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Does the Likely Demographics of Affordable Housing Justify NIMBYism?

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ABSTRACT

NIMBYism (not in my backyard) decreases the amount of affordable housing construction. A possible motivator for this is an existing homeowner's fear that proximity to affordable housing depresses property value. Using a hedonic regression analysis of the sales prices of homes in Sacramento County, California, this study finds that increases in the demographic characteristics in a census tract that are likely to increase if more affordable housing is built there lower the sales price of a home. This finding holds even after controlling for the percentages of racial/ethnic groups more likely to face discrimination. Policymakers should recognize this economic element of NIMBYism as they consider instruments to increase the amount of affordable housing built. We conclude with a suggestion for a knowingly controversial policy mechanism based upon cap and trade with the hope it will spur further debate on this issue.

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High housing demand, combined with a stagnant housing supply, has resulted in California being one of the most expensive places to call home (Dillon, 2017). In the first quarter of 2017, the median price of homes sold in California was $497,000, about 50% higher than the national average of $322,000.[1] To qualify for a 30-year mortgage on this home required a minimum annual household income of $102,000. At the time, only about a third of the state's households earned at least this amount. Even worse are similar figures reported for the San Francisco Bay Area where the median sales price of a home in early 2017 was $1.3 million. At this price, only about 13% of the Bay Area's households earned the minimum qualifying annual income of $267,000 for a 30-year mortgage. Addressing this lack of affordable housing is especially important for California because of the sizeable percentage of its households earning below the poverty level.[2]

In his report on the consequences of California's prohibitive cost of housing, Taylor (2016b) concludes that residents are 4 times more likely than the typical American to live in overcrowded homes, live farther from where they work and endure a long commute, and still spend a greater portion of their income on housing. The California Housing Forum (2016) and Taylor (2016a) implicate the state and its local government's failure to enforce, and further implement, policies to increase the construction of affordable housing. This reluctance stems in part from opposition by neighborhood groups that may support the concept of more affordable housing in principle, but in practice work toward it occurring *not in my backyard* (NIMBY).

Why would you oppose affordable housing in your backyard? A reason often given is that it changes the character of a neighborhood because the newly built affordable units are more likely occupied by residents of lower socioeconomic status who live at a higher density per household. This could lead to a higher rate of neighborhood crime, greater fiscal stress on the local provision

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of public services with less than a compensating increase in local revenue, and public schools that contain more difficult-to-educate children that drain already limited resources from current students.[3] Even if unwarranted, if these fears are held by the typical home buyer they nonetheless motivate homeowners to oppose the construction of affordable housing in their neighborhood for the purely economic reason of preserving their homes' resale value.

The State of California's Housing Element Law requires that each locality take a fair share of affordable housing needed for its metropolitan region. Most localities meet this requirement through zoning land for it. But NIMBYism can curtail the construction of affordable houses on land zoned for it.[4] Provisions in California's Environmental Quality Act (CEQA) slow, and even halt, the construction of affordable housing in the state through the required filing of an Environmental Impact Report (EIR) for some housing projects of this type. An EIR is meant to describe the project's expected effects on the neighborhood and jurisdiction where built. Not surprisingly, competing interpretations often occur with a developer producing an EIR finding of minimal effects, and an EIR generated by a neighborhood association asserting them to be extensive. This triggers a lengthy review process, further public comment, and an ultimate court interpretation if not resolved through negotiation. NIMBY groups are aware of this and often pressure local officials to put an affordable housing project through the CEQA process even if it is likely exempt (O'Neill, Gualco-Nelson, & Biber, 2018)—because once in this process, the NIMBY group can hope to commission an unfavorable EIR.

Hernandez, Friedman, and DeHerrera (2015) analyze 600 CEQA lawsuits between 2010 and 2012 and conclude that environmental preservation was the sole filing purpose for only about 13% of them. In their opinion, the chief reason for nearly 80% of the legal actions is the opposition of local groups to affordable housing development. Residential NIMBYism in California, utilizing the challenge of an EIR as allowed through CEQA, has successfully delayed/prevented affordable housing development projects. The NIMBY threat of challenging an EIR finding that new affordable housing satisfies CEQA discourages the construction of affordable housing unless developers receive a higher rate of return to compensate for the increased likelihood that their efforts may never come to fruition. This further raises the price of affordable housing built in California.

To deal with the NIMBY tactic of using CEQA to slow the supply of affordable housing in California, Governor Brown proposed an As of Right amendment to CEQA that in 2016 would have severely restricted the capacity to challenge a developer's affordable housing proposal that met all local residential building codes. This faced resistance on multiple fronts, including: (a) environmental groups who saw it as undermining CEQA's true intent, (b) localities who saw it as a threat to local control of land use, and (c) NIMBY groups who feared the loss of a tool they found effective at keeping affordable housing out of their neighborhoods. Although the governor's original proposal never made it out of the legislature, a diluted version became law in late 2017 (Kimberlin, 2017).

Residents are appropriately concerned about neighborhood crime, congestion, or lower performing public schools regardless of whether they reduce residential property values. What we examine here is whether preservation of home value could also be a concern. This is not an unreasonable assertion given that Californians (and Americans) hold most of their wealth/savings in their home's positive equity. Thus, we empirically check whether the characteristics of residents more likely to reside in affordable housing in a neighborhood (census tract) exert a negative influence on a home's resale value in that neighborhood.

We are not the first to suggest a rational basis for NIMBYism. Fischel (1987, 2005, 2015) has written a series of books that lays out the theoretical basis for this motivation and offers empirical evidence strongly in favor of it throughout the United States. The title of his 2005 book, *The Homevoter Hypothesis: How Home Values Influence Local Government Taxation, School Finance, and Land Use Policies*, describes this premise well. Fischel suggests that a homeowner's opinion on a proposed local land-use policy (such as more affordable housing) is based less upon how they personally feel about it, and more upon their own perception of how others feel about it.

To determine whether the fears of NIMBY groups regarding the proximity of more affordable housing to their own home have any validity, we check whether more affordable housing in a neighborhood reduces the selling price of homes experiencing it. But a measure of the presence of more affordable housing (beyond that receiving a public subsidy) in a neighborhood is not easy to find. And, as noted above, it is not so much that existing homeowners dislike an inexpensive home in of itself; instead, their concern may stem from the characteristics and higher household density of the residents expected to occupy it. To test this, we use a hedonic regression analysis of the selling price of homes to determine the influence of poverty (or greater percentages of people in lower income households), low educational attainment, and greater average household size in the neighborhood (census tract). We do this with a 2013 data set from Sacramento County, California, on the sales price of homes and their characteristics.[5] Given it is in the middle of the most recent American Community Service data compiled from the 5 years between 2011 and 2015 that records the needed characteristics of a census tract, we deliberately use 2013 home sales data because 2013 is the middle year of these observations.

We desire to offer evidence that confirms or denies the fear of property value loss from more affordable housing. And even if this fear confirmed, we believe it is important to understand how much residential property value is expected to decline, relative to other factors that influence home values, if there is an increase in demographic characteristics associated with greater affordable housing in a census tract. But we also realize that these characteristics often correlate with race and ethnicity. Understanding this, we take care to control for the presence of African Americans and Latinos in one form of our analysis. In doing so, we effectively separate the influence of socioeconomic characteristics and household density from the influence of prejudicial discrimination against these two groups on home price.

The remainder of this article is divided into four sections. The next section includes a brief review of earlier empirical studies that measured the effect of greater affordable housing units, and the characteristics of its residents, on home values in a neighborhood. Then we offer an overview of our hedonic regression analysis and the data used to conduct it. The following section presents the findings of our study. Finally, we conclude with the thoughts of others on NIMBYism, the policy relevance of our findings, and what they mean for California and other states with affordable housing concerns that are, at least partially, blamed on NIMBYism. We finish with a brief description of a possible, but likely controversial, policy intervention.

Previous Literature

Many earlier empirical studies of the effects of affordable/public housing units (DeSalvo, 1974; Nourse, 1963) found no effect, or even a positive effect, of subsidized housing on nearby property values. Guy, Hysom, and Ruth (1985) thought this may be due to inadequate regression techniques, and sought to remedy it through a more suitable hedonic regression analysis of the effect of distance to affordable townhouse clusters in Fairfax County, Virginia. They find that a shorter distance to any of these units lowered the selling price of a home. Lee, Culhane, and Wachter (1999) continued this line of inquiry using data from Philadelphia to test the influence of proximity to distinct types of federally assisted housing units between 1989 and 1991 on sales prices. After controlling for housing characteristics, neighborhood demographics and neighborhood amenities, they find that proximity to scattered-site public housing and units rented with Section 8 vouchers exerted negative influences. Relevant to our analysis, they also report that higher percentages of African Americans, Latinos, and poverty in a neighborhood reduced home prices, whereas higher median income drove prices up.

Green, Malpezzi, and Seah (2002) examine the impact of the proximity of housing subsidized through Section 42 federal low-income housing tax credits (LIHTC) to property values. As an advancement, they use the hedonic regression method of only looking at repeat sales. Their regressions included measures of poverty, income levels, marriage status, and education levels. Using data

gathered from both Madison and Milwaukee (Wisconsin), they offer no evidence that proximity to Section 42 housing reduces sales price. Woo, Joh, and Zandt (2016) further examine the influence of LIHTC housing on the sales price of neighboring properties, offering stronger controls to get at the causal attributions between such housing and neighborhood composition. Examining both levels and trends in housing prices using a difference-in-difference method, they look at 1996 to 2007 sales data from Charlotte, North Carolina, and Cleveland, Ohio, and conclude that proximity to LIHTC exerts a general negative (positive) effect on home sales price in Charlotte (Cleveland) that varies across a neighborhood's income composition.

Nguyen (2005) offers her own review of 10 first-wave studies conducted between 1963 and 1985 on whether presence of housing affordability affects property values, and the seven second-wave studies conducted on the same issue between 1993 and 2001. First-wave studies used a form of matching methodology and often lack the rigor necessary to trust their findings, whereas second-wave studies relied upon the sales price of a home and hedonic regression methodology. The first-wave studies predominantly found a positive to zero influence of proximity of affordable housing on property values. Second-wave studies, alternatively, offered the more mixed results of negative effects whose magnitude on home prices is relatively small. In addition, these magnitudes varied based upon the characteristics of the affordable housing and the demographic composition of the neighborhhod.

We found two previous hedonic regression studies like that done here. Harris (1999) uses 1980 nationwide data from the Panel Study of Income Dynamics on individual reported housing expenditure (a positive proxy measure for the home's value) to explore how it changes as the percentage of African Americans in a neighborhood increases. Recognizing that this measure alone can proxy for other neighborhood concerns, he runs two regressions that do and do not control for neighborhood affluence, poverty, percentage without college education, and unemployment rate. The negative influence of race on housing expenditure disappeared after these controls were added, whereas affluence continued to exert a positive influence on housing expenditure and the other included socioeconomic measures exerted the expected negative influences. Myers (2004) explored the same issue with nationwide data from the American Housing Survey in 1985, 1989, and 1993 that allowed for a greater number of explanatory variables, more precisely defined neighborhoods, and fixed neighborhood effects. She finds that house values fall as the percentage of African Americans in a neighborhood rises, whereas median household income exerts the opposite, positive influence. The few studies that have used the likely characteristics of affordable housing occupants as explanatory variables in their hedonic regression studies find that they can exert negative influences on home expenditures, even after controlling for the percentage of African Americans in a neighborhood.

Hedonic Regression Model and Data Used

The purpose of this study is to examine the effects of characteristics of the population who are more likely to inhabit affordable housing on the selling price of single-family residential properties in the same census tract. We use realtor-generated Multiple Listing Service data from late 2013 for Sacramento County. Neighborhood characteristics come from census tract data collected through the American Community Survey over the 5 years between 2011 and 2015 (the most recent available). The general formulation of the hedonic regression model is:

$$\textbf{Selling Price}_i = \textbf{f}\ (\text{Property characteristics}_i, \text{Selling characteristics}_i, \text{Neighborhood characteristics}_i) \quad (1),$$

where;

$$\textbf{Property Characteristics}_i = \textbf{f}\ (\text{Home square feet}_i, \text{Lot square feet}_i, \text{Years old}_i, \text{Garage spaces}_i, \text{Bedrooms}_i, \text{Full baths}_i, \text{Half baths}_i, \text{Shaker roof dummy}_i, \text{Tile roof dummy}_i, \text{Slate roof dummy}_i,$$

Metal roof dummy$_i$, Wood roof dummy$_i$, Foundation raised dummy$_i$, Foundation concrete slab dummy$_i$, Foundation concrete raised slab dummy$_i$, Half-plex dummy$_i$, Condo dummy$_i$, Pool dummy$_i$, Fireplaces$_i$, Stucco dummy$_i$, One story dummy$_i$) (2),

Selling characteristics$_i$ = f (Days on market$_i$, Short sale dummy$_i$, Foreclosure dummy$_i$, Tenant occupied dummy$_i$, Housing and Urban Development (HUD) dummy$_i$, Homeowners Association (HOA) dummy$_i$, HOA annual dues$_i$, Federal Housing Administration (FHA) finance dummy$_i$, Veterans Administration (VA) finance dummy$_i$, Cash finance dummy$_i$, Covenants, Conditions, and Restrictions (CC&R) dummy$_i$) (3),

Neighborhood characteristics = f (Average household size$_i$, % Education less than HS$_i$, Poverty rate$_i$ or [% Income less than \$15k$_i$, % Income \$15k–25k$_i$, % Income \$25k–\$35k$_i$, % Income \$35k–\$50k$_i$, % Income \$75k–\$100k$_i$, % Income \$100k–\$200k$_i$, % Income \$200k plus$_i$], Set of 235 census block group dummies for Sacramento County$_i$) (4)

As was well established in previous hedonic-based regression research, it is necessary to account for the characteristics of the property itself. Whereas it is evident that an increase in the square feet of the home or the lot it sits on influences the selling price of a house, factors such as the structural characteristics of the home and its age also matter. It is also desirable to account for observable characteristics of the home sale that could affect what the buyer is willing to pay for it, and/or what the seller is willing to accept.

Controlling for the characteristics of the property, along with its selling characteristics, allows for a more accurate determination of the independent influence of the relevant neighborhood characteristics by census tract contained within Equation (4). These characteristics include the average household size, a measure of the lowest educational achievement, and the poverty rate. As an alternative to the extreme of just looking for the influence of poverty rate, a second regression examines the influences of greater percentages of different household income categories. We purposely exclude a middle category of \$50k to \$74k that includes the 2013 median household income in Sacramento County.

An additional issue is the influence of racial and ethnic composition in a census tract on the sales price of a home in that neighborhood. It is important to detect this influence in of itself, and to report the influence of occupancy and socioeconomic characteristics in a census tract after controlling for the two groups (African Americans and Latinos) most likely to face such discrimination in California. We do this through an additional regression for each specification that includes these variables.

Figure 1 presents a map of Sacramento County and the census tracts located within it. To control for possible unobservable neighborhood characteristics that affect the value of a home, it is not possible to include a set of census tract dummies for Sacramento County because of perfect collinearity with the constant socioeconomic measures assigned by census tract. Instead, we include a set of census block group dummies that do not overlap with the county's census tracts.[6] Table 1 offers the descriptive statistics for all the variables used in this hedonic regression study. In this table, note that the means for dummy variables are in decimal form because they are bounded by values of 0 and 1, whereas the means for percentage values are not in decimal form because they are actual percentages.

Using the above regression model and the data just described, we ran regressions with the various functional forms of linear–linear, log–linear, and log–log. The names of these forms first refer to whether the dependent variable is in its normal or transformed natural log form, and second refer to whether the same is done for explanatory variables where possible. As with previous hedonic regression analyses of the type done here, we find the log–linear functional form most appropriate because it exhibits a greater percentage of statistically significant relationships. For the explanatory variables not initially found to exert a statistically significant influence on the selling price of a home, we tried adding a squared value to see if accounting for the negative or positive effect of a variable in the log–linear form, at an increasing or decreasing rate, generated a statistically significant finding. This was the case for *lot size, years old, bedrooms*, and *homeowner*

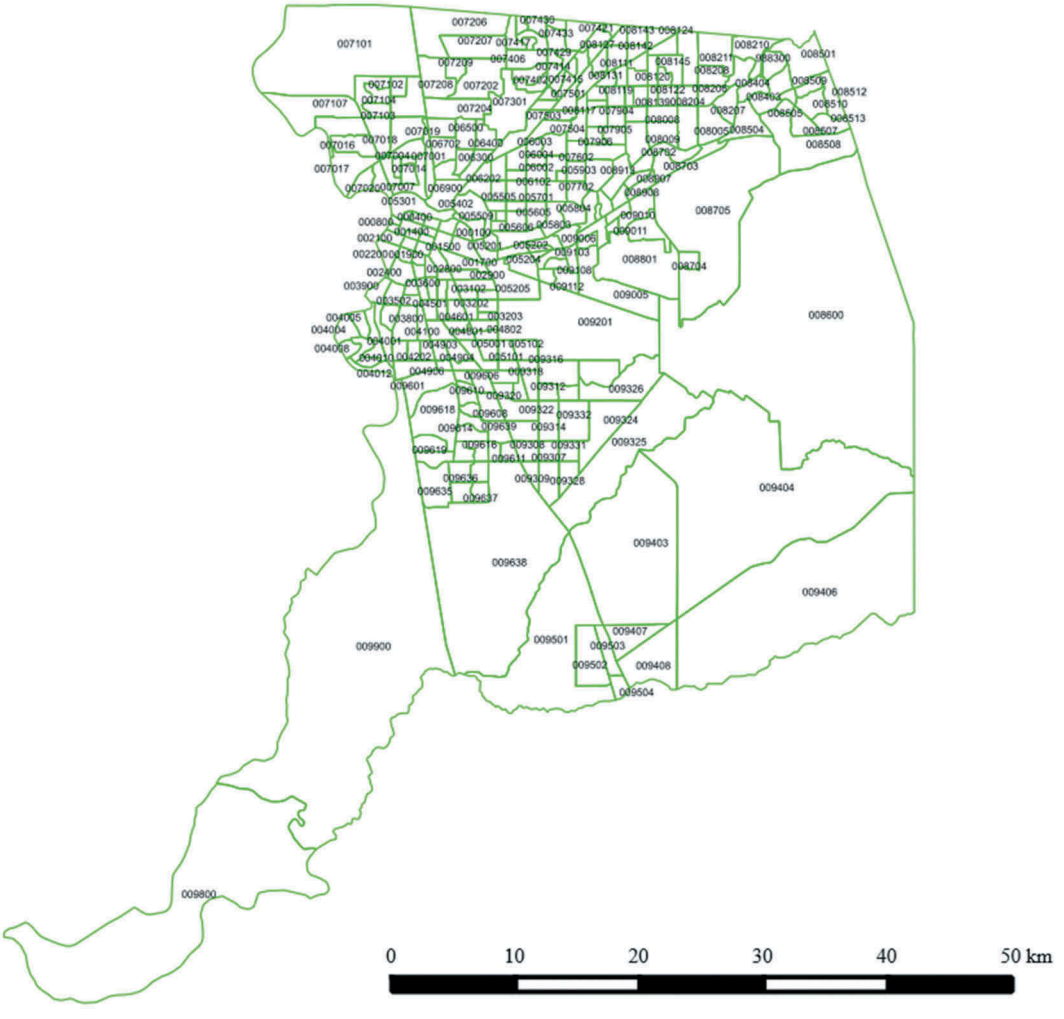

Figure 1. Map of 2010 census tracts in Sacramento County, California.

association dues. The advantage of using the log–linear form is that the calculated regression coefficients are not unit dependent and represent the expected decimal percentage change in the selling price of a home given a 1-unit change in the respective explanatory variable.[7] The regression findings are presented in Table 2.

Multicollinearity is often an econometric issue. The detection of its presence is through a variance inflation factor (VIF) exhibiting a value greater than 5. For all regressions, except for VIFs calculated for the census block set of dummy variables and explanatory variables that included their squared values, this only occurred for the three measures of foundation and home square feet. Since home square feet and all the foundation measures exerted a statistically significant influence on selling price, such multicollinearity is not a concern. Also relevant is the lack of multicollinearity between the various neighborhood characteristics included in the regressions.

The Breusch–Pagan/Cook–Weisberg test for heteroscedasticity indicated its presence with greater than 99% certainty. We dealt with the potential bias this yields in the standard errors calculated for regression coefficients by using cluster-robust standard errors based on the 55 zip codes in Sacramento

Table 1. Descriptive statistics (based on 4,100 observations).

Variable	Mean	Std. Dev.	Min.	Max.
Dependent variable				
Selling price ($)	265,315	154,065	27,500	2,795,000
Property characteristics				
Home square feet	1,647.06	670.73	320	7537
Lot square feet	201,694.70	7,167,885.07	0	2.97e+ 08
Years old	35.18	21.78	0	123
Garage spaces	1.80	0.88	0	10
Bedrooms	3.29	0.88	1	9
Full baths	1.99	0.64	1	7
Half baths	0.21	0.41	0	3
Shaker roof dummy	0.05	0.21	0	1
Tile roof dummy	0.30	0.46	0	1
Slate roof dummy	0.002	0.04	0	1
Metal roof dummy	0.008	0.09	0	1
Wood roof dummy	0.015	0.12	0	1
Foundation raised dummy	0.26	0.44	0	1
Foundation concrete slab dummy	0.70	0.46	0	1
Foundation concrete raised slab dummy	0.04	0.20	0	1
Half-plex dummy	0.02	0.14	0	1
Condo dummy	0.07	0.26	0	1
Pool dummy	0.22	0.41	0	1
Fireplaces	0.83	0.54	0	4
Stucco dummy	0.43	0.50	0	1
One-story dummy	0.71	0.45	0	1
Selling characteristics				
Days on market	84.62	70.54	4	901
Short sale dummy	0.12	0.32	0	1
Foreclosure dummy	0.06	0.23	0	1
Tenant occupied dummy	0.11	0.31	0	1
HUD dummy	0.02	0.15	0	1
HOA dummy	0.19	0.40	0	1
HOA annual dues	35.96	123.80	0	5,500
FHA finance dummy	0.21	0.41	0	1
VA finance dummy	0.05	0.22	0	1
Cash finance dummy	0.23	0.42	0	1
CC&R dummy	0.85	0.36	0	1
November sold dummy	0.30	0.46	0	1
December sold dummy	0.33	0.47	0	1
Neighborhood characteristics				
Average household size	2.84	0.53	1.3	4.21
Education less than HS grad (%)	13.39	10.16	0	51.70
Poverty rate	15.97	10.87	0	59.40
Income less than $10k (%)	5.45	4.07	0	20.1
Income $10k–$15k (%)	5.15	4.38	0	34.0
Income $15k–$25k (%)	9.07	5.50	0	35.9
Income $25k–$35k (%)	9.34	4.69	0	23.8
Income $35k–$50k (%)	13.12	5.60	1.1	29.6
Income $75k–$100k (%)	13.67	5.48	1	30.1
Income $100–k$150k (%)	15.21	7.69	0.5	47.4
Income $150k–$200k (%)	6.01	4.92	0	29.7
Income $200k plus (%)	4.96	4.93	0	27.0
African American (%)	9.03	7.14	36.9	0
Latino (%)	20.60	11.17	65.5	0

Note. Std. Dev. = standard deviation; FHA = Federal Housing Administration; HUD = Housing and Urban Development; HOA = Homeowners Association; VA = Veterans Administration; CC&R = Covenants, Conditions, and Restrictions.

County that the housing sale data were drawn from. Cameron and Miller (2015) suggest it is best to cluster over the largest group possible, while maintaining an adequate number of groups. Thus, we chose zip codes, as opposed to census block groups or tracts which are smaller in geographic presence.

The hedonic regression results recorded in Tables 2 and 3 for property characteristics reveal no real surprises compared with what was found in the previous housing literature. Referring to only

Table 2. Regression results using log of selling price as dependent variable and poverty rate as an explanatory variable[a] (4,100 observations, clustered on 55 zip codes; robust standard errors used).

Explanatory variable[b]	Without race/ethnicity[c]	With race/ethnicity
Property characteristics		
Home square feet (1,000s)	0.351***	0.338***
Lot square feet (1,000s)	7.16e-6***	4.64e-6**
Lot square feet squared	−2.50e-14***	−1.62e-14**
Years old	−0.0114***	−0.0119***
Years old squared	0.000114***	0.000117***
Garage spaces	0.0393***	0.0389***
Bedrooms	0.208***	0.200***
Bedrooms squared	−0.0298***	−0.0286***
Full baths	0.0603***	0.0618***
Half baths	0.0483***	0.0469***
Shaker roof dummy	0.0380**	0.0468***
Tile roof dummy	0.0111	0.0193*
Slate roof dummy	0.0407	0.0656
Metal roof dummy	0.0345	0.0420
Wood roof dummy[d]	0.0280	0.0327
Foundation raised dummy	0.357***	0.363***
Foundation concrete slab dummy	0.265***	0.272***
Foundation concrete raised slab dummy[e]	0.302***	0.312***
Half-plex dummy	−0.154***	−0.155***
Condo dummy	−0.384***	−0.395***
Fireplaces	0.0649***	0.0690***
Stucco dummy	−0.00135	−0.000571
One-story dummy	0.0924***	0.0840***
Selling characteristics		
Days on market	−0.0000830	−0.0000841
Short sale dummy	−0.163***	−0.162***
Foreclosure dummy	−0.0921***	−0.0918***
Tenant occupied dummy	−0.0594***	−0.0514***
HUD dummy	−0.155***	−0.160***
HOA dummy	−0.164***	−0.146***
HOA annual dues (1,000s)	0.528***	0.461***
HOA annual dues squared (1,000s)	−0.0000955***	−0.0000830***
FHA finance dummy	−0.0215***	−0.0178**
VA finance dummy	−0.00711	−0.0624
Cash finance dummy[f]	−0.136***	−0.134***
CC&R dummy	0.00132	0.00258
Neighborhood characteristics		
Average household size	−0.155***	−0.144***
Education less than HS grad (%)	−0.00863***	−0.00580***
Poverty rate	−0.00718***	−0.00467***
African American (%)	–	−0.00562***
Latino (%)	–	−0.00394***
R^2	0.846	0.853

[a]Data on home selling price and characteristics are drawn from all residential home sales in Sacramento County, CA, in the last quarter of 2013. Neighborhood characteristics are drawn from the 2011–2015 American Community Survey.
[b]Also included is a set of 234 dummy variables representing each of the census block groups in Sacramento County for which a home sold under the period of observation. The regression coefficients for these are not recorded here.
[c]Each cell contains the calculated regression coefficient, which represents the expected percentage change in home sales price (in decimal form) from a one-unit change in the respective explanatory variable.
[d]*Composition roof* is the excluded category.
[e]*No foundation* is the excluded category.
[f]*Conventional finance* is the excluded category.
***Indicates statistical significance from zero in a two-tailed test at ***p < .01; **p < .05; and *p < 0.10.
FHA = Federal Housing Administration; HUD = Housing and Urban Development; HOA = Homeowners Association; VA = Veterans Administration; CC&R = Covenants, Conditions, and Restrictions.

the regressions with race/ethnicity, a 1000-foot increase in a home's square footage raises its price by a little over 30%. The equivalent finding for the lot's square footage indicates that its growth contributes to home value at a decreasing rate. As a home ages, its selling price first declines and then rises, with the inflection point coming near a vintage of 51 years. More full and half baths in a

Table 3. Regression results using log of selling price as the dependent variable and household income categories as explanatory variables[a] (4,100 observations, clustered on 55 zip codes, robust standard errors used).

Explanatory variable[b]	Without race/ethnicity[c]	With race/ethnicity
Property characteristics		
Home square feet (1,000s)	0.309***	0.298***
Lot square feet (1,000s)	4.89e-6***	3.08e-6*
Lot square feet squared	−1.74e-14***	−1.10e-14*
Years old	−0.00997***	−0.0107***
Years old squared	0.0000990***	0.000104***
Garage spaces	0.0389***	0.0385***
Bedrooms	0.221***	0.214***
Bedrooms squared	−0.0304***	−0.0292***
Full baths	0.0643***	0.0654***
Half baths	0.0479***	0.0471***
Shaker roof dummy	0.0105	0.0169
Tile roof dummy	−0.0126	−0.00315
Slate roof dummy	0.00233	0.0216
Metal roof dummy	−0. 0000440	0.00745
Wood roof dummy[d]	0.00732	0.00119
Foundation raised dummy	0.331***	0.339***
Foundation concrete slab dummy	0.257***	0.264***
Foundation concrete raised slab dummy[e]	0.285***	0.295***
Half-plex dummy	−0.156***	−0.159***
Condo dummy	−0.348***	−0.358***
Fireplaces	0.0620***	0.0660***
Stucco dummy	0.00113	0.00273
One-story dummy	0.0814***	0.0750***
Selling characteristics		
Days on market	−0.000067	−0.0000716
Short sale dummy	−0.160***	−0.159***
Foreclosure dummy	−0.0903***	−0.0900***
Tenant occupied dummy	−0.0649***	−0.0579***
HUD dummy	−0.140***	−0.146***
HOA dummy	−0.166***	−0.149***
HOA annual dues (1,000s)	0.368***	0.307***
HOA annual dues squared (1,000s)	−0.0000591***	−0.0000487***
FHAA finance dummy	−0.0110	−0.00837
VA finance dummy	−0.00293	−0.00582
Cash finance dummy[f]	−0.129***	−0.128***
CC&R dummy	0.000652	0.000113
Neighborhood characteristics		
Average household size	−0.224***	−0.203***
Education less than HS grad (%)	−0.00375***	−0.00138*
Income less than $10k (%)	−0.00723***	−0.00578***
Income $10k–$15k (%)	−0.00286**	−0.00220**
Income $15k–$25k (%)	−0.00447***	−0.00500***
Income $25k–$35k (%)	−0.00118	−0.00113
Income $35k–$50k (%)	0.000807	−0.000257
Income $75k–$100k (%)	0.000437	−0.000772
Income $100k–$150k (%)	0.00352***	0.00211**
Income $150k–$200k (%)	0.00587***	0.00309**
Income >$200k (%)[g]	0.0134***	0.0135***
African American	–	−0.00441***
Latino	–	−0.00373***
R^2	0.864	0.868

[a]Data on home selling price and characteristics are drawn from all residential home sales in Sacramento County, CA, in the last quarter of 2013. Neighborhood characteristics are drawn from the 2011–2015 American Community Survey.

[b]Also included is a set of 234 dummy variables representing each of the census block groups in Sacramento County for which a home sold in the period of observation. The regression coefficients for these not recorded here.

[c]Each cell contains the calculated regression coefficient which represents the expected percentage change in home sales price (in decimal form) from a one-unit change in the respective explanatory variable.

[d]*Composition roof* is the excluded category.

[e]*No foundation* is the excluded category.

[f]*Conventional finance* is the excluded category.

***Indicates statistical significance from zero in a two-tailed test at ***p < .01; **p < .05; *p < .10.

home raise its value. Interestingly, when holding square feet of a home constant, more bedrooms add value, but at a decreasing rate. This is likely because homeowners value an open floor plan. The type of roof appears to make no difference to a home's selling price. The presence of any of the foundation types measured here adds about a 30% increase in value relative to the base category of no foundation, whereas if the characteristics of the house apply to a one-story home, instead of any other alternative, the home sells for about 8% more. A half-plex or condominium with the same characteristics gets about 16% or 40% less, respectively, on the market, whereas each fireplace yields about a 7% increase in a home's selling price.

A short-sale home, one in foreclosure (real estate owned), or a Housing and Urban Development (HUD) sale (previously financed under a Federal Housing Administration (FHA) loan, but foreclosed upon), sold for about 16%, 9%, and 15% less, respectively, than a nondistressed sale. Compared with conventional financing, a home purchased with cash sold for about 13% less. A home falling under a homeowner association (HOA) agreement sold for between 14 and 15% less than one without. But the amount of activity in the HOA (as measured by dues) tempered this by exerting a positive effect on sale value at a decreasing rate.

Of primary interest to this research are the regression results recorded under neighborhood characteristics. Recall that these measure characteristics within the census tract of a home that are likely to increase if more affordable housing is built there. We display results for these with both percentage African American and percentage Latino excluded and included. Three findings are noteworthy. First, all the nonrace/ethnicity characteristics that are statistically significant when race/ethnicity is excluded remain the same when it is included. Second, percentage of African Americans and Latinos in a census tract displays a negative influence on a home's sales price. A 1-percentage-point increase in these values correlates with about a 0.5 and 0.4 percentage point decrease, respectively, in sales price. Third, the magnitude of influence of average household size, percentage of adult residents with less than a high school education, and poverty (or income categories) declines when race/ethnicity is accounted for. The racial/ethnic composition of a neighborhood, even in a highly diverse county like Sacramento, matters to the sales price obtained for a home. Furthermore, other measures of the socioeconomic characteristics of the neighborhood matter after controlling for race/ethnicity. For the remaining purposes of interpretation, we refer to the detected effects of neighborhood characteristics both controlling for race/ethnicity and not controlling for it.

When controlling for race/ethnicity, if the average household size increases by 0.53 persons (a 1-standard deviation increase from the average household size of 2.84 recorded in Table 1), the expectation is that the sales price of a home will decrease by 7.6% (0.53×0.144) using the result in Table 2 (accounting only for poverty rate) and will decrease by 10.8% (0.53×0.203) if using the result in Table 3 (accounting for all household income groups). Additionally, if the percentage of residents over age 25 with less than a high school diploma rises by 10.16 percentage points (or 1 standard deviation from the mean of 13.39 recorded in Table 1), there is an expected decline in home sales value by 5.8% (10.16×0.00580) as indicated in Table 2, whereas the specification in Table 3 yields a smaller decline of 1.4% (10.16×0.00138).

The above simulations are for changes in household characteristics that are expected to rise if more affordable housing is built in a census tract. Another way of accounting for these expected effects is to simulate a change in either poverty rate (as accounted for in Table 2) or various household income classes different than the one that contains the median home value in Sacramento County (as measured in Table 3). The poverty rate across Sacramento's 309 census tracts used here varies widely from zero to just over half the population. Table 2 (with race/ethnicity) indicates that a 1-percentage-point increase in a census tract's poverty rate results in about a 0.47% reduction in the sales price of a home within it, whereas a 10.87-percentage-point increase in a census tract's poverty rate (or a 1-standard-deviation change) results in an expected 5.1-percentage-point decrease in home sales price within that census tract.

The hedonic regressions in Table 3 take the alternative approach of excluding the census tract's poverty rate, and instead look at the influences of percentage of population living in the census-collected categories of household income relative to the excluded collected category ($50k to

$74k) that includes the 2013 median household income in Sacramento County of $52,980.[8] This is clear evidence that replacing Sacramento County median income households with sufficiently far away lower (higher) income households in a census tract decreases (increases) the market value of a home sold in that census tract. If a 1-percentage-point amount in the category containing the median-income household is replaced with 1-percentage-point amount increases in the household income categories of less than $10k, $10k to $15k, or $15k to $25k, the decreases in home sales prices are about 0.6%, 0.2%, and 0.5%, respectively. If a 1-percentage-point amount in the category containing the median-income household is replaced with 1-percentage-point amount increases in the household income categories of $100k to $150k, or $150k to $200K, or more than $200k, the increases in home sales prices are about 0.2%, 0.22%, and 1.4%, respectively.

Perhaps it is best to report these forecasted changes in the selling price of a home in dollars when an increase in a socioeconomic characteristic occurs that may happen when more affordable housing is built in the census tract that the house sits. We do this in Table 4 for the expected change in the value of Sacramento County's 2013 median value home sales price ($240,000) by simulating a 1-standard-deviation change in the respective variables listed in the table's first column. The top value in each cell is the dollar change if race/ethnicity is not accounted for, whereas the lower value is based upon controlling for percentage African American and percentage Latino in a census tract.

Table 4 offers the magnitude of the dollar changes predicted by the hedonic regression results in Tables 2 and 3. Also, note that these values can be cumulative. If a census tract experiences a 1-standard-deviation change in the person size of its average household, the percentage of its population who have less than a high school education, and the poverty rate, the expected decline in the $240,000 median home sales price would be a cumulative effect of $40,817, or a 17% drop. Relevant from Table 3 is the positive influence of sale price of a home when the value in the median household income category of $50k–$75k decreases and is replaced with an equivalent increase in the highest income category. Raising the $200k plus household income category (controlling for percentage African American and Latino) raises the $240,000 median home sales prices by $16,2000 (6.9%). Seeing the magnitude of these values, it is perhaps not a surprise that a homeowner interested in maintaining their property value is resistant to new housing affordable to those at the lower end of the income distribution, and is more likely to be favorable to new housing construction purchased by the affluent.

Table 4. Expected dollar change in 2013 median value ($240k) homes in Sacramento County, CA, from given change in neighborhood characteristics (the top value in each cell controls for percentage African American and Latino).

Neighborhood characteristics	Table 2 results	Table 3 results
Average household size (mean of 2.84) rises one standard deviation of 0.5 persons	− $17,280[a] [− $18,600]	− $24,3600 [− $26,880]
Education less than high school (%; mean of 13.39) rises one standard deviation of 10 percentage points	− $11,208 [− $20,712]	− $3,312 [$9,000]
Poverty rate (mean of 15.97) rises one standard deviation of 11 percentage points	− $12,329 [− $18,955]	-
Income less than $10k (%; mean of 5.45) ises one standard deviation of 4 percentage points	-	− $5,549 [− $6,941]
Income $10k–$15k (%; mean of 5.15) rises one standard deviation of 4 percentage points	-	− $2,112 [− $2,746]
Income $15k–$25k (%; mean of 9.07) rises one standard deviation of 6 percentage points	-	− $7,200 [− $6,437]
Income $100k–$150k (%; mean of 15.21) rises one standard deviation of 8 percentage points	-	$4,052 [$6,758]
Income $150k–$200k (%; mean of 6.01) rises one standard deviation of 5 percentage points	-	$3,708 [$7,044]
Income $200k plus (%; mean of 4.96) rises one standard deviation of 5 percentage points	-	$16,200 [$16,080]

Note. [a]Calculated as (0.5 persons × −0.144 regression coefficient) × $240,000 median home value.

Conclusion

This study examined the likely effects of a change in neighborhood characteristics if greater affordable housing were built in a census tract. Our regression results show that a home sells for less in census tracts with a greater density of people per home, with a greater percentage of residents with less than a high school degree, and with more of the population living in poverty (or various measures of low income). Admittedly, we are not able to determine why these characteristics are driving lower home prices (e.g., that affordable housing will lead to greater crime). But for what we are trying to demonstrate, this does not matter. If a resident feels the same way as our regression analyses indicate that the typical homebuyer does, it should not be a surprise that they are interested in protecting their home values by using available methods (like the California Environmental Quality Act and an Environmental Impact Report in California) to try to keep new affordable housing out of their backyard. In this concluding section we explore the counteraction of NIMBYism to spur further affordable housing construction.

Our hedonic regression findings suggest that that NIMBYism could be based in a rational self-interest to protect one's home value. Glaeser and Gyourko (2017) identify the primary cause of high housing prices in high-housing-demand metropolitan areas in United States as restricted supply because of extreme land-use regulation. They measure the degree of this restrictive regulation by how much the sales price of a home diverges from what it costs to construct, and label this an implicit tax. Using the San Francisco core-based statistical area (CBSA) as a case study, they calculate a price-to-cost ratio of 2.84 which is the highest among the 80 CBSAs examined. They also show that price-to-cost ratios correlate negatively with the permits issued in the CBSAs between 2000 and 2013. As Glaeser and Gyourko (2017, p. 20) conclude:

> The great challenge facing attempts to loosen local housing restrictions is that existing homeowners do not want more affordable homes: they want the value of their asset to cost more, not less. They also may not like the idea that new housing will bring in more people, *including those from different socio-economic groups*. (Emphasis added)

So, what to do? There exists a substantial literature on overcoming NIMBYism. Iglesias (2002), writing specifically after studying local opposition to affordable housing in the San Francisco Bay Area, identifies the best approach to counteracting NIMBYism as managing local opposition. He describes this as respecting the legitimate concerns of the community, honoring the rights of current and prospective residents, and advancing the prospects for future affordable housing. Scally and Tighe (2015) note that it is particularly difficult to achieve equity and fairness in housing opportunities when NIMBYism prevails in democratic planning processes that override these considerations in favor of the self-interest of current residents. After surveying the previous planning literature on locally unwanted land uses (LULUs) that drive NIMBYism, Schively (2007) offers five mechanisms that she considers relevant to overcoming opposition: risk communication, consensus building, empowerment, institutions, and compensation. Of interest here is her suggestion of an auction-based mechanism for minimizing the compensation often needed to voluntarily site a necessary LULU in a city or region. But as she also notes, rarely is consideration given to the use of compensation because of the politics of placing morality (equity) at the forefront, which greatly diminishes the consideration of monetary incentives (efficiency). Hermansson (2007), writing on the ethics of LULU conflicts, questions the prevailing attitude that NIMBYism is egotistic and irrational. Such a judgement rests on the assumption of weighting the benefits against the costs of a LULU to all impacted by it, which does not consider the intensity of LULU costs perceived by those directly affected by it. Consider the scenario she poses where a city has just zoned vacant property next to a homeowner, after the existing owner purchased it, as a potential site for an affordable housing subdivision. The homeowner believes more affordable housing is good for society but raises opposition to it being near her own property. Hermansson notes that many would label such NIMBYism as morally bankrupt. She points out that it is unlikely someone would be labeled the same if they tried to get out of mandatory participation in a medical experiment

whose findings would benefit all society but that requires that the participant miss a substantial amount of work without compensation. She concludes that if one is compelled to take an action for the benefits of others who subsequently can avoid this action, it is reasonable to receive an offer of fair compensation for doing it.

To the best of our knowledge, rarely is direct compensation used in the United States to overcome the objections of NIMBY groups to greater affordable housing in their neighborhood. Weisberg (2007) describes New York City's approach to a fair-share siting of affordable housing that involves: (a) a participatory process open to all stakeholders that admits past mistakes, (b) agreement that the status quo is unacceptable, (c) the goal of geographic fairness, and (d) keeping multiple options open. Within this process, New York City has recognized the potential cost to a neighborhood of locating more affordable housing there and sometimes provides nonmonetary compensation in the form of neighborhood improvements and/or tax reductions. California has chosen to instead employ a set of anti-NIMBY tools (Rawson, 2006) that start with its statewide Housing Element Law that every jurisdiction must plan/zone for its fair share of affordable housing necessary for the region it is part of—although, as noted earlier, the achievement of this affordable housing element is difficult because of the CEQA that permits the slowdown/stoppage of construction if environmental concerns are raised.

The Californian approach to overcoming objections to new affordable housing in localities where already planned for is weak legal interventions to enforce it and only minor subsidies to encourage it. This was evident in a flurry of new legislation passed in the fall of 2017. As described by Kimberlin (2017), the legislation included: (a) a streamlined local review process for some proposed affordable housing projects (Senate Bill [SB] 35); (b) creation of Workforce Housing Opportunity Zones and Housing Sustainability Districts designated for expedited development (SB 540 and Assembly Bill [AB] 73); (c) requirements that housing element satisfaction only allowed whether land has a realistic chance of affordable development (AB 1397), continuous update of housing elements (SB 166), for expanded analysis of constraints on development (AB 879), and further review of housing element satisfaction with the possibility of reporting violations to State Attorney General (AB 72); and (d) increasing the burden of proof to reject housing development based on CEQA (SB 167) and requiring the court to give greater deference to housing developers in CEQA decisions (AB 1515). Most do not think that these minor legislative tweaks are nearly enough to overcome California's significant shortage of affordable housing (Taylor, 2016b).

Perhaps it is time for California to consider the possibility of compensation. Wassmer (2005) broached this subject; given that California has since embraced the economic concept of cap and trade as the preferred method to achieve its ambitious greenhouse gas (GHG) emission reduction goals, why not consider a version of this market tool to overcome the pervasive NIMBYism that exists in the siting of affordable housing?

Under cap and trade, if the state wishes to cut its total GHGs by 30%, the realization is explicit that it is not socially efficient to require every GHG generator in California to adhere to this fixed percentage cut. Instead, the mandate on each GHG generator is to cut the required 30% by a certain date in the future, and allow those generators not wanting to meet the requirement the option to buy the right to emit more from another emitter, who would then need to emit an equivalent amount less. Although in some sense this is not equitable, economists widely recognize it as a highly cost-effective way of reaching the overall goal. A cap-and-trade mechanism would offer a similar option to a jurisdiction seeking to satisfy its 30% affordable housing mandate when facing resistance from NIMBY groups saying that it imposes too high a cost to do so. Responding to this resistance, the local policymaker approaches another jurisdiction in the region and asks how much compensation they require to take on an additional amount of affordable housing. A jurisdiction expected to experience a greater drop in home value because of affordable housing would pay another jurisdiction expected to see less. Ideally, the payment could then compensate the homeowners who subsequently had the affordable housing placed in their backyard by funding additional local government expenditures intended to mitigate the actual and perceived

fiscal and social costs of the new affordable housing. This could be a possible win for all involved, including the lower income residents who now have access to affordable housing units that would otherwise be planned for but not built because of NIMBYism.

For those familiar with affordable housing policy in the United States, there is a precedent for such a scheme that emerged from the New Jersey Supreme Court Decision of *Mount Laurel I* in 1975. This decision prohibited economic discrimination against the poor through local land-use powers that resulted in less than a fair share of regional affordable housing within a locality's borders. A subsequent *Mount Laurel II* decision in 1983 required local proof of a realistic opportunity for such affordable housing occurring through enhanced mechanisms that made it easier for developers and municipalities to satisfy. In response to this, New Jersey's Legislature passed the Fair Housing Act of 1985 that created the state Council on Affordable Housing (COAH), and more importantly for the purposes of this article, a Regional Contribution Agreement (RCA) system were a community could get out of up to half of their fair-share affordable housing by transferring it to any another community in the region, and to restrict up to the other half of their required affordable housing units to seniors. In 2007, a New Jersey Appellate Court prohibited the second type of exemption based upon its discrimination against low-income households with children (Fair Share Housing Center, n.d.), and in 2008, state legislation prohibited the use of RCAs by COAH.

Fox (1987) and Evans (2007) offer a summary of the flaws that led to the elimination of RCAs that includes: (a) the year 2000 median income of sending jurisdictions of affordable housing was about $85k, whereas it was around $43k for receiving jurisdictions; (b) a furthering of economic segregation; and (c) affordable housing being built, but not where greater job opportunities, better schools, and less crime were occurring. The result of the loss of the RCA system in New Jersey has been further foot dragging by communities to build their fair share of affordable housing and court battles to define what to do if this is not satisfied. Evidence of the resulting frustration is a 2017 proposal from a New Jersey Assemblyman to reinstate RCAs (Ebenau, 2017).

As was the case in New Jersey, a primary objection to the consideration of cap and trade to further affordable housing construction in a metropolitan area is the likely outcome that more affluent communities will offload their fair share of affordable housing to less affluent communities. This not only violates the social justice norm that every jurisdiction must take on its fair share of affordable housing but also curtails many of the opportunities for residents of affordable housing. Thus, any plan of this sort needs to only allow for trading away a limited percentage (say, half, as in the case of New Jersey) of the state-required affordable housing element in a jurisdiction, but also institute a further equity-based safeguard (which the New Jersey RCA did not have). We suggest this safeguard be that trade can only occur among jurisdictions in a region if the traders exhibit a similar profile in terms of jobs, income, education, race/ethnicity, etc.

Using cap and trade to further affordable housing construction mandates in a California community, furthermore, will function best if accompanied with a stepped-up increase in the state's enforcement of its Housing Element Law. Resistance to this increased enforcement—which is now prevalent in California under the mantra of preserving local control—should be less under a safety valve of cap-and-trade trading because jurisdictions, and the policymakers who represent them, would now have an alternative to accepting further affordable housing that is under their local control. Thus, there is a conceivable way to address the sobering reality that the building of greater affordable housing in a neighborhood really does have an impact on the neighborhood's existing home values. And that is a reasonable concern even for a socially conscious homeowner.

Notes

1. Values drawn June 14, 2018, from CA Association of Realtors (http://www.car.org/marketdata/data/countysaleactivity) and Census Bureau (https://www.census.gov/construction/nrs/pdf/uspricemon.pdf).
2. Nichols (2017) notes that California's rate of poverty is the highest in the nation after consideration of its high cost of living.

3. An alternative explanation is that even absent these reasons, the typical homebuyer prejudges the likely occupants of affordable housing and does not desire them in their neighborhood. Regardless of whether this is true, the logic behind NIMBYism being a protection of home value still holds.
4. See Lewis (2003) and Ramsey-Musolf (2016) for background on California's Housing Element Law.
5. We are aware of the potential limitations of the broader usefulness of our findings caused by using only a single geography. In response we can only add that the racial/ethnic diversity of Sacramento County, as described by Narula (2014) citing the work of Randy Olson, is in the top 5% of all United States counties and in the same *highly diverse* category as Los Angeles County and counties in the San Francisco Bay Area. Furthermore, Graham (2018, p. 458) identifies the Sacramento Metropolitan Area as the eighth most racially integrated in the United States. If such diversity results in greater tolerance, the magnitude of the NIMBY influence detected here may be lower than if a similar analysis done for a less diverse county. We leave it to others to confirm this.
6. Census block groups are divisions of census tracts that generally contain between 600 and 3,000 people. Each census tract contains at least one block group, but larger census tracts can contain more than one block group.
7. This is standard in hedonic regression analysis. Although some confusion occurs when the measure of an explanatory variable is a percentage point value (as are all the variables in Table 1 with % as the unit of measurement), here a 1-unit change is a 1-percentage-point change, that leads to a 1-percentage-point change in home value as represented by the regression coefficient multiplied by 100.
8. See https://fred.stlouisfed.org/series/MHICA06067A052NCEN

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No potential conflict of interest was reported by the authors.

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