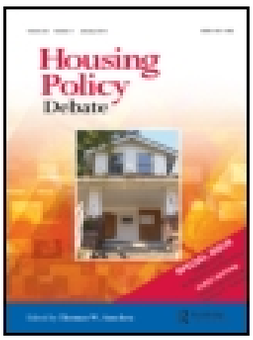

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State Affordable Housing Appeals Systems and Access to Opportunity: Evidence From the Northeastern United States

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State Affordable Housing Appeals Systems and Access to Opportunity: Evidence From the Northeastern United States

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ABSTRACT

In many U.S. states, local governments exercise extensive control over land-use regulation. Much scholarly research indicates that local restrictions on multifamily residential development have contributed to rapid housing cost increases, particularly in the West Coast and the Northeast. Such evidence has led scholars and policymakers to advocate state intervention in local land-use regulation, in order to constrain local discretion over permitting multifamily housing. This article provides the most comprehensive comparison to date of housing outcomes associated with state affordable housing appeals systems (SAHASs) in the northeastern U.S. SAHASs enable developers of certain below-market-rate and mixed-income housing projects to request an override of local land-use regulation. We describe the essential attributes of a SAHAS and provide empirical data to assess housing outcomes in the four northeastern states where such systems have been adopted – Connecticut, Massachusetts, New Jersey, and Rhode Island. Our findings are consistent with previous claims that a SAHAS can increase access to opportunity, and that the Massachusetts system has been particularly effective. We conclude by discussing features of the Massachusetts system that may explain its relative efficacy, and we describe how state and federal policymakers could improve data collection practices related to state intervention in local land-use regulation.

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housing affordability; land use/zoning; regulation; state and local government

Metropolitan regions with strong, dynamic economies in the northeastern and western United States served as engines of opportunity during much of the 20th century, but have become increasingly impenetrable for lower wage workers, largely because of housing costs (Ganong & Shoag, 2017; Moretti, 2013b). Just as rising housing costs deter people from moving to economically vibrant regions, they can also create challenging conditions for many existing residents, who may find themselves priced out (Gabriel & Painter, 2018; Joint Center for Housing Studies of Harvard University, 2017). An extensive literature demonstrates that rising housing costs in such areas are partially attributable to local regulatory restrictions on housing supply generally, and the supply of multifamily housing in particular (Been, Ellen, & O'Regan, 2019). As a result, housing policy scholars and advocates have encouraged states to exercise their legal power to constrain local discretion over land-use regulation, thereby easing restrictions on multifamily housing (Lens & Monkkonen, 2016; Stahl, 2018).

In this article, we analyze one model for such state-imposed limitations—the state affordable housing appeals system (SAHAS), which enables developers of certain below-market-rate (BMR) and mixed-income housing projects to request an override of local land-use regulation. Scholars have asserted that when a SAHAS operates in a strong housing market, it can boost BMR housing production

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Supplemental data for this article can be accessed here.

(Bratt & Vladeck, 2014; Dillman & Fisher, 2009; Graddy & Bostic, 2010). As a result, some have called for adoption of elements of the SAHAS model in states, such as California, where housing costs are particularly high (Monkkonen, Manville, & Friedman, 2019; Reid, Galante, & Weinstein-Carnes, 2017; Stahl, 2018). Others, in contrast, question the efficacy of SAHASs (Elmendorf, 2020; Fischel, 2015). Unfortunately, the relevant evidence is limited (Been et al., 2019, p. 34).

This article describes the attributes of a SAHAS and provides data to compare BMR housing stock in municipalities and census tracts with relatively high median household incomes and relatively low poverty rates in the four northeastern states with SAHASs—Connecticut, Massachusetts, New Jersey, and Rhode Island. We also compare housing outcomes in these four states with those in New York State, which does not have a SAHAS. Our findings are consistent with claims that a SAHAS can facilitate the development and preservation of BMR housing, and that the Massachusetts system has been particularly effective. Nevertheless, the evidence is also consistent with claims that any effects of these systems are modest in comparison to housing needs. Our analysis also points to the need for federal policy to support improved data collection by state and local governments. We conclude by discussing why the Massachusetts SAHAS may be relatively effective, and by describing options for state and federal policymakers.

Local Land-Use Regulation, Housing Costs, and Access to Opportunity

Many empirical studies, summarized by Gyourko and Molloy (2015) and Quigley and Rosenthal (2005), find strong negative associations between the stringency of land-use regulation and the responsiveness of housing supply to demand. State governments have long delegated substantial authority to local governments to regulate land use (Briffault, 1990, pp. 39–85; Young, 1996, vol. 1, sec. 2.19–2.29), and in areas where demand for housing is strong—including many coastal regions in the West and Northeast—local regulatory restrictions have limited the amount of new housing constructed (Glaeser & Gyourko, 2018). Local governments typically determine the permissible land uses in zoning districts, and many such districts either explicitly prohibit multifamily and townhome projects or do not explicitly allow them. Even when such projects are authorized in principle, local governments can impose numerous review requirements, thereby prolonging the process for development approvals, driving up project costs, and potentially scuttling development (Reid et al., 2017).

Such land-use regulations can serve a variety of goals, including many that are widely viewed as legitimate. For example, land-use regulations can help to preserve ecological resources and minimize the congestion of local public goods such as roadways (Pendall, 1999). Other goals may be patently illegitimate, such as the exclusion of racial and ethnic minorities (Danielson, 1976; Trounstine, 2018).

Regardless of the goals, local control over land-use regulation can constrain housing supply generally, and multifamily housing supply in particular (Pendall, 2000; Schuetz, 2009). As a result, large metropolitan areas in the Northeast and the West have particularly high housing cost burdens, measured by comparing housing costs with household income, and these burdens are disproportionately borne by low-income households (Gabriel & Painter, 2018; Joint Center for Housing Studies of Harvard University, 2017).

Notably, high housing cost burdens affect both inter- and intraregional geographic mobility, thereby limiting access to areas conducive to socioeconomic advancement (Acolin, Bernstein, & Wachter, 2017; Acolin & Wachter, 2017; Ganong & Shoag, 2017). Impediments to interregional geographic mobility can harm both current and future generations, because opportunities for socioeconomic advancement are unevenly distributed among regions, and many low-skilled workers in low-income regions would derive wage gains from moving to higher income regions (Acolin & Wachter, 2017; Chetty, Hendren, Kline, & Saez, 2014; Diamond, 2016; Moretti, 2013a). Rising housing costs also create challenges for many existing residents of high-cost metropolitan areas. In the absence of rent control or housing subsidies, lower income renters must spend an increasing portion of their income to remain in such areas, with potentially adverse consequences for health and well-being (Harkness & Newman, 2005; Newman & Scott Holupka, 2015).

Households that are unable or unwilling to increase their housing expenditures may have to move, either to a relatively remote part of the same region (thereby likely extending their commutes), or to a different region, which may limit their access to opportunity for reasons described above. At the extreme, rising rents can push lower income households into homelessness (Byrne, Munley, Fargo, Montgomery, & Culhane, 2013; Fargo, Munley, Byrne, Montgomery, & Culhane, 2013; Hanratty, 2017).

State Affordable Housing Appeals Systems

Whereas states typically delegate significant authority over land-use regulation to local governments, a SAHAS empowers developers of BMR and mixed-income housing to challenge local land-use regulations. At least four states—Massachusetts, New Jersey, Connecticut, and Rhode Island—have adopted a SAHAS (Marantz & Dillon, 2018). In these states, developers of BMR housing projects, as well as certain mixed-income housing projects (which combine BMR and market-rate units), can use a SAHAS to override local land-use regulations. A SAHAS applies only in municipalities that have not fulfilled their fair-share housing obligations, as specified by state law. For example, in Massachusetts, projects that reserve 25% of units for households at or below 80% of area median income (AMI) can qualify for the SAHAS,[1] and municipalities are exempt from the SAHAS if at least 10% of their housing stock satisfies the state's fair-share standards, described below. Local governments have a powerful motivation to attain exemption on their own terms, because if they do not, then a developer proposing a qualifying project has access to the SAHAS, significantly curtailing local control over the project.

The SAHAS model differs from other state BMR housing policy interventions, such as housing finance programs and planning mandates, because it facilitates the override of local regulatory barriers to production. Unlike state housing finance programs, which provide financial resources for BMR housing production, a SAHAS need not entail direct financial aid for BMR housing projects (Basolo, 2019). Housing planning mandates, which require local governments to plan for existing and future housing needs, are somewhat analogous to SAHASs, inasmuch as they are related to local land use. Planning mandates can prompt receptive officials to adopt new policies and revise zoning regulations (Aurand, 2014; Jun, 2017; Palm & Niemeier, 2017; Pendall, 2008; Ramsey-Musolf, 2016). But in the absence of a SAHAS or some other mechanism to override local permitting authority, a planning mandate may have an insignificant impact on local governments that are not receptive to multifamily housing development generally or BMR housing specifically (Ramsey-Musolf, 2017). That is because, unlike a SAHAS, even a strong planning mandate does not compel a local government to permit any particular project or to zone any particular parcel of land for multifamily development.

A combination of four attributes differentiates SAHASs from other forms of state intervention in local land-use regulation:

(1) If a local government has not fulfilled its fair-share housing obligations, then qualifying BMR and mixed-income projects need not comply with local zoning requirements. Thus, for example, a multifamily project might be built in an area zoned for single-family use. Alternatively, a multifamily project might be built in an area where such projects are allowed as a conditional use (i.e., subject to approval by a local zoning board), even if it does not satisfy all of the mitigation requirements for a conditional use permit. (In the absence of a SAHAS, local zoning boards often have broad discretion to deny such permits.)
(2) A developer proposing a qualifying project is eligible to request an *expedited appeals procedure* if the local government denies the proposal or approves it subject to conditions that render the project economically infeasible. This expedited procedure can significantly reduce a developer's legal fees and carrying costs.
(3) The expedited procedure favors the developer, because the local government bears the burden of proving that its requirements are reasonable, in light of the regional need for housing. This

arrangement shifts the conventional burden of proof, which—in the absence of a SAHAS—requires the developer to demonstrate that the relevant regulations are unreasonable.

(4) A developer who prevails is generally entitled to a building permit. This *builder's remedy* gives developers meaningful assurance that the appeals process will culminate in the opportunity to build the proposed project. In the absence of the builder's remedy, a local government might simply be required to amend its zoning ordinance, a time-consuming process which provides no assurance that a particular project will be approved.

In tandem, the four attributes of a SAHAS can empower developers of BMR and mixed-income housing to challenge restrictive zoning practices. (States such as Illinois, New Hampshire, and Pennsylvania have adopted some—but not all—of the above elements.[2])

The function and operation of SAHASs has changed over time, as the funding model for BMR and mixed-income housing has shifted (Marantz & Zheng, 2018). The SAHAS model emerged in the Northeast during the late 1960s and early 1970s as a tool for opening suburban areas to low- and moderate-income households (Danielson, 1976, pp. 300–306). Public funding for BMR housing was relatively plentiful at that time (Dolbeare & Crowley, 2002), and a SAHAS could serve as a complement to financial subsidies by expediting the approval of subsidized projects. As federal appropriations for BMR housing production declined, the SAHAS model became an increasingly important substitute for financial subsidies in areas with strong housing markets, because it enabled developers of qualifying mixed-income projects to build more densely than otherwise allowed (Bratt & Vladeck, 2014; Mallach, 1986). Financial returns from the additional market-rate units attributable to the SAHAS could both subsidize the BMR units and raise developers' total return on investment, compared with returns under existing zoning regulations (Schuetz, 2009). In strong housing markets, such potential profits have encouraged mixed-income housing developers to identify localities that have not fulfilled their fair-share obligations and to challenge exclusionary zoning practices (Fisher, 2013; Mallach, 1986), although the effect in weaker housing markets has received less scholarly attention.

A SAHAS could thus mitigate the exclusionary effects of stringent baseline zoning regimes, by incentivizing developers to identify sites that can support denser development and by empowering such developers to build on these sites. Fisher and Marantz (2015) provide evidence consistent with this possibility. They find that most multifamily units permitted in the suburbs of Boston used the permitting system associated with the Massachusetts SAHAS. They also find that for-profit developers of rental housing systematically used the SAHAS to build in municipalities with relatively convenient access to jobs that placed comparatively stringent restrictions on residential development.[3] Their findings suggest that the law may have encouraged some municipalities to loosen their zoning restrictions or, where it did not have this effect, empowered developers to override these restrictions.

The impact of a SAHAS on developers' behavior will depend, in part, on the demand for housing and, in part, on the cost of providing BMR units. The latter cost depends, in large measure, on the affordability requirements for qualifying projects. These requirements vary among the SAHAS states. In Massachusetts, for example, developers can qualify for the SAHAS if at least 25% of the units are affordable at 80% of AMI. By contrast, Connecticut requires qualifying mixed-income projects to include units affordable at lower income thresholds. Carroll (2001) and Tondro (2001) contend that the additional costs associated with Connecticut's more stringent affordability criteria may deter developers from building mixed-income housing.

As claims such as Tondro's and Carroll's suggest, variations in SAHAS design could lead to variation in housing outcomes among SAHAS states (Graddy & Bostic, 2010). For example, in Massachusetts and Rhode Island, a project eligible for the SAHAS is also eligible for a comprehensive permit, which consolidates all local review processes. This is generally not the case in New Jersey and Connecticut. In addition, Connecticut, Massachusetts, and Rhode Island have relatively clear and uniform fair-share requirements for exemption from the SAHAS. For example, in Massachusetts, a municipality is exempt if at least 10% of its year-round housing stock consists of (a) BMR units, restricted by deed to households earning no more than 80% of AMI; and (b) market-rate rental units in projects where at least 20% of the

units are affordable at 50% of AMI or at least 25% of the units are affordable at 80% of AMI.[4] In New Jersey, by contrast, the legislature gave a state administrative agency responsibility to establish a methodology to calculate local fair-share requirements and then determine municipal obligations on a case-by-case basis. Below, we discuss how such variation might affect housing outcomes.

Evaluating Housing Outcomes Under a SAHAS

There are several channels through which a SAHAS could improve housing affordability. Most directly, an effective SAHAS can increase the stock of BMR housing (Bratt & Vladeck, 2014; Cowan, 2006; Dillman & Fisher, 2009), and this possibility is the focus of our empirical analyses, below. (Notably, even projects that do not use the permitting process associated with a SAHAS may be attributable to a SAHAS if they help a municipality to fulfill its fair-share obligation.) A SAHAS might also increase the stock of units affordable to households with incomes *exceeding* the threshold for BMR housing. This is because a majority of the units in qualifying mixed-income projects can be market-rate units, and such projects typically consist of building types, such as multifamily structures, that provide relatively inexpensive market-rate alternatives to detached single-family homes. In the absence of a SAHAS, developers may have difficulty securing local approvals for such projects. Finally, if a SAHAS expands the supply of housing units in a metropolitan area, this increase could reduce the cost of units that are *not* developed under the SAHAS by alleviating competition among homeseekers (Been et al., 2019). Thus, housing affordability may vary between SAHAS states and non-SAHAS states, and differences in the regulatory design of SAHASs raise the possibility of variation in efficacy among SAHAS states.

Making the relevant comparisons is challenging, in part, because SAHASs are not randomly assigned to states, and many of the potential influences on housing outcomes are unobservable. Thus, for example, states where voters are more amenable to BMR housing might be more likely to adopt laws associated with greater BMR housing production. Moreover, inter-state variation in regulatory definitions and reporting requirements concerning deed-restricted BMR units poses additional complications, and several prior assessments of SAHAS efficacy have relied on incommensurable state-level data sets for inter-state comparisons (e.g., Bratt & Vladeck, 2014; Cowan, 2006; Graddy & Bostic, 2010). In particular, these prior comparisons include some market-rate rental units in the count of BMR units in Massachusetts, but include only BMR units in other states. In addition, they may include certain units in Massachusetts that have not received a certificate of occupancy,[5] while including only units that have received a certificate of occupancy in other states. The present study is, to our knowledge, the first to use a direct measure of housing affordability to compare multiple SAHAS states with a non-SAHAS state, drawing on state-level administrative data on deed-restricted BMR units that have received a certificate of occupancy. This study is also the first to use commensurable data on deed-restricted BMR units to make comparisons among SAHAS states.

Study Area

We analyze data from core-based statistical areas (or components thereof) in five territorially contiguous northeastern states. Core-based statistical areas (CBSAs) are geographical aggregations of counties that have a "high degree of social and economic integration" with an urban core (Office of Management and Budget, 2015, A-2). Our study area consists of the Massachusetts component of the Boston–Cambridge–Newton, MA–NH, CBSA (hereinafter, the Boston CBSA); the Hartford–West Hartford–East Hartford, CT, CBSA (hereinafter, the Hartford CBSA); the New Jersey component of the New York–Newark–Jersey City, NY–NJ–PA, CBSA (hereinafter the New York City [NYC] CBSA); the New York State component of the NYC CBSA; and the Rhode Island component of the Providence–Warwick, RI–MA CBSA (hereinafter, the Providence CBSA). Connecticut, Massachusetts, New Jersey, and Rhode Island are—to our knowledge—the only four states that have adopted a SAHAS as defined above. New York State, which has no SAHAS, serves as a control in two of the analyses described below.

The study area is characterized by both relatively high potential for upward economic mobility and relatively restrictive local land-use regulation. To illustrate the former characteristic, we draw on metrics from Chetty et al. (2014), who find significant interregional variation in the probability that the children of parents at the 25th percentile of the national income distribution will reach a higher income rank. Based on this metric, the CBSAs wholly or partially within our study area provide relatively good prospects for upward economic mobility, compared with most CBSAs having populations of at least 500,000 as of 2010. Ranked among all 104 such CBSAs, according to the upward mobility metric proposed by Chetty et al. (2014), those in our study area range from 11th (the Boston CBSA) to 37th (the Hartford CBSA; Opportunity Insights, 2019b). On the other hand, as discussed below, local land-use regulation is generally relatively restrictive in these areas, limiting opportunities to move to these CBSAs from elsewhere or to move within these CBSAs.

Although variations in sociopolitical context may affect the outcomes that we analyze, the geographically contiguous states in our study area share many plausibly relevant attributes. For example, state adoption of a housing trust fund may indicate statewide support for affordable housing (Basolo, 2019). Such funds can be used for a variety of purposes, including leveraging federal funds, filling financing gaps for BMR projects, and providing rental or downpayment assistance (Scally, 2012). As of 2016, all five states in our study area had housing trust funds, and all but Rhode Island had active revenue commitments for these trust funds, such as document recording fees and general fund revenues (Center for Community Change, 2016). In addition, a liberal political orientation may also affect state innovation in housing policy (Basolo & Scally, 2008), and the five states in our study area are all relatively left leaning, with each giving a majority of the two-party vote to the Democratic candidate in every presidential election from 1992 through 2016 (MIT Election Data and Science Lab, 2017).

Whereas the existence of housing trust funds may indicate support for BMR housing, low-density single-family zoning and restrictions on apartment development may impede the development of such housing. Notably, Pendall, Puentes, and Martin (2006, pp. 12–14) characterize land-use regulations in our study area as predominantly "exclusionary," because of low-density single-family zoning outside of central cities, coupled with bans on apartment development.

Despite these similarities and their geographic proximity, the components of our study area also exhibit noteworthy socioeconomic variation. Table 1 provides summary statistics for a subset of of our study area—the portion of each CBSA component outside of its most populous city. The relevant portions of the Hartford CBSA and the Rhode Island part of the Providence CBSA have average population densities around 50% lower than the comparable portions of the other three CBSA components, and median gross rents roughly 20–30% lower. These differences suggest relatively weak demand for housing in the Providence and Hartford CBSAs, which may account for variation in the housing outcomes analyzed below. Moreover, in the relevant portions of the three CBSAs covering New England states (i.e., Connecticut, Massachusetts, and Rhode Island), a substantially lower proportion of the population identifies as Black, African American, Hispanic, or Latino, compared with the analyzed portions of the New Jersey and New York State components of the NYC CBSA. Correspondingly, a substantially higher proportion of the population in the relevant portions of the New England CBSAs identifies as non-Hispanic white. Relative racial and ethnic homogeneity may increase local acceptance of BMR housing, and could therefore affect the outcomes that we observe (Nguyen, Basolo, & Tiwari, 2013). We use regression models, detailed below, to control for socioeconomic variation within each CBSA component. The regression models also control for regional effects, but do not enable us to distinguish between state policy interventions and other potential sources of interregional variation, preventing causal inference concerning specific state policy interventions.

Data and Methods

Housing policy research has long focused on access to various kinds of opportunity. One widely used metric comes from the Moving to Opportunity experiment, in which the U.S. Department of Housing and Urban Development (HUD) offered housing vouchers to randomly selected households living in

Table 1. Summary statistics for core-based statistical area (CBSA) components.

	CBSA component				
	Hartford–West Hartford–East Hartford, CT (excluding the City of Hartford)	Boston–Cambridge–Newton, MA–NH (MA part, excluding the City of Boston)	New York–Newark–Jersey City, NY–NJ–PA (NJ part, excluding the City of Newark)	New York–Newark–Jersey City, NY–NJ–PA (NY part, excluding New York City)	Providence–Warwick, RI–MA (RI part, excluding the City of Providence)
Total population	1,089,261	3,620,005	6,300,994	4,915,788	874,981
Black/African American (%)	7.8	5.5	11.0	10.6	4.5
Foreign born (%)	12.0	17.0	25.0	18.8	9.9
Hispanic or Latino (%)	10.1	9.3	20.4	17.9	8.2
Non-Hispanic white (%)	75.7	75.6	56.7	64.8	82.4
Below poverty level (%)[a]	8.1	8.9	9.9	8.3	11.3
Land area (sq. mi.)	1,497	2,375	3,784	3,638	1,015
Avg. population density (per sq. mi.)	727	1,524	1,665	1,351	862
Median gross rent ($)[b]	1,034	1,231	1,246	1,375	925

Note. [a]Calcuated as a percentage of the population for whom poverty status is determined.
[b]Estimated via Pareto interpolation.
Data sources: 2011–2015 American Community Survey and TIGER/Line shapefiles (U.S. Census Bureau, n.d.-a).

high-poverty housing projects during the 1990s (Sanbonmatsu et al., 2011). A subset of the selected households received vouchers that could be used only in low-poverty census tracts, defined as tracts with poverty rates below 10%. Following the Moving to Opportunity experiment, numerous studies concerning the siting of BMR housing have used this 10% threshold to identify higher opportunity tracts (e.g., Ellen & Horn, 2018; McClure, 2006).

Although we use the 10% threshold in several analyses, we rely more heavily on an alternative taxonomy based on median household income, which may better capture variation in opportunities for economic advancement and access to amenities (see Sanbonmatsu et al., 2011, p. 44). Specifically, we group census tracts and municipalities[6] based on median household income as of the 2011–2015 American Community Survey (ACS), as follows: (a) less than $64,667 (lower middle income and below); (b) $64,667–$74,999 (middle income); (c) $75,000–$99,999 (upper middle income); and (d) $100,000 or more (upper income). The bottom of our middle-income category is 120% of the national median as of the 2011–2015 ACS ($64,667). Using the national median, rather than CBSA medians, enables us to identify areas that could facilitate both inter- and intraregional geographic mobility, and also permits consistent categories across the CBSA components in our study area. (Within our study area, median household income ranges from $56,852 in the Rhode Island component of the Providence CBSA to $75,458 in the Massachusetts component of the Boston CBSA.)

As with similar taxonomies (e.g., Bischoff & Reardon, 2014, p. 211), ours uses somewhat arbitrary categories, but it has three advantages. First, it is relatively intuitive. Second, as discussed below, it enables us to mitigate constraints on access to Massachusetts administrative data, which have stymied prior comparative analyses of deed-restricted BMR housing stock. Third, it effectively distinguishes both among municipalities and among census tracts. This third feature is important, because several SAHAS states inventory deed-restricted BMR housing at the municipal level, but not the tract level.

Table 2 separately compares municipalities and census tracts using our income-based categories, as well as the more conventional poverty-based categories. For each category, the table displays municipal-level and tract-level means for key indicators used by the Kirwaan Institute for the Study of Race and Ethnicity (2009), Knaap (2017), and Opportunity Insights (2019c). The indicators, most of which come from the 2011–2015 ACS (U.S. Census Bureau, n.d.-a), include percentages of unemployed persons in the labor force, households that receive public assistance, population age 25 or older with an associate degree or higher, households below the poverty level, single-parent households, and population identified as non-Hispanic white. The remaining indicators are means of commuting time to work, household income, and, from Reardon et al. (2018), third-grade math test scores in 2013.[7]

As Table 2 indicates, the income-based categories meaningfully distinguish among tracts and among municipalities with respect to key indicators of demographics and socioeconomic opportunity. All of the indicators are consistent with expectations, and most are easily interpretable. The unemployment rate declines with increasing median household income, as do the percentages of households receiving public assistance, households below the poverty level, and single-parent households. The percentage of college degree holders increases with the income categories, as does the percentage of housing units that are owner-occupied and the percentage of the population identified as non-Hispanic white. Mean third-grade math test scores also increase substantially with income. For context, the 2013 national median for district-level mean scores is 231.4 and the standard deviation is 11.7. Thus, for example, school districts covering the upper income municipalities in our sample have mean scores that are, on average, roughly 1.4 standard deviations above the national median. The most notable variations between municipal-level and tract-level measures, such as mean commuting times and the percentage of the population identified as non-Hispanic white, reflect the inclusion of the largest central city in each CBSA (i.e., NYC, Boston, Providence, and Hartford). Our three analyses, summarized in the remainder of this section and detailed in the following sections, mitigate such aggregation bias by excluding these central cities, a convention in many studies of BMR and rental housing (e.g., Ellen & Horn, 2018; Schuetz, 2009).[8]

Table 2. Means of selected demographic and opportunity indicators, by income and poverty categories.

Unit of Analysis	Variable	Income category				Poverty category	
		Lower-middle & below	*Middle*	*Upper-middle*	*Upper*	*Moderate to high*	*Low*
Municipality	% unemployed [a,b,c,d]	9.8	7.7	6.6	5.8	9.4	6.5
	% of households receiving public assistance [a,b]	3.6	2.3	1.6	1.0	3.5	1.5
	Mean commute time to work (in mins) [a,c]	28.3	29.2	31.0	33.6	29.1	31.6
	% with Associate degree or above [a,b,c,e,f]	32.1	42.8	49.0	65.9	36.3	53.9
	% owner-occupied housing [a,b]	50.0	69.1	75.8	85.1	50.3	78.7
	% of households below poverty level [a,b,c]	15.4	8.5	5.8	3.7	16.2	5.1
	% single-parent households [c]	38.1	24.1	18.5	11.0	36.4	16.6
	% non-Hispanic white [c]	56.2	76.0	80.7	82.6	54.6	81.5
	Mean third-grade math test scores [a,b,c,g]	227.2	235.6	239.7	247.7	229.0	242.0
	Mean household income ($) [b,c,h]	69,594	89,059	106,884	166,125	77,655	125,954
	N [i]	134	105	253	229	146	575
Tract	% unemployed [a,b,c,d]	11.3	7.8	6.8	5.5	10.8	6.6
	% of households receiving public assistance [a,b]	5.4	2.4	1.7	1.0	5.2	1.6
	Mean commute time to work (in minutes) [a,c]	35.1	33.7	33.0	33.3	35.1	33.2
	% with Associate degree or above [a,b,c,e,f]	30.2	43.7	49.8	67.0	33.5	53.9
	% owner-occupied housing [a,b]	32.5	59.7	71.9	79.2	33.7	74.3
	% of households below poverty level [a,b,c]	23.3	9.7	6.6	4.2	23.3	5.0
	% single-parent households [c]	44.3	26.9	18.8	11.4	42.7	17.1
	% non-Hispanic white [c]	32.1	56.3	69.5	78.0	33.3	71.9
	Mean third grade math test scores [a,b,c,g]	227.9	232.2	235.2	241.2	228.0	237.4
	Mean household income ($) [b,c,h]	59,202	86,535	105,731	165,170	65,746	123,229
	N [i]	2,766	690	1,401	1,273	3,019	3,111

Note. This table presents the mean values of demographic and opportunity indicators used by the Kirwaan Institute for the Study of Race and Ethnicity (2009, indicated by [a]), Knaap (2017, indicated by [b]), and Opportunity Insights (2019c, indicated by [c]). The means are disaggregated by income and poverty categories for municipalities, described in note 6, and census tracts in the New York and New Jersey components of the New York–Newark–Jersey City, NY–NJ–PA, CBSA; the Hartford–West–Hartford–East Hartford CBSA; the Massachusetts component of the Boston–Cambridge–Newton, MA–NH, CBSA; and the Rhode Island component of the Providence–Warwick, RI–MA, CBSA. CBSA definitions are those used in the 2011–2015 American Community Survey (ACS; U.S. Census Bureau, n.d.-a), which, along with Reardon et al. (2018), is the source of the data. Areas (i.e., municipalities and tracts) designated *lower middle-income and below* have a median household income of less than $64,667; *middle-income* areas have a median household income between $64,667 and $74,999; *upper middle-income* areas have a median household income between $75,000 and $99,999; *upper income* areas have a median household income of $100,000 or more; *moderate- to high-poverty* areas have a poverty rate of 10% or more; *low-poverty* areas have a poverty rate under 10%.

[d]Opportunity Insights (2019c) uses employment rate; [e]Knaap (2017) uses the percentage of the population with a high-school diploma or greater; [f]Opportunity Insights (2019c) uses the percentage of the population with a bachelor's degree or greater; [g]the Kirwan Institute (2009) uses a measure of passing math scores; [h]Knaap (2017) uses median income; [i]the numbers of observations indicated in the table pertain to the ACS data; *N* for municipality-level math test scores (by column): 129/100/237/223/141/548; *N* for tract-level math test scores (by column): 2,755/685/1,379/1,248/3,005/3,062.

Our first analysis draws on novel administrative data, detailed in Appendix A (appendices are available online; see supplemental data), to compare BMR housing stock in middle-, upper middle-, and upper income municipalities in the largest CBSA component in each of the four SAHAS states. Notably, this comparison is possible only because Connecticut, Massachusetts, New Jersey, and Rhode Island maintain relatively precise and accessible records concerning deed-restricted BMR units. (By contrast, we were unable to obtain comparable data from New York State.) Although Massachusetts maintains municipal-level counts of BMR units, the Massachusetts Department of Housing and Community Development (MA-DHCD) does not publicly release these counts because of concerns about possible violations of state privacy law.[9] As a result, previous comparisons have used the public data released by MA-DHCD, which combines BMR units with some market-rate rental units in mixed-income projects. To address this limitation, MA-DHCD provided us with counts of deed-restricted BMR

units for municipalities in the Massachusetts component of the Boston CBSA, but masked the identity of individual municipalities by aggregating the data based on the income categories described above.

Our second and third analyses expand the study area to encompass the New York State component of the NYC CBSA (excluding New York City itself). These analyses also shift the level of aggregation from municipalities to census tracts for the middle- to upper-income categories described above, as well as the low-poverty category. For the second analysis, we use logistic regression to model the siting of projects funded via the federal Low-Income Housing Tax Credit program (LIHTC) in low-poverty and middle- to upper-income census tracts from 1987 to 2016, as a function of demographic, economic, and geographic attributes drawn from the 1990 census and the 1992 vintage of the National Land Cover Database. The LIHTC program subsidizes the construction or rehabilitation of rental housing in which at least 20% to 40% of the units are reserved for low-income households, and it also provides funding for the preservation of affordability restrictions. Using the LIHTC data enables us to compare SAHAS states with a non-SAHAS state (New York), which does not publish comprehensive data on deed-restricted BMR units. Our third analysis uses data from the 2011–2015 ACS to compare housing affordability in the sampled census tracts for low-income renter (LIR) households, defined as those with incomes less than $50,000.[10] As discussed below, an effective SAHAS should be associated with a relatively high proportion of LIR households in these tracts, and a relatively low proportion of these LIR households should be rent-burdened (i.e., spend more than 30% of their income on housing).

Although our comparisons improve upon aspects of prior research by Bratt and Vladeck (2014), Cowan (2006), and Graddy and Bostic (2010), there are limitations. As with any nonexperimental research design, there are myriad unmodeled sources of variation. For example, as noted above, we are unable to separately control for inter-state socioeconomic variation. Nor can we control separately for differences in state housing finance programs (Scally, 2009), state policies governing LIHTC allocation (Ellen & Horn, 2018), and state and local laws concerning private landlords' discrimination against voucher holders (Poverty & Race Research Action Council, 2019). Moreover, as noted above, adoption of a SAHAS is clearly not randomly assigned. Thus, our analyses cannot provide causal evidence concerning the effect of a SAHAS on housing stock. Nevertheless, they can provide evidence that is either consistent or inconsistent with prior claims concerning SAHAS efficacy.

Comparing Deed-Restricted BMR Units

Our initial analysis is an apples-to-apples comparison of deed-restricted BMR units in the largest CBSA in each of the four SAHAS states (Connecticut, Massachusetts, New Jersey, and Rhode Island). The analysis essentially provides a snapshot, for the largest CBSA component in each SAHAS state, of the number of housing units legally reserved for households at or below 80% of AMI as of 2016, located in middle- to upper income municipalities outside of the largest central city in the CBSA.[11] Notably, the validity of the comparison depends on the accuracy of the state data. The New Jersey data may exclude some projects, because of possible lapses in reporting during multiyear litigation concerning the criteria for making fair-share determinations (Thaden & Wang, 2017),[12] although some housing advocates contend that New Jersey municipalities added little or no BMR housing during the relevant period (*In re Adoption of N.J.A.C. 5:96 & 5:97*, 110 A.3d 31, 39 (NJ 2015)).

Table 3 indicates the number of total housing units (as of the 2011–2015 ACS), the number of BMR housing units (as of 2016), and the percentage of housing units that are deed-restricted BMR units. The 55 upper income Massachusetts municipalities have 4.70 BMR units per 100 total units, on average, compared with 3.24 in the 132 upper income New Jersey municipalities, 2.60 in the 12 upper income Connecticut municipalities, and 2.52 in the single upper income Rhode Island municipality. The 57 upper middle-income Massachusetts municipalities have, on average, 4.83 BMR units per 100 total units, compared with 2.81 in the 108 upper middle-income New Jersey municipalities, 3.58 in the 26 upper middle-income Connecticut municipalities, and 4.45 in the 14 upper middle-income Rhode Island municipalities. In the middle-income Connecticut, Massachusetts, and Rhode Island municipalities, the percentage of BMR units is at least 5%, whereas only 2.43% of housing stock consists of BMR

Table 3. Total housing stock and deed-restricted BMR housing stock in selected CBSAs.

CBSA component	Income category	Municipalities (N)	Units		
			Total (N)	BMR (N)	BMR (%)
Boston–Cambridge–Newton, MA–NH CBSA (MA portion)					
	(1) Middle	17	183,393 (±1,763)	9,161	5.00 (±0.05)
	(2) Upper middle	57	534,191 (±2,030)	25,794	4.83 (±0.02)
	(3) Upper	55	348,958 (±1,381)	16,411	4.70 (±0.02)
	(1), (2), and (3)	129	1,066,542 (±1,797)	51,366	4.82 (±0.01)
Hartford–West Hartford–East Hartford, CT CBSA					
	(1) Middle	9	55,028 (±781)	3,060	5.56 (±0.08)
	(2) Upper middle	26	181,000 (±1,281)	6,483	3.58 (±0.03)
	(3) Upper	12	58,251 (±602)	1,513	2.60 (±0.03)
	(1), (2), and (3)	47	294,279 (±1,339)	11,056	3.76 (±0.02)
New York–Newark–Jersey City, NY–NJ–PA CBSA (NJ portion)					
	(1) Middle	48	347,111 (±1,661)	8,437	2.43 (±0.01)
	(2) Upper middle	108	711,337 (±2,311)	19,984	2.81 (±0.01)
	(3) Upper	132	614,972 (±1,691)	19,901	3.24 (±0.01)
	(1), (2), and (3)	288	1,673,420 (±2,696)	48,322	2.89 (±0.00)
Providence–Warwick, RI–MA CBSA (RI portion)					
	(1) Middle	9	107,588 (±779)	5,330	4.95 (±0.04)
	(2) Upper middle	14	69,395 (±867)	3,085	4.45 (±0.05)
	(3) Upper	1	6,634 (±205)	167	2.52 (±0.08)
	(1), (2), and (3)	24	183,617 (±1,005)	8,582	4.67 (±0.03)

Note. Total units are measured as of the 2011–2015 American Community Survey (variable B25002) (U.S. Census Bureau, n.d.-a). The 90% confidence level margins of error are derived from the relevant variance replicate estimates tables (see U.S. Census Bureau, 2017). Below-market-rate (BMR) units are measured as of 2016. The BMR statistics for Massachusetts are estimates, and the estimation procedure is described in Appendix A.

units in the middle-income New Jersey municipalities. Notably, the Massachusetts municipalities in all three income categories have similar percentages of BMR housing (4.70–5.00%), whereas there is more variation between income categories in the other three states. The New Jersey municipalities have a significantly lower proportion of BMR housing in each income category than their Massachusetts counterparts do, although the lower reported proportions in New Jersey may be partially attributable to the possible lapses in reporting described above.

In sum, the sampled upper middle-income and upper income Massachusetts municipalities have a higher proportion of BMR units, relative to their counterparts in New Jersey, Connecticut, and Rhode Island. These findings are consistent with prior scholarship describing the Massachusetts SAHAS as a relatively successful means of opening up relatively affluent suburbs of large central cities (Bratt & Vladeck, 2014; Graddy & Bostic, 2010; Reid et al., 2017). Nevertheless, this variation might be attributable to sources other than the SAHAS. For example, if a state provides relatively generous financial subsidies for BMR housing, this could also increase BMR housing production and preservation. Moreover, the timing of SAHAS adoption and the history of implementation vary among the four states, and this variation may account for some observed differences.

Differences among the data sources limit the possible inter-state comparisons. None of the four states surveyed publishes a comprehensive breakdown of BMR units by unit size (e.g., studio, one-bedroom, two-bedroom, etc.), and Connecticut and Massachusetts do not publish the breakdown of BMR units by age restriction, tenure (i.e., rental or ownership), restriction to special-needs populations, or project size. Moreover, the data do not permit more detailed analysis of income limits. For example, it is not possible to conduct inter-state comparisons of the number of units restricted to households with incomes under 80% of AMI. Below, we discuss how state and federal policy could mitigate these limitations.

Comparing the Siting of LIHTC Projects

To compare the four CBSA components in the prior analysis with the New York State component of the NYC CBSA, we analyze the siting of LIHTC projects placed in service between 1987 and 2016,

using the LIHTC database provided by HUD. Examining variation in LIHTC project siting among states helps to assess the plausibility of the claims concerning SAHAS efficacy described above, for two reasons. First, restrictive land use regulations and local opposition to multifamily development can thwart LIHTC projects (Khadduri, 2013). If a SAHAS facilitates new LIHTC development by limiting local regulatory barriers, then we should observe more LIHTC projects in SAHAS states, holding all else equal. Second, LIHTC funding can be used to preserve affordability restrictions on existing units. Notably, municipalities in SAHAS states have an incentive to ensure that such restrictions remain in place, to avoid backsliding vis-à-vis their fair-share obligations. Thus, if LIHTC projects preserve affordability restrictions, that could also indicate the efficacy of a SAHAS. For both reasons, an effective SAHAS should be associated with relatively widespread LIHTC usage.

For the four states included in the preceding analysis, the LIHTC database provides a less comprehensive tally of BMR units than the state-level data summarized above and detailed in Appendix A. This is because all LIHTC projects contain BMR units, but not all BMR units are located in LIHTC projects. In Appendix B, we assess potential sources of bias related to the use of the LIHTC data. That analysis suggests that the LIHTC data serve as a suitable proxy for the siting of BMR housing in relatively urbanized tracts within our samples (i.e., those with a relatively lower proportion of detached single-family homes, a higher proportion of housing connected to a public sewer, and a lower proportion of land covered by wetlands).

We model the siting of LIHTC projects using a dichotomous dependent variable, *project*, that equals 1 if a sampled tract has at least one LIHTC project (new construction, rehabilitation, or preservation), and 0 otherwise. Although this dichotomous measure is arguably cruder than a count of units (or projects), we view it as appropriate, because we expect an effective SAHAS to increase the likelihood of any LIHTC development and preservation in the sampled tracts, for the reasons described above. Moreover, as detailed in Appendix B, duplicates and missing data in the LIHTC database prevent us from accurately measuring the counts of LIHTC projects or BMR units in such projects.

Because our dependent variable is dichotomous, we use logistic regression to model the siting of LIHTC projects as a function of the state where the tract is located, demographic controls measured as of the 1990 census, and geographic attributes. Four dichotomous variables are of interest—*Connecticut, Massachusetts, New Jersey*, and *Rhode Island*—each of which equals 1 if a tract is in the largest CBSA component in the relevant state (outside of the largest city in the CBSA), and 0 otherwise. The coefficients are odds ratios, comparing the odds of having at least one LIHTC project in the average sampled tract in each of the SAHAS states, relative to the average sampled New York State tract. The control variables, described in Table 4 and summarized in Table 5, are socioeconomic and geographical measures commonly used in econometric analysis of land-use regulation and housing supply (e.g., Glaeser & Ward, 2009; Jackson, 2016; Schmidt & Paulsen, 2009). We use the 1990 census data to mitigate simultaneity bias, an issue discussed in greater detail in Appendix B. All of our control variables are percentages, with the exception of the dichotomous public sewer variable, miles to central business district, population, land area, and median household income. We take the natural log of the latter three variables so that the coefficients of these variables can approximate elasticities, and their magnitudes are more comparable with those of the other control variables.[13] Table 6 compares the numbers of sampled tracts, all of which are within 30 miles of the central business district of the largest city in the CBSA, to the number of all tracts in the relevant component of each CBSA within this 30-mile radius.

Table 7 reports the regression results with robust standard errors for middle- to upper-income tracts and low-poverty tracts. For both samples, holding all else equal, LIHTC projects are more likely to be located in the Massachusetts, Connecticut, and Rhode Island tracts than in the New York State tracts. On average, the odds of LIHTC development, rehabilitation, or preservation occurring in the sampled Massachusetts tracts are roughly 2.5 times greater than in the sampled New York State tracts, significant at the 1% level. The average sampled Rhode Island tract has the largest relative odds, ranging from 4.5 to 5.5 times that of the average sampled New York tract, for middle- to upper-income and low-income tracts, respectively, significant at the 1% level. Notably, the relatively small number of

Table 4. Variable definitions and sources for logistic regression models.

Variable	Definition	Source
Project (dichotomous)	= 1 if census tract has at least one LIHTC project	(1)
Population (1990, log)	Natural log of population in 1990	(2)
Land area (log)	Natural log of land area	(2)
Median household income (1990, log)	Natural log of median household income in 1990	(2)
% detached single-family housing (1990)	% of housing units that were detached single-family homes in 1990	(2)
% Hispanic (1990)	% of population identified as Hispanic in 1990	(2)
% Black (1990)	% of population identified as Black in 1990	(2)
% Asian (1990)	% of population identified as Asian in 1990	(2)
% under age 18 (1990)	% of population under 18 in 1990	(2)
% age 65 or older (1990)	% of population age 65 or older in 1990	(2)
% below poverty line (1990)	% of population with income below poverty line in 1990	(2)
% wetlands	% of land covered by wetlands	(3)
Public sewer (dichotomous)	= 1 if over 75% of housing units were connected to a public sewer in 1990	(2)
Miles to central business district	Miles from centroid of census tract to central business district in the CBSA	(2)
Connecticut (dichotomous)	= 1 if census tract is located in the Hartford CBSA (excluding the City of Hartford)	(2)
Massachusetts (dichotomous)	= 1 if census tract is located in the Massachusetts component of the Boston CBSA (excluding the City of Boston)	(2)
New Jersey (dichotomous)	= 1 if census tract is located in the New Jersey component of the NYC CBSA	(2)
Rhode Island (dichotomous)	= 1 if census tract is located in the Rhode Island component of the Providence CBSA (excluding the City of Providence)	(2)

Sources: (1) U.S. Department of Housing and Urban Development (n.d.); (2) U.S. Census Bureau (n.d.-b); (3) U.S. Geological Survey (2000).

Table 5. Summary statistics for logistic regression samples.

	Census tract type											
	Middle- to upper-income						Low-poverty					
Variable	Mean	*SD*	Median	Min	Max	*N*	Mean	*SD*	Median	Min	Max	*N*
Project (dichotomous)	0.14	0.35	0.00	0.00	1.00	1653	0.15	0.35	0.00	0.00	1.00	1885
Population (1990, log)	8.33	0.66	8.42	2.30	9.71	1653	8.31	0.70	8.41	1.79	9.58	1885
Land area (log)	0.36	1.32	0.25	−7.17	4.06	1653	0.24	1.34	0.16	−7.17	4.06	1885
Median household income (1990, log)	10.86	0.26	10.82	10.49	11.92	1653	10.80	0.31	10.77	8.59	11.92	1885
% detached single-family housing (1990)	67.44	26.12	73.52	0.00	100.00	1653	62.90	28.31	68.73	0.00	100.00	1885
% Black (1990)	5.37	14.12	0.98	0.00	100.00	1653	5.28	13.35	1.06	0.00	100.00	1885
% Asian (1990)	3.38	4.82	2.32	0.00	100.00	1653	3.32	4.68	2.28	0.00	100.00	1885
% under age 18 (1990)	21.39	4.66	21.65	0.00	57.78	1653	21.12	4.81	21.38	0.00	57.78	1885
% age 65 or older (1990)	13.71	5.00	13.58	0.00	54.93	1653	14.08	5.44	13.94	0.00	100.00	1885
% below poverty line (1990)	3.66	3.14	3.00	0.00	51.95	1653	3.81	2.38	3.29	0.00	9.99	1885
% wetlands	4.37	6.47	2.19	0.00	62.22	1653	4.32	6.37	2.2	0.00	62.22	1885
Public sewer (dichotomous)	0.78	0.41	1.00	0.00	1.00	1653	0.80	0.40	1.00	0.00	1.00	1885
Miles to central business district	16.78	7.19	16.86	1.83	29.96	1653	16.08	7.35	15.93	0.91	29.96	1885
Connecticut (dichotomous)	0.11	0.31	0.00	0.00	1.00	1653	0.11	0.31	0.00	0.00	1.00	1885
Massachusetts (dichotomous)	0.25	0.43	0.00	0.00	1.00	1653	0.25	0.43	0.00	0.00	1.00	1885
New Jersey (dichotomous)	0.34	0.47	0.00	0.00	1.00	1653	0.34	0.47	0.00	0.00	1.00	1885
Rhode Island (dichotomous)	0.05	0.21	0.00	0.00	1.00	1653	0.07	0.25	0.00	0.00	1.00	1885

Note. SD = standard deviation. Middle- to upper-income tracts are defined as census tracts with a median household income at or above 120% of the U.S. median income as of the 1990 census. Low-poverty tracts are defined as census tracts with fewer than 10% of households below the poverty threshold, measured as of the 1990 census. Both samples are restricted to tracts located within 30 miles of the central business district of the largest city in each CBSA. All tracts in the largest city in each CBSA are excluded from both samples.

Sources: U.S. Department of Housing and Urban Development (n.d.); U.S. Census Bureau (n.d.-b); U.S. Geological Survey (2000).

sampled tracts in Rhode Island, indicated in Table 6, suggests that these magnitudes should be interpreted cautiously. In the average low-poverty Connecticut tract, the odds of a LIHTC project are

Table 6. Tabulation of census tracts sampled for logistic regression, by CBSA component.

	Tract type		
	All	Middle- to upper-income	Low-poverty
Boston CBSA (Massachusetts component)	608	405	471
Hartford, Connecticut CBSA	232	181	210
NYC CBSA (New Jersey component)	1,015	557	642
Providence CBSA (Rhode Island component)	178	78	131
NYC CBSA (New York State component)	498	432	431
Total	2,531	1,653	1,885

Note. Middle- to upper-income tracts are defined as census tracts with a median household income at or above 120% of the U.S. median income as of the 1990 census. Low-poverty tracts are defined as census tracts with fewer than 10% of households below the poverty threshold, measured as of the 1990 census. The sample is restricted to tracts located within 30 miles of the central business district of the largest city in each CBSA. All tracts in the largest city in each CBSA are excluded from the sample.
Sources: U.S. Census Bureau (n.d.-b).

Table 7. Regression results for LIHTC projects in sampled census tracts.

	Tract type	
	Middle- to upper-income	Low-poverty
	Odds ratios	Odds ratios
Connecticut (dichotomous)	2.124*	2.588***
	(0.855)	(0.930)
Massachusetts (dichotomous)	2.539***	2.492***
	(0.717)	(0.671)
New Jersey (dichotomous)	0.834	0.862
	(0.207)	(0.204)
Rhode Island (dichotomous)	4.502***	5.525***
	(2.265)	(2.237)
Population (1990, log)	1.371	1.339*
	(0.276)	(0.231)
Land area (log)	1.433***	1.467***
	(0.185)	(0.162)
Median household income (1990, log)	0.995	1.371
	(0.414)	(0.517)
% detached single-family housing (1990)	0.973***	0.975***
	(0.004)	(0.004)
% Black (1990)	1.020***	1.023***
	(0.005)	(0.005)
% Asian (1990)	1.066***	1.063***
	(0.022)	(0.019)
% under age 18 (1990)	1.079***	1.053***
	(0.026)	(0.020)
% age 65 or older (1990)	1.052***	1.065***
	(0.019)	(0.016)
% below poverty line (1990)	1.025	1.043
	(0.026)	(0.042)
% wetlands	0.998	0.996
	(0.015)	(0.013)
Public sewer (dichotomous)	1.621*	1.501
	(0.447)	(0.376)
Miles to central business district	1.031**	1.047***
	(0.015)	(0.014)
N	1653	1885

Note. Robust standard errors are given in parentheses.
This table displays the results of a logistic regression modeling the location of Low-Income Housing Tax Credit (LIHTC) projects in two types of census tracts: middle- to upper-income census tracts (i.e., those with a median household income of at least 120% of the national median as of the 1990 census), and low-poverty census tracts (i.e., those with fewer than 10% of households with incomes below the poverty threshold as of the 1990 census). The dependent variable equals 1 if a LIHTC project was located in a tract, and is 0 otherwise. The reference category for the four state-level dichotomous variables is the New York State part of the NYC CBSA (excluding the City of New York).
*$p < .10$. **$p < .05$. ***$p < .01$.
Sources: U.S. Department of Housing and Urban Development (n.d.); U.S. Census Bureau (n.d.-b); U.S. Geological Survey (2000).

2.6 times greater than in the average sampled New York tract, significant at the 1% level. For middle- to upper income Connecticut tracts, the odds ratio is 2.1, significant at the 10% level. The odds of LIHTC development, rehabilitation, or preservation occurring in the sampled New Jersey tracts are not different than those in the sampled New York tracts at conventional levels of statistical significance. The odds ratios for the control variables are generally consistent between the two samples.

Overall, our analysis of the spatial pattern of LIHTC development and preservation in the sampled census tracts suggests that three SAHAS states—Connecticut, Massachusetts, and Rhode Island—may be more effective at increasing opportunities for low-income households to live in middle- to upper income tracts and low-poverty tracts, relative to New York State. We observe no difference between New Jersey and New York, a finding consistent with evidence that New Jersey's SAHAS primarily resulted in the production of condominiums, rather than multifamily rental units (Kirp, Dwyer, & Rosenthal, 1995; see also, Marantz & Zheng, 2018).

Comparing Housing Affordability for Low-Income Renters

Using 2011–2015 ACS data for each of four categories defined above (middle-income, upper middle income, upper income, and low-poverty), we identify the total number of households, the number of LIR households (i.e., those with incomes under $50,000), and the number of *non-rent-burdened low-income renter* (NRBLIR) households (i.e., LIR households spending 30% or less of their income on housing costs). We posit that an effective SAHAS should be associated with a larger proportion of NRBLIRs (relative to total households) in the sampled tracts. This claim hinges on the assumption that LIR households in the sampled tracts generally will be rent burdened in the absence of housing subsidies, of which there are two basic forms—tenant-based subsidies and project-based subsidies. Tenant-based subsidies are assigned to individual households and often take the form of vouchers, which can fund the difference between 30% of household income and the rent for a unit, up to an administratively determined maximum (Reina, Acolin, & Bostic, 2019). Project-based subsidies, which attach to particular units in subsidized projects (as distinguished from particular households), entail legal restrictions that establish rents for covered units at a level affordable to households earning a maximum percentage (e.g., 80%) of an administratively determined AMI.

A SAHAS, if effective, should increase the stock of BMR units (i.e., units receiving project-based subsidies), which should in turn increase opportunities for households receiving tenant-based subsidies (i.e., voucher holders). As noted above, a SAHAS could increase the stock of BMR units through at least two channels. First, a SAHAS can facilitate land-use approvals for both mixed-income projects and projects consisting exclusively of BMR units. Second, in mixed-income projects associated with a SAHAS, the cross-subsidization of BMR units by market-rate units serves as a form of project-based assistance.

If a SAHAS increases the stock of BMR units in middle- to upper-income and low-poverty tracts, then it could also increase the usage of vouchers in such tracts. During the 2011–2015 period covered by our analysis, the maximum rent that vouchers would cover was significantly lower than market-rate rents in many middle- to upper income and low-poverty areas (Reina et al., 2019).[14] In these areas, a larger stock of BMR units would have increased the housing options for voucher holders. For example, a household with an income equal to 50% of AMI could be a NRBLIR in a unit with a rent set at 30% of 80% of AMI, if it had a voucher covering the difference between 30% of 50% of AMI and 30% of 80% of AMI. Thus, vouchers may be part of the mechanism through which a SAHAS increases opportunities for NRBLIR households in middle- to upper income and low-poverty areas, rather than a confounder of the effect of a SAHAS.

Although we cannot empirically identify the effects of individual components of this mechanism, we can assess whether the outcomes are consistent or inconsistent with prior accounts concerning SAHAS efficacy. As above, we compare the largest CBSA component in each SAHAS state with the New York State component of the NYC CBSA. We divide our sample into middle-income tracts, upper

middle-income tracts, upper income tracts, and low-poverty tracts, as defined above, excluding tracts within the largest city in each CBSA.

We first conduct simple analyses using two-proportion *z* tests. Across CBSA components, for each category of tracts, we compare LIR households as a proportion of total households. We also compare NRBLIR households as a proportion of total households. For both sets of comparisons, we calculate 90%, 95%, and 99% confidence intervals using the methodology prescribed by the U.S. Census Bureau (2008). Two proportions are different at a given level of statistical significance (10%, 5%, or 1%) if the relevant confidence intervals do not overlap.

Because these comparisons account for only two sources of tract-level heterogeneity (income category and CBSA component), we also run regression models, enabling us to account for additional differences among tracts, such as demographic composition and distance from the largest central city in the CBSA. Two-stage zero-inflated negative binomial (ZINB) regression models are appropriate in this case, for three reasons. First, the dependent variables are counts of NRBLIR households, and ZINB models can be used for count outcomes. Second, different processes may determine whether a tract has any NRBLIR households, and the number of NRBLIR households in tracts with at least one such household. The logistic stage of a ZINB model predicts excess zeros (i.e., more observed zeros than predicted by a negative binomial density). For example, in this case, excess zeros might occur if local governments have the legal authority to completely prohibit BMR housing. The negative binomial stage of the ZINB model predicts the number of NRBLIR households in tracts that accommodate any such households. Third, within each region, the variances of the counts of NRBLIR households are higher than the means, suggesting that the distribution is overdispersed. We test model fit by comparing alternative count models accounting for the presence of excess zeros and/or overdispersion, including zero-inflated Poisson and negative binomial regression models.[15] The ZINB models have smaller Akaike information criterion and Bayesian information criterion statistics, suggesting that ZINB regression models are the most appropriate.

Table 8, which reports the *z* tests, indicates that both the proportion of LIR households in the sampled tracts and the rent burdens of these households vary between states with a SAHAS and New York State, as well as across the four SAHAS states. Across categories (i.e., middle-income, upper middle income, upper income, and low-poverty), the proportion of LIR households in the sampled Massachusetts tracts is generally higher than the comparable proportion in the sampled New York State tracts, and the proportion of NRBLIRs is consistently higher in the sampled Massachusetts tracts. For example, 6.4% (±0.3%) of households in the Massachusetts upper income tracts are LIRs, compared with 3.8% (±0.2%) in the New York State upper income tracts (see Table 8, row 13).[16] Moreover, the proportion of NRBLIRs, relative to all households, is roughly 2–3 times higher in the Massachusetts upper income tracts compared with the New York State upper income tracts (i.e., 1.4%, ±0.2% in Massachusetts vs. 0.5%, ±0.1% in New York State; see Table 8, row 15).

The results for the other three SAHAS states are less consistent across samples. Middle-income, upper middle-income, and low-poverty tracts in Rhode Island have higher proportions of NRBLIRs, compared with the New York State tracts. But this is not the case for upper income Rhode Island tracts. (Notably, the number of upper income tracts in Rhode Island is low in both absolute terms and as a proportion of middle- to upper-income tracts, relative to the other states.) The differences between New York and Connecticut are less pronounced. There is no significant difference between New York and New Jersey in the middle-, upper middle, and upper income samples, and the difference between New York and New Jersey in the low-poverty sample is statistically significant (at the 5% level), but substantively small.

Table 9 reports the ZINB models, which are consistent with the comparisons presented in Table 8. For example, the odds of an upper income tract in the Massachusetts portion of the Boston CBSA being an excess zero are 66.0% lower than those of upper income tracts in the New York State portion of the NYC CBSA, significant at the 1% level (see Table 9, column c). (We exclude the Providence CBSA from this model specification, because of its small number of upper income tracts.) The negative binomial portion of the model indicates that, controlling for other variables, the upper

Table 8. Proportion of low-income renter households without rent burdens, by tract type and CBSA component.

		New York–Newark–Jersey City, NY–NJ–PA CBSA (NY part)	Hartford–West Hartford–East Hartford, CT CBSA	Boston–Cambridge–Newton, MA–NH CBSA (MA part)	New York–Newark–Jersey City, NY–NJ–PA CBSA (NJ part)	Providence–Warwick, RI–MA CBSA (RI part)
Middle-income tracts	(1) Total households (owners + renters)	161,830	70,555	185,786	261,140	52,640
	(2) Low-income renter (LIR) households	28,719	11,125	34,075	44,769	7,677
	(3) As % of total households	17.7%	15.8%*	18.3%	17.1%	14.6%***
	(4) LIR households spending ≤30% of income on housing	4,074	2,443	7,367	5,277	2,071
	(5) As % of total households	2.5%	3.5%*	4.0%***	2.0%	3.9%**
Upper middle-income tracts	(6) Total households (owners + renters)	565,263	149,887	443,398	557,796	90,164
	(7) Low-income renter (LIR) households	54,880	13,227	53,725	57,143	8,090
	(8) As % of total households	9.7%	8.8%*	12.1%***	10.2%	9.0%
	(9) LIR households spending ≤30% of income on housing	6,412	2,900	11,161	7,388	2,335
	(10) As % of total households	1.1%	1.9%**	2.5%***	1.3%	2.6%***
Upper income tracts	(11) Total households (owners + renters)	603,191	87,269	348,560	679,898	12,668
	(12) Low-income renter (LIR) households	23,214	2,995	22,377	34,307	326
	(13) As % of total households	3.8%	3.4%	6.4%***	5.0%***	2.6%
	(14) LIR households spending ≤30% of income on housing	2,732	477	4,823	4,756	7
	(15) As % of total households	0.5%	0.5%	1.4%***	0.7%	0.1%
Low-poverty tracts	(16) Total households (owners + renters)	1,249,432	310,696	924,766	1,517,242	190,053
	(17) Low-income renter (LIR) households	99,759	28,086	101,372	142,313	24,952
	(18) As % of total households	8.0%	9.0%***	11.0%***	9.4%***	13.1%***
	(19) LIR households spending ≤30% of income on housing	12,268	6,387	22,371	18,368	7,051
	(20) As % of total households	1.0%	2.1%***	2.4%***	1.2%**	3.7%***

Note. This table compares characteristics of selected types of census tracts, defined below, across CBSA components (each excluding the most populous city in the CBSA). CBSA definitions are those used in the 2011–2015 American Community Survey (U.S. Census Bureau, n.d.-a), which is the source of the data. *Middle-income tracts* have a median household income between $64,667 and $74,999; *upper middle-income tracts* have a median household income between $75,000 and $99,999; *upper income tracts* have a median household income of $100,000 or more; *low-poverty tracts* have fewer than 10% of households below the poverty threshold. Low-income households have incomes under $50,000. For each tract type, two-proportion *z* tests identify differences in proportions relative to the New York State tracts.

*$p < .1$. **$p < .05$. ***$p < .01$.

Table 9. Zero-inflated negative binomial regression models predicting non-rent-burdened low-income renter households.

	(a) Middle income		(b) Upper middle income		(c) Upper income		(d) Low poverty	
	Odds ratio	IRR	Odds ratio	IRR	Odds ratio	IRR	Odds ratio	IRR
Hartford–West Hartford– East Hartford, CT CBSA	0.689	1.480**	0.703	1.403**	0.862	1.007	0.480***	1.704***
	(0.400)	(0.231)	(0.199)	(0.188)	(0.300)	(0.202)	(0.090)	(0.163)
Boston–Cambridge-Newton, MA–NH CBSA (MA part)	0.267**	1.314**	0.513***	1.428***	0.340***	1.613***	0.278***	1.717***
	(0.160)	(0.178)	(0.132)	(0.167)	(0.084)	(0.259)	(0.047)	(0.135)
New York–Newark-Jersey City, NY–NJ–PA CBSA (NJ part)	0.827	0.811*	0.759	0.908	0.862	1.234	0.684***	1.086
	(0.317)	(0.102)	(0.147)	(0.094)	(0.157)	(0.158)	(0.083)	(0.075)
Providence–Warwick, RI– MA CBSA (RI part)	0.000***	1.515**	0.351**	1.615***	-	-	0.113***	2.664***
	(0.000)	(0.304)	(0.167)	(0.280)			(0.036)	(0.274)
Total households (log)	0.799	2.778***	0.596***	2.519***	0.405***	3.502***	0.465***	2.761***
	(0.390)	(0.361)	(0.119)	(0.244)	(0.099)	(0.481)	(0.064)	(0.202)
Land area (sq. mi., log)	0.996	0.934	0.874	0.930*	0.939	0.957	1.058	0.931**
	(0.178)	(0.051)	(0.074)	(0.036)	(0.089)	(0.060)	(0.060)	(0.026)
% Black or African American	0.990	0.999	0.994	1.004	1.001	1.018**	0.987**	1.008***
	(0.010)	(0.003)	(0.007)	(0.003)	(0.009)	(0.008)	(0.005)	(0.002)
% Asian	1.041***	0.991*	1.013	0.996	1.030***	1.006	1.038***	0.996
	(0.016)	(0.005)	(0.010)	(0.004)	(0.009)	(0.006)	(0.007)	(0.004)
% single-family detached housing	1.027***	0.993***	1.024***	0.993***	1.028***	0.996	1.036***	0.989***
	(0.009)	(0.002)	(0.004)	(0.002)	(0.005)	(0.003)	(0.003)	(0.001)
% 65+	0.949**	0.985**	0.991	1.014**	0.983	1.025**	0.992	1.002
	(0.025)	(0.007)	(0.014)	(0.007)	(0.015)	(0.011)	(0.009)	(0.005)
Miles to central business district	1.006	0.999	1.012*	0.999	1.005	1.004	0.993*	1.006***
	(0.012)	(0.004)	(0.007)	(0.003)	(0.008)	(0.006)	(0.004)	(0.002)
N	413		1,037		1,047		2,443	
Likelihood-ratio test of α = 0	0.526***		0.557***		0.588***		0.588***	

Note. The dependent variable is the number of non-rent-burdened low-income renter (NRBLIR) households in a tract. The logistic component predicts excess zeros, with coefficients in the form of odds ratios, and the negative binomial component predicts the number of NRBLIR households, with coefficients in the form of incidence-rate ratios. The reference category consists of sampled tracts in the New York State component of the NYC CBSA.

Robust standard errors are given in parentheses. The results of the likelihood-ratio test of alpha = 0 suggest that a zero-inflated negative binomial model is preferable to a zero-inflated Poisson model.

*$p < .10$. **$p < .05$. ***$p < .01$.

income Boston-area tracts are expected to have 61.3% more NRBLIR households compared with their New York State counterparts in the NYC CBSA, also significant at the 1% level. The coefficients on the control variables generally consistent with expectations. For example, in all model specifications, a higher proportion of detached single-family dwellings is associated with higher odds of being an excess zero tract (i.e., not accommodating any NRBLIR households). Controlling for land area, the total number of households is positively associated with the number of NRBLIR households, indicating that denser tracts accommodate larger numbers of NRBLIRs. Notably, distance from the largest central city does not appear to be an important determinant of either excess zeroes or the number of NRBLIR households.[17]

Connecting Variation in SAHAS Design to Variation in Housing Outcomes

Our analyses indicate that the Massachusetts SAHAS is associated with improved BMR housing outcomes, relative to Connecticut, New Jersey, and New York State. Outcomes in Rhode Island are somewhat similar to those in Massachusetts, and—notably—the Rhode Island SAHAS is closely modeled on the Massachusetts version. Although our empirical analysis does not enable us to determine the causes of the observed variation, commentators have identified at least five salient features of the Massachusetts SAHAS that, in combination with a strong housing market in the Massachusetts component of the Boston CBSA, distinguish Massachusetts from the other three SAHAS states.

First, as noted above, developers can request a comprehensive permit for qualifying projects from the local zoning commission. Condominium and rental projects can qualify if at least 25% of the units are affordable at 80% of AMI, and rental projects can also qualify if at least 20% of the units are affordable at 50% of AMI.[18] The comprehensive permit consolidates all local approvals, and it enables the local commission to waive zoning requirements, potentially expediting development of BMR and mixed-income housing (Reid et al., 2017). (Rhode Island also authorizes comprehensive permits for qualifying projects, but Connecticut and New Jersey do not.)

Second, the Massachusetts fair-share standard is clear and consistent, particularly in comparison with New Jersey's standard (Bratt & Vladeck, 2014; Graddy & Bostic, 2010). As discussed above, a municipality satisfies the Massachusetts fair-share standard, and thereby immunizes itself from the builder's remedy, if 10% of its year-round housing stock consists of deed-restricted BMR units and market-rate rental units in projects where 20% to 25% of the units are deed-restricted BMR units.[19] In New Jersey, by contrast, fair-share determinations for each municipality have been made on an individualized basis, according to a complicated formula. This procedure has resulted in extensive bureaucratic wrangling and litigation over the adequacy of both the determinations of municipal fair shares and the underlying methodologies, hampering BMR housing development (Mallach, 2011).[20]

Third, Massachusetts municipalities can gain immunity from the builder's remedy for 1–2 years by actively planning for BMR housing and adding BMR units. To qualify for such a temporary moratorium, a municipality must obtain state approval for a housing production plan and increase the number of qualifying housing units during a single year, either by 0.5% (for a 1-year moratorium) or by 1% (for a 2-year moratorium; 760 Code Mass. Regs. 56.03(4)(f)). The temporary moratorium rewards municipalities that plan for BMR housing and ensure that such housing is actually built, but it does not reward planning that does not yield results.

Fourth, mixed-income projects qualifying for the Massachusetts SAHAS can yield profits for developers. In part, this is because Massachusetts does not require such projects to include units affordable to households with incomes below 80% of AMI. Connecticut, by comparison, requires qualifying mixed-income projects to include units affordable at lower income thresholds, and the additional costs may deter developers from building mixed-income housing (Carroll, 2001; Tondro, 2001). As noted above, data limitations preclude inter-state comparisons concerning the number of units restricted to households with incomes under 80% of AMI.

Fifth, Massachusetts provides for state-level administrative review of local comprehensive permit decisions, instead of judicial review. The state administrative board has the power to direct the local zoning commission to issue a comprehensive permit. If a municipality does not satisfy the 10% threshold or qualify for a temporary moratorium, then the administrative board applies criteria that strongly favor the developer. Administrative review, as distinguished from judicial review, might help to expedite adjudication and increase predictability, particularly if the members of the review board have substantial subject-matter expertise and lengthy terms of service, as has been the case in Massachusetts (Bratt & Vladeck, 2014; Reid et al., 2017).

Conclusion

The above analyses are consistent with prior claims that a SAHAS can be effective, and that the Massachusetts SAHAS has been particularly effective in opening middle- to upper-income and low-poverty areas to low-income households. The sampled upper middle- and upper income Massachusetts municipalities have a higher proportion of BMR housing units than do their counterparts in other SAHAS states. Middle- to upper-income and low-poverty tracts in the sampled Massachusetts, Connecticut, and Rhode Island municipalities are more likely to accommodate at least one LIHTC project, compared with their sampled counterparts in New York State or New Jersey. The sampled Massachusetts tracts also have a higher proportion of NRBLIRs, compared with the sampled New York State tracts. These comparisons hold for all sampled tract types in Massachusetts, but they hold for only some types of sampled tracts in Connecticut and Rhode Island. In general, the sampled New Jersey and New York State tracts were indistinguishable with respect to NRBLIRs, a finding consistent with prior critiques of the New Jersey SAHAS (e.g., Bratt & Vladeck, 2014; Graddy & Bostic, 2010).

Although our analysis does not demonstrate that the Massachusetts SAHAS caused variation in housing outcomes, prior scholarship suggests several possible causal mechanisms related to the Massachusetts SAHAS. As discussed above, any impacts of the Massachusetts system may have resulted from some combination of the strong housing market in the Boston area, the consolidation of the permit review process, the relative simplicity of the state's fair-share requirement, the potential for developer profits based on the requirements for qualifying mixed-income projects, and the expeditious and consistent administrative review of appeals. In addition, the 2-year moratorium allowed by Massachusetts may give municipalities latitude to plan, while maintaining pressure on municipalities to accommodate qualifying projects.

Notably, our analysis does not address possible connections between a SAHAS and market-rate development. As discussed above, a SAHAS could increase housing options for a relatively underserved segment of the population—middle-market renters with incomes slightly above the eligibility threshold for BMR units (Goodman, 1999). Middle-market rental housing often does not require financial subsidies, but it does require local land-use approvals that may be difficult for developers to secure in the absence of a SAHAS. The impact of a SAHAS on middle-market rental housing merits further attention.

Furthermore, we do not assess variation in central city housing affordability. The SAHAS model was initially intended to promote housing affordability in the suburbs during an era of residential decentralization, but employment accessibility has since become an increasingly important driver of housing costs (Edlund, Machado, & Sviatschi, 2015). A SAHAS may not be well suited to mitigating problems of housing affordability in central cities, which—in our study area—have sufficiently high proportions of BMR units to attain exemption.[21] This topic also merits scholarly attention.

Future analysis should also assess interstate variation in unit size, age restrictions, restriction to special-needs populations, project sizes, and income limits. Such analyses would require better data, and state and federal housing officials are well positioned to develop regional or national standards for data collection concerning BMR housing stock (Lewis & Marantz, 2019). The federal Fair Housing Act requires federal agencies to administer housing and urban development programs "in a manner affirmatively to further" fair housing (42 U.S.C. 3608(d)). HUD could partially fulfill this obligation by

providing grants or incentives to improve the collection of data concerning deed-restricted BMR units. Collecting such data consistently over time would facilitate the kind of longitudinal multilevel modeling necessary to identify the effects of policy interventions.

In sum, we find evidence consistent with prior scholarship indicating that in strong housing markets, a SAHAS can serve as an important regulatory lever for the development and preservation of BMR housing outside of large central cities. Our findings also suggest that variation in SAHAS design may be important, although—as noted above—other sources of variation may explain the outcomes that we observe. Our results are consistent with claims that, in areas where stringent land-use regulation limits multifamily housing generally—and BMR housing in particular—builders' remedies, bright-line rules, comprehensive permitting, burden-shifting regimes, and expedited adjudication may help to overcome local regulatory barriers to BMR and mixed-income housing projects. Nevertheless, the limitations described above point to the importance of improved data collection, which could facilitate research more conclusively identifying the impacts of state intervention in local land-use regulation on housing affordability.

Notes

1. Rental projects reserving 20% of units for households at or below 50% of AMI can also qualify for the Massachusetts SAHAS (*Stuborn Ltd. P'ship v. Barnstable Bd. of App.*, Decision of Jurisdiction, No. 98–01, at 9 n. 7, Mass. Hous. App. Comm., March 5, 1999).
2. For example, Pennsylvania courts have provided a builder's remedy when local governments prohibit a given type of development (e.g., apartments), but Pennsylvania does not base fair-share requirements on BMR housing stock and does not restrict the builder's remedy to projects including BMR units (Rowan, 2007). In Illinois, the builder's remedy is available to developers of BMR housing, but such developers bear the burden of proving that a "proposed affordable housing development (i) has been unfairly denied or (ii) has had unreasonable conditions placed upon it by the decision of the local government" (310 Ill. Stat, ch. 310, §67/30(c)).
3. The developer of a qualifying project must be a "public agency or limited dividend or nonprofit organization" (Mass. Gen. L., ch. 40B, sec. 21). A private for-profit developer can create a limited dividend organization by agreeing to comply with regulatory requirements limiting the developer's profits to "a reasonable return for building and operating the [p]roject" (Massachusetts Department of Housing and Community Development, 2014, p. I-2). Any profits over this limit are to be remitted to the municipality where the project is located, "for the purpose of developing and/or preserving Affordable Housing" (Massachusetts Department of Housing and Community Development, 2014, p. IV-10).
4. Year-round housing stock is measured as of the most recent decennial census. Even if a municipality has not attained the 10% fair-share threshold, it will be exempt from the SAHAS if "low or moderate income housing exists…on sites comprising one and one half per cent or more of the total land area zoned for residential, commercial or industrial use" (Mass. Gen. L., ch. 40B, sec. 20). As of 2015, only one municipality qualified for exemption based on the latter provision (Bobrowski, 2016, sec. 18.07[C][1]), whereas 47 municipalities qualified for exemption based on the 10% fair-share threshold.
5. Units contributing to the Massachusetts fair-share requirement can generally be counted toward that requirement as soon as they are permitted. If a unit does not receive a building permit and a certificate of occupancy within a period of time prescribed by regulation, then it will cease to contribute toward the 10% fair-share threshold (760 Code Mass. Regs. 56.03(2)(c)).
6. We define municipalities as general-purpose local governments, other than counties. All territory within our study area is covered by municipalities thus defined. Municipalities are typically coextensive with one (or, in some cases, both) of two geographic areas used for tabulation in the decennial census and the ACS: Places and County Subdivisions (U.S. Census Bureau, 1994, Chapters 8–9). Each municipality in the Connecticut, Massachusetts, New Jersey, and Rhode Island components of our study area is coterminous with a single county subdivision. The situation is somewhat more complicated in New York State (NYS), which has three types of municipalities satisfying our definition: towns, cities, and villages (New York State Department of State, Division of Local Government Services, 2018). Most of these villages are geographically subsidiary to a single town, although some straddle parts of multiple towns, and all towns in the NYS component of our study area include territory that is not covered by a village. All towns and cities in the NYS component of our study area are coterminous with a single county subdivision, with the exception of New York City, which is divided into five county subdivisions. The place-level data for New York City provides a citywide tabulation, and we use it in lieu of the five relevant county subdivisions for calculating the municipal statistics in Table 2. The NYS villages in our study area are represented as places (and

not as county subdivisions) in the decennial census and ACS. These villages are not independently included in the municipal statistics in Table 2, because they are covered by the town-level (i.e., county subdivision) tabulations.

7. The test scores are converted from the school district level to the tract level and the municipality level based on the method described by Opportunity Insights (2019a). For the district-to-tract conversion, we use the applicable crosswalk from the 2014 School District Geographic Reference Files (GRFs) published by the U.S. Department of Education's National Center for Education Statistics. For the district-to-municipality conversion, we use the district-to-block group crosswalk from the 2014 GRFs, and then proportionately aggregate the block group data to municipalities, as defined in note 6, based on land area. For each type of geography (tracts, block groups, and municipalities), we treat the geography as missing if 2013 third-grade math test score data are unavailable for districts covering more than 25% of its land area.
8. All such central cities would, in any case, be excluded from the municipal-level BMR housing analysis in Table 3, because of median household incomes below $64,667. Newark, the largest city in the New Jersey component of the New York–Newark–Jersey City, NY–NJ–PA, CBSA, is excluded from the analysis in Table 3 on the latter basis. Boston, Hartford, New York City, and Providence are also excluded from the tract-level regression models. Although middle-income, upper middle-income, upper income, and low-poverty tracts in Newark are included in the regression models, there are few such tracts, and the results are robust to their exclusion.
9. Telephone communication with Margaux LeClair, Counsel/Fair Housing Specialist, MA-DHCD, May 18, 2018.
10. We selected this cut point because it most closely aligns the income categories for the ACS housing cost burden data with 80% of median household income for our study area as of the 2011–2015 ACS. State housing agencies typically use income limits developed by HUD in determining eligibility for housing assistance. HUD sets the low-income limits at 80% of the median income for a given Fair Market Rent (FMR) area, typically consisting of one or more counties (42 U.S.C §1437(b)(2)(A)). The median household income in our study area is approximately $68,000 (estimated via Pareto interpolation), and 80% of $68,000 is $54,400. To align the analysis with the household income categories in the ACS rent burden tables (e.g., $35,000 to $49,999; $50,000 to $74,999; etc.), we classify households with incomes under $50,000 as low-income.
11. The Connecticut, New Jersey, and Rhode Island data are current as of 2016. The Massachusetts data are current as of 2018, and we use a procedure described in Appendix A to estimate the number of BMR units as of 2016. In general, the relevant area for determining AMI is the applicable FMR area, described in note 10. Connecticut, however, compares FMR area median income with the state median income, and uses the lower of the two values (Conn. Gen. Stat., §8–30g(a)(7) (West, 2018)).
12. When the New Jersey Supreme Court established the basic parameters of the New Jersey SAHAS in 1983, it vested responsibility for administration in the courts. Legislation adopted in 1985 shifted responsibility to a state administrative agency, but this agency did not fulfill its obligations, and the courts resumed responsibility for administration in 2015. This history is recounted in two decisions by the state supreme court, *In re Adoption of N.J.A.C. 5:96*, 74 A.3d 893 (NJ, 2013; tracing the history from 1983 to 2013), and *In re Adoption of N.J.A.C. 5:96 & 5:97*, 110 A.3d 31 (NJ, 2015; extending the history to 2015).
13. Using the unlogged values for these three variables does not substantively affect the models.
14. HUD's Small Area Fair Market Rent (SAFMR) program is intended to mitigate precisely this problem, by increasing the maximum allowable rent in high-cost areas (Reina et al., 2019). A demonstration SAFMR program ran from October 2012 through September 2016 in six areas across the United States, including one town in our study area (Mamaroneck, NY). The results shown in Tables 8 and 9 are robust to the exclusion of the five tracts in Mamaroneck.
15. Following Wilson (2015), we do not use the Vuong test to assess model fit.
16. All margins of error reported in the text are at the 90% confidence level.
17. Distance to central city is weakly to moderately correlated with other variables, such as the percentage of housing units that are detached single-family dwellings ($0.27 < \rho < 0.46$), the log of land area ($0.43 < \rho < 0.55$), and the log of total households ($-0.17 < \rho < -0.10$).
18. Qualifying projects must also be subject to an Affirmative Fair Marketing Plan, and they must be eligible for a subsidy from a public agency, which must submit a site approval letter or a letter of interest (Bobrowski, 2016, secs. 18.04[B], 18.04[C]; Mass. Gen. L., ch. 40B, sec. 20; 760 Code Mass. Regs. 56.02). The subsidy requirement enables state agencies to monitor project proposals and impose conditions, but the dollar value of subsidies for many mixed-income projects is minimal (Forton, 2001, pp. 668–676).
19. See notes 1, 3, and 4, and the accompanying text.
20. The administrative history of the New Jersey SAHAS through 2015 is recounted in the two decisions cited in note 12.
21. As of 2017, 38.35% of the housing stock in the City of Hartford satisfied the state's fair-share criteria, compared with a median of 5.17% in the remaining 56 municipalities in the Hartford CBSA; 19% of the housing stock in the City of Boston satisfied the state's fair-share criteria, compared with a median of 7.5% in the remaining 166 municipalities in the Massachusetts component of the Boston CBSA (including qualifying market-rate rental units, as discussed in the text); and 14.95% of the housing stock in the City of Providence satisfied the state's fair-share criteria, compared with a median of 5.40% in the remaining 38 municipalities in the Rhode Island component of the Providence CBSA.

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Disclosure Statement

No potential conflict of interest was reported by the authors.

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