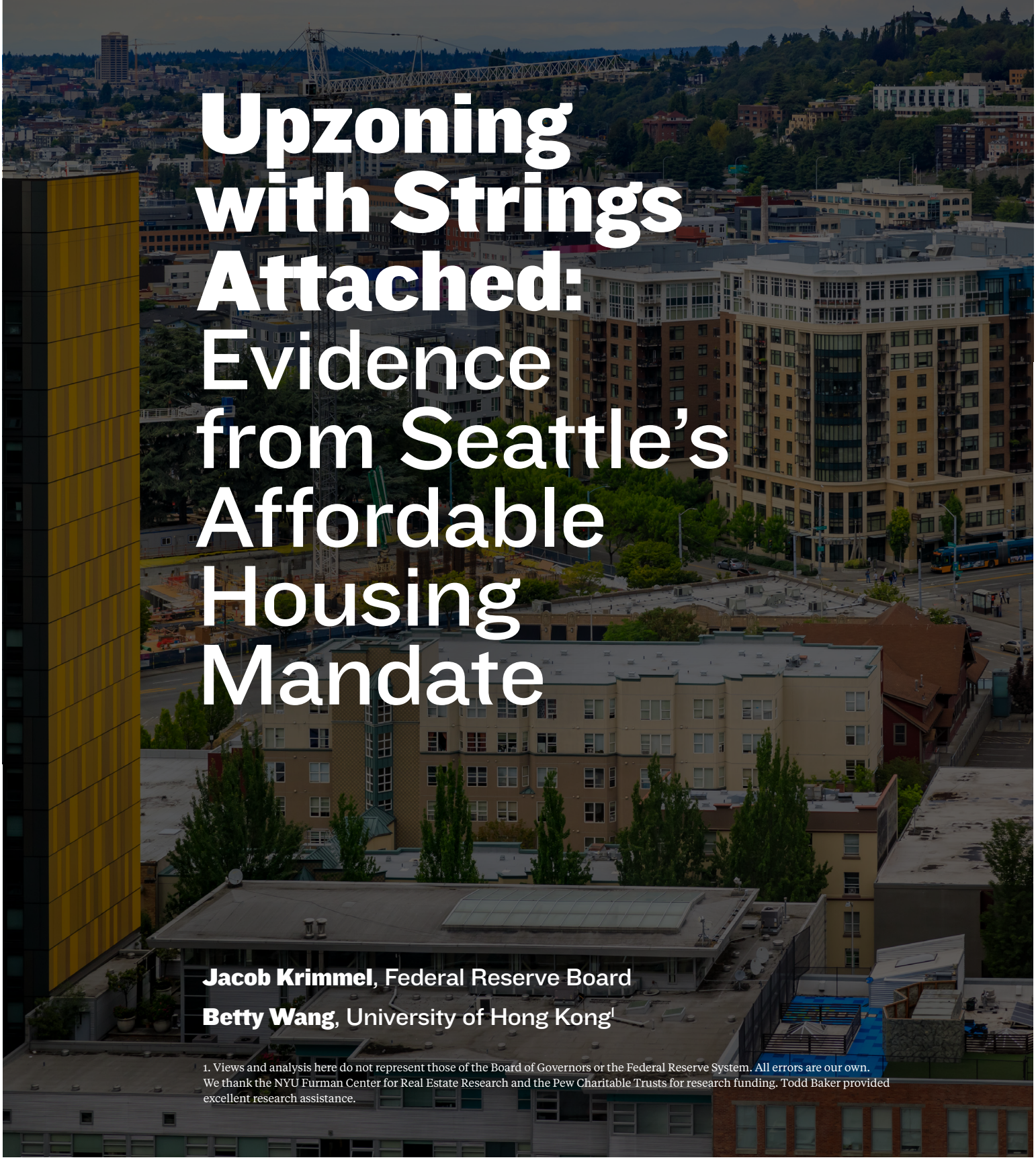
Learning from Land Use Reforms: Housing Outcomes and Regulatory Change



Upzoning with Strings Attached: Evidence from Seattle's Affordable Housing Mandate

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Abstract

This paper analyzes the effects of a major municipal residential land use reform on new home construction and developer behavior. We examine Seattle's Mandatory Housing Affordability (MHA) program, which relaxed zoning regulations while also encouraging affordable housing construction in 33 neighborhoods in 2017 and 2019. The reforms allowed for more dense new development ('upzoning'), but also required developers to either reserve some units of each project at below-market rates or pay into a citywide affordable housing fund. Using difference-in-differences estimation comparing areas affected versus unaffected by the reforms, we show new construction fell in the upzoned, affordability-mandated census blocks. Our quasi-experimental border design finds strong evidence of developers strategically siting projects away from MHA-zoned plots—despite their upzoning—and instead to nearby blocks and parcels not subject to the program's affordability requirements. The effects are driven by low-rise multifamily and mixed-use development. Our findings speak to the mixed results of allowing for more density while simultaneously mandating affordable housing for the same project.

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Introduction

There is broad academic consensus that stringent land use regulations are behind many major sociopolitical issues facing cities today, including housing unaffordability, residential segregation, and lagging economic growth.[2] Some of the most common forms of regulation are limits to urban density, which may restrict the size or height of multifamily residences or ban multi-unit buildings outright. Such low-density zoning is viewed as the root cause of affordability issues for many in-demand cities.[3] For instance, land zoned for single-family detached homes accounts for 94 percent of all land zoned for residential use in San Jose, 75 percent in Los Angeles, and 70 percent in Minneapolis.[4]

While the ill effects of tightening land use controls are well established, there is far less practical knowledge on how to ameliorate the situation. It is not clear to academics or policymakers exactly how existing zoning codes and regulations should be changed to spur new construction where housing shortages are most acute; nor is it straightforward to enact such reforms, even if there were consensus. At present, state and local policymakers around the country are implementing or discussing a wide range of housing affordability reforms, from changing zoning codes to enacting rent controls.[5]

A key challenge facing policymakers seeking to boost supply and lower housing costs in the long run is finding a suite of reforms that are politically feasible in the short run. For example, though there is widespread agreement among economists that allowing more dense construction will, in theory, boost supply and bring down prices, voters and politicians remain wary. A prominent concern is that upzoning would lead only to the construction of expensive units, which would not directly alleviate affordability issues among rent-burdened existing residents. Empirical evidence on the effects of upzoning is scarce, however, mainly because these policy changes are rare, especially at larger geographic scales.

2. While all cities in the U.S. have some form of land use regulatory rules, restrictiveness and corresponding housing shortages vary widely across metro areas. See Gyourko, Hartley, Krimmel (2021) for variation in land use restrictions across metro areas.

3. Edward L. Glaeser and Joseph Gyourko, "The Economic Implications of Housing Supply," Journal of Economic Perspectives 32, no. 1 (February 1, 2018): 3–30, https://doi.org/10.1257/jep.32.1.3.

4. A small number of cities also adopt urban growth boundary lines to limit the extensive margin along which cities could grow (most notably, Portland, Oregon).

5. These include, for example, sweeping ADU reforms in California and Oregon (https://www.hcd.ca.gov/policy-and-research/accessory-dwelling-units/); rent control proposals in Boston (https://www.boston.com/real-estate/real-estate-news/2023/01/18/boston-rent-control-michelle-wu-plan/); a ban on single-family zoning in Minneapolis (https://www.planning.org/blog/9219556/measuring-the-early-impact-of-eliminating-single-family-zoning-on-minneapolis-property-values/), and inclusionary zoning in Washington, D.C. (https://dhcd.dc.gov/service/inclusionary-zoning-iz-affordable-housing-program/).

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This paper analyzes Seattle's Mandatory Housing Affordability (MHA) reform, one of the largest city-wide density and affordable housing reforms in the United States. Seattle presents an ideal setting to answer the question of how to tackle housing shortfalls and affordability issues. The city's population has boomed and house prices have soared in recent years. While the metro area population has grown by 30 percent over the past two decades, Seattle is building fewer new units per year than when it had 1 million fewer inhabitants. As a result, since 2000, median house prices have nearly tripled; one in seven residents is severely rent burdened. While there is a growing political will for large-scale housing reform, much of Seattle's land remains zoned only for detached single-family residences.[6]

The MHA reform presents a case study of how one high-cost city struck a balance between its efforts to alleviate affordability issues and local political opposition from both single-family homeowners resistant to change and rent-burdened households fearing displacement. The MHA program upzoned 33 non-contiguous neighborhoods between 2017 and 2019. In these areas, MHA allowed for greater density while mandating that all new commercial and multifamily residential construction contribute to affordable housing. The reform combines two policy levers that some economists would consider to be in conflict with one another: increasing development capacity through upzoning while requiring private development to create income-restricted affordable housing. Geographically, the MHA touches very little single-family zoned land, thus making minimal alterations to the city's landscape while attempting to increase overall housing production. MHA applied almost exclusively to areas already zoned for multi-family, commercial, or high-density single-family homes (e.g. townhouses and rowhouses) – an important factor for MHA's political feasibility.

Seattle is one of the first large cities to adopt this "upzoning with strings attached" model, a prominent policy vehicle being discussed across the county. Thus, Seattle's MHA represents an interesting example for other cities considering density reforms to alleviate affordability issues. Whether (and when) such a policy would spur or stifle housing development, especially affordable housing development, remains an empirical question. What is the "right mix" of sticks (requiring affordability contribution) and carrots (allowing more development capacity and density) for developers?

6. The authors' conversations with officials from the City of Seattle, community groups, and developers indicate that pro-density and pro-affordability reforms have been discussed for at least the past 10 years. We note also that Seattle recently adopted reforms to boost accessory dwelling unit (ADU) production in single-family neighborhoods.

We first present empirical evidence on the quantity response to the regulatory changes: are more housing units permitted and built following the rezoning? Our main empirical finding suggests strategic developer behavior following the reform at selected zones, guided by a cost-benefit trade-off. Using a difference-in-differences analysis on a quasi-random sample of geographic areas that straddle the boundary of MHA zones, we find that there is no overall supply decline, but strong *strategic substitution* of new construction away from blocks and parcels subject to the MHA. It is worth noting that the substitution is more likely to happen for low-rise residential zones than for high-rise residential zones. This is a mixed result, as supply increases but not in all MHA zones as intended. In particular, we find that, conditional on a permit being issued, it is more likely to be issued to a non-MHA block zone after the policy took effect in April 2019. Looking at the number of units, we find there are differentially fewer units added to MHA low-rise zones after the reform. Worryingly, most of the drop in the number of units in MHA zones is coming from the multifamily segment of the market, where most of the housing products are 3- and 4-story townhouses and duplexes. This is of particular note because low-rise and small multifamily homes are seen as a more affordable alternative to luxury apartments for low- and moderate-income renters.

Overall, our findings suggest preliminary mixed results for the MHA. While upzoning allows for the construction of larger, taller multifamily buildings, it appears MHA's affordability requirements act as a tax on some additional development. Importantly, any project on an MHA-zoned parcel was subject to the affordability requirement, regardless of whether the project itself was "taking advantage" of the upzoning reform.[7] On balance, it appears the cost of the affordability requirement to developers outweighed the benefit of additional units via upzoning, especially in low-rise zones.

7. For instance, it would not matter if a developer was building a duplex that would have been allowed under pre-MHA zoning rules or a triplex that would only have been allowed under post-MHA zoning.

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Institutional Background

Seattle has experienced an intensifying housing affordability crisis over the past two decades, driven in part by the growth of big tech companies like Microsoft and Amazon which has boosted labor demand, and therefore housing demand. The median home price has tripled since 2000, and rental rates for a one-bedroom have increased by 35 percent over the past five years. There is also a large racial gap in rent burdens: 35 percent of the city's Black renter households are severely rent burdened, compared to 19 percent of white renter households. Seattle's population grew by 15.7 percent between July 2010 and July 2016, faster than almost any other large city in the country. In the city's 2035 Comprehensive Plan, Seattle housing officials identified that 20-year growth estimates would require the production of an additional 27,500-36,500 units, not including existing unmet needs. The shortage was anticipated to be particularly severe for units restricted to 30 percent and 50 percent of Area Median Income (AMI). Yet prior to the passage of the MHA, approximately 65 percent of the city's land was zoned for exclusively single-family usage.

The MHA reform allows for greater building heights and higher floor area ratio (FAR) limits in designated MHA zones, while requiring a developer contribution in exchange for the density bonus. The contribution comes in two forms that the developer could choose: "payment" or "performance." Payment, a one-time monetary payment based on a predetermined schedule, goes directly into the city's affordable housing fund; performance requires developers build rent- and income-restricted units on-site. The contributions are designed to mitigate the perceived negative impacts of new development.

The MHA reform upzoned 33 neighborhoods, allowing taller and denser construction in three major types of buildings—commercial, multifamily, and mixed-use (single-family zones exempted). Every project located in an MHA rezone triggers the affordability requirement, where the developer could choose between payment or performance. The level of developer contribution required, measured either through units built ("performance option") or dollars contributed to the affordable housing fund ("payment option"), is determined by the extent to which the zone has changed from its prior classification ("M", "M1", or "M2"). This would ideally provide a distribution of mixed-income housing as well as a source of public revenue which the city housing agency could leverage towards more private funding for targeted development. The program generated $68 million (and roughly 850 affordable units) in its first full year (2020) with the majority of developers taking the payment option.

One key thing to note is that this MHA program is not an unexpected "shock." The program's details were informed by two years of community engagement and policy analysis. The guiding principles for the MHA program generated from that process include: creating more rent-restricted affordable housing for low-income people, minimizing displacement and impacts on neighborhood character, increasing variety of housing choices (including homeownership and family-size housing), developing additional housing opportunities near schools, transit, and jobs, and coordinating growth with infrastructure investments.

In fact, the current program is an expansion of the city's pre-existing voluntary Incentive Zoning (IZ) program. The biggest difference from IZ to MHA was that it became *mandatory* in designated geographies, in that it applies to all new permits issued within MHA zones after the reform. MHA was initially rolled out in six "urban villages"[8] between 2015 and 2017 before being expanded on the same terms citywide in an additional 27 urban villages in April 2019. Throughout the paper, we will be using April 2019 as our "post" period since the overwhelming majority of neighborhoods affected and permits issued occurred after this wave of the reform. Importantly, the designers of MHA see the program as a necessary steppingstone for more ambitious future upzonings, both in terms of increases in allowable density and in geographic scope.

The geographic design of the MHA rezonings was informed by neighborhood assessments completed as part of the city's comprehensive planning process. The demographic and neighborhood trends of each urban village were examined to determine whether the area has a low or high "Risk of Displacement,"[9] and "Access to Opportunity."[10] The architects of MHA intended to spur the most housing production in areas with a low risk of displacement and high access to opportunity.

Figure 1 shows that MHA rezonings affect quite a wide geography of neighborhoods. The left panel of Figure 1 shows all MHA rezonings. The right panel breaks the rezonings down into three tiers of rezoning, based on the intensity of the zoning change. In the majority of cases, called the "M tier," the zoning code itself did not change, but taller buildings and/or higher FAR were allowed. For these cases, a suffix was added to the zoning code after

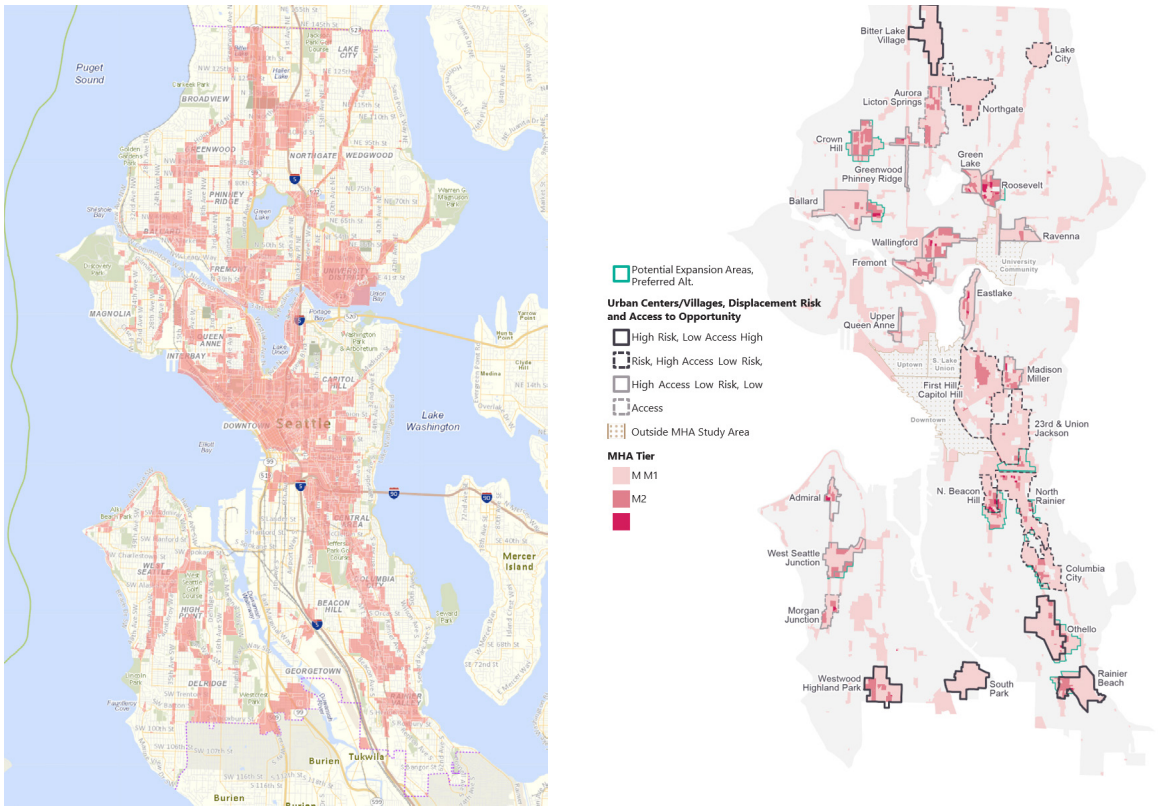
8. An urban village is the city's inventive term for certain mixed-use neighborhoods designated to accommodate common housing and business growth.

9. "Risk of displacement" is determined by 14 indicators including the racial composition of a neighborhood's residents, their educational attainment, its proximity to high-income neighborhoods and development capacity.

10. "Access to opportunity" includes factors such as local educational outcomes, property value appreciation, and proximity to resources such as parks, health care facilities, or public transit.

MHA took effect: an LR3 becomes LR3(M), for example.[11] These rezones allow for roughly one story of additional development capacity. As a percentage of developable land in MHA rezoned areas, 78 percent of land falls under this mild change. The other 22 percent of land falls under M1 and M2 tiers, which provided for more significant changes than M tier.[12] The right panel shows the three colors corresponding to the three tiers. The most moderate M tier is the lightest pink. Housing officials carefully chose to map M tiers, as opposed to M1 or M2 tiers, in high-risk or low-opportunity areas, in order to minimize displacement risk and avoid hurting access to opportunity. Their aim was to ensure affordable units would be added in low-rise multifamily zones rather than allowing for high-rise luxury apartments. This modest upzoning, paired with MHA's affordability mandate, did, however, leave M-tier areas at particular risk of lower supply responses.

Figure I. MHA Areas and the Intensity of Upzoning



Source: City of Seattle GIS Program. "Mandatory Housing Affordability (MHA) Zones." *Seattle GeoData*, January 5, 2020. https://data-seattlecitygis.opendata.arcgis.com/datasets/SeattleCityGIS::mandatory-housing-affordability-mha-zones/explore?location=47.598377%2C-122.274283%2C12.00.

11. "LR" means Lowrise.

12. Seattle classified its zones into five broad categories based on the density of permitted development. The M1 tier, which accounts for 20% of MHA rezoned areas, includes rezonings that moved the land up an entire category. The M2 tier, which accounts for only 2% of rezoned areas, involves upzones that shifted the land by two or more categories.

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To understand the size of the MHA rezoning treatment effect, we look at the actual permitting activities following MHA rezones. At the permit level, 75 percent of all permits issued in MHA-rezoned areas between April 2019 and July 2022 occurred in areas subject to the four most common zoning changes. Table 1 summarizes these four changes. These four types of rezoning were also the four most common when ranked by the total square footage of the lots on which new buildings were permitted, although their ranking was different across the two measures. For example, though the fourth-largest number of permits were issued in places that changed from the LR3 (lowrise 3) zone to LR3(M), those permits accounted for the largest area on which new development occurred. Out of all 34 million square feet of MHA-rezoned land on which new development occurred, 52.3 percent belongs to one rezone of LR3 to LR3(M).

Table (2) shows the four types of rezoning in which the largest number of net units were created. Here, there is a partial overlap with the earlier set, but certain commercial areas also appear, due to the permitting of especially large developments in these areas. Appendix Tables (9) and (10) show the specific height, density and FAR limit changes for commonly observed types of rezones.

Table 1: Most Commonly Observed Four Rezones by Number of Building Permits and Lot Size

Rezone	Rezone full name	Count of permits	Percent (%) of total permits	Lot size (sq. ft.)	Percent (%)
RSL to RSL(M)	Residential Small Lot	418	18.4	3,169,433	9.1
LR1 to LR1(M)	Lowrise 1	386	17.5	2,302,597	6.6
LR2 to LR2(M)	Lowrise 2	329	14.9	2,373,404	6.8
LR3 to LR3(M)	Lowrise 3	271	12.3	18,243,500	52.3
All others		803	36.3	8,787,566	25.2
Total		2,206	100	34,876,500	100

LR = lowrise. M = tier indicating zoning code did not change. RSL = residential small lot.
Source: City of Seattle, MHA Director's Report 2018

Table 2: Most Commonly Observed Four Rezones by Number of Net Units Created

Rezone	Rezone full name	Count of permits	Percent (%)
DNC 240/290-400 to DMC 240/290-440	Downtown Mixed Commercial	3,188	12
LR3 to LR3(M)	Lowrise 3	1,887	7.1
LR2 to LR2(M)	Lowrise 2	1,301	4.9
CI-655 to NC3-75(M)	Commercial to Commercial/Mixed use	1,142	4.3
All others (all fewer than 1,000 permits for one type of rezone)		18,996	71.1
Total		26,514	100

C = commercial. DMC = downtown mixed commercial. LR = lowrise. M = tier indicating zoning code did not change. NC = commercial/mixed use.
Source: authors' calculations.

The key takeaway is that the increased development capacity created by most MHA rezonings was relatively limited. Hence the "carrots" for developers—the development capacity increase—might not be big enough to outweigh their costs from the affordability payment or performance requirement. Figure A2 in the Appendix shows an example of the specific building prototype for the most prevalent rezone change (LR3 to LR3(M)).[13] The allowable FAR increases from 2.0 to 2.2 after MHA took effect,[14] which means the height limit increases from 40 feet to 50 feet, adding another floor. Other zoning code changes generally enjoy similar magnitude as LR3 does.

With a relatively modest density bonus, the "affordability tax" on developers is comparatively high. Housing officials estimate that the legislation will result in 17,000 more total housing units over 20 years than would be generated by development in its absence; 5,600 of which would be rent- and income-restricted units. Importantly, estimates operated on the assumption that half of developers would choose to build affordable units on-site and half would choose to contribute to the affordable housing fund. However, in the first year that MHA was in full swing, an overwhelming majority of developers (98%) chose the payment option. This suggests either that the performance option constitutes a large "affordability tax" on the developers or the payment option levels were set too low.

13. Sam Assefa, Kathy Nyland, Steve Walker and Nathan Torgelson. "Directors' Report on Citywide Implementation of Seattle Mandatory Housing Affordability Program," (2018).

14. For LR3 inside Urban Villages.

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Data and Analysis

To examine the effect of the MHA reforms on new home permitting and construction, we merge two publicly available maps from Seattle GeoData (part of Open Data Seattle): the map of Residential Building Permits Issued and Final since 1990 and the city's Mandatory Housing Affordability (MHA) Zones map. The permit data are address-level geocoded and include information on the development site, permitting stage, plans for units created and demolished (by type of unit), as well as other geographic data.

We then construct a panel dataset at the census block level over time. MHA zones do not always perfectly overlap with census block polygons, so we categorize a census block as an MHA block if at least 50 percent of its area falls within an MHA zone. Under this definition, we find just 11 percent (3,960 out of 35,279) of census blocks are within the MHA. MHA zones account for a very small share of census blocks themselves, but many more blocks are geographically proximate to an MHA zone. While just over 1 in 10 census blocks has at least 50 percent of its area in an MHA zone, over 31 percent of census blocks are located within a census tract that overlaps with an MHA zone somewhere within its boundaries. In this way, many census blocks are not themselves upzoned, but are in the neighborhood (census tract) of somewhere that is. More details on the construction of our dataset can be found in the Appendix.

Table (3) below presents population and socioeconomic summary statistics. The first three columns are block groups that were completely rezoned under MHA, those partially rezoned under MHA, and those that are fully non-MHA.[15] These correspond roughly to the preexisting built environment of Seattle neighborhoods, with MHA zones being located in the most densely developed areas. The summary statistics change monotonically across all socioeconomic variables: as we move away from the fully MHA block groups to fully non-MHA ones, there are fewer people, fewer housing units, higher incomes, lower poverty, and a higher percentage of owner-occupied housing. Put differently, the fully-MHA block groups—with a poorer population of more renters, located around major commute lines—are precisely where housing affordability and displacement concerns are the greatest.

15. Note that we do not have summary statistics by census block because population, income and demographic variables at the block level are not available in 5 year ACS samples.

Fully non-MHA block groups are not a suitable control group for fully MHA block groups. As such, we limit our analysis to the partial MHA block groups, which we call "border" MHA blocks for identification. One drawback of the border analysis is that although fully MHA block groups (column 1) do not have an adequate non-MHA comparison, these areas saw the most intense upzoning (the M1 and M2 zones). In effect, the 'treatment' is stronger in areas which lack a good control group and weaker in areas where there is an adequate control. This will downwardly bias any effects we find.

Table 3: Summary Statistics by Census Block Group MHA Status

	Fully MHA	Border MHA/ Non-MHA	Fully Non-MHA	All
Population	1,627.34	1,395.45	1,513.35	1,491.63
	−615.13	−405.84	−614.88	−571.77
Housing Units	867.31	601.72	568.19	599.35
	−420.51	−215.7	−243.76	−266.2
Median Income (2017 dollars)	66,810.58	93,625.62	96,007.03	93,320.46
	−26,051.03	−37,717.84	−41,502.25	−40,300.85
Median House Value (Thousands of 2017 dollars)	464.16	567.94	450.99	482.63
	−157.12	−232.88	−245.52	−242.58
Share College+	0.59	0.6	0.44	0.49
	−0.19	−0.19	−0.22	−0.22
Share in Poverty	0.17	0.1	0.08	0.09
	−0.16	−0.09	−0.08	−0.1
Share Owner-Occupied	0.23	0.59	0.68	0.63
	−0.15	−0.21	−0.26	−0.27
Share White	0.6	0.67	0.62	0.63
	−0.21	−0.23	−0.2	−0.21
Observations	107	365	948	1,420

MHA = Mandatory Housing Affordability.
Notes: Summary statistics at census block group (CBG) level, according to 2013–2017 American Community Survey 5-year estimates.
Means of CBG listed for each column (for example, mean of CBG median income) and standard deviation in parentheses.
Source: Authors' analysis via 2013–2017 5-year ACS

Empirical Findings

Consider two hypothetical outcomes of the policy change. The "first best" outcome is an increase in overall supply in MHA zones. With the mandatory affordability requirements, this increase in overall supply also means an increase in affordable units. At the other extreme, there could be no positive supply response either in or outside of the MHA zone if the reform does not provide the right incentives. The success of MHA rests on developers' response to a cost-benefit trade-off: on the one hand, MHA allows developers to build and sell more units; on the other hand, each MHA-zoned project comes with a "developer tax" from the affordable housing requirement (either payment or performance).

Our main empirical finding suggests strategic developer behavior following the reform, guided by this trade-off.[16] We find that there was no overall decline in housing production, but strong *strategic substitution* of new construction away from MHA zones. This policy outcome can be thought of as a middle ground between our initial hypothetical outcomes: MHA enactment did not halt all new development, but new units were not built where intended.

To quantify the substitution effect, we estimate a difference-in-differences regression at the census block level. Equation details can be found in the Appendix. Tables (4) through (6) below show the generalized difference-in-differences result on different dependent variables. Estimates for key coefficient β_3 (see appendix for the formal difference-in-differences equation) are shown on the first row.

All tables are organized in six columns. The first three columns use the sample of all census tracts with no fixed effects (column 1), tract fixed effects (column 2), and year-month and block fixed effects (column 3). To get to the causal effect of MHA, we limit our analysis to a quasi-experimental sample in columns 4 through 6 for estimating Equation (1). In particular, we use the sample of "Border Tracts" which are tracts that straddle an MHA boundary. This sample gets rid of tracts that are entirely within MHA zones and entirely outside of MHA zones. There are a total of 397 tracts, and 118 tracts are border tracts by our definition. The estimation is done at the census block level, which is a finer geography than census tracts. All the variation in our "Post X MHA" coefficients come from the comparison within neighborhoods, where some blocks in that neighborhood are upzoned and others are not.

16. Appendix tables (4) and (5) present summary statistics on the average monthly number of net units and value in MHA versus non-MHA zones *in aggregate*, before and after the policy change.

If the MHA upzoning program worked as hypothesized, then within a border tract, there would be much more permitting activity and more new supply in the upzoned blocks. But we find the opposite—that the development is happening more in the blocks that were not upzoned within the same neighborhood.

The identifying assumption is that, within-tract, the growth potential of housing demand is the same whether the housing project falls onto either side of the MHA line. A tract is a fine geographic level that allows us to make this assumption. Columns 4 and 5 use the quasi-random sample of border tracts, with tract and year-month fixed effects (column 4) and block and year-month fixed effects (column 5). Column 6 zooms into the finer geographic level of block groups and uses the finer block groups at the border (partially MHA), with year-month and block fixed effects.

There are three variables that measure quantity response. They are: whether there was a permit issued at all (Table (4)), the number of permits issued (Table (5)), and the net units permitted (Table (6)). Tables (4), (5), and (6) examine housing supply activity in Seattle's census blocks from five years prior to MHA through the most recent data (April 2022). All tables are set up the same way: columns 1, 2, and 3 examine effects for all of Seattle, adding fixed effects across the columns; columns 4 through 6 limit the sample to areas on the MHA borders.

We find quantitatively strong and consistent empirical evidence for substitution of supply away from MHA zones. Across all specifications on all three quantity dependent variables, the number of permits and number of units permitted per month decreases in MHA blocks after the reform takes effect.

Table (6) examines whether there was at least one permit issued in a census block, finding that MHA rezonings decreased the likelihood of a permit being issued, particularly at the border tracts. We define the dependent variable to be an indicator variable which equals 1 if there is at least 1 permit issued in that block-month, and 0 if none is issued. We see that the estimate of -.004 on "Post X MHA" is very consistent across all specifications and our two geographic samples. The magnitude is economically meaningful: it is twice as large as the dependent variable mean in the full sample of all tracts (first three columns).[17]

17. Put differently, this means that after MHA goes into effect, an MHA block is differentially 4.8 percent less likely to receive a permit in a given year (-0.004 x 12 months) than a non-MHA block in that same time frame. On average, the likelihood a block receives a permit on an annual basis is about 2.4% (0.002 x 12 months), which is why we would describe this magnitude as both large and economically meaningful.

Interestingly, as we move to the finer geography of border tracts, the (absolute) magnitudes are bigger. This suggests that the substitution action is happening in the border tracts: permitting activity is switching *within* and not *across* neighborhoods. Notice also that the dependent variable means increase from 0.002 in columns 1-3 (the all tracts sample) to 0.007 in columns 4-6 (the border tract sample). One could interpret this increase as an annual likelihood of receiving a permit increasing from 2.4 percent overall to 8.4 percent for border-MHA neighborhoods; this indicates that throughout this time period (including five years before MHA) much more housing is being permitted in these MHA-border neighborhoods than in either fully non-MHA or fully MHA areas. These results are consistent with developers deciding first to build in a certain neighborhood and then strategically choosing to build on parcels in that neighborhood not subject to the MHA's affordability requirements. This suggests the potential benefits accruing to developers from the MHA's upzoning component failed to outweigh the costs to developers of the affordability requirements.

Table 4: Extensive Margin: At Least One Permit is Issued, Block by Month

	1	2	3	4	5	6
Post X MHA	−0.004***	−0.004***	−0.004***	−0.005***	−0.005***	−0.004***
	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
Post	−0.000	−0.000				
	−0.001	−0.001				
MHA Block	0.009***	0.005***		0.005***		
	−0.001	−0.001		−0.001		
R−squared	0.002	0.007	0.028	0.003	0.023	0.022
DV Mean	0.002	0.002	0.002	0.007	0.007	0.007
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3,527,900	3,527,900	3,527,900	1,049,600	1,049,600	862,700

***p < .01.
BlkGrp = block group. DV = dependent variable—in this table, whether at least one permit is issued at the block-month level.
Geo. FE = geographic fixed effects. Geo. Sample = geographic sample. MHA = Mandatory Housing Affordability. Mo = month.
Notes: Standard errors are in parentheses. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.
Source: Authors' analysis

Table (5) looks at the number of permits issued, again finding a reduction driven by MHA rezonings. The magnitudes are small (-0.007 per month), but the base is also very small (0.003), so economically the effect is quite large. We do see (in columns 1 and 2) that MHA blocks generally see more permitting activity throughout the sample period. Column 3 adds block and month fixed effects and we see the point estimate is unchanged: permitting differentially decreases in MHA zones. The final column limits the sample only to those census tracts that at least partially intersect an MHA zone. Since tracts are much larger than blocks, this specification removes all control census blocks that are far away from an MHA zone and thus could differ unobservably from treatment areas. We see the point estimate is unchanged and even a bit stronger, while remaining statistically significant. We think that overall permitting activity tended to move across MHA boundaries after the policy took effect.

Table 5: Number of Permits, Block by Month

	1	2	3	4	5	6
Post X MHA	−0.007***	−0.007***	−0.007***	−0.009***	−0.009***	−0.008***
	−0.002	−0.002	−0.002	−0.002	−0.002	−0.002
Post	0.000*	0.000*				
	0	0				
MHA Block	0.015***	0.011***		0.012***		
	−0.002	−0.002		−0.002		
R−squared	0.002	0.005	0.025	0.002	0.022	0.02
DV Mean	0.003	0.003	0.003	0.011	0.011	0.01
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3,527,900	3,527,900	3,527,900	1,049,600	1,049,600	862,700

*p < .10. ***p < .01.
BlkGrp = block group. DV = dependent variable—in this table, the number of permits at the block-month level. FE = fixed effects.
Geo. Sample = geographic sample. MHA = Mandatory Housing Affordability. Mo = month.
Notes: Standard errors are in parentheses. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.
Source: Authors' analysis

The results for the number of new units created are very similar and robust. We take this as evidence that there is substituting behavior along the border of MHA zones, which suggests strategic developer behavior is at play. Developers want to profit from growing demand in these MHA zones, but the cost of construction is too high after the reform. By moving to the bordering blocks, they avoid those costs but still enjoy the spillover from in-demand neighborhoods.

Table 6: Number of New Units, Block by Month

	-1	-2	-3	-4	-5	-6
Post X MHA	−0.069**	−0.069**	− .069**	−0.057***	−0.057***	−0.065***
	−0.03	−0.03	−0.03	−0.018	−0.018	−0.016
Post	−0.000	−0.000				
	−0.001	-0.001				
MHA Block	0.189***	0.120***		0.119***		
	−0.026	−0.016		−0.013		
R−squared	0.001	0.001	0.014	0.001	0.016	0.015
DV Mean	0.023	0.023	0.023	0.052	0.052	0.041
Geo. Sample	All Tracts	All Tracts	All Tracts	Border Tracts	Border Tracts	Border BlkGrp
YearMo FE			Yes	Yes	Yes	Yes
Geo. FE		Tract	Block	Tract	Block	Block
Observations	3,527,900	3,527,900	3,527,900	1,049,600	1,049,600	862,700

**p < .05. ***p < .01.
BlkGrp = block group. DV = dependent variable, in this table it is the number of new units at the block-month level as indicated in the title of the table. FE = fixed effects. Geo. Sample = geographic sample. MHA = Mandatory Housing Affordability. Mo = month.
Notes: Standard errors are in parenthesis. Standard errors clustered at census tract. Sample limited to at most 5 years before MHA.
Source: Authors' analysis

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Event Study Plots

To illustrate these findings visually, we produce four event study plots using the three variables discussed above as well as the net change in multifamily units. We take column 5 from the three quantity tables as our preferred estimates for the event study plots. Even though column 6 represents arguably the finest geography, column 5 provides the finest data for the socio-economic variables. However, these plots should tell the same story using either of the estimates. The coefficient estimates are similar across columns 5 and 6, and if anything, 5 underestimates the true effect. Figure 2 plots the relative treatment effect of MHA zones since the non-MHA areas are normalized to 0.[18]

These plots show that MHA enactment in April 2019 was associated with a lower likelihood of permit issuance in MHA zones (top left), fewer permits being issued per block (top right), slightly fewer units permitted overall (bottom left), and significantly fewer multifamily units permitted (bottom right). This final result on fewer multifamily units is particularly worrying, considering a major goal of MHA was to encourage dense multifamily development.

Common striking patterns emerge from comparing the four plots. For all four event studies, there is a decline in the treated MHA zones after the reform, but the decline is gradual and there may be an uptick that precedes the decline. We expect to see the substitution continue happening as we get more data for newer months (our data is currently updated until April 2022).

18. The red bands are 95% confidence intervals around the point estimates. The x-axis is re-centered around the "event date" of April 2019, where the green vertical line is the partition for pre- and post-reform.

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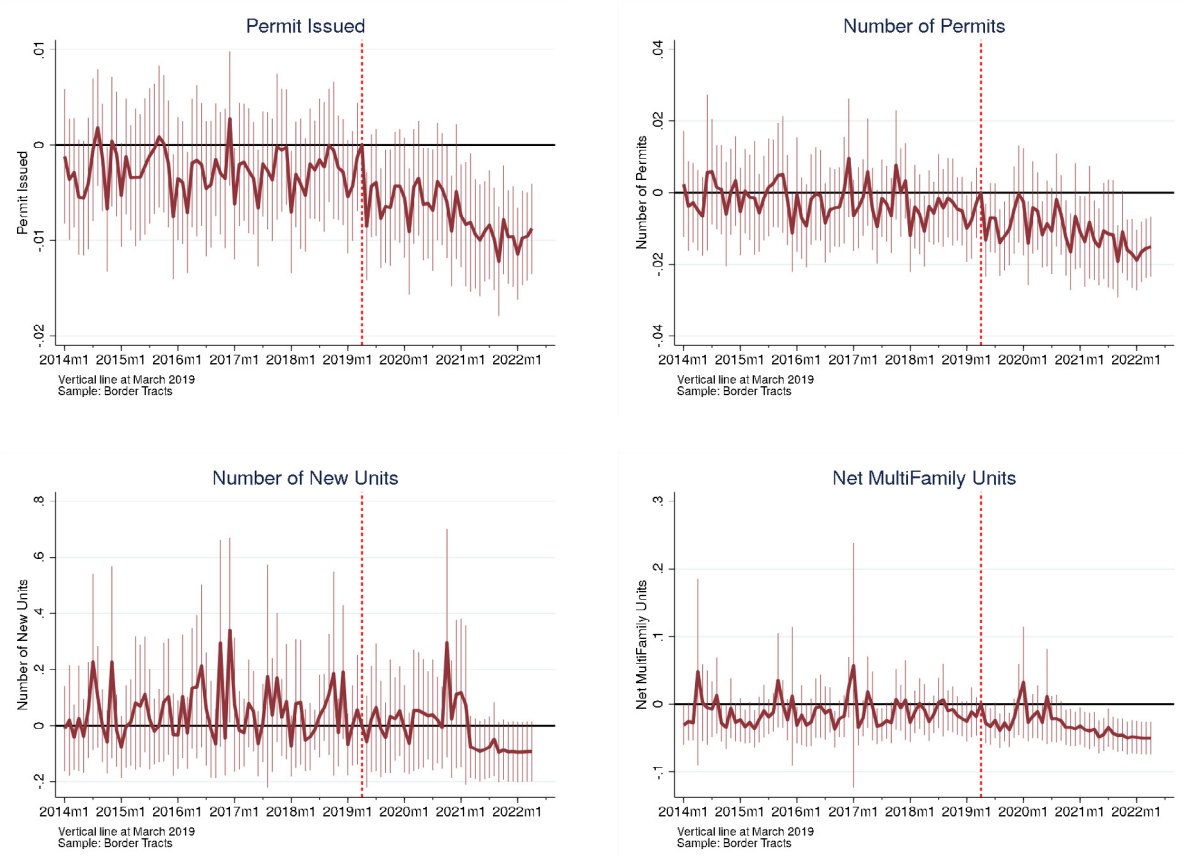
Figure 2. Event Study Results



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Conclusion

This paper provides empirical evidence on the question of whether upzoning leads to new home construction if there are affordable housing "strings attached." We perform a difference-in-differences estimation using within-neighborhood variation, where some census blocks in that neighborhood are upzoned—and subject to affordable housing requirements—while other blocks are not. Our hypothesis was that there would be much more permitting activity in the upzoned blocks, as the benefits of being able to build more densely were intended to outweigh the costs of any inclusionary zoning requirements. However, we observe the opposite in the data. We find a differentially larger supply response in blocks where the zoning has not actually changed and where there is no affordable housing mandate. This result unfortunately runs contrary to the program's dual goals of increasing overall housing supply in general and affordable housing units in particular.

Examining the locations of permitting activity, we find new construction is sited just across MHA lines at very fine geographies. Developers appear to be strategically substituting away from plots and parcels subject to the MHA. We interpret this result as evidence of the MHA's cost to developers outweighing its benefits, especially in MHA border neighborhoods. Specifically, the MHA's affordability requirements act as a "tax" on developers, which appears to dominate potential gains from higher-density projects.

Several caveats must be mentioned, however. First, the program is in its infancy. Our data allow us to examine only the first three years of MHA, two years of which were affected by COVID-19. The pandemic likely negatively affected both the demand for multifamily housing and the speed of the City's housing permitting process. It may also have shifted the demand for housing across Seattle's geography, given changing patterns of working-from-home—and here, perhaps for the longer-term. Certainly, the pandemic was not accounted for in policymakers' initial efforts to pair the amount of MHA's upzoning with the amount of its affordability requirements. Second, there are drawbacks to our MHA border block design. By design, MHA blocks near the border were zoned for smaller increases in density than areas farther away from an MHA boundary. This design necessitates a trade-off between examining where the reform's treatment is more powerful (the interior, fully MHA neighborhoods) versus where its effects can be more precisely estimated (the border, partial MHA neighborhoods). In choosing the latter, we acknowledge that our estimates are potentially downwardly biased; and MHA's effects may be more positive in

the interior areas. Regardless, while we cannot speak to how MHA affected the interior, fully-MHA and higher-density neighborhoods compared to a counterfactual, it is worth noting that in an absolute sense permitting did continue in these areas. Third, there may be large non-economic or difficult-to-quantify benefits of MHA. For example, given the size of the reform and the consensus it took to implement it, MHA has provided Seattle a potential springboard to expand upzoning in magnitude and geography—one policymakers hope to use. These benefits may be institutional or political in nature. Although such institutional and political benefits are outside the scope of this economic analysis, they may be quite significant.

How similar inclusionary housing programs will function outside Seattle remains ambiguous: our findings are a function not only of the size of the density bonus provided and affordability mandate imposed by Seattle, but also the shape of housing demand in Seattle and the city's room for development outside the rezoned areas. Each of these factors will vary across different cities—and across time. Even so, our findings point to the potential for unintended consequences when density bonuses are too small or affordability mandates too onerous. In the future, we recommend policymakers pursuing similar inclusionary housing strategies implement both stronger upzonings (larger density bonuses) and lighter, more flexible affordability mandates.

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Appendix

Tables and Figures

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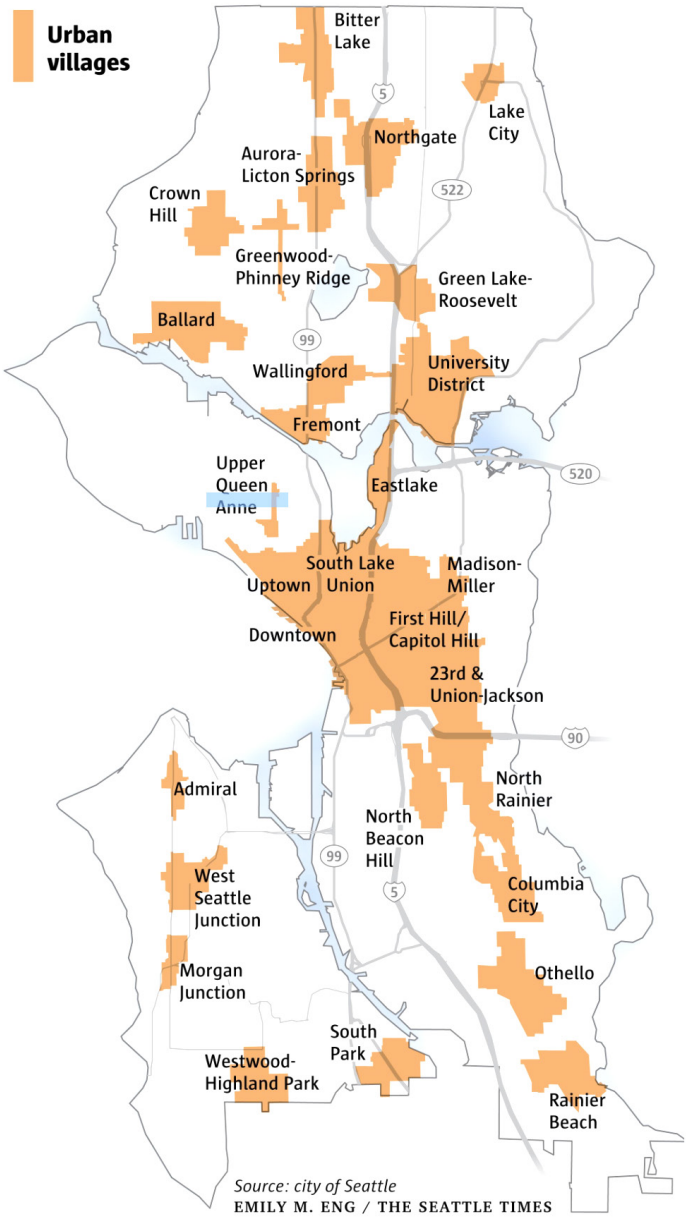
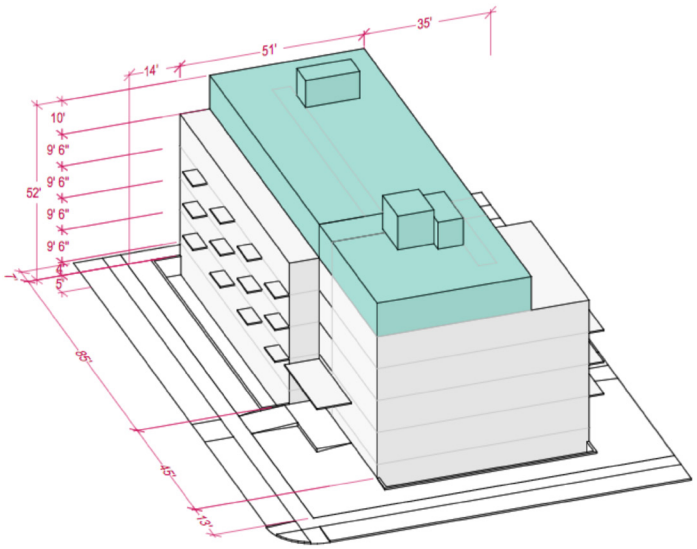


Source: Stephen Fesler, "How HALA Rezones Would Increase Capacity," *The Urbanist*, September 30, 2016, https://www.theurbanist.org/2016/09/30/hala/.



Source: Office of Planning and Community Development, "Draft MHA Zoning Concepts - Lowrise 3" (City of Seattle, n.d.), https://www.scribd.com/document/325878333/Seattle-OPCD-Draft-MHA-Zoning-Concepts.

A3.

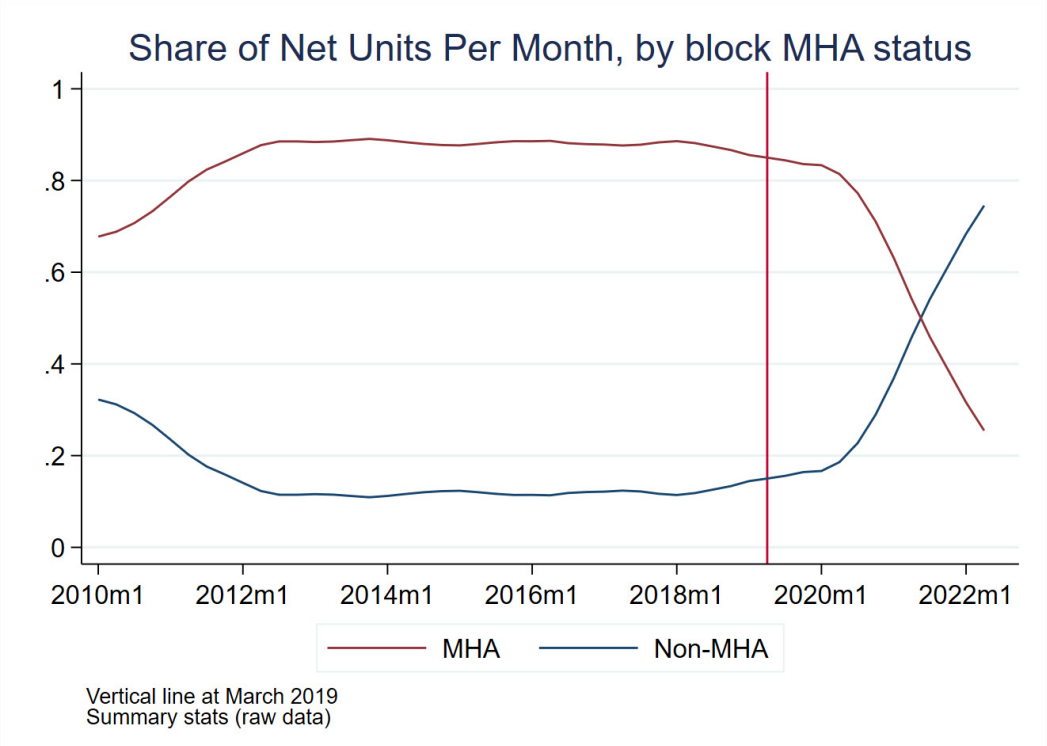


Table 7: Number of Net Units, Mean, and Standard Deviation

	Jan 2010–Apr 2019	After Apr 2019
Non-MHA	85.4	104.2
	−82.8	−98.8
MHA	670.6	466.6
	−508	−495.9

MHA = Mandatory Housing Affordability.
Source: Authors' analysis

Table 8: Value (in $1,000), Mean, and Standard Deviation

	Jan 2010–Apr 2019	After Apr 2019
Non-MHA	22,433	28,895
	−19,401	−20,300
MHA	121,538	89,217
	−123,860	−110,165

MHA = Mandatory Housing Affordability.
Source: Authors' analysis

Table 9: Mandatory Housing Affordability Development Capacity Change in Lowrise Zones

Zone			FAR limit		Height limit		Density limit	
Pre MHA	Post MHA	Housing type	Pre MHA	Post MHA	Pre MHA	Post MHA	Pre MHA	Post MHA
Lowrise 1	Lowrise 1 (M)	Cottage	1.1	1.1	18	22	1/1,600	No Limit
		Townhouse	1.2	1.1	30	30	1/1,600	1/1,350
		Rowhouse	1.1	1.1	30	30	1/1,600	1/1,350
		Apartment	1	1.1	30	30	1/2,000	No Limit
Lowrise 2	Lowrise 2 (M)	Cottage	1.1	1.3	18	22	1/1,600	No Limit
		Townhouse	1.3	1.3	30	40	No Limit	No Limit
		Rowhouse	1.2	1.3	30	40	No Limit	No Limit
		Apartment	1.3	1.3	30	40	No Limit	No Limit
Lowrise 3	Lowrise 3 (M)	Cottage	1.1	1.8	18	22	1/1,600	No Limit
		Townhouse	1.4	1.8	30	40	No Limit	No Limit
		Rowhouse	1.3	1.8	30	40	No Limit	No Limit
		Apartment	1.5	1.8	30	40	No Limit	No Limit

FAR = floor area ratio. MHA = Mandatory Housing Affordability.
Source: Policy Proposal Director's Report, City of Seattle

Table 10: Mandatory Housing Affordability Development Capacity Change in Residential Small Lot Zones

Zone			FAR limit		Height limit		Density limit	
Pre MHA	Post MHA	Housing type	Pre MHA	Post MHA	Pre MHA	Post MHA	Pre MHA	Post MHA
Residential small lot (RSL)	RSL (M)	RSL	None	0.75	25	30	1/2,500	1/2,000
		Tandem RSL	None	0.75	18	30	1/2,500	1/2,000
		Cottage RSL	None	0.75	18	30	1/1,600	1/2,000

FAR = floor area ratio. MHA = Mandatory Housing Affordability.
Source: Policy Proposal Director's Report, City of Seattle

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Data and Econometrics

Data description

To examine the effect of the MHA reforms on new home permitting and construction, we merge two publicly available maps from Seattle GeoData (part of Open Data Seattle): the map of Residential Building Permits Issued and Final since 1990 and the city's Mandatory Housing Affordability (MHA) Zones map. The permit data are address-level geocoded and include information on the development site, permitting stage, plans for units created and demolished (by type of unit), as well as other geographic data. The permitting data also include information on the lot size and the estimated value of the project, from which we can infer the density of the final project (on a units per acre basis) and obtain a proxy of the overall market value. The MHA map contains MHA zone polygons with their pre- and post-zoning designation.

We then construct a panel dataset at the census block level over time. MHA zones do not always perfectly overlap with census block polygons, so we categorize a census block as an MHA block if at least 50 percent of its area falls within an MHA zone. Just 11 percent (3,960 out of 35,279 census blocks) are within the MHA.[19] MHA zones account for a very small share of census blocks themselves, but many more blocks are geographically proximate to an MHA zone. While just over 1 in 10 census blocks has at least 50 percent of its area in an MHA zone, over 31 percent of census blocks are located within a census tract that overlaps with an MHA zone somewhere within its boundaries. In this way, many blocks are not themselves upzoned, but somewhere in their neighborhood will be.

19. For reference, 84% of blocks do not overlap with the MHA zones at all, while about 4% of blocks have between 0 and 50% MHA coverage (and are thus categorized as non-MHA under this definition). Of the blocks that are categorized as MHA, over 80% of them are entirely contained within an MHA. This is a rather conservative way to categorize MHA blocks so as to limit false positives of permits popping up near, but not within, MHA designated areas.

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Regression equation

$$Y_{i,t} = \alpha + \beta_1 \cdot \text{post}_t \times \text{MHA}_i + \beta_2 \cdot \text{post}_t + \beta_3 \cdot \text{MHA}_i + \gamma_t + \delta_i + \epsilon_{i,t}$$

We estimate Equation (1) in our econometric analysis, where t is month, i is MHA status of the census block (or block group in column 6 specification across all results tables), and γ and δ are, respectively, month and block (or tract) fixed effects. We limit our pre-period such that 5 years of pre-period and 3.5 years of post is more balanced. Using the full pre-period back to January 2010 gives similar results, as shown in Appendix Table. We limit our pre-period to January 2014 to March 2019, and April 2019 to April 2022 will be our post-period. A block is "Treated" if it is in the designated MHA zone, whether entirely or partially. "Post" is a dummy variable that equals to 1 if it is after April 2019. The key coefficient of interest is β_3.