

Local Zoning Laws and the Supply of Multifamily Housing in Greater Boston

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EXECUTIVE SUMMARY

Housing affordability is a significant issue in many U.S. metropolitan areas, including Greater Boston. Affordability has always been a major challenge for low-income renters; however, even middle-income families now face considerable affordability hurdles, particularly in metro areas with strong labor markets. Where people live has important implications for their health, schooling, and economic mobility. Researchers and policymakers have devoted attention to the role of land-use practices, such as regulating residential zoning, in creating housing affordability problems, particularly in the context of single-family houses. This paper studies how zoning regulations influence affordability in the context of multifamily housing, focusing on Greater Boston. It finds that reforms such as relaxing housing-density restrictions could lead to meaningful increases in the supply of multifamily housing and reductions in rents.

This report examines how multifamily zoning, relaxed maximum-height restrictions, and relaxed density restrictions on residential construction, or a combination of any of these three zoning reforms, affect the supply of multifamily houses and the cost of multifamily rents as well as house prices for single-family homes. In addition, it studies the effectiveness of inclusionary zoning policies in overcoming restrictive zoning. Specifically, it examines Massachusetts's Comprehensive Permit Act, often referred to as Chapter 40B. The Comprehensive Permit Act enables developers to appeal aspects of local zoning laws that limit housing construction in some capacity. This analysis helps us understand whether inclusionary zoning policies such as Chapter 40B are substitutes for relaxing land regulations in order to increase housing affordability. This report also examines how recent reforms to the state's Chapter 40A (the Zoning Act) requiring denser housing construction around public transit stops could affect the supply and price of housing in the immediate vicinity.

This report finds that density restrictions play a key role in limiting the multifamily housing supply. Relaxing density restrictions, either alone or in combination with relaxing maximum-height restrictions and allowing multifamily housing, is the most fruitful policy reform for increasing supply and reducing multifamily rents. Adopting multifamily zoning or relaxing height regulations does not yield the same increase in multifamily units built or reduce rents unless either is combined with relaxing density restrictions. Furthermore, Chapter 40B rarely substitutes for relaxing zoning regulations, particularly restrictions on multifamily housing. However, the law does complement relaxed zoning regulations by allowing developers to build more units than they could otherwise. Relaxing zoning regulations around public transit stops as required by recent reforms to Chapter 40A could result in greater housing supply and lower housing costs. The effects likely would be smaller in large municipalities and those closer to the city of Boston, which already have denser housing construction.

I. Introduction

Over the past three decades, housing costs in Greater Boston¹ and other U.S. metropolitan areas have risen sharply due to a low supply of new housing stock, in particular new multifamily housing (Glaeser et al. 2006; Sasser et al. 2006; Chiumenti 2019). Regulation of land use that creates disincentives for redesigning older housing stock or building new stock, as well as residents' preferences for less dense single-family housing, can cause an overall housing supply shortage. This report focuses on the impact of residential zoning regulations, specifically those that limit multifamily housing, on the cost and supply of different types of housing, including different types of multifamily homes. In addition to quantifying the effects of residential zoning regulations on housing costs and supply, this report looks at the effect of Massachusetts's Comprehensive Permit Act,² which provides mechanisms for overriding local zoning laws, on the supply of multifamily housing in more strictly regulated areas. It also examines the potential effect of recent reforms to the state's Zoning Act, which allow more housing construction around public transit stops.

High housing costs limit the number of workers who can access productive but expensive metro areas.

Multifamily housing is by definition a denser and larger form of construction than single-family homes, and it is curtailed when buildings are restricted to certain heights, when the number of units that can be built on a plot of land is restricted, or when multifamily housing is prohibited altogether. These land-use restrictions and others like them have an impact beyond simply raising the cost of housing locally. High housing costs prompt residents and businesses to move to areas where land costs are lower, and they limit the number of workers who can access productive but expensive metro areas. This loss of productivity has implications not just regionally but for the national economy as well (Hsieh and Moretti 2019).

Current homeowners often have competing interests with new homebuyers and renters when it comes to promoting housing affordability. Increasing the supply of homes in a neighborhood or town is one key way to lower costs or at least keep prices from rising rapidly in high-demand areas. However, current homeowners have an incentive to oppose new construction that could reduce their home's value. This report does not suggest solutions to the complex politics of this issue; its intent is to provide guidance to policymakers seeking to promote housing affordability in Greater Boston. This report highlights findings from Kulka, Sood, and Chiumenti (2022), which includes additional technical details and analysis.

Developers wishing to build multifamily housing can face multiple hurdles to completing projects. Most cannot self-finance their projects (Schuetz 2020), and often they face both lengthy local-government approval processes and community opposition (Einstein et al. 2019; Schuetz 2020). According to the 2018 Wharton Residential Land Use Regulatory Index, the approval process for a multifamily building in Greater Boston takes, on average, 39 percent longer than the process for a single-family house (Gyourko et al. 2019). In 1969, Massachusetts enacted the Comprehensive Permit Act to provide an incentive for communities to build more housing that would be affordable to low-income households and to create a mechanism through which

¹ This report defines Greater Boston as the service region of the Metropolitan Area Planning Council (MAPC), a regional planning agency in the state of Massachusetts that compiled the zoning data used in this report. The MAPC service region includes the city of Boston and 100 other cities and towns. For a map showing the cities and towns included in this report's definition of Greater Boston, see Appendix 1.

² M.G.L. c. 40B, §§ 20-23.

developers could appeal and override local zoning board decisions.³ The law allows developers to submit a comprehensive permit request to a local zoning board instead of having to seek approval for individual aspects of development involving separate bylaws, ordinances, or regulations. These comprehensive-permit developments are often termed Chapter 40B properties, in reference to the section of the law allowing their construction. Chapter 40B also allows developers to appeal decisions of local zoning boards to a state authority, which may choose to override a board's decision if in the city or town where the project would be located, less than 10 percent of the housing stock meets the affordability criteria and at least 25 percent of the proposed project is affordable.⁴ A municipality's stock of qualifying affordable housing is recorded in its Subsidized Housing Inventory (SHI).⁵

This report uses residential property tax assessment records, coupled with residential zoning data, to assess the effects that allowing multifamily housing, increasing the allowable maximum building height, and increasing the allowable housing density have on housing supply and costs.⁶ It also estimates how changes in housing density indirectly affect prices in a neighborhood through a willingness to pay for living in high- or low-density areas. For the discussion on Massachusetts's Comprehensive Permit Act, this report uses data on properties counted in a municipality's SHI, which includes Chapter 40B properties built through the comprehensive-permit process.

II. Local Zoning Regulations in Greater Boston

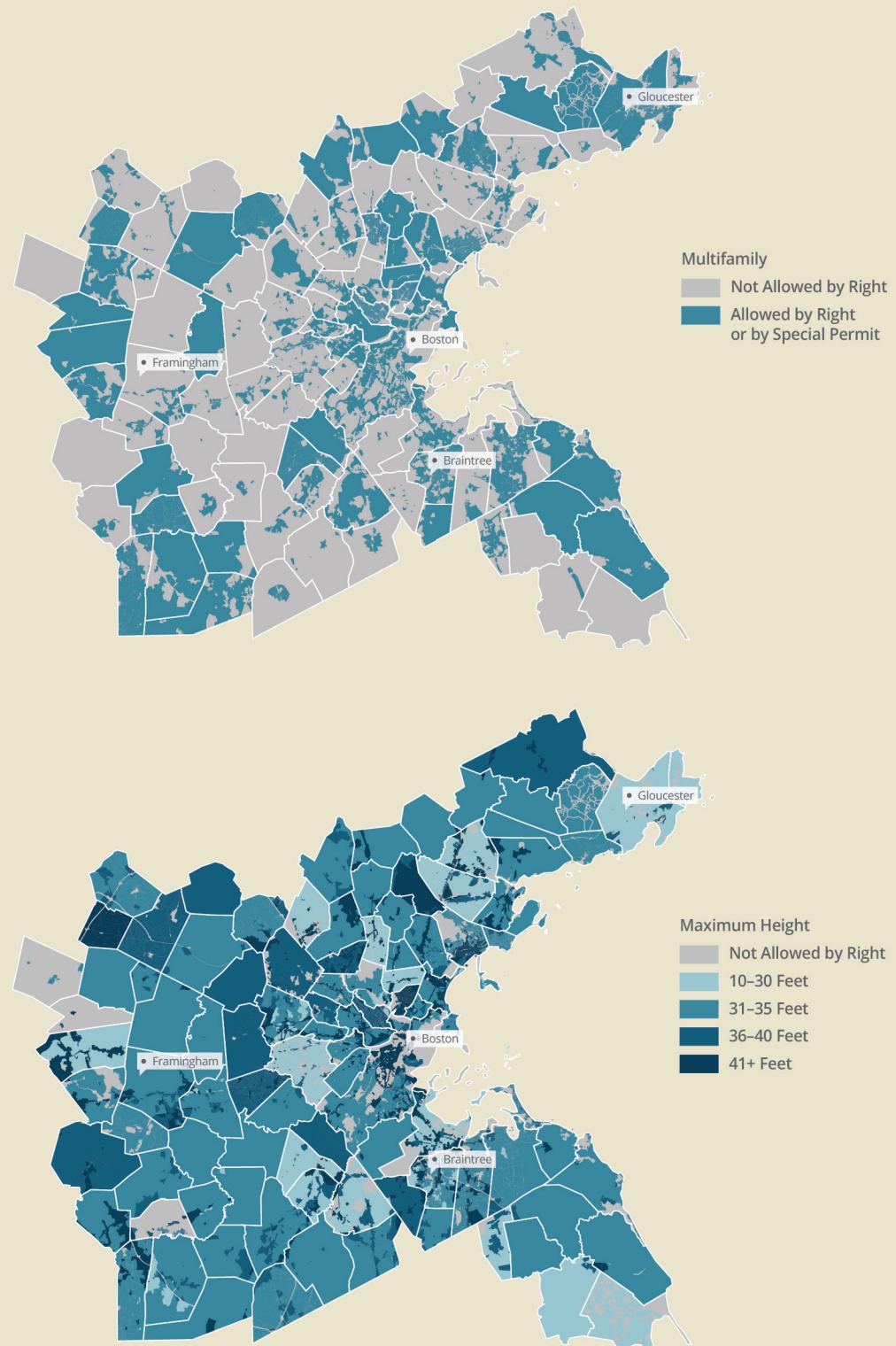
Among the many residential zoning regulations that could restrict or promote the construction of additional housing in an area, three are used most commonly in Greater Boston. These regulations concern the allowable maximum height of new construction, the allowable number of dwelling units per acre (DUPAC), and whether multifamily housing is allowed. Figure 1 shows how these regulations vary across 101 municipalities in Greater Boston. While all three have relatively straightforward definitions, their implementation and interaction can be complex. Special circumstances, caveats, and exemptions come into play when these regulations are applied to real-world construction projects. Height regulations, which are commonly measured in feet, and DUPAC regulations both can be "by-right" regulations. Simply put, if a regulation is by right, it is expressly defined in the local zoning code.⁷ If a regulation is not by right, a developer must request special approval from the local zoning board regardless of the height or density of the project they are proposing to build. In the case of multifamily zoning, construction may not be allowed at all (MAPC 2020).

Current homeowners often have competing interests with new homebuyers and renters when it comes to promoting housing affordability.

- 3 Over the years, there have been several changes to Chapter 40B, including an expansion of so-called safe harbor exemptions, which allow municipalities to retain the final say over construction project approvals if they are able to show progress in providing affordable housing or have put in place housing production plans detailing how they will meet the law's 10 percent affordability threshold (Bratt and Vladeck 2014).
- 4 Affordability in this case is defined as costing not more than 30 percent of household income for households making no more than 80 percent of the area median income (AMI) (DHCD 2014).
- 5 Municipalities can count toward their SHI all properties that are affordable to households earning less than 80 percent of the AMI, not just those that were built through the comprehensive-permit process. For this report, SHI data were made available through a request to the Massachusetts Department of Housing and Urban Development (DHCD) and were current as of May 2021. The data exclude properties for which federal and state programs provide rental assistance to tenants in the form of housing vouchers.
- 6 Data on property tax assessment records come from the Warren Group. Local zoning regulation data come from the MAPC Zoning Atlas of the Greater Boston area, released in December 2020. For a short description of these data sources and others used in the report, see the Data Sources box on page 10.
- 7 When this report refers to differences in housing density (DUPAC) or maximum-height restrictions, it is referring to zoning areas where these are by-right regulations.

Figure 1

Local Zoning Regulations across Greater Boston

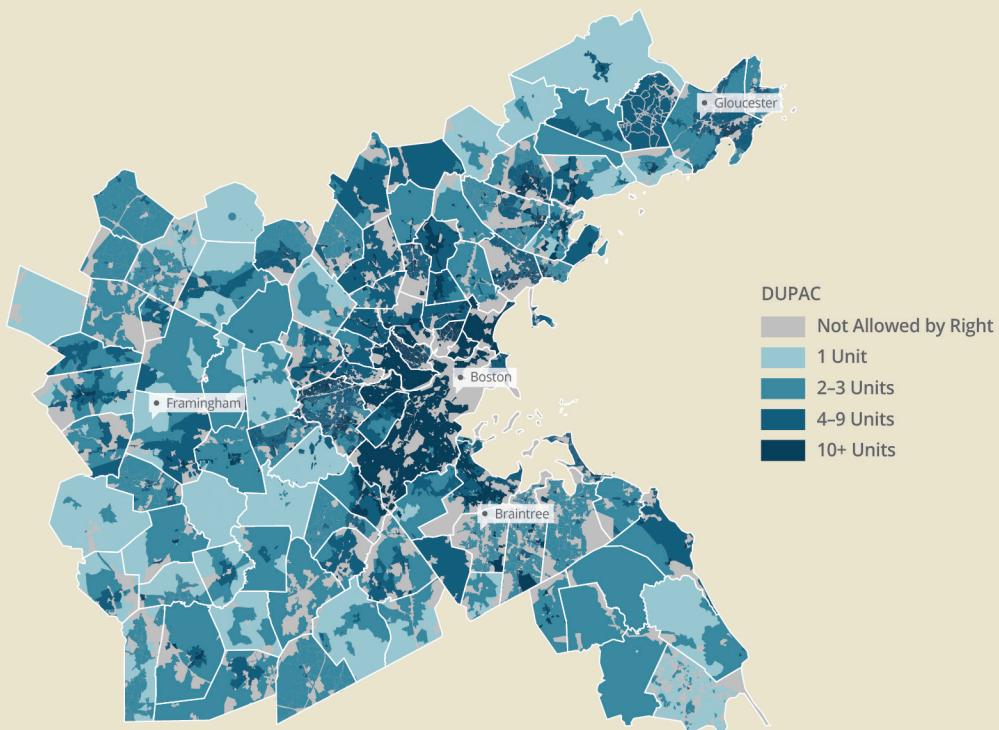


Note(s): "Multifamily" refers to areas where multifamily construction is allowed generally or by special permit.
 "Maximum Height" refers to the allowable maximum height of new construction.

Source(s): 2020 Metropolitan Area Planning Council Zoning Atlas.

Figure 1
Continued

Local Zoning Regulations across Greater Boston



Note(s): "DUPAC" refers to the allowable number of dwelling units per acre.

Source(s): 2020 Metropolitan Area Planning Council Zoning Atlas.

Multifamily Zoning

By-right multifamily zoning laws exemplify the complexity of these regulations. They might allow two- or three-unit buildings while prohibiting the construction of larger apartment complexes. Or they might, on paper, prohibit all housing construction except for single-family homes but in practice allow multifamily buildings to be built by special permit. If multifamily-housing construction is allowed by right, it requires no discretionary action or special approval by the zoning regulatory body. Prohibiting multifamily housing by right is the primary method of limiting multifamily housing of any type in Greater Boston. The construction of multifamily housing is allowed by right on only about 16 percent of the land area in Greater Boston, and it is allowed on another 26 percent of the land by special permit. This report combines zoning areas where multifamily housing is allowed by right and areas where a special permit is required when making comparisons with areas where multifamily housing is prohibited.

Maximum-height Restrictions

Maximum-height restrictions indicate the maximum allowable building height in feet. Even if multifamily construction is allowed in some capacity (either by right or by special permit), municipalities often restrict the design and size of multifamily buildings by limiting the maximum height of a structure. Bertaude and Brueckner (2005) show that restrictions on taller building heights cause urban sprawl and limit housing availability near centers of economic activity. This report studies

The construction of multifamily housing is allowed by right on only about 16 percent of the land area in Greater Boston, and it is allowed on another 26 percent of the land by special permit.

how maximum-height restrictions (measured in floors, each of which is equivalent to 10 feet) affect housing costs and supply as well as the supply of different types of housing (Brueckner and Singh 2020). Regulations for almost 70 percent of the land area in Greater Boston limit building heights to 35 feet (or 3½ floors) or less.

Dwelling Units per Acre (DUPAC)

Housing density can be regulated directly in a variety of ways, such as limiting the number of units allowed on a plot of land or requiring a minimum lot size for the construction of a building. DUPAC is a measure of housing density that captures these types of regulations and enables a standard comparison of density restrictions across zoning areas where residential development is allowed. However, the exact mechanisms regulating density in these zoning areas may differ.⁸ Regulations for roughly 24 percent of the land area in Greater Boston allow only one housing unit per acre of land.

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Zoning Regulations and the Housing Stock

Table 1 shows how the three zoning regulations discussed above can influence the types of housing that are available in a community. The more a regulation prevents larger multifamily housing construction in an area, the larger is the single-family share of that area's total housing stock. Single-family properties constitute 89 percent of all residential housing units in areas where multifamily housing is not allowed by right.⁹ But even in areas where multifamily housing development is allowed, the units that are in multifamily properties account for only 32 percent of the total number of residential housing units, indicating that other zoning regulations may be influencing the types of housing that are built.

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- 8 DUPAC is calculated by taking the square footage of 1 acre and dividing it by the specified minimum lot size before multiplying it by the maximum number of units allowed per lot. DUPAC thus provides a standard measure of density across cities and towns where lot sizes might differ and where different density regulations might be in place.
 - 9 Single-family properties are defined as any residential property classified as single family on its tax assessment record. Multifamily properties are those classified as having more than one unit on their tax assessment record or classified as mixed use but primarily residential properties with more than one unit. Condominiums are excluded from the analysis due to difficulty determining if these properties are more appropriately classified as single-family homes or as multifamily buildings.

Table 1

Housing Stock Characteristics by Zoning Regulation

Greater Boston, 2018

	Percentage of Units in Single-family Properties	Percentage of Units in Multifamily Properties	Average Number of Units per Property
Multifamily			
Not Allowed by Right	89	11	1.3
Allowed by Right or by Special Permit	68	32	2.2
Maximum Height			
10–30 feet	82	18	1.4
31–35 feet	80	20	1.5
36–40 feet	80	20	1.6
41+ feet	40	60	6.1
DUPAC			
1–2 units	96	4	1.1
3–4 units	94	6	1.1
5–10 units	80	20	1.5
11–20 units	55	45	2.0
21+ units	37	63	4.1

Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. "Maximum Height" refers to the allowable maximum height of new construction. Single-family properties are those classified as single family on their tax assessment record. Multifamily properties include those classified as having more than one unit or as mixed used but primarily residential with more than one unit listed on their tax assessment record. Properties classified as condominiums are excluded.

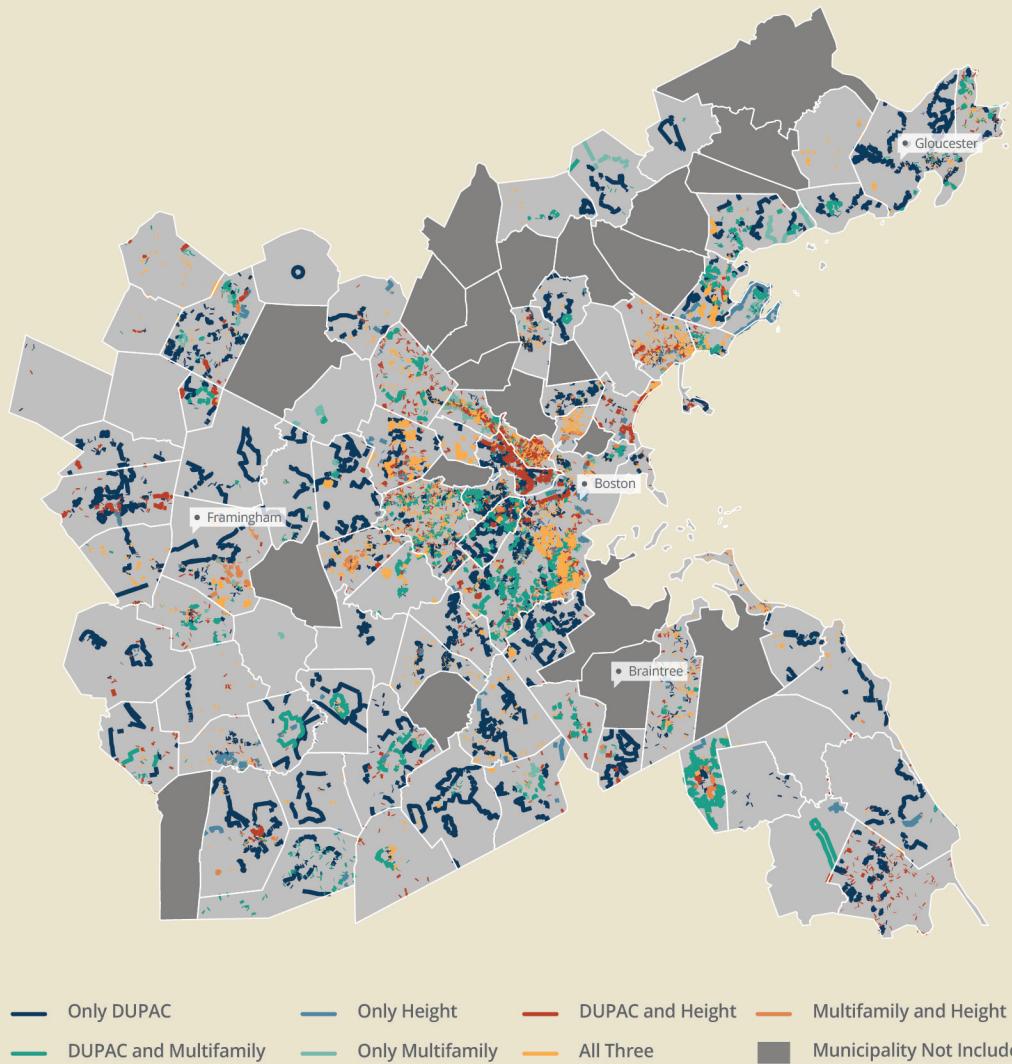
Source(s): Warren Group 2018 tax assessment records, 2020 Metropolitan Area Planning Council Zoning Atlas.

In communities where buildings can be taller or where the allowable housing density is greater, multifamily properties comprise a much larger share of the total housing stock. However, even in areas where height or DUPAC regulations allow the greatest housing density, the average number of units per residential property is only 6.1 and 4.1, respectively. The interaction of these three regulations likely informs which types of housing can be built more than any one regulation does on its own. For example, in zoning areas where 21 or more units are allowed per acre, the average maximum height restriction is 65 feet, about 6½ floors, and in half of all areas in Greater Boston, buildings can be no taller than 45 feet. In zoning areas where multifamily housing is allowed by right or by special permit, the average DUPAC restriction is 2.8 units, and the average maximum height restriction is 41 feet, or about four floors.

Figure 2

Zoning-area Boundaries across Greater Boston

By type of regulation that changes at the zoning-area boundary



Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. "Height" refers to the allowable maximum height of new construction. "Multifamily" refers to whether multifamily housing is allowed. Excludes boundaries where no regulations change and those that overlap with municipality boundaries, major roads or waterways, or elementary school attendance areas.

Source(s): 2020 Metropolitan Area Planning Council Zoning Atlas.

Figure 2 displays the seven possible ways these regulations—whether multifamily housing is allowed, maximum-height restrictions, and DUPAC restrictions—can interact and change at the boundary between two residential zoning areas.¹⁰ In many municipalities across Greater Boston, one or all three regulations change at a boundary between zoning areas; that is, a regulation (or regulations) on one side of a boundary differs from the corresponding regulation (or regulations) on the other side. Some types of changes are more common than others. For example, changes to only DUPAC regulations are the most common, and changes to only maximum-height restrictions are the least common.

¹⁰ Zoning-area boundaries were excluded if they overlap with major roads or waterways such as highways or large rivers (Kulka 2020). In total, about half of the 33,635 possible zoning boundaries were either removed entirely or had portions removed that overlap with municipality borders, school attendance areas, major roads, or major waterways.

DATA SOURCES

Housing Supply

The data for this report were assembled from several sources. Tax assessment records collected by the Warren Group from 2010 through 2018 were used for the data on housing supply. Rent data for multifamily properties with more than five units were collected from CoStar.¹ In cases where no rent data were available, the owner cost of housing was imputed as 6.29 percent of the tax assessed value of the property. The owner cost of housing is commonly used to estimate the rental value of owner-occupied housing (Katz 2017). For this report, it serves as a substitute for rent data when none are available. Data on Subsidized Housing Inventory (SHI) properties were provided by the Massachusetts Department of Housing and Community Development and were current as of May 2021.²

Zoning Regulations

Zoning regulation data at the parcel level came from the Metropolitan Area Planning Council (MAPC) Zoning Atlas, released in December 2020. The Zoning Atlas was constructed over the 10-year period from 2010 to 2020; however, most of the regulations highlighted by MAPC were enacted in the mid-20th century (the first height regulations in Boston were put in place in 1918, and the city's first comprehensive zoning regulations were adopted in 1956). Regulations involving multifamily buildings, maximum height, and maximum density were chosen because they are the most widely implemented across municipalities in Greater Boston and the most pertinent to the supply of multifamily housing. The Zoning Atlas includes an abundance of other quantitative and narrative information on zoning regulations, bylaws, and ordinances that may influence the proposed designs for and ultimately approval of multifamily housing projects. The 101 cities and towns included in the Zoning Atlas constitute this report's definition of Greater Boston.³

a Tax assessment records were matched with CoStar and SHI properties based first on a direct address match. If no direct address match existed, the closest property within the same zoning area was used, followed by the closest property within 0.1 mile. The remaining properties were matched based on address similarity and excluded if they had no match that was at least 90 percent similar to a Warren Group address. Less than 5 percent of matches in either case depended on this similarity matching method.

b While the SHI tracks affordable housing properties in Massachusetts for the purpose of calculating a municipality's affordable housing supply, it excludes information on rental subsidy programs that are tenant based, such as the Housing Choice Voucher Program. The SHI also excludes data for the city of Boston, which maintains its own inventory of affordable housing.

c To account for other factors affecting the cost of housing and where households choose to locate, this report controls for school attendance, which ensures that properties are compared only across boundaries falling within the same elementary school attendance area. Data on school attendance areas were retrieved from the National Center for Education Statistics School Attendance Boundary Survey (SABS) for 2016. Twenty-two municipalities were excluded because they lack data in the 2016 SABS.

III. Effects of Local Zoning Regulations on the Greater Boston Housing Market

This report studies the effects that allowing multifamily housing by right, easing maximum-density restrictions, and easing maximum-height restrictions have on the supply of housing and housing costs (rents and house prices) by examining changes in supply and costs at the boundaries between zoning areas where the regulations on one side of a boundary are stricter than those on the other side.¹¹ That is, this report looks at the difference between the supply on one side of a boundary and the supply on the other side and the difference between the costs on one side and the costs on the other. For changes in zoning regulations to be causally related to changes in housing supply and prices, it is assumed that differences in the supply and types of housing are due solely to differences in the regulations across zoning-area boundaries. It is also assumed that households living immediately adjacent to boundaries between different zoning areas chose where to live due to the differences in regulations. To support these assumptions, this report compares only differences across boundaries that are within the same city or town and the same school attendance area (Kulka 2020) and have the same use type (whether it is residential or mixed use). In addition, the analysis includes only properties within one-half mile of the closest zoning-area boundary to ensure that households on either side reasonably have the same access to public amenities such as parks and public transit.

Multifamily zoning can change the type of housing available, and allowing taller buildings may change the size of units; however, unless there is a change to the number of units that can be built on any given lot, neither will increase the supply of housing.

Households may have preferences for living in areas with lower housing density, which may in turn not only affect where they choose to live but also help explain why zoning regulations that limit the housing supply even exist. Figure 3 shows where single-family and multifamily homes are located in Greater Boston and distinguishes between whether a multifamily home is a lower-density property with two or three units or a higher-density property with four or more units. Figure 3 also shows the locations of properties that are counted toward a municipality's Subsidized Housing Inventory (SHI), which can be either single-family or multifamily properties. Single-family properties are the predominant form of housing stock outside the city of Boston. Multifamily buildings tend to be highly concentrated in city centers and in the densely populated urban core in and around Boston. The SHI properties are usually found in these areas as well.¹²

Housing Supply and Residential Zoning Regulations

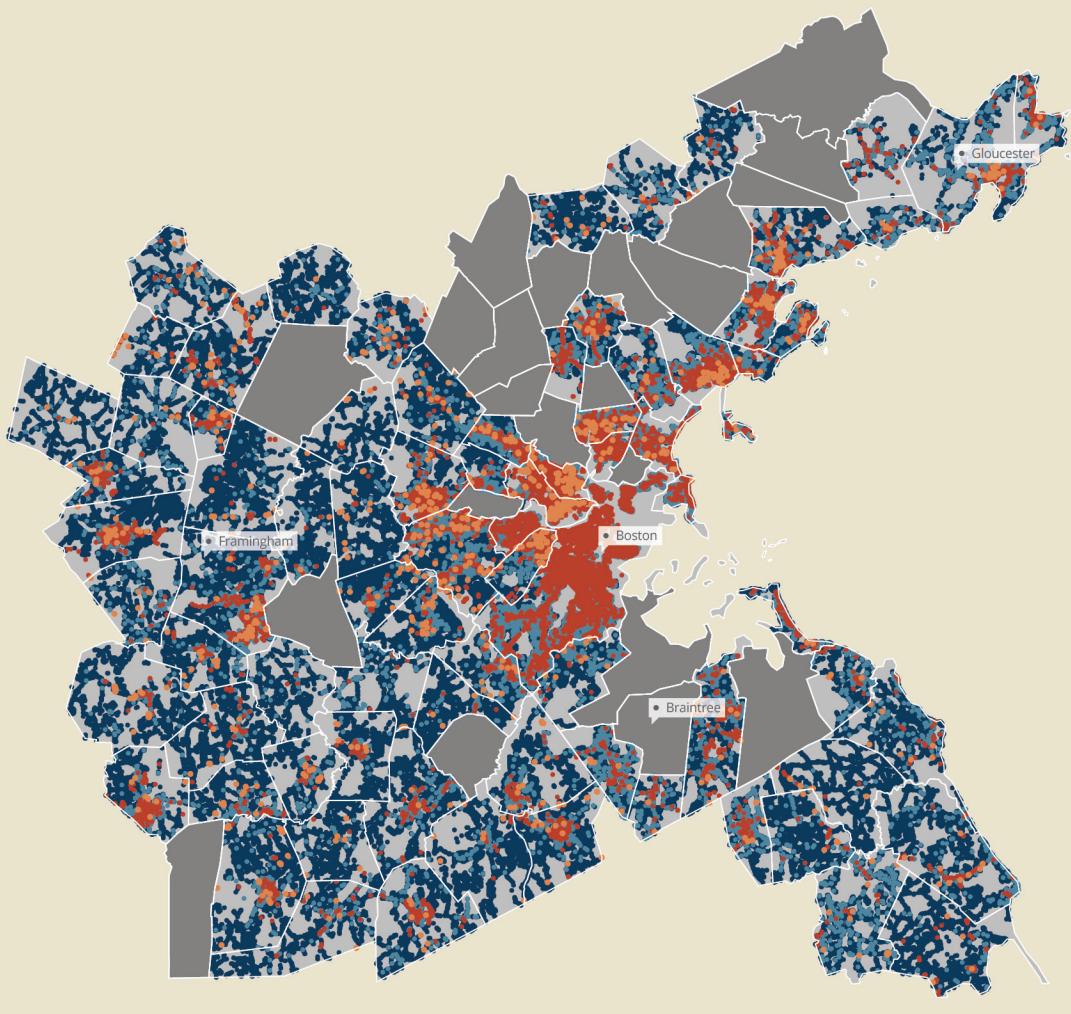
Not all zoning regulations have the same effect on the supply of housing. Adopting multifamily zoning or relaxing maximum-height restrictions does not necessarily result in more units being built, unless these regulations are accompanied by a relaxing of density restrictions, as measured by DUPAC. Multifamily zoning can change the type of housing available, and allowing taller buildings may change the size of units; however, unless there is a change to the number of units that can be built on any given lot, neither will increase the supply of housing.

¹¹ Stricter-regulation zones are ones where the allowable maximum height or DUPAC is lower, meaning they require buildings to be shorter or projects to be less dense. Stricter-regulation zones also do not have by-right zoning laws. Conversely, less strict zones have multifamily, height, or DUPAC regulations that are by right, or they allow construction of taller buildings and denser housing developments.

¹² While this report refers to all of the units in an SHI property as affordable to households with incomes below 80 percent of the area medium income (AMI), the actual number of units in the property may be much smaller. The Massachusetts Department of Housing and Community Development (DHCD) allows a municipality to add all of the units in a development to its SHI if the development designates at least 25 percent of the units as affordable for households that earn less than 80 percent of the AMI (DHCD 2014).

Figure 3

Residential Properties by Type Greater Boston, 2018



● Single Family ● 2 or 3 Units ● 4 or More Units ● SHI Properties ● Municipality Not Included

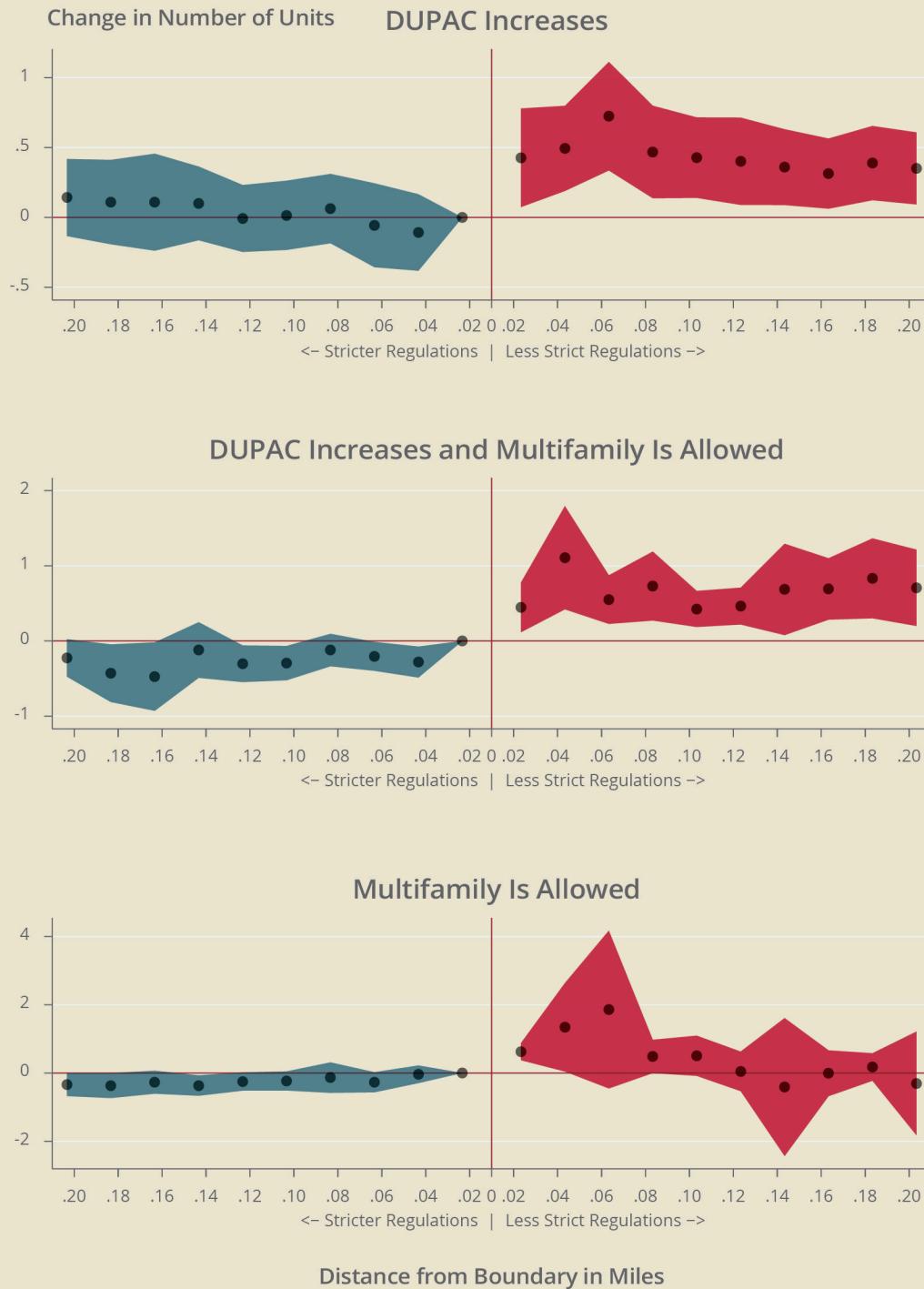
Note(s): Single-family properties are those classified as single family on their 2018 tax assessment record. Two- or three- and four-plus-unit properties are those classified as such on their tax assessment record or classified as mixed use or other residential properties with two to three units or four or more units. Subsidized Housing Inventory (SHI) properties exclude those whose address was suppressed or could not be accurately determined. No SHI property data were available for Boston, as the city maintains its own inventory of affordable housing.

Source(s): Massachusetts Department of Housing and Community Development Subsidized Housing Inventory (SHI) property list received in May 2021.

This finding is shown in Figure 4, which displays the average change (that is, the average difference) in the housing supply in less restrictive zoning areas relative to the supply in more restrictive zoning areas. The change in the number of housing units is relative to the number of units in properties on the stricter side that are located within 0.02 mile of a zoning boundary. When only DUPAC restrictions are relaxed, the average number of units per property within 0.02 mile of a zoning-area boundary on the less strict side of that boundary is 0.40 greater compared with properties on the stricter side of the boundary. When both DUPAC and multifamily restrictions are relaxed, the number of units per property within 0.02 mile of a boundary on the less strict

Figure 4

Change in Housing Supply Due to Regulation Change By change in regulation at zoning-area boundaries



side also is 0.40 greater on average. In each case, the number of units on the less strict side of a zoning-area boundary is greater up to 0.20 mile from the boundary when compared with properties immediately on the stricter side. However, when just multifamily restrictions are relaxed, a meaningful difference in the number of units on the less strict side is seen only among properties closest to a boundary.¹³

Relaxing unit-density restrictions has a similar effect of increasing housing supply when paired with relaxing maximum-height restrictions. When just maximum-height restrictions are relaxed, there is no difference in the average number of housing units.¹⁴ But when maximum-height and DUPAC restrictions are relaxed, the average number of housing units in properties within 0.02 mile of a zoning-area boundary on the less strict side is 2.40 greater compared with properties within 0.02 mile on the stricter side.¹⁵ Thus, relaxing density regulations by allowing more units to be built on available lots more consistently increases the housing supply compared with easing maximum-height restrictions or allowing multifamily housing. This result supports recent anecdotal evidence from zoning reforms in cities such as Minneapolis, which in 2018 became the first city in the United States to broadly allow the construction of multifamily housing on land previously zoned only for single-family use but did not also relax density regulations. This reform has not resulted in a notable increase in the housing supply in Minneapolis; since enactment “only 23 building permits have been issued for new duplexes and triplexes in places they would not have previously been allowed.”¹⁶

Zoning-regulation reform is also more effective at increasing the supply of certain types of multifamily housing. The construction of two- and three-unit housing appears to benefit the most from relaxing zoning regulations. The construction of higher-density buildings with four or more units occurs only when DUPAC regulations are relaxed alone or together with relaxing restrictions on multifamily housing. It is likely that other factors inhibit the construction of larger apartment buildings, including construction costs, community opposition, the availability of land, or other types of land-use restrictions such as parking requirements. While these factors represent additional roadblocks to constructing higher-density buildings, they may be less relevant to the construction of buildings with fewer than four units.¹⁷

Zoning-regulation reform is also more effective at increasing the supply of certain types of multifamily housing. The construction of two- and three-unit housing appears to benefit the most from relaxing zoning regulations. For details, see Appendix 2. Increasing the supply of two- and three-unit housing can be achieved by adopting multifamily zoning or increasing the number of units that can be built per acre. The construction of higher-density buildings with four or more units occurs only when DUPAC regulations are relaxed alone or together with relaxing restrictions on multifamily housing. It is likely that other factors inhibit the construction of larger apartment buildings, including construction costs, community opposition, the availability of land, or other types of land-use restrictions such as parking requirements. While these factors represent additional roadblocks to constructing higher-density buildings, they may be less relevant to the construction of buildings with fewer than four units.¹⁷

¹³ When only multifamily housing is allowed by right on the less strict side, the average number of units per property within 0.02 mile of a zoning boundary is 0.60 greater compared with properties nearest the boundary on the stricter side. But for those properties more than 0.02 mile from the boundary, there is no statistically significant difference in the number of housing units compared with the number for properties within 0.02 mile of the boundary on the stricter side.

¹⁴ The change in the average number of units supplied is not statistically significant.

¹⁵ When maximum-height restrictions are relaxed and multifamily housing is allowed (by right or by special permit), there is no statistically significant difference between the average number of units per property on the less strict side of a boundary compared with the stricter side.

¹⁶ See MaryJo Webster and Michael Corey, “How Twin Cities Housing Rules Keep the Metro Segregated,” *Star Tribune*, August 7, 2021.

¹⁷ Local housing market dynamics also play a role, which may explain why the Minneapolis reforms have not resulted in the increase in housing stock that would be expected. The local rent that can be charged for an apartment may not be sufficient to cover the construction costs of two- and three-unit buildings, but larger buildings may be able to spread the costs over more units. The availability of buildable lots is also a factor, because if there is a shortage, supply increases would come primarily from the conversion of single-family properties into multifamily homes.

Housing Costs and Zoning Regulations

Whether it is the monthly rent payment or the price of a home, the cost of housing can be directly and indirectly influenced by the supply of housing in an area, among other factors.¹⁸ Housing costs are directly affected by supply when more apartments become available and landlords compete with one another by lowering rents to attract tenants (Asquith et al. 2019; Pennington 2021). The reverse can occur when fewer apartments are available, with rents rising because tenants compete over fewer options. The housing supply can affect housing costs indirectly if changes in

An increase in a neighborhood's housing density would indirectly affect housing costs by making the neighborhood a more or less desirable place to live depending on whether large lot sizes are valued.

the quantity or types of buildings affect the characteristics of an area. For example, an increase in a neighborhood's housing density would directly affect housing costs by increasing the supply of housing, and it would indirectly affect costs by making the neighborhood a more or less desirable place to live depending on whether large lot sizes are valued. This change in housing costs can be thought of as a willingness to pay for density: A decrease in housing costs means higher density is less desirable, and an increase means it is more desirable.

Figure 5 shows how housing costs—rents for multifamily properties and house prices for single-family homes—are directly affected by changes in regulations across a zoning boundary. As with Figure 4, differences in housing costs compare properties on the less strict side of a zoning-area boundary with those on the stricter side and are relative

to the cost of housing for properties within 0.02 mile of a zoning-area boundary on the stricter side. When only DUPAC regulations are relaxed, rents for multifamily properties that are within 0.02 mile of a zoning-area boundary on the less strict side are an average of 5.4 percent less compared with properties within 0.02 mile on the stricter side, equating to an average decline of \$144 per month for every new unit added. Housing prices are an average of 7.2 percent less, or about \$425 less per month per new unit.

When both DUPAC and maximum-height restrictions are relaxed, rents are 6.2 percent less on average, and house prices are an average of 1.7 percent less, although in the latter case this effect is not statistically significant.¹⁹ Relaxing only maximum-height restrictions has no impact on either rents or house prices nearest a zoning boundary, but the effect on house prices increases in magnitude the farther away from the boundary a property is located.

It is possible to consider the effect on single-family house prices only when multifamily restrictions are relaxed alone or in combination with height or density regulations because, by definition, in areas where multifamily housing is not allowed, there are no multifamily-property rents for comparison. Relaxing DUPAC and allowing multifamily housing (either by right or by special permit) lowers house prices by an average of 4.1 percent for homes within 0.02 mile of a zoning-area boundary. The negative effect on house prices when DUPAC is relaxed and multifamily housing is allowed remains statistically significant up to 0.20 mile from a zoning-area boundary and is overall the most substantial. For every additional unit of housing added, monthly costs decline an average of \$204. There is

¹⁸ Assessed property values were converted to the owner cost of housing for easy comparisons with multifamily rents. The owner cost of housing is the rental value of owner-occupied housing. Using U.S. Bureau of Labor Statistics estimates, we define the annual owner cost of housing as 6.29 percent of the house value. Asking rents for multifamily properties in Greater Boston were retrieved from CoStar and used to calculate rents. When no asking rent was available, the owner cost of housing was used.

¹⁹ Because the average number of units added on the relaxed side of the boundary is more than two when DUPAC and maximum-height restrictions change, the overall impact on housing costs per unit added is lower. Across these boundaries, an additional unit of multifamily housing lowers rents by an average of \$27 per month and monthly owner costs by \$16 per month. Again, the effect on owner costs is not statistically significant.

Figure 5

Change in Housing Costs Due to Regulation Change By change in regulation at zoning-area boundaries

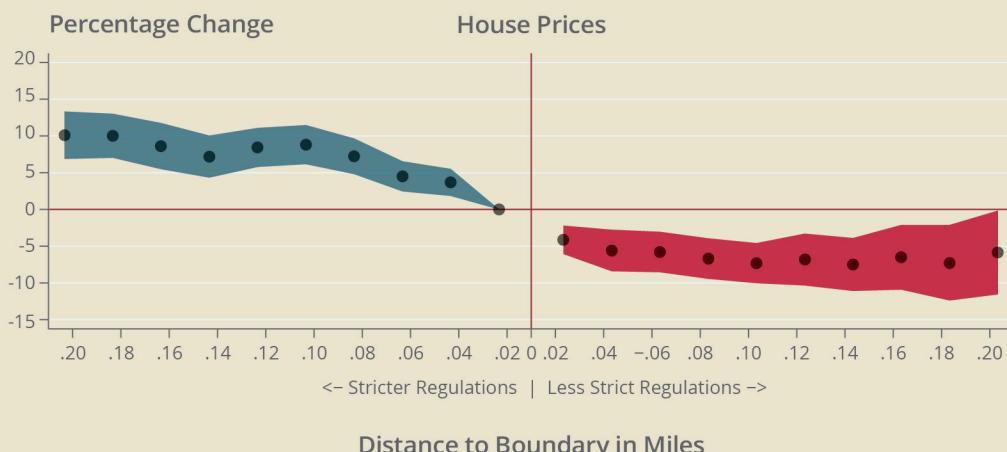
DUPAC Increases



House Prices



DUPAC Increases and Multifamily Is Allowed



Distance to Boundary in Miles

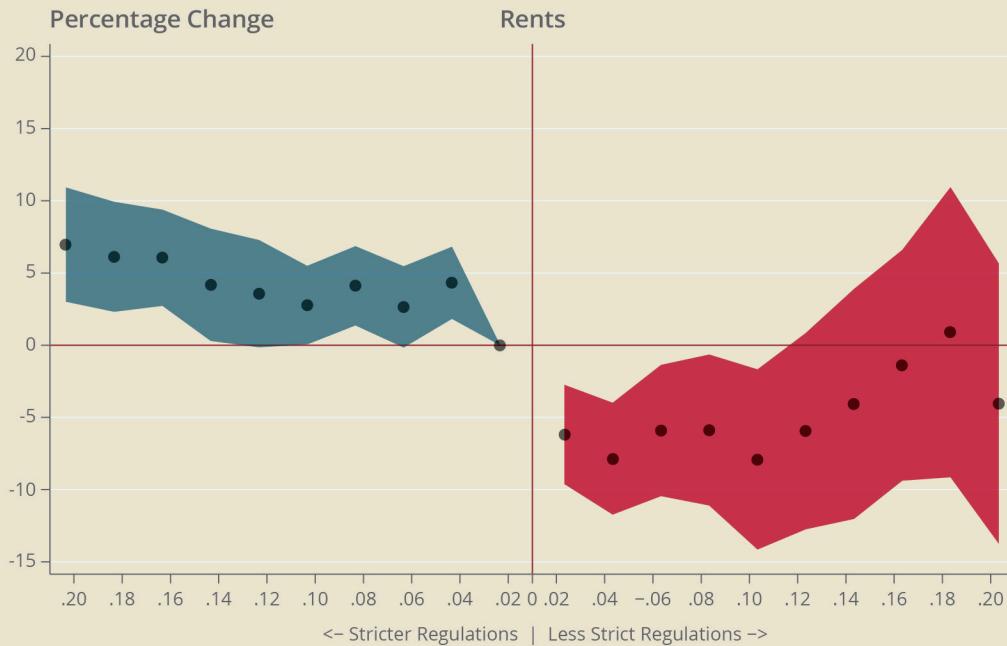
Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. Excludes condominium properties and properties built before 1918. Changes in housing supply are relative to properties in the more restrictive zoning area located from 0 to 0.02 mile of a boundary. Shaded areas represent the 95 percent confidence interval for the change in units. Distance from a boundary encompasses properties from the next-closest distance marker; for example, properties located 0.20 mile from a boundary include those located 0.18 mile from that boundary.

Source(s): Warren Group tax assessment records for 2018, 2020 Metropolitan Area Planning Council Zoning Atlas.

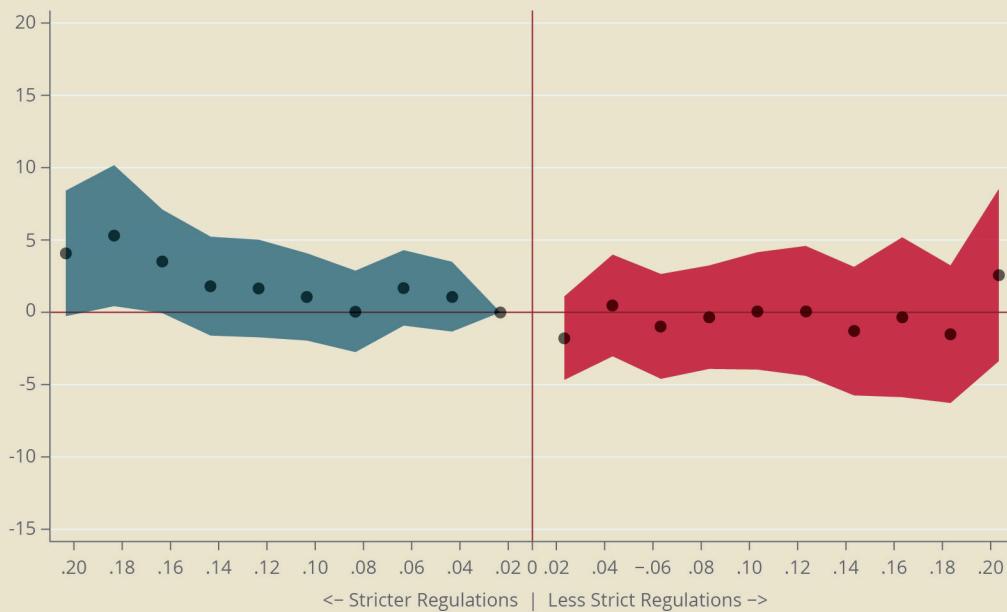
Figure 5
Continued

Change in Housing Costs Due to Regulation Change
By change in regulation at zoning-area boundaries

DUPAC Increases and Height Increases



House Prices



Distance to Boundary in Miles

Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. Excludes condominium properties and properties built before 1918. Changes in housing supply are relative to properties in the more restrictive zoning area located from 0 to 0.02 mile of a boundary. Shaded areas represent the 95 percent confidence interval for the change in units. Distance from a boundary encompasses properties from the next-closest distance marker; for example, properties located 0.20 mile from a boundary include those located 0.18 mile from that boundary.

Source(s): Warren Group tax assessment records for 2018, 2020 Metropolitan Area Planning Council Zoning Atlas.

no meaningful difference in house prices when multifamily construction is allowed on its own or in combination with relaxing maximum-height restrictions. It is not surprising that changing these two regulations alone or together does not affect home prices given that allowing multifamily housing or relaxing height restrictions without also increasing density does not increase the supply of housing.

Figure 5 highlights the direct effect that changing zoning regulations can have on housing costs, but housing costs are also affected indirectly when changes in zoning regulations change the characteristics of the neighborhood. Table 2 provides estimates for this indirect effect depending on whether the increase in housing stock involves two- and three-unit buildings or buildings with four or more units. As with the direct effect shown in Figure 5, the indirect effect on rents cannot be estimated when comparing a zoning area that does not allow multifamily housing with one that does. At the zoning-area boundaries where only DUPAC increases, a 1 percent increase in the number of two- and three-unit buildings within 0.10 mile of a property results, on average, in a decline of about 0.1 percent for rents for a multifamily building and a decline of about 0.2 percent in the price of a single-family home. For these same boundaries, when the number of buildings with four or more units increases by 1 percent, rents increase and house prices decline, but neither effect is statistically different from zero. In fact, this report finds no effect from an increase in four-plus-unit buildings on rents or house prices. This is likely due to these higher-density buildings being highly clustered in small areas (as shown in Figure 3) and often not located in places where only DUPAC regulations are different on either side of a zoning-area boundary (as shown in Figure 2). Thus, it is possible that increases in high-density buildings do have an indirect impact on housing costs, but this cannot be confirmed using the data available for this report.

At the boundaries where both DUPAC and multifamily zoning regulations differ on either side, the price of a single-family home is, on average, 0.2 percent less when there is a 1 percent greater number of two- and three-unit buildings within 0.10 mile of that house. This finding indicates the extent to which single-family homeowners might dislike living near denser housing. This may be due in part to where single-family homeowners are located. As Figure 2 shows, the boundaries where DUPAC regulation differ on either side tend to be in suburban communities, where there may be a stronger dislike of living near high-density apartment buildings.

The effects that zoning regulations have on housing supply and costs suggest possible avenues for reform that would increase supply and lower costs while avoiding community opposition to new construction. For example, relaxing DUPAC restrictions—alone or in combination with allowing multifamily construction or relaxing maximum-height rules—is shown to increase the supply of housing and lower rents. In general, however, neither renters nor homeowners like living near higher-density buildings. Also important to consider is the effect of zoning regulation changes on house prices, which is often a source of contention between homeowners and advocates for expanding housing supply. If the goal of zoning reform is to make housing more affordable, then for renters, relaxing density regulations to accommodate more multifamily housing is a key component of any reform. However, these reforms can negatively affect the values of homeowners' properties. Increasing the supply of multifamily housing is likely more palatable in more urbanized areas, in city centers, and in the downtown districts of smaller communities. Yet, this presents a tradeoff. Focusing on these areas could help avoid community opposition, but many of these areas already have a large amount of multifamily housing, so there would be fewer opportunities to increase supply.

It is important to consider the effect of zoning regulation changes on house prices, which is often a source of contention between homeowners and advocates for expanding housing supply.

Table 2

Percentage Change in Housing Costs Due to Change in Density By regulation changes across zoning-area boundaries

Zoning-area Boundaries	1 Percent Increase in 2- to 3-unit		1 Percent Increase in 4-plus-unit	
	Change in Rents	Change in House Prices	Change in Rents	Change in House Prices
When DUPAC Increases	-0.10	-0.17	-0.17	-0.10
When DUPAC Increases and Multifamily Is Allowed	-	-0.21	-	-0.10
When DUPAC and Maximum Height Increase	0.04	-0.06	-0.10	-0.10
When All Three Regulations Are Relaxed	-	-0.21	-	-0.05

Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. "Maximum Height" refers to the allowable maximum height of new construction. Bolded values indicate statistical significance. Rents for multifamily properties were obtained using data from CoStar and were imputed as the owner cost of housing if none was available. House prices were calculated as the owner cost of housing for single-family properties. Condominium properties were excluded.

Source(s): Warren Group 2018 tax assessment records, 2020 Metropolitan Area Planning Council Zoning Atlas.

IV. The Effect of State-level Land-use Policies

Relaxing zoning regulations at a local level is just one tool available to policymakers seeking to increase the supply of housing and to make housing costs more affordable. Others include rental subsidies for households and tax credits for developers. Also important are state statutes governing local zoning laws. In Massachusetts, two important statutes are Chapter 40A (the Zoning Act) and Chapter 40B (the Comprehensive Permit Act). Together, these laws constitute a kind of regional zoning policy in the state to ensure that municipalities meet a minimum standard of housing supply and production. In general, Chapter 40A places restrictions and requirements on municipal zoning laws, while Chapter 40B provides a pathway for developers to build affordable housing in areas with limited supply.

Examining Recent Reforms to Chapter 40A

In 2021, Massachusetts's Chapter 40A law was amended to require that certain communities along transit lines zone for multifamily development and allow density of at least 15 units per acre near metro transit stops.²⁰ The effects calculated in previous sections of relaxing local zoning laws can be used to examine the potential effects of this reform. Figure 6 plots the average change in monthly rents and monthly owner costs (from changes in house prices) within 0.30 mile of select train stations in Greater Boston.²¹ For the area around each transit stop, the figure indicates the housing-cost reduction from the combination of regulatory reforms with the largest impact on those costs. The reforms include a 10 percent relaxation in DUPAC, a 10-foot (one-floor) increase in the allowable maximum height, and/or a switch from prohibiting multifamily housing to allowing it by right. For example, if, based on the estimation, the largest decline in rents near a station would occur from relaxing DUPAC and maximum height together, and the largest decline in house prices would occur from relaxing only DUPAC, then each result is shown respectively.

As the figure indicates, a small-scale relaxation of land-use restrictions almost always lowers house prices, but rents fall intermittently; the gray points represent statistically insignificant changes. The decreases in rents and owner costs would be smaller in municipalities closer to the city of Boston and larger in communities farther away.

Different combinations of zoning-regulation reforms could have the greatest impact on housing costs, even within municipalities. For example, around the Wellesley Square train station, relaxing DUPAC and height restrictions could have the largest impact on both rents and house prices, resulting in a roughly \$530 decline in average monthly rents but a decline in monthly owner costs of only about \$15. In contrast, around the Wellesley Hills train station, allowing multifamily housing and increasing DUPAC could have the largest impact on house prices, resulting in an average decline in monthly owner costs of \$766, whereas increasing maximum height and DUPAC could reduce monthly rents by about \$600 on average.

The reforms to Chapter 40A are expected to have a smaller effect on rents and house prices in communities where housing density is already close to meeting the threshold of 15 units per acre. For example, a 10 percent increase in DUPAC and allowing multifamily housing by right around the Newton Highlands and Swampscott train stations would result in an average of about 10 dwelling units per acre. However, in many other towns, reaching 15 dwelling units per acre would require a five-fold or greater increase in the allowable density, which is far from the small changes in regulations illustrated in Figure 6. Overall, Figure 6 highlights that zoning reforms such as the Chapter 40A amendment can make housing near public transportation more affordable by lowering housing costs. However, the eventual impact of this reform depends heavily on how it is implemented locally, and communities should not assume that rents and house prices will respond in the same way even around different train stations within the same municipality.

The Chapter 40A and Chapter 40B laws constitute a kind of regional zoning policy to ensure that municipalities meet a minimum standard of housing supply and production.

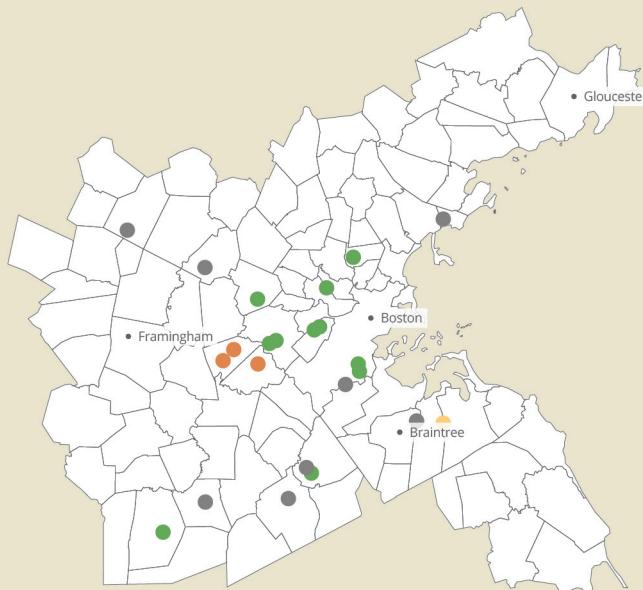
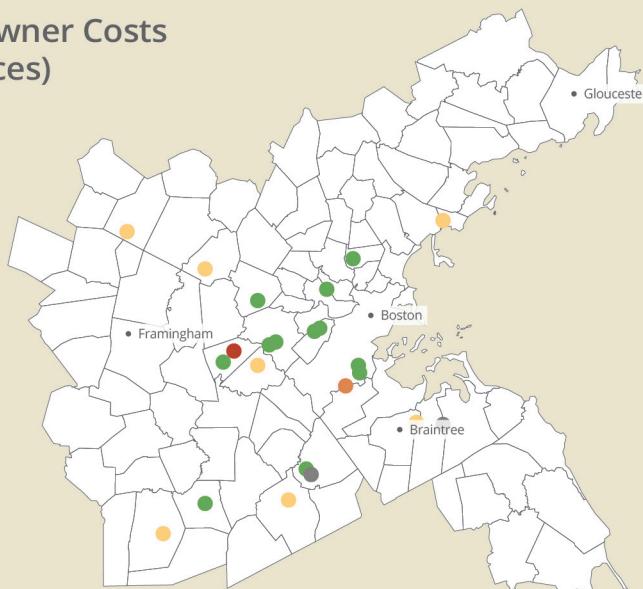
²⁰ The January 2021 amendment to M.G.L c. 40A (the Zoning Act) was part of the broader Enabling Partnerships for Growth Act passed by the Massachusetts state legislature. While the amendment was passed in 2021, it did not go into effect until January 2022.

²¹ Each of the 23 train stations chosen for analysis has a sufficient number of residential properties within 0.30 mile of its location, and together the surrounding areas represent a broad range of community types.

Figure 6

Estimated Changes in Monthly Housing Costs around Train Stations Due to Relaxed Density Regulations

Within 0.3 mile of the station

Rents
**Monthly Owner Costs
(House Prices)**
**Change in Housing Costs (Dollars)**

●	\$0 to \$-199	●	\$-200 to \$-399	●	-400 to \$-599	●	\$-600 to \$-899	●	Not Significant
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Note(s): For the area around each transit stop, the figure indicates the housing-cost reduction from the combination of regulatory reforms with the largest impact on those costs. The reforms include a 10 percent relaxation in the allowable number of dwelling units per acre (DUPAC), a 10-foot (one-floor) increase in the allowable maximum height, and/or a switch from prohibiting multifamily housing to allowing it by right. For example, if, based on the estimation, the largest decline in rents near a station would occur from relaxing DUPAC and maximum height together, and the largest decline in monthly owner costs (from a decline in house prices) would occur from relaxing only DUPAC, then each result is shown respectively. Each of the 23 train stations chosen for analysis has a sufficient number of residential properties within 0.3 mile of its location, and together the surrounding areas represent a broad range of community types.

Source(s): 2010–2018 Warren Group tax assessment records, 2020 Metropolitan Area Planning Council Zoning Atlas.

Zoning Regulations and Chapter 40B

As noted above, another state statute influencing local zoning and housing development is Massachusetts's Comprehensive Permit Act. Passed in 1969, with several court challenges following its passage and various amendments attached to it over the years, the law is meant to incentivize local communities to build affordable housing by giving developers a pathway for project approval that does not rely solely on local zoning board decisions. In Massachusetts municipalities where less than 10 percent of the housing stock is affordable for households making at or below 80 percent of the area median income (AMI), the Comprehensive Permit Act allows housing developers to bypass local zoning regulations (including multifamily, maximum-height, and density restrictions) by applying for a comprehensive permit and appealing local decisions to a state zoning board.²² The properties for which this permitting process is used are often referred to as Chapter 40B properties, in reference to the section of the act authorizing them. At its core, the Comprehensive Permit Act provides a mechanism for housing to be built more densely than would otherwise be allowed due to local laws while ensuring that a portion of the new housing is affordable. The law also incentivizes communities that are below the 10 percent threshold to increase their affordable-housing stock so that local zoning board decisions cannot be appealed to the state board. Municipalities and the state track their affordable housing stock in the Subsidizing Housing Inventory (SHI).

This report uses location data on properties in the SHI to examine how zoning regulations affect where qualifying affordable housing is built.²³ If the Comprehensive Permit Act does indeed make it easier to construct new housing in places with restrictive zoning laws—that is, if it serves as a substitute for relaxed zoning regulations—then there should be a greater number of Chapter 40B properties in such areas compared with areas where zoning regulations are more relaxed. If, however, the law acts as a complement to relaxed zoning regulations, then Chapter 40B properties will be more prevalent in less restrictive zoning areas. Table 3 displays the effect that relaxed zoning regulations have on the number of SHI properties. The table also distinguishes between all properties in the SHI, the subset that are Chapter 40B properties, and the Chapter 40B properties that are multifamily.²⁴

The affordable housing properties included in the SHI, and specifically Chapter 40B properties, are generally more likely to be found in areas with less strict zoning regulations. In instances where relaxed zoning regulations lead to a smaller share of housing that qualifies as SHI and Chapter 40B housing, this effect is driven entirely by single-family SHI and Chapter 40B properties. For example, when multifamily housing is allowed by right or by special permit, the share of the housing stock comprising SHI properties, which include Chapter 40B properties, is about 0.02 percentage point smaller than it otherwise would be. A similar decline is seen when the analysis is restricted to just Chapter 40B properties. However, when the analysis is restricted specifically to multifamily Chapter 40B properties, allowing multifamily housing increases the share by about 0.02 percentage point. That is, it is more likely for single-family Chapter 40B properties to be built in areas zoned for single-family construction, while it is more likely for multifamily Chapter

22 Exemptions to this rule include certain “safe harbor” stipulations that allow a local zoning board to deny a comprehensive permit even if less than 10 percent of the town’s housing stock is affordable. A comprehensive permit involves a single application to a local zoning board for the permitting of a project instead of the more typical process of seeking separate approvals for height, density, or other project characteristics.

23 Due to privacy concerns, some property addresses are suppressed in the SHI, particularly for single-family residences and certain types of congregate housing.

24 Table 3 focuses on the effects from a regulation scenario in which all regulations differ on either side of a zoning-area boundary, because most of the Chapter 40B buildings are in dense areas where such is the case (see Figure 3).

Table 3

Percentage Point Change in Share of Properties in Subsidized Housing Inventory (SHI) Due to Relaxed Zoning Regulations
Greater Boston, 2018

	All SHI Properties	All Chapter 40B Properties	Multifamily Chapter 40B Properties
Allowing Multifamily by Right or by Special Permit	-0.02	-0.02	0.02
Increasing DUPAC 1 unit*	<0.01	<0.01	<0.01
Increasing Height 1 floor*	0.06	0.05	0.12

Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. "Height" refers to the allowable maximum height of new construction. Includes only properties assigned to boundaries where all three regulations change (multifamily, DUPAC, and maximum-height restrictions). Chapter 40B properties are those that are included in the Massachusetts Subsidized Housing Inventory (SHI) and where built using the comprehensive permit process. This analysis excludes SHI properties that could not be reliably assigned to a zoning area based on address and properties whose address was suppressed for privacy reasons.

Source(s): Warren Group tax assessment records for 2018, 2020 Metropolitan Area Planning Council Zoning Atlas, Massachusetts Department of Housing and Community Development Subsidized Housing Inventory (SHI) property list received in May 2021.

40B properties to be built in areas zoned for multifamily construction.²⁵ When DUPAC is one unit greater or the maximum-height restriction is one floor taller, the share of the housing stock that is affordable is larger.

While the Comprehensive Permit Act may not be meant to operate this way, the law has not necessarily failed to enable developers to overcome restrictive zoning. Other location characteristics affect the demand for apartments and influence the decision of where to build multifamily housing, such as access to public transit stations or proximity to urban amenities. The pathway that the comprehensive permit process offers to constructing multifamily buildings in areas zoned for lower-density housing may not be sufficient to change the existing financial incentives to build in areas zoned for multifamily construction. Nevertheless, the Chapter 40B process allows developers to build more housing units than they could otherwise while ensuring that some percentage of the units is affordable. Thus, the law still helps developers overcome restrictive zoning practices and may work to increase the supply of affordable multifamily housing and multifamily housing in general.

The effect that relaxing zoning regulations has on increasing affordable housing tends to be quite small. As shown in Table 3, when DUPAC is one unit greater, the share of the housing stock qualifying as affordable under the Comprehensive Permit Act is less than 0.01 percentage point larger. This is partly because a very small share of the housing stock is included in the SHI, and an even smaller share comprises Chapter 40B properties. Given the estimates from Table 3, the

²⁵ One reason for the discrepancy between single-family and multifamily Chapter 40B properties may be because local communities still exert some control over the process even though their decisions can be appealed. Developers may face fewer legal hurdles building single-family Chapter 40B properties in areas where land use is more restricted, or affordable single-family construction might provoke less opposition from the local community.

overall probability of a multifamily Chapter 40B property being built is about 14 percent.²⁶ If a goal were set to increase the number of multifamily Chapter 40B properties by, for example, 50 percent, this would equate to about 1,000 new multifamily comprehensive permit applications being filed, assuming that only about 14 percent would be approved. Put another way, for every 500 comprehensive permit applications filed, about 28 percent would need to be approved in order to increase the supply of affordable housing by 50 percent.²⁷ Since it is unlikely that developers would submit such large numbers of applications, increasing the number of Chapter 40B properties and the affordable housing stock at a meaningful rate would involve making it less challenging for comprehensive permit applications to gain approval and making it simpler to build housing in general, even in areas where zoning regulations are relaxed and building multifamily housing is already relatively easy.

V. Policy Implications of Land-use Regulation Changes

Housing has become increasingly unaffordable in Greater Boston. From 2010 to 2018, the house price index in the area increased 32 percent,²⁸ and median rents increased 10.3 percent.²⁹ Vacant space in Greater Boston is scarce. In 2018, less than 1 percent of all residential lots was listed as vacant and developable.³⁰ This report highlights which reforms to zoning regulations might provide the most fruitful means of increasing the supply of multifamily housing and reducing rents. It focuses on three commonly used zoning regulations: multifamily by-right zoning, maximum-height restrictions, and unit-density restrictions as measured by dwelling units per acre (DUPAC). This report also looks at how effective Chapter 40B is at increasing the supply of affordable housing through circumventing strict zoning laws.

In theory, allowing multifamily housing to be built by right would increase the supply of apartments in Greater Boston and make renting more affordable. However, this would not be the case in practice. Changing just multifamily zoning would neither increase the supply of rental properties nor lower the cost of renting in the area. Increasing unit density would do both. Thus, mirroring the recent reforms to multifamily zoning that have been enacted in other U.S. metropolitan areas may not be the best course of action in Greater Boston. Instead, policymakers should focus on reforms that allow denser housing to be built in general.

The impact on prices from relaxed regulations comes from two sources: directly from a change in regulation that affects the supply of housing in an area and indirectly through changes in neighborhood density. Based on the estimates in this report, relaxing DUPAC restrictions results in a modest reduction in rents. This is especially true for less dense suburban communities, where most DUPAC boundaries are located (see Figure 2) and where demand for housing is less intense, so any increase in housing supply has a greater impact on prices.³¹ Relaxing DUPAC and

26 This represents an upper bound of approval rates, and in many areas this approval probability is likely to be close to zero, because in many municipalities, we observe no Chapter 40B buildings, even though most of those cities and towns do not meet the 10 percent affordability threshold.

27 Our analysis includes 282 multifamily Chapter 40B properties. A 50 percent increase would add 141 buildings. Thus, with an approval rate of about 14 percent, an additional 1,030 comprehensive permit applications would need to be submitted to result in such an increase. Or if the number of applications was set to 500, the approval probability would have to increase to about 28 percent.

28 Federal Housing Finance Agency House Price Index (all transactions) for 2010 through 2018.

29 U.S. Census Bureau's American Community Survey gross rent estimates for 2010 through 2018.

30 Warren Group tax assessment data for 2018. In 2018, 0.79 percent of residential lots in Greater Boston were classified as developable or potentially developable, down from 1.2 percent in 2011.

31 Closer to a city center, high demand may outweigh an increase in supply. But in the suburbs, where demand is lower, the supply effect may outweigh the demand effect. See the accompanying working paper (Kulka, Sood, and Chiumenti 2022) for the heterogeneous response to regulation change across geography.

maximum-height restrictions also reduces rents. However, our estimates indicate that renters and single-family homeowners both dislike higher-density housing, so the decrease in rents and house prices occurs alongside a measurable dislike for the changing characteristics of the neighborhood.

How then can zoning reforms meaningfully improve housing affordability in Greater Boston if they are likely to face strong community opposition? The answer depends in large part on where geographically the focus is placed. Relaxing only DUPAC decreases both rents and home prices, but there is no statistically significant effect on home prices across zoning-area boundaries when DUPAC and height regulations are relaxed. DUPAC-only boundaries are spread out across both urban and suburban communities, while DUPAC-and-height boundaries tend to be highly clustered in urban centers. This supports the finding that it is likely easier to build more multifamily housing in and near city centers or close to public transit stops, where the density is already high. This approach does not lower the prices of single-family houses, so it does not help make homeownership affordable for first-time homebuyers, but it does help to make renting an apartment

more affordable. Relaxing DUPAC and maximum-height restrictions in and around city centers might be met with minimal community opposition, but such changes likely would have only a small impact, because these are the areas where most of the multifamily housing stock already is located.

Changing just multifamily zoning would neither increase the supply of rental properties nor lower rents. Increasing unit density would do both.

Finally, zoning reform itself is a local process, but Massachusetts's Comprehensive Permit Act does function as a form of statewide zoning policy, holding municipalities accountable for a minimum level of housing affordability within their borders. Given the small amount of new housing construction that involves the comprehensive permit process, known as Chapter 40B housing, the act does not appear to serve as a substitute for more relaxed zoning laws. If Greater Boston

were to rely solely on policies such as Chapter 40B to increase housing affordability, far more building applications would need to be submitted or a larger share would need to be approved. Chapter 40B is still a valuable and meaningful policy that likely allows developers to build more densely than they could otherwise, but its effect is seen mostly in areas where multifamily housing is already allowed or where density and maximum-height restrictions are less stringent.

Increasingly expensive housing in Greater Boston and other U.S. metropolitan areas is not just a matter of residents having to spend a larger share of their income on housing costs. Rising rents and home prices in major cities result in a redirection of low-skill migration away from those cities and in cross-country income disparities (Ganong and Shoag 2017). Losing residents to other metropolitan areas has negative implications for urban amenities, businesses that need an adequately skilled labor supply, and aggregate GDP due to losses from productivity spillovers. For example, Hsieh and Moretti (2019) estimate that the stringent land-use regulations in cities such as New York, Boston, and San Francisco reduced aggregate U.S. growth 36 percent from 1964 to 2009 by limiting the number of workers who could access these productive locations.

In addition to the efficiency argument for why policymakers in Greater Boston should consider various ways to increase the housing supply and reduce housing costs, there is also an equity argument. The status quo hurts first-time homebuyers, who tend to be younger, and renters of multifamily housing, who tend to be people of color and low- or middle-income earners, while benefiting older and wealthier homeowners. Thus, while reducing housing costs through zoning reform could help first-time homebuyers and lower-income renters, it could be at the expense of current homeowners and therefore would likely generate substantial political opposition from those residents.

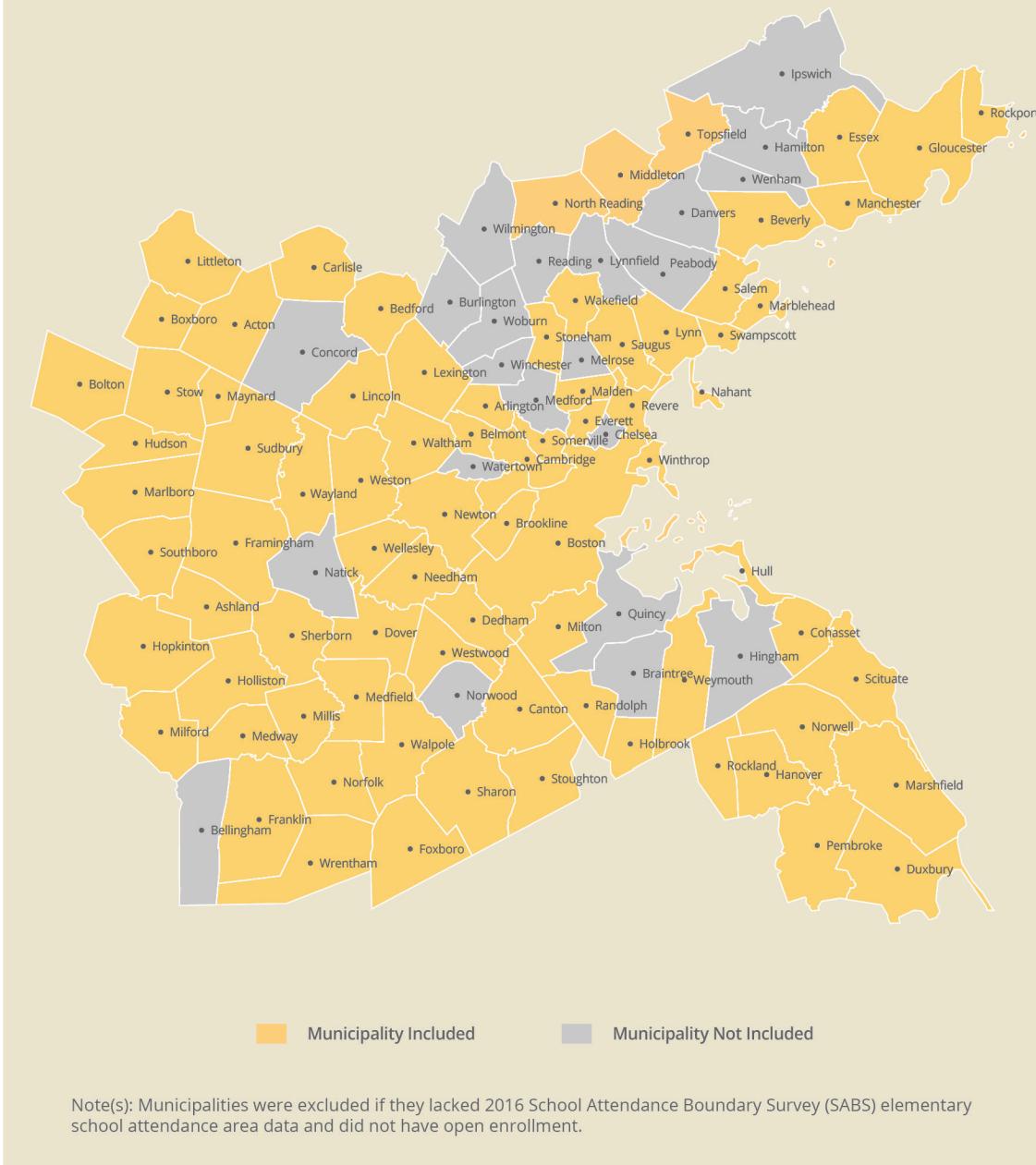
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Appendix

Appendix 1

Greater Boston Municipalities Included in Analysis



Appendix 3: Regression Discontinuity Methods

Appendix 2		Percentage Change in Multifamily Housing Supply by Type of Building in Greater Boston By regulation that changes at zoning-area boundary							
Multifamily Building Type		2- to 3-unit Buildings				4-plus-unit Buildings			
Regulation Change		Only Multi-family	Only DUPAC	Multi-family and DUPAC	Height and DUPAC	Only Multi-family	Only DUPAC	Multi-family and DUPAC	Height and DUPAC
Allowing Multifamily by Right or by Special Permit	0.250			0.042		0.066		0.011	
Standard Error	0.066			0.019		0.035		0.014	
Increasing Height					-0.011				0.004
Standard Error					0.011				0.008
Increasing DUPAC		0.002	0.003	0.001			0.002	0.000	0.003
Standard Error		0.001	0.003	0.003			0.001	0.002	0.002
Allowing Multifamily and Increasing DUPAC				0.004				0.003	
Standard Error				0.002				0.001	
Increasing Height and Increasing DUPAC					0.00				0.00
Standard Error					0.00				0.00
N	2108	53902	14803	4560	1996	52993	14041	4106	
R ²	0.383	0.276	0.315	0.509	0.574	0.507	0.410	0.649	

Note(s): "DUPAC" refers to the allowable number of dwelling units per acre. "Height" refers to the allowable maximum height of new construction. Bolded values indicate statistical significance. Row N denotes the number of observations included in each regression. Row R² denotes the proportion of the variance in the dependent variable (number of units) that is predicted by the independent variables in each regression specification.

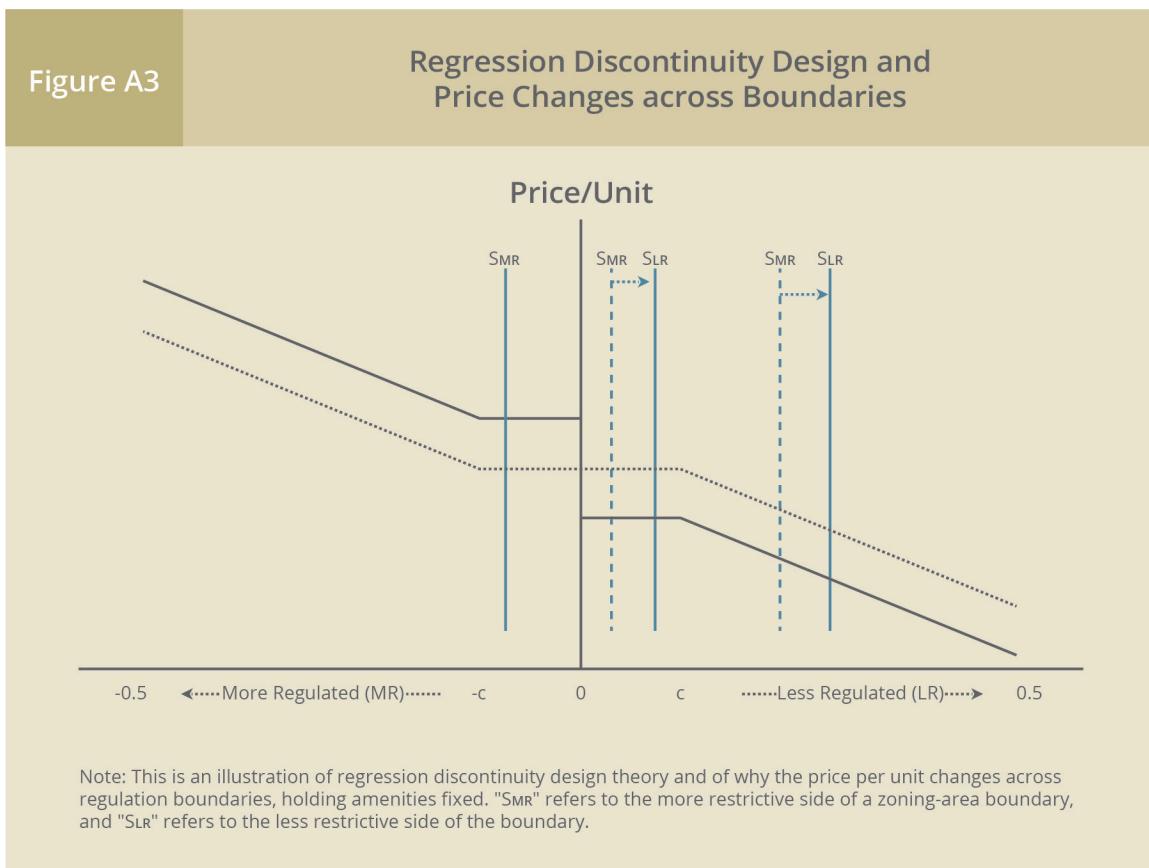
Source(s): Warren Group tax assessment records for 2018, 2020 Metropolitan Area Planning Council Zoning Atlas.

This report uses a regression discontinuity design (RDD) to estimate the direct effects of land-use regulations on the cost and supply of multifamily housing and the spillover, or indirect effects, of the change in residential density due to zoning changes. Both are correlated with location quality, which is not accounted for in this analysis. To identify causal effects of these regulations on housing supply and housing costs, there needs to be variation not correlated with unobserved location amenities that affect the supply and type of housing. Examining changes across a zoning boundary while controlling for other factors such as school attendance area and town helps with causal identification.

Four Key Mechanisms Resulting in Price Changes across a Zoning Boundary When the Type or Supply of Housing Changes

Mechanism	Description	Direct/Indirect Effect
Supply Effect	Increases in housing supply lower prices if the demand for housing remains unchanged.	Direct Effect
Demand Effect	Increases in demand can raise prices if the supply of housing remains unchanged.	
Option Value (homeowners only)	Land that can be used either as a single-family or multifamily residence has an increased future sale value.	
Willingness to Pay	If households dislike living in denser neighborhoods, then higher density will reduce prices.	Indirect Effect

As Figure A3 shows, at a zoning-area boundary, price per unit shifts when regulations change the type and size of housing, even though amenities in the area remain the same. Near a boundary, where a difference in density affects the characteristics of a neighborhood, the direct effect on price per unit can be estimated. Farther from a boundary, the effect that density has on prices comes from both direct and indirect effects, which cannot be separated. More technical details can be found in Figure A3 and in Kulka, Sood, and Chiumenti (2022).



Height restrictions were first adopted in Boston in 1918, and the comprehensive zoning code was adopted in 1956. As shown in the working paper that accompanies this report (Kulka, Sood, and Chiumenti 2022), the types of buildings constructed before 1956 do not change discontinuously across regulation boundaries, especially for maximum-height and DUPAC regulation changes. Our identification assumptions imply that on either side of a regulation boundary, the type of housing and the density are different, but close to a boundary, the unobserved quality of the neighborhood does not change, and public amenities, municipal services, distance to school and rivers are also continuous.

Empirical Model

The empirical models are given by:

$$Y_h = \rho_0 + \rho_1 I_{Regulation_h} + f_h(dist) + \lambda^{seg}_h + \epsilon_h \quad (1)$$

$$Y_h = \rho_0 + \rho_1 I_{Regulation_h} + \rho_2 \theta^{GD}_h + \rho_3 \theta^{HD}_h + \rho_4 x_h + f_h(dist) + \lambda^{seg}_h + \epsilon_h \quad (2)$$

Equation 1 estimates direct price effects of regulation changes and supply effects. In Equation 1, Y_h is either owner cost (single-family) or rent (multifamily) in price regressions. In the supply version of Equation 1, we use a linear regression probability model where Y_h has a value of 0 for a single-family home and a value of 1 for a two- or three-unit building or a four-plus-unit building. Y_h will fall between 0 and 1 as an estimate of the share of multifamily housing. Regulation is either DUPAC or height change or an indicator of whether multifamily construction is allowed or a combination of these regulations. $f_h(dist)$ is a polynomial on the distance to the boundary segment, while λ^{seg} is the boundary-segment fixed effect.

Equation 2 estimates the willingness to pay for neighborhood density. θ^{GD}_h is the share of buildings within a 0.1-mile radius around h that contain two or three units, while θ^{HD}_h is the share of buildings within a 0.1-mile radius around h that contain four or more units. x_h is building characteristics including the year the building was constructed, lot and building area, number of rooms, number of bathrooms, etc.

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