Housing Policies in California Cities:

Seeking Local Solutions to a Statewide Shortfall

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Abstract. The urgent need for more housing in California is felt statewide, yet decisions about housing development are made at the local level. Some cities respond with policies that encourage housing development, while other cities have policies that deter growth. The housing shortfall has particular consequences for young people trying to rent their first apartments or buy their first homes. To ensure that the next generation of young people can afford to live in California, we have to consider the role of local policies and development in shaping their access to housing.

In this paper, I examine the ways that local land use policies and planning practices, along with housing, economic, and demographic characteristics, shape housing development in California cities and explore the implications of those patterns. I ask three primary research questions:

What city characteristics enable or inhibit housing development across various types of California cities? I find that less housing was built in cities with older housing and higher homeownership and vacancy rates. Single-family housing was built mainly in lower-middle-density cities, while multifamily housing was built in higher-density cities. More single-family housing was built in cities with higher housing prices; less where commuters take transit, bicycle, or walk. Employment access is related to more multifamily but not single-family development.

Which local housing policies are associated with housing development? I measure local policies using data collected through a statewide survey of planners, the Terner California Residential Land Use Survey. I find links with a range of policies, particularly for single-family housing. More single-family development occurred in cities with inclusionary housing incentives, higher approval rates, more land zoned for non-residential uses, and cities subject to urban growth boundaries. Unsurprisingly, more single-family housing was built in cities that annexed land, while building caps and land supply constraints were associated with reduced single-family development. Less multifamily housing was built in cities with higher parking requirements and more land devoted to single-family housing. Cities with longer approval times for affordable housing projects had less development overall.

How severe is the housing development shortfall in different parts of California, and what are the implications for young people? Discrepancies between housing development and job growth at the county level have been accompanied by sharp housing price increases. Young adults have formed fewer households and purchased fewer homes.

This research sheds light on the factors that affect housing development, reveals best practices for enabling development, and underscores the consequences of the housing shortfall for young people trying to find a place to live in California's increasingly crowded housing market.

Acknowledgments.

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Introduction

The urgent need for more housing is felt across California, as both rents and housing prices have reached new heights. Though the housing affordability crisis extends throughout the state, local decisions about development projects help determine where housing is built, and ultimately how much is built overall. Some cities respond to the need for more housing with policies that encourage housing development, while other cities have policies in place that deter growth. The housing shortfall has particular consequences for young people trying to rent their first apartments or buy their first homes. To ensure that the next generation of young people can afford to live in California, we have to consider the role of local policies and development in shaping their access to housing.

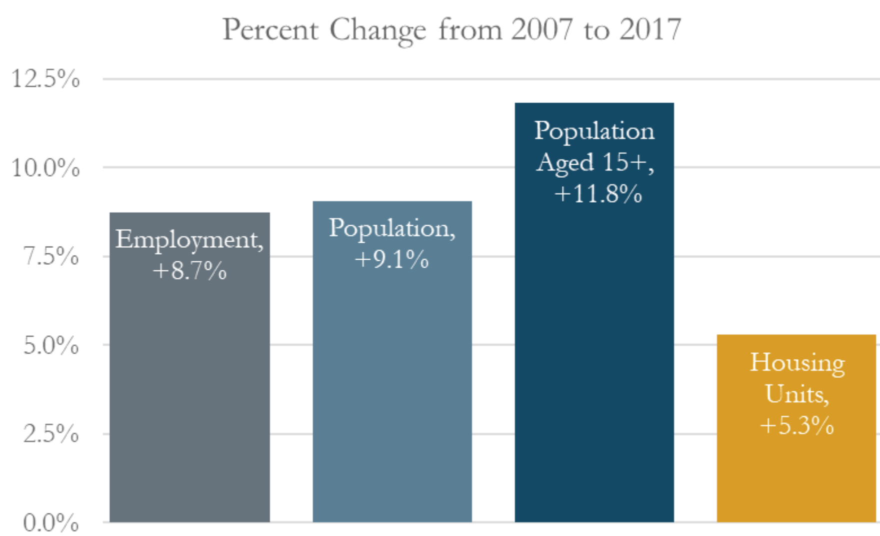
In this paper, I evaluate the local policies and planning practices that shape housing development in California cities, using new data collected through a statewide survey of planners, the Terner California Residential Land Use Survey. To understand how local housing policies relate to housing production, I combine the survey data with city-level data on building permits, as well as housing market, demographic, and socioeconomic indicators.

This paper addresses three main research questions: First, where has housing been built across various types of California cities? I use multivariate analysis to examine how housing construction between 2010 and 2017 is related to housing stock and housing market characteristics, employment access, and population composition in incorporated cities in California. Second, which local housing policies are associated with housing development? I evaluate the relationship between local housing policies and development across all California cities with survey responses. Finally, after addressing these two questions, I observe the wider, county-level patterns of housing development in comparison with increases in employment, and assess the housing attainment of young adults aged 25-34 in the counties most affected by the housing shortfall. This research reveals best practices for enabling housing development, as well as the local policies that discourage development, and sheds light on the consequences for young people trying to find a place to live in California's increasingly crowded housing market.

Background

California is a great place to live, with a thriving economy, vibrant and diverse cities, a balmy climate, and the natural beauty of beaches, deserts, and mountains. Over the past several decades, the demand for housing has grown faster in California than in other regions of the country, but housing construction has not kept up. Between the economic peak in 2007 and 2017, California had robust overall growth in both employment (adding 8.7 percent more jobs) and population (adding 9.1 percent more people and 11.8 percent more adults over age 15), as shown in Figure 1.[1] Based simply on population growth by age and existing headship rates, California would have needed to build at least 1,819,568 additional units during these ten years to house the added population.[2] Yet after 2007, the recession that began in 2008 ground construction to a halt. Even though construction picked up during the recovery, development remained well below the peak levels during the 1980s. With both new construction and demolitions factored in, the housing stock grew by only 5.3 percent from 2007 to 2017, less than two thirds the rate of population and employment growth. The total increase in housing units was 708,112, less than half of the estimated need.

Figure 1. Percent change in California population, employment, and housing units from 2007 to 2017



Estimated additional housing units needed, 2007 to 2017*: +1,819,568

Total change in the number of housing units, 2007 to 2017: +708,112

**Based on population growth by age group, holding 2007 age-specific headship rates constant.*

Data Sources: U.S. Census Bureau Intercensal Population Estimates; California Department of Finance Population and Housing Estimates; U.S. Census Bureau American Community Survey retrieved through Social Explorer; U.S. Bureau of Labor Statistics employment data accessed using the Federal Reserve Bank of St. Louis Economic Data portal.

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[1] 2007 represents the employment peak before the recession of 2008. After 2007, employment fell sharply until 2010, declining by 7.6 percent in three years. Then employment growth picked up and increased by 17.7 percent from 2010 to 2017. The recession and recovery together sum to overall growth of 8.7 percent from 2007 to 2017.

[2] This estimate does not take into account (a) housing affordability problems that already existed in 2007, (b) out-migration from California that occurred over the period, or (c) demolition and other losses of existing housing units—the amount of total development would need to be higher to meet housing needs.

As demand outpaced supply, California experienced extraordinary and sustained price increases. Why has there been so little housing development in response? A rich body of research offers a series of answers. In dense urban areas bounded by the ocean on one side and mountains on the other, there is little land available for new construction (Saiz, 2010). Redevelopment and infill development are expensive and difficult, in part because of local residents' opposition to new development, especially for multifamily and affordable housing (Pendall, 1999; Scally, 2013; Scally & Tighe, 2015; Whittemore & BenDor, 2018). Construction costs have risen for multiple reasons, from the prices of labor and materials to the exacting standards for new construction (Reid & Raetz, 2018). And local land use policies and planning practices—particularly growth management policies, zoning regulations, and the approvals process—can slow or even stifle development (Glaeser & Ward, 2009; Jackson, 2016; Mayer & Somerville, 2000).

Researchers have extensively studied the effects of local land use regulations on housing development, housing prices (Albouy & Ehrlich, 2018), and even more diffuse outcomes such as racial segregation (Lens & Monkkonen, 2016; Rothwell & Massey, 2010). Most of these studies rely on data from surveys of planners in local jurisdictions, most commonly the Wharton Survey on Residential Land Use Regulation (Gyourko, Saiz, & Summers, 2008) and the Brookings National Survey on Local Residential Development Regulation (Pendall, Puentes, & Martin, 2006), and more recently the California Land Use Survey (Jackson, 2018). In many cases, this data is aggregated to the metropolitan statistical area (MSA) level. The survey data is usually combined to form an index of the overall stringency of regulation, composed of sub-indices that measure various aspects of the regulation. Several researchers have more closely examined the ways in which specific policies or sets of policies influence development (Gabbe, 2018; Glaeser & Ward, 2009; Jackson, 2016; Lens & Monkkonen, 2016).

Still, more research is needed to understand how local policies and regulations are operating during the most recent period of a housing shortfall, to bring out the practical implications for local governments. To that end, this study is motivated by three main questions:

Question 1. What city characteristics enable or inhibit housing development across various types of California cities?

Question 2. Which local housing policies are associated with housing development?

Question 3. How severe is the housing development shortfall in different parts of California, and what are the implications for young people?

There is some debate over whether new housing development can truly make a difference for housing affordability (Been, Ellen, & O'Regan, 2019). As Been, Ellen, and O'Regan (2019) point out, some of the skepticism over whether supply can make a difference is because housing development happens at the local level, and the impacts on affordability may be diffused over a wide area. To understand the overall impacts of housing development throughout California, I zoom out from the city level to the county level. I compare employment growth with housing development to measure the discrepancy in different parts of California. This aggregate view gives a sense of the severity of the housing shortfall during the period since 2010, which serves as a benchmark for the first full year of economic expansion after the Great Recession.

To weigh the consequences of the shortfall, I examine both changes in housing prices and changes in housing outcomes for young adults in their late 20s and early 30s. This is a crucial stage of life when many establish households for the first time and homebuying begins in earnest (Clark, Deurloo, & Dieleman, 2003; Clark & Dieleman, 1996; Myers, 1983). Because young people are just starting out in the housing market, they are more sensitive to immediate housing market conditions than older people, many of whom formed households and purchased homes in previous decades and have the option to remain in their current housing. Housing market conditions when people are beginning their housing careers can have lasting impacts on their lives (Clapham, 2005). Those who face housing cost burdens have limited ability to save for the future (Mendenhall, Kramer, & Akresh, 2014), and those who are unable to buy homes are denied both the savings mechanism and the tax advantages of mortgage payments. Examining the consequences of the shortfall for young people adds urgency to the call for state and local policymakers to find ways to address the need for more housing in California.

Methods

To answer these questions, I use regression analysis to model housing development in California cities as a function of city characteristics and local housing policies.[3] Housing development is measured as a count of the units permitted during the period of 2010 through 2017, using data from the U.S. Census Bureau Building Permits Survey. I run separate regressions for single-family, multifamily, and total housing units to reflect the fact that local policies likely apply differently to single-family and multifamily development.

The first set of regressions seeks to identify the various factors associated with housing development at the city level, from housing stock and housing market characteristics to employment and commuting patterns to population composition and city size. I model how these city characteristics, measured using 2000 U.S. Census data,[4] influence how much housing was permitted between 2010 and 2017. The models include measures of city size and density, commuting patterns, housing stock age, local housing market conditions, and demographic composition. I also control for the region in which the jurisdiction is located, to account for broader economic conditions surrounding each city. (For example, a city in the Bay Area may experience different drivers of housing demand and supply than a city in the Central Valley.)

The second set of regressions seeks to tease out whether local policies played a role in the change in supply. Because this analysis focuses on jurisdictions within the same state, where the overall housing policy framework is consistent, I am able to hone in on the impacts of specific local policies on housing development. The policy variables are measured using data from the Terner California Residential Land Use Survey (Mawhorter & Reid, 2018), a new statewide survey of local jurisdictions that includes measures of zoning regulations, growth management policies, the approvals process, affordable housing policies, and development constraints.

Following these two analyses, I turn to the consequences for the broader California housing market, and for young adults in particular. I measure the shortfall between employment increases and housing development at the county level, looking at changes between 2010 and 2017 using the latest available employment data. I also calculate changes in per capita headship, homeownership, and rentership rates for young adults aged 25-34 to see how their housing attainment is faring in the counties facing the most severe housing shortfalls.

Findings

In order to understand the factors that influence development, it is helpful to begin with a clear picture of development patterns over time and over space. In the period from 2010 to 2017, housing development recovered from unprecedented lows after the recession of 2008, as shown in Figure 2. Multifamily construction met and even exceeded the amount of multifamily development during the previous boom, while single-family construction barely recovered. The reduced share of single-family housing may represent a welcome shift away from the exurban sprawl of the 2000s, yet multifamily development has not taken up the slack to produce enough units to meet housing needs.

Despite the rebound in new construction in the state overall, the amount of new housing built over this time period is incredibly uneven from city to city. Many cities added little to no housing at all. During the seven-year period from 2010 to 2017, 99 cities—over 20 percent of all cities in California—added less than 1 percent to their housing stock through permitted construction. Housing production levels can vary widely from one jurisdiction to the next, even between similar cities located in the same region. To the east of Los Angeles, 134 housing units were permitted in Monrovia between 2010 and 2017, adding less than 1 percent to the initial housing stock of 14,500 units, while in neighboring Arcadia 1,536 units were permitted, adding 7.4 percent

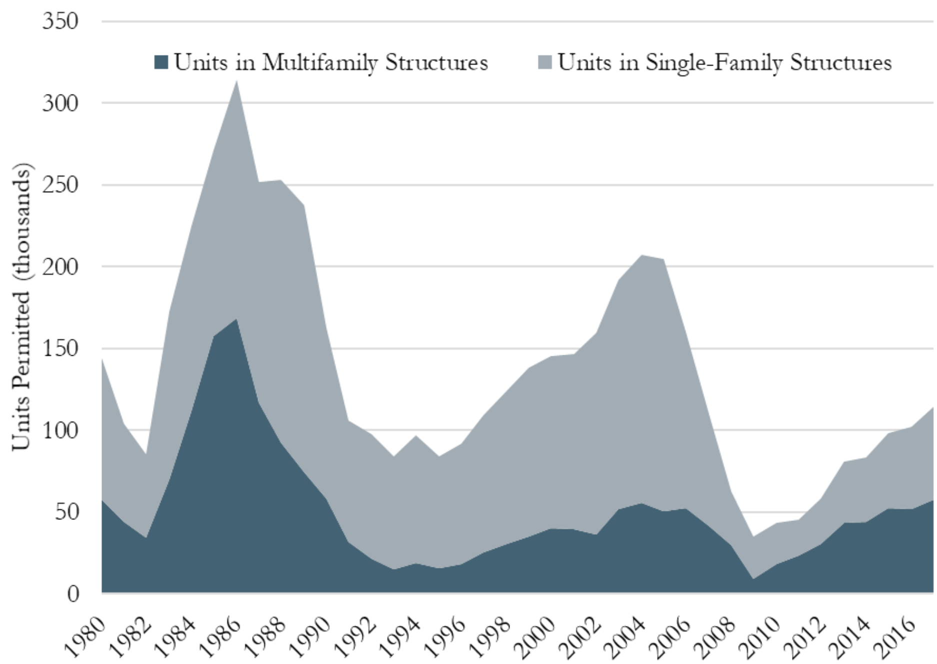
[3] More details about the analytical approach are described below, and summary statistics and model specification notes are available in a technical appendix.

[4] Lagged ten years before the start of the dependent variable in order to reduce the potential for endogeneity.

to the housing stock of 20,700 units. North of the San Francisco Bay Area, only 74 housing units were permitted in San Rafael, adding 0.3 percent to the initial housing stock of 24,000 units, while in nearby Novato 1,254 units were permitted, adding 5.9 percent to the housing stock of 21,000 units. Understanding what is driving these differences can help policymakers develop better solutions to address California's housing shortfall.

It is somewhat surprising to see no clear distinctions between urban, suburban, and exurban places in terms of development patterns. However, this seemingly haphazard distribution of development can be partially explained by the differences in the location of various types of development. When multifamily and single-family development are mapped separately, as in Figure 4 and Figure 5, rough geographic patterns

Figure 2. Housing units permitted in California by structure type, 1980-2017

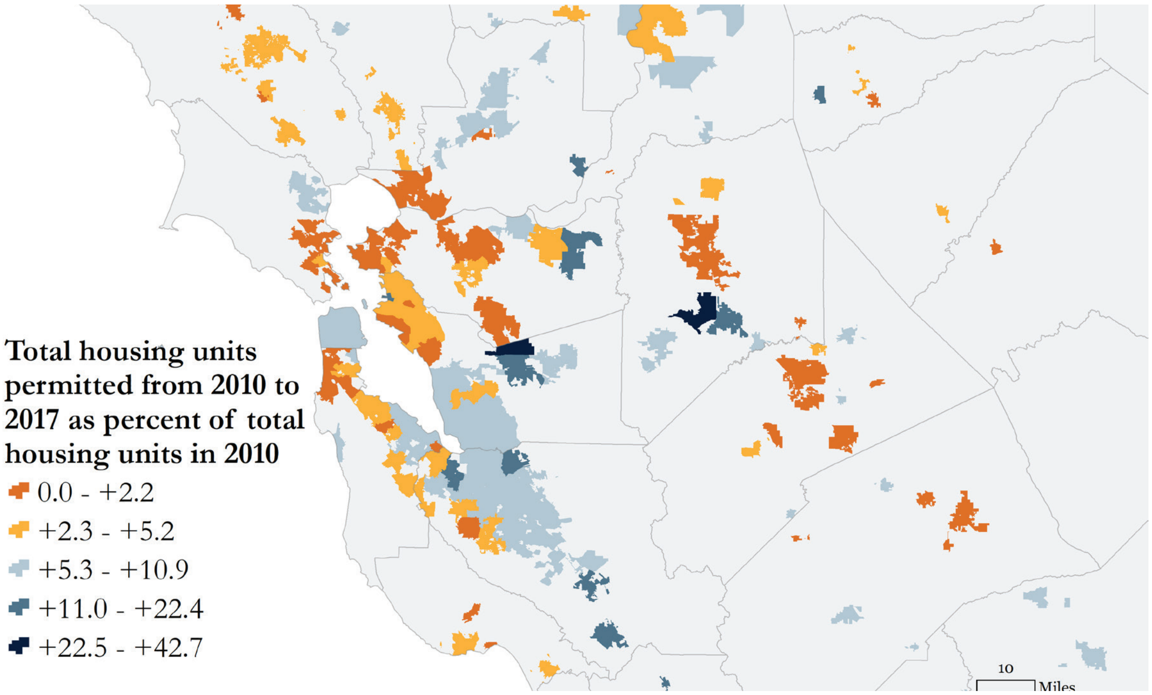


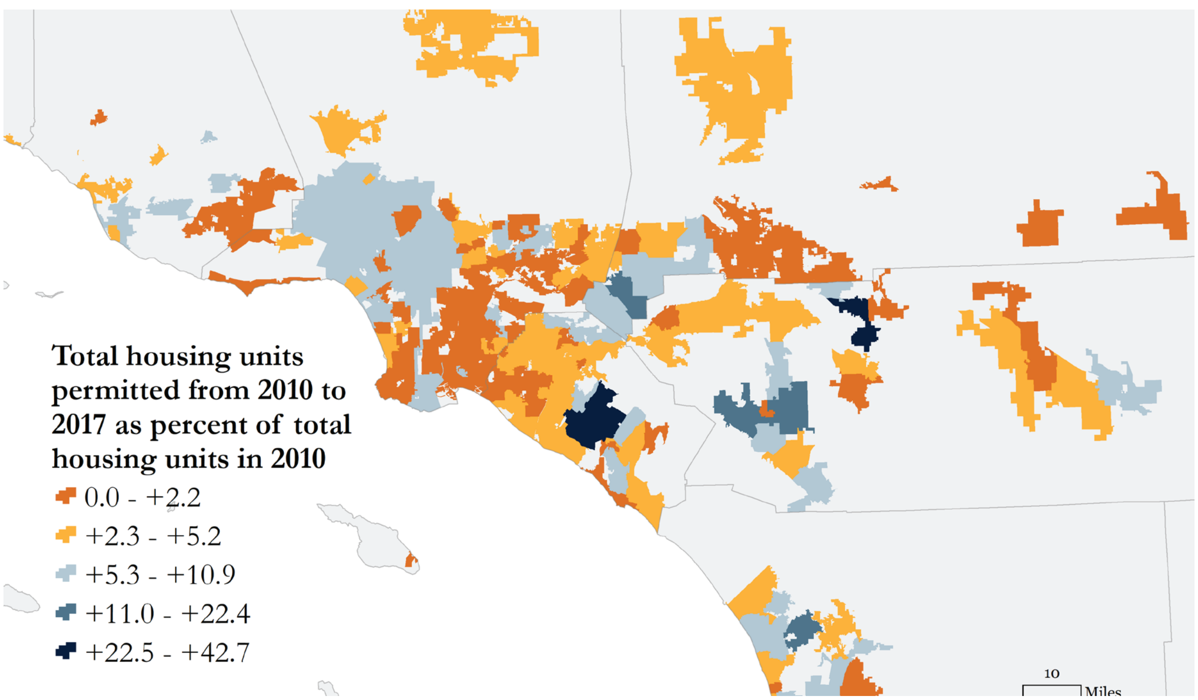
Data Source: U.S. Census Bureau Building Permits Survey, accessed using the HUD State of the Cities Data System.

Figure 3 maps the percent added to the housing stock through permitted construction in the San Francisco Bay Area and the Los Angeles region. It is immediately noticeable that very few cities within these booming metropolitan regions are in the top two quintiles in the state in terms of development. In the extent of both maps, only two relatively far-flung suburbs make it into that top quintile (Dublin and Lathrop in the San Francisco Bay Area, and Irvine and Beaumont in the Los Angeles area). Some of the major cities—Los Angeles, San Francisco, and San Jose—fall in the middle quintile of development. Beyond those cities and a few others, broad swaths of the suburbs fall into the lowest two quintiles among California cities. There is no obvious geographic pattern to the places with more housing development, which span urban, suburban, exurban, and rural cities.

begin to emerge. Very little single-family housing is built in dense urban cores and inner-ring suburbs, either in the San Francisco Bay Area or in the Los Angeles region. In contrast, more multifamily housing is built in those same urban cores. Still, there are still a handful of inner-ring suburbs with little to no single-family or multifamily housing development (particularly along the peninsula south of San Francisco and to the north in Marin County, and to the south and east of the City of Los Angeles). For both single-family and multifamily housing, the cases where cities have either much higher or much lower housing development than their neighbors warrant further attention. Can these differences be explained by city characteristics that are not obvious on the map, or can they be attributed to local policies?

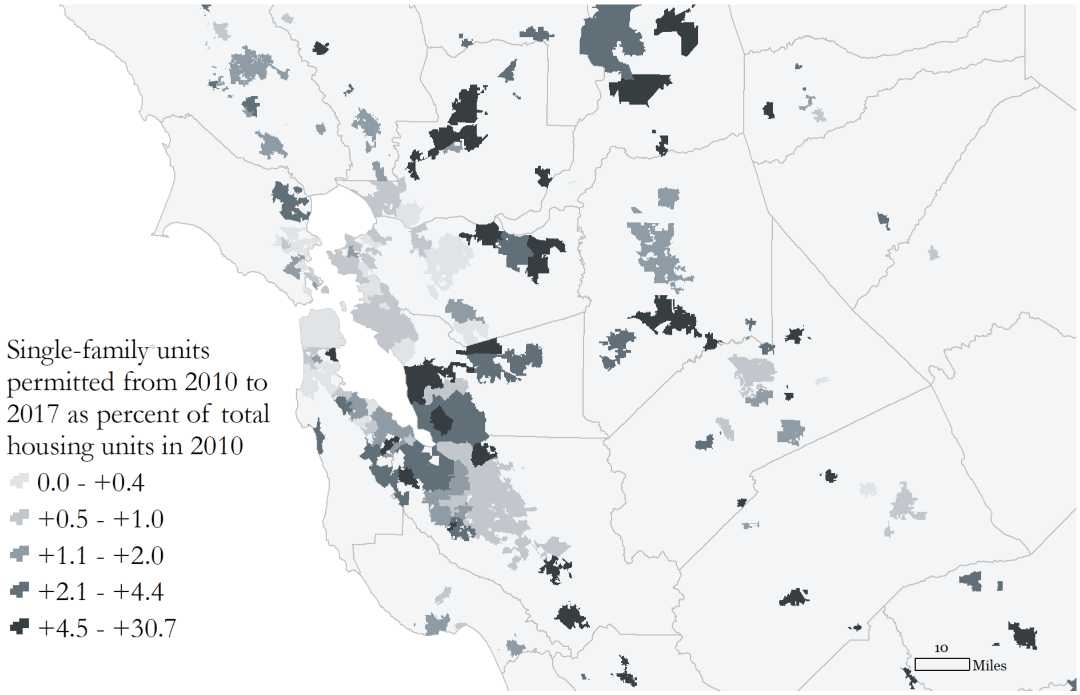
Figure 3. Maps of percent added to the housing stock from 2010 to 2017 in the San Francisco Bay Area and Los Angeles region, by quintile among California cities

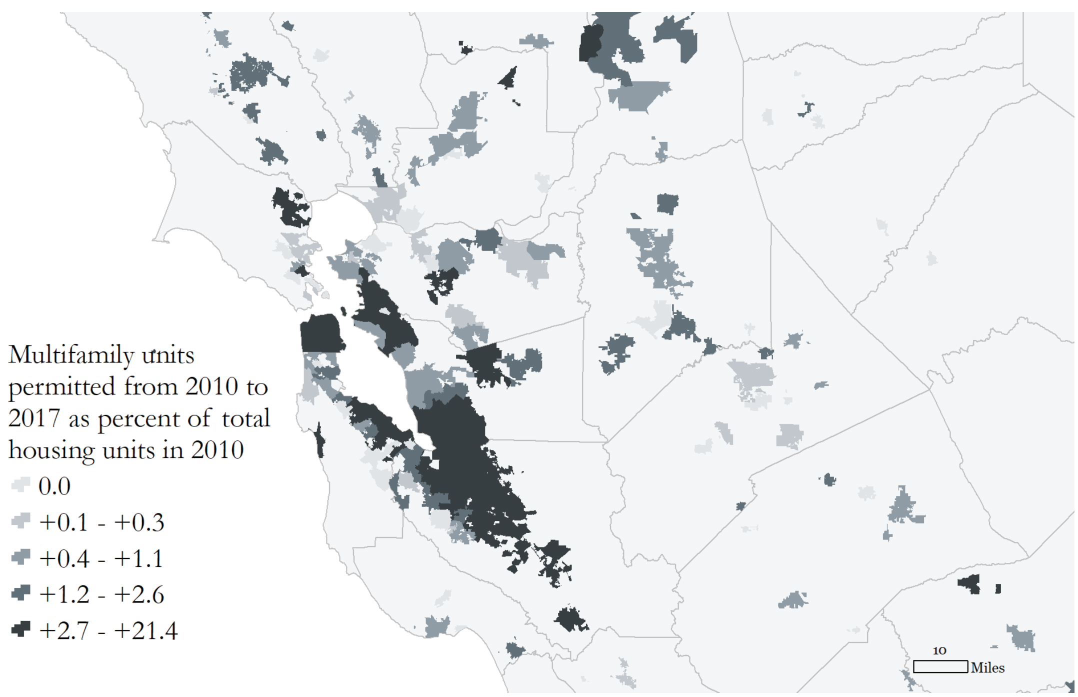




Data Sources: U.S. Census Bureau Building Permits Survey, https://www.census.gov/construction/bps/; California Department of Finance Housing Estimates, http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/

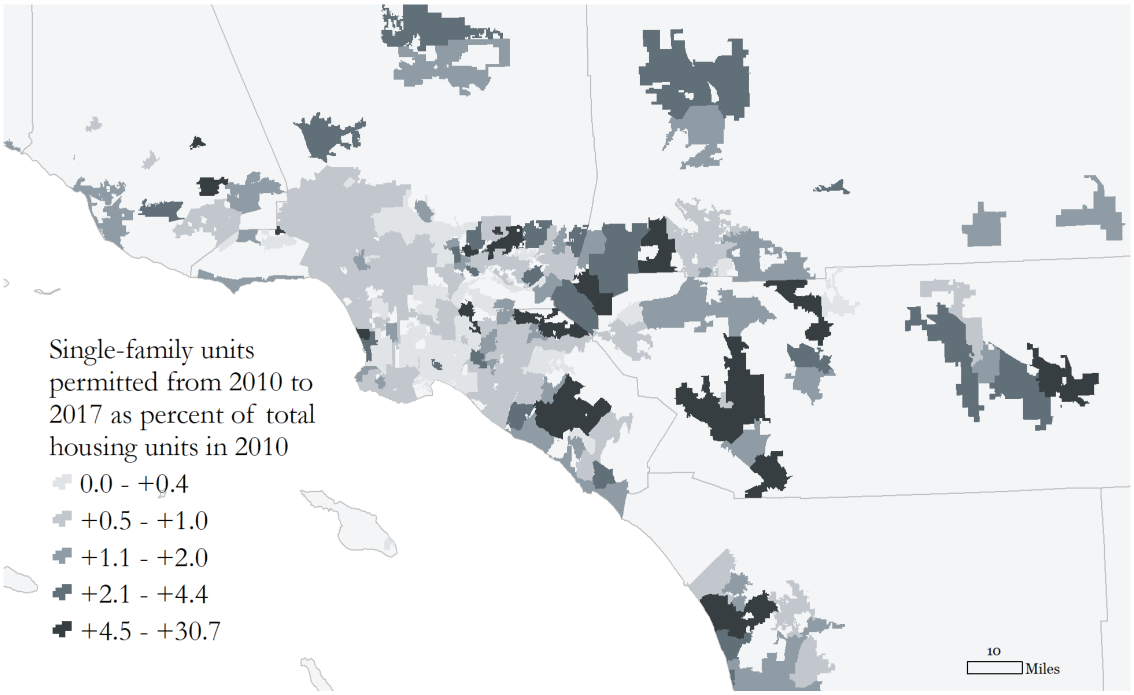
Figure 4. Maps of percent added to the housing stock from single-family and multifamily permits from 2010 to 2017 in the San Francisco Bay Area, by quintile among California cities

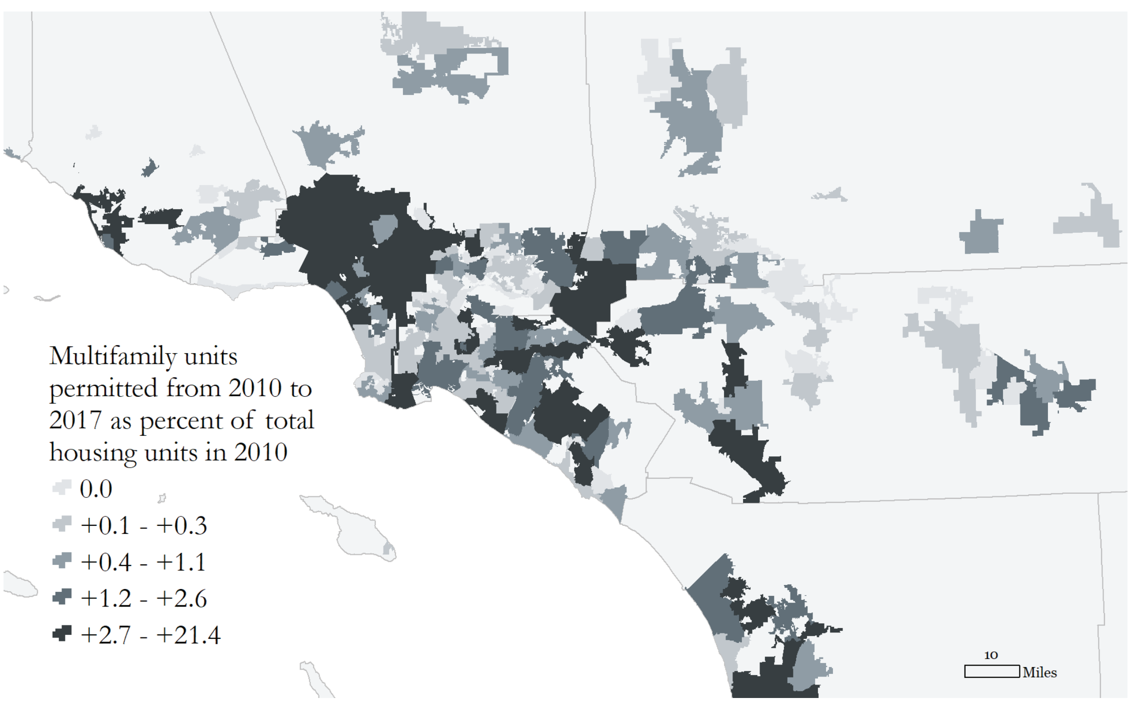




Data Sources: U.S. Census Bureau Building Permits Survey, https://www.census.gov/construction/bps/; California Department of Finance Housing Estimates, http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/

Figure 5. Maps of percent added to the housing stock from single-family and multifamily permits from 2010 to 2017 in the Los Angeles region, by quintile among California cities





Data Sources: U.S. Census Bureau Building Permits Survey, https://www.census.gov/construction/bps/; California Department of Finance Housing Estimates, http://www.dof.ca.gov/Forecasting/Demographics/Estimates/E-5/

Question 1. What city characteristics are associated with housing development?

The first goal of this paper is to make some sense of the variation in housing development rates across California cities. To understand the city features that facilitate or inhibit development, I use multivariate analysis to measure the relationships between the number of housing units permitted between 2010 and 2017 and a range of factors, from housing stock and housing market conditions to employment access and population composition.[5] Each of the measures included in the model is likely to be associated with housing development in some way, either facilitating or inhibiting development. Table 1 gives examples of city characteristics and housing development rates across a wide variety of California cities.[6]

The housing stock is characterized by two main measures: housing density (housing units per square mile) and when housing was built (the percent built before 1940, from the 1940s to the 1960s, in the 1970s and 1980s, and since 1990, all measured in 2000). In cities with denser housing, it may be more difficult and expensive to build because of a limited amount of available land. On the other hand, multifamily housing may be more likely to be built in cities that already have dense housing. And urban agglomeration in denser cities may spur higher demand for new housing. Cities with older housing are likely to have less new housing development because they have had more time to grow and fill in their boundaries during previous waves of development, and because of the expense and difficulty of redevelopment (similar to the effect of housing density).

The three measures used to describe the local housing market are the homeownership rate, the for sale vacancy rate, and the median house value. Higher homeownership rates may lead to reduced housing development, especially for multifamily housing, as there is some evidence that homeowners may be more prone to oppose local housing development (Scally, 2013; Whittemore & BenDor, 2018). A measure of structure type (single-family or multifamily housing) is not included in the model because it is highly correlated with homeownership rates and housing density. High for sale vacancy rates reflect weak demand for housing in a city, especially in a state with such strong housing demand overall.[7] In cities with high for sale vacancy rates, substantial new housing development is unlikely. Median home values measure the relative desirability of the city and reflect the value of many other city characteristics such as socioeconomic status, school quality, crime rates, employment access, open space, and other amenities (Bostic, Longhofer, & Redfearn, 2007).[8]

Employment access and commuting patterns measure both the potential housing demand pressure in a city and a city's position on the urban-suburban-exurban continuum. Employment access is measured by counting the jobs within the city plus jobs surrounding the city, weighted by how close they are to the city.[9] Theoretically, cities with more jobs nearby should have greater demand for housing and more development, controlling for other factors. Commuting patterns are measured as the percent of workers who commute by public transit, on a bicycle, or by walking to work. Along with housing density

[5] Since the dependent variable is measured in counts, with a highly skewed distribution, negative binomial regression models are the best fit to analyze the data. In order to adjust for the wide variation in city size, I include an exposure variable in the model: the baseline number of housing units in 2010. All other city characteristics were measured in 2000, a full decade before the period in question, to reduce endogeneity.

[6] See the technical appendix for summary statistics of all the measures included in the model.

[7] For sale vacancy rates are a better indicator of housing market weakness than rental vacancy rates in part because they fluctuate less than rental vacancy rates, and are more likely to reflect underlying lack of demand for housing in a city. Renters move far more often than homeowners, so higher rental vacancy rates may reflect higher rates of residential mobility rather than weak demand for housing (Gabriel & Nothaft, 2001).

and employment access, this measure gives a sense of whether a city is located in a metropolitan center.

Population composition and city size are included as control variables in the model. Population characteristics such as the percent non-Hispanic White and the percent immigrants may have some impacts on housing construction in a city through resident attitudes towards new development, though these variables are conceptually distinct from a physical constraint such as density or the age structure of the housing stock, and are more directly measured in the survey data analyzed in the following section. City size could potentially influence housing development through both the administrative capacity of the city government and agglomerative effects. Finally, regional fixed effects account for differences in economic conditions and regional governance of the two largest metropolitan statistical areas (MSAs), four major councils of governments (COGS), and four rural areas of California.

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[8] Median home values provide a more accurate measure of housing prices than median rents at the city level, since there are cities in California with very few rental housing units, but there is a large enough share of owner-occupied homes in all California cities. Median home values and median rents are highly correlated. I ran the regressions again with median rents substituted for median home values, and the coefficients were similar.

[9] The measure of employment access is calculated using an inverse-distance-weighted gravity model, with employment data from the Bureau of Labor Statistics Zip Code Business Patterns interpolated to census tracts using the US Department of Housing and Urban Development USPS Zip Code-Census Tract Crosswalk Files, and distances between census tracts from the Census Tract Distance Database from the National Bureau of Economic Research.

Table 1. Housing development from 2010 through 2017 and city characteristics (measured in 2000) for a variety of California cities

	Housing Units, 2010	Percent Units Added Through Building Permits, 2010-2017			Housing Units Per Square Mile	% Hsg. Built Before 1940	Home-ownership Rate	For Sale Vacancy Rate	Median House Value	Employ-ment Access	% Take Transit, Bicycle, Walk
		All Units	*Single-family*	*Multifamily*							
San Francisco Bay Area											
San Francisco	376,162	6.6	.1	6.5	7,421	49.9	35.0	.8	$623,854	32	42.5
San Jose	314,038	7.1	.5	6.6	1,612	5.2	61.8	.4	$554,193	31	6.1
Oakland	169,710	5.2	.5	4.7	2,810	35.1	41.4	1.0	$335,467	30	22.4
Fremont	73,989	6.2	2.4	3.8	906	1.6	64.5	.6	$522,904	30	6.6
Berkeley	49,454	3.1	.2	2.9	4,482	48.8	42.7	.7	$552,422	29	39.1
San Leandro	32,419	.7	.1	.6	2,387	11.7	60.6	.6	$339,009	29	12.7
San Ramon	26,222	.8	.1	.7	1,516	.2	71.3	.4	$621,345	29	6.2
San Rafael	24,011	.3	.2	.1	1,383	11.1	53.8	.9	$674,477	29	16.7
Novato	21,158	5.9	2.3	3.6	686	2.9	67.6	.9	$538,401	28	10.4
Milpitas	19,806	20.1	5.0	15.0	1,280	.7	69.8	.4	$535,892	30	3.5
Dublin	15,782	42.7	30.7	12.0	784	1.2	64.9	.7	$483,055	28	7.0
Los Altos	11,204	6.1	3.7	2.4	1,689	6.1	85.6	.3	$1,436,768	29	3.8
Belmont	11,028	1.0	.4	.7	2,337	3.4	60.2	.3	$858,666	27	5.5
Sacramento Area											
Sacramento	190,911	3.7	2.1	1.7	1,688	13.0	50.1	2.0	$185,961	31	8.7
Roseville	47,757	13.9	12.4	1.5	1,048	3.6	69.5	1.3	$283,812	29	2.7
Citrus Heights	35,075	.4	.4	.0	2,432	1.2	57.2	1.0	$195,849	28	3.7
Central Valley											
Fresno	171,288	5.4	4.0	1.4	1,428	6.5	50.6	1.9	$140,061	30	5.4
Bakersfield	120,725	8.8	7.5	1.3	780	4.3	60.5	2.0	$152,753	30	3.6
Stockton	99,637	1.7	1.2	.5	1,500	8.5	51.6	1.4	$173,416	30	4.9
Modesto	75,044	.8	.6	.2	1,877	4.7	58.7	1.2	$182,714	30	3.8
Manteca	23,132	16.1	14.8	1.3	1,064	2.7	63.0	1.1	$224,629	28	3.9
Central Coast											
Santa Barbara	37,820	2.3	1.0	1.3	1,954	19.0	42.0	.7	$692,630	29	14.1
San Luis Obispo	20,553	4.2	2.9	1.3	1,811	11.3	41.9	1.1	$373,250	29	14.7
Monterey	13,584	.6	.2	.4	1,586	12.9	38.5	1.0	$578,840	29	21.0
Seaside	10,872	.1	.1	.1	1,247	4.0	44.0	2.9	$342,699	27	9.5
Marina	7,200	6.6	4.2	2.4	976	1.2	45.8	6.4	$344,027	26	5.1
Los Angeles Area											
Los Angeles	1,412,006	5.7	.8	5.0	2,852	16.7	38.6	1.8	$318,200	33	14.4
Long Beach	176,032	1.4	.2	1.3	3,403	17.9	41.0	2.2	$293,110	30	9.9
Anaheim	104,237	4.7	.5	4.2	2,037	2.4	50.0	.9	$301,079	31	8.0
Irvine	81,110	33.8	12.5	21.4	1,163	.1	60.0	1.1	$444,830	31	6.6
Santa Ana	76,919	2.4	.7	1.7	2,748	6.2	49.3	.8	$255,770	31	11.8
Pasadena	59,551	4.0	.4	3.5	2,344	30.0	45.8	1.4	$395,683	30	11.4
Rancho Cucamonga	56,618	4.6	3.3	1.2	1,125	1.0	70.2	1.2	$260,345	29	3.2
Santa Monica	50,912	3.0	.6	2.4	5,794	16.6	29.8	1.4	$707,241	30	9.7
West Hollywood	24,588	8.4	.3	8.1	12,821	18.2	21.6	1.7	$388,747	29	11.2
Chino	21,797	18.3	10.7	7.6	850	1.7	68.7	.9	$252,523	29	4.6
Culver City	17,491	1.4	.5	1.0	3,349	10.9	54.4	1.2	$401,292	29	8.6
Rancho Santa Margarita	17,260	1.0	.6	.4	1,346	.0	78.3	.5	$402,767	28	1.8
Beverly Hills	16,394	2.2	1.5	.7	2,794	34.6	43.4	1.6	$1,466,433	29	7.3
San Diego Area											
San Diego	515,275	6.5	1.2	5.2	1,448	7.7	49.5	.8	$324,693	32	8.6
Oceanside	64,435	2.2	1.0	1.2	1,468	2.0	62.1	1.0	$273,628	29	5.4
Escondido	48,044	2.8	1.0	1.7	1,242	2.4	53.2	1.0	$262,706	29	5.6

Table 2 shows the results of negative binomial regressions modeling the effects of city characteristics on the number of units permitted in California cities from 2010 through 2017. The first model is for the total number of units permitted, the second model is for single-family units, and the third model is for multifamily units. The results are displayed as incidence rate ratios (IRRs). IRRs above 1 indicate a positive association between the city characteristic and the number of housing units permitted, while IRRs below 1 indicate a negative association.[10] For example, in the total units model the IRR of 1.091 ($p<.05$) for logged employment access means that a one-unit increase in employment access corresponds with a 9.1 percent increase in the predicted number of units permitted, with a confidence level of over 95 percent. An IRR of .906 ($p<.01$) for the for sale vacancy rate means that a one percentage point increase in a city's for sale vacancy rate is associated with a 9.4 percent decrease in the predicted number of units permitted, with a confidence level of over 99 percent.

[10] IRRs are multiplicative: For every one unit increase in the independent variable, the predicted number of housing units permitted is multiplied by the IRR.

Table 2. Estimated incidence rate ratios from negative binomial regressions analyzing the number of housing units permitted in California cities, 2010 to 2017

	Dependent variable: # housing units permitted, 2010-17		
Independent variables:	**Total units**	**Single-family**	**Multifamily**
All independent variables measured in 2000.	Exposure variable: Total number of housing units, 2010		
Housing characteristics:			
Housing density (ln)	1.533	4.193 *	15.151 ***
	1.235	*2.925*	*12.359*
Squared housing density (ln)	.945	.866 **	.823 **
	.057	*.046*	*.051*
When housing was built (Reference category: Percent of housing units built since 1990)			
Percent built 1970 to 1989	.976 ***	.972 ***	.986
	.007	*.008*	*.010*
Percent built 1940 to 1969	.966 ***	.967 ***	.969 ***
	.005	*.006*	*.007*
Percent built before 1940	.972 ***	.962 ***	.972 *
	.008	*.008*	*.014*
Homeownership rate	.984 **	.985 *	.968 ***
	.006	*.007*	*.008*
For-sale vacancy rate	.906 **	.921 *	.806 **
	.034	*.033*	*.057*
Median house value ($10,000s)	1.004	1.008 **	.993
	.003	*.003*	*.005*
Employment and commuting:			
Employment access (ln)	1.091 *	1.008	1.178 **
	.048	*.064*	*.072*
Percent commute by transit, bicycle, or walking	.991	.970 **	1.000
	.010	*.012*	*.019*
Population composition:			
Percent non-Hispanic White	1.001	.990 *	1.009
	.005	*.005*	*.008*
Percent foreign born	1.011	.984	1.032 *
	.008	*.008*	*.013*
City size:			
Total population (ln)	.988	.925	1.161
	.062	*.072*	*.117*
Regional fixed effects†	yes	yes	yes
N	456	456	456

Robust standard errors in italics below incidence rate ratios. *$p<0.05$, **$p<0.01$, ***$p<0.001$

† The ten California regions in this study consist of the two largest metropolitan statistical areas (MSAs): (1) Los Angeles-Long Beach-Anaheim, (2) San Francisco-Oakland-Hayward; the four major councils of governments (COGs): (3) Southern California Association of Governments outside the central MSA, (4) Association of Bay Area Governments outside the central MSA, (5) Sacramento Area Council of Governments, and (6) San Diego Association of Governments; and the remaining counties aggregated into (7) Northern California, (8) Central Coast, (9) Central Valley, and (10) Sierras.

More new housing is built in cities with greater access to jobs, and less new housing is built in cities with older housing, higher homeownership rates, and higher vacancy rates.

The results for the first model indicate that the variation in total housing development across cities is associated with housing stock characteristics, housing market features, and employment access. Overall, less housing is built in cities with an older housing stock. This result holds for housing built before 1940; housing built during the 1940s, 1950s, and 1960s; and housing built during the 1970s and 1980s, as compared with housing built during the 1990s. For each additional percent more housing built before 1940; the model predicts 2.8 percent fewer units permitted (IRR .972, $p<.001$), controlling for other factors. For every one percent more housing built during the 1940s, 1950s, and 1960s; the model predicts 3.4 percent fewer units permitted (IRR .966, $p<.001$). For every one percent more housing built during the 1970s and 1980s, the model predicts 2.4 percent fewer units permitted (IRR .976, $p<.001$). These results are consistent with the idea that in established cities where much of the existing housing stock was built in previous decades, there may be less space for new housing development.

Cities with higher homeownership rates experience lower amounts of housing development. A one percentage point higher homeownership rate corresponds with 1.6 percent fewer predicted units permitted (IRR .984, $p<.01$). Weak housing demand in 2000 is also associated with less housing development from 2010 through 2017; a one percentage point higher for sale vacancy rate is associated with 9.4 percent fewer units permitted (IRR .906, $p<.01$). Though comparing the IRRs may seem as though for sale vacancy rates has a larger impact on development than homeownership rates, it is important to understand the results in the context of the measures themselves. For sale vacancy rates range from a low of 0 percent to a high of 8.2 percent, with a mean of 1.5 percent and a standard deviation of 1.3 percent. A one percentage point difference in the for sale vacancy rate is nearly a standard deviation. Homeownership rates vary much more widely, from a low of 16.0 percent to a high of 97.1 percent, with a mean of 60.8 percent and a standard deviation of 14.1 percent. A homeownership rate one standard deviation higher than the mean predicts a 20.7 percent reduction in permitted units, while a for sale vacancy rate one standard deviation higher than the mean predicts an 11.8 percent reduction in permitted units. Each is a fairly large effect, both statistically significant and substantively important.

Job proximity appears to play a role in the location of housing development as well: A one standard deviation increase in employment access is associated with a 17.3 percent more permitted units (IRR 1.091, $p<.05$). While these results for the first model make sense, none of the other variables in the model have a measurable association with the total number of units permitted in a city. As the maps reveal, single-family and multifamily housing development are proceeding in different locations, so the results may be different for the two types of construction.

More single-family housing is built in lower-middle-density cities with higher housing prices; less single-family housing is built in cities with older housing, higher homeownership and vacancy rates, and more commuters who take transit, bicycle, or walk to work.

Similar to the results for all permitted units in the first model, more single-family units are permitted in cities with less older housing, lower homeownership rates, and lower vacancy rates. However, job proximity does not have a measurable association with single-family housing development. Other factors come into play for single-family development instead.

The most single-family units are permitted in lower-middle-density cities. At the lowest densities there is a great deal of variation in the predictions, though lower densities generally have lower predicted single-family development, and there is a generally upward swing to the relationship. The predicted number of single-family housing units permitted peaks around one standard deviation below the mean. Beyond that point, the relationship becomes negative, and fewer single-family units are permitted at higher housing densities. For example, the model predicts that an average-density city would have 32.8 percent fewer single-family units permitted compared with a city at one standard deviation below the mean. This suggests that more single-family housing is built in low-density suburbs and exurban cities, though slightly less in the lowest-density rural cities.

More single-family units are permitted in cities with higher house values, controlling for other factors. The average California city's median house value was $369,000 in 2000 (measured in inflation-adjusted 2017 dollars). A city with a median house value of $667,000, a standard deviation above average, is predicted to have 27.3 percent more single-family units permitted. The effect is measured much more precisely at lower housing values, suggesting that low housing values act as a limiting factor for development, rather than high housing values attracting more development to a city.

Though job proximity apparently plays little role in the location of single-family development, commuting patterns do seem to matter. In this case, urban cities where a higher percentage of commuters use public transit, bicycle, or walk to work experienced less single-family development. A one standard deviation increase in workers who ride public transit, bicycle, or walk to work is associated with a 16.5 percent reduction in the predicted number of single-family units permitted (IRR .970, p<.01). This result, combined with the finding that less single-family housing is permitted in denser cities and in cities with older housing, means that far less single-family housing is permitted in well-established, dense, urban cities compared with other places.

Compared with similar cities, a city with a larger non-Hispanic White population one standard deviation above the mean is predicted to have 23.2 percent fewer single-family units permitted (IRR .990, p<.05). This relationship is statistically significant despite controlling for the percent immigrants and the other factors in the model. Among cities with smaller White shares of the population, there is a great deal of variation in the predictions, which suggests that the negative relationship between a larger White population and single-family development is an accurate interpretation, rather than picking up a positive relationship between single-family development and the presence of other racial and ethnic groups.

More multifamily housing is built in higher-density cities with greater employment access, and less multifamily housing is built in cities with older housing, higher homeownership rates, and higher vacancy rates.

The relationships look somewhat different for multifamily development. There are a few similarities: Less multifamily development is predicted in cities with older housing (the IRR for the percent built before 1940 is .972, p<.05, and the IRR for the percent built in the 1940s, 1950s, and 1960s is .969, p<.001); less multifamily development is predicted in cities with higher homeownership rates (IRR .968, p<.001); and much less multifamily development is predicted in cities with higher for sale vacancy rates (IRR .806, p<.01). From there the associations diverge. Unlike the results for single-family development, there is no visible relationship between multifamily development and median house values,[11] the share of workers who commute by transit, bicycling, or walking, or the percent non-Hispanic White.

Though the basic shape of the quadratic association between housing density and multifamily is an inverted U, similar to the association with single-family development, the model predicts more multifamily development in much denser cities. In this case, very few multifamily permits are issued in low-density cities, and the predicted number of permits rises until the very highest densities, where there is wide variation in multifamily development.

The strong relationship between employment access and multifamily development (IRR 1.178, p<.01) must drive the positive but weaker association between employment access and total development (IRR 1.091, p<.05), since there is no visible relationship between employment access and single-family development. For multifamily development, 35.2 percent more permitted units are predicted in cities one standard deviation above the mean employment access.

[11] In an alternate model specification including median rents instead of median house values, there was still no statistically significant relationship of housing prices with multifamily development.

There is no measurable association between multifamily development and cities where more workers commute by public transit, bicycling, or walking to work, and fewer single-family units are permitted in cities where more workers use these more sustainable commute modes, controlling for other factors. These findings do not bode well for California's chances of meeting its emissions reduction goals.

There is no visible relationship between the non-Hispanic White share of the population and multifamily development, and in contrast with the negative relationship with single-family development, the IRR is slightly above one. In this case, the population characteristic that seems to matter is the immigrant share of the population. More multifamily development is predicted in cities with larger immigrant populations in 2000 (IRR 1.032, $p<.05$), though there is a lot of variation around the predictions at the upper end of the range. It is clearer that cities with very few immigrants in 2000 see less multifamily development in the 2010s. Multifamily development is predicted to be 33.7 percent lower in cities one standard deviation below average in terms of their immigrant population. Given the opposing results for single-family and multifamily housing, it is unsurprising that both demographic variables are not associated with the total housing units permitted.

Taken together, these results give a solid understanding of the types of California cities where single-family and multifamily development are occurring. Very little development of any kind is going forward in cities with older housing, higher homeownership rates, and higher vacancy rates. Single-family development is concentrated in lower-middle-density cities with higher median house values, outside the urban areas with alternatives to driving to work, and higher non-Hispanic White shares predict reduced single-family development. Multifamily development is concentrated in denser cities with good employment access and larger immigrant populations. This understanding provides a foundation for analyzing how local housing policies and planning practices affect housing production.

Question 2. Which local housing policies are associated with housing development?

Local governments have a great deal of discretion over housing development—both in defining zoning regulations and in the approvals process. The second question for this paper is which local policies and planning practices encourage or discourage housing development. As in the previous section, I use negative binomial regression to analyze the association between local land use policies and the number of single-family, multifamily, and total housing units permitted between 2010 and 2017, controlling for the city characteristics included in the regressions above.

The policy variables included in the analysis are summarized in Table 3. I use key representative questions to characterize a city's growth management practices, zoning regulations, approval process, affordable housing policies, and development constraints. I first chose theoretically relevant concepts to characterize each of these five domains and then selected survey questions to represent each concept prioritizing questions with a large number of responses and more variation in the responses. Growth management practices can be characterized by straightforward yes/no questions: whether a jurisdiction has annexed new land, whether a jurisdiction is subject to an urban growth boundary, and whether a jurisdiction has an annual limit on building permits.

For zoning regulations, I sought measures of (a) the amount of land zoned for residential and non-residential uses, (b) restrictions that affect how much housing can be built on a certain amount of land, and (c) parking requirements, based on evidence that density restrictions and parking requirements have the largest impacts on development (Gabbe, 2018). We asked planners directly about the first concept and have measures for the share of land in their jurisdiction zoned for single-family, multifamily, and non-residential development. On average, planners reported that less than a quarter of land in a jurisdiction is zoned to allow multifamily housing, just under half of land is zoned to allow non-residential uses, and about three quarters of land is zoned for single-family housing.[12]

The survey includes a wide variety of measures for the second zoning concept, restrictions that affect how much housing can be built on a given lot. These measures include minimum lot sizes, maximum density restrictions, height limits, setbacks, lot coverage limits, and maximum floor area ratios for both single-family and multifamily development. The most straightforward of these measures is the number of units that can be built per acre of land. This can be regulated either through minimum lot sizes for single-family housing or explicitly through a maximum density, so I combined these measures by calculating the maximum units per acre from the minimum lot size. The responses for single-family and multifamily development are tightly correlated, but fewer cities have explicit density restrictions for multifamily housing, so the single-family density restriction better captures the concept.

Parking requirements can be much more onerous for multifamily development than single-family development; the difficulty and expense of constructing a multifamily parking structure is far greater than building a garage connected to a single-family home. Accordingly, our survey results show that developers more often request variances for multifamily than single-family parking requirements (Mawhorter & Reid, 2018). The multifamily parking requirement measure for this analysis includes the number of parking spaces required for both residents and guests (typically a fraction of a space per unit) in a two-bedroom apartment.

[12] These are not mutually exclusive categories–we used three separate questions to ask how much land is zoned to allow each type of use, which means that land zoned for both single-family and multifamily housing would count towards the percentage of land in both questions. Though these were asked as three separate questions, they are tightly interrelated and statistically behave somewhat like a single categorical variable, so only two of these three measures are included in the regression.

The approval process has three key characteristics: (a) whether staff, a planning commission, or the city council has approval authority over projects, (b) the application approval rate, and (c) approval time. I simplified the measure of approval authority to indicate whether a single-family project with five or more homes requires city council approval, the most stringent level of review. The application approval rate for single-family projects is quite high; according to the survey, in two thirds of cities, more than 95 percent of completed single-family project applications are approved. For approval time, I use a question about whether projects with affordable housing take longer than entirely market-rate projects. I use this question instead of the basic questions about how long a typical project takes because asking planners to compare approval times for different types of projects likely results in more accurate and consistent answers than asking planners to recall a specific amount of time. Since projects with affordable housing tend to be larger and more complicated than typical projects, this question may reflect not only approval time, but also the city's capacity to successfully approve complex projects.

Local affordable housing policies are highly idiosyncratic and implemented in various ways, so I chose one simple indicator for this concept: whether a city encourages or requires inclusionary housing (the inclusion of affordable housing units in market rate housing projects).[13] Nearly half of respondents in the estimation sample reported no inclusionary policy, 18 percent encourage but do not require inclusionary housing, and the remaining third have an inclusionary requirement.

Two development constraints are measured as well: the severity of land supply constraints and the frequency of citizen opposition to development. These measures are based on planners' responses, like other survey measures, yet they are likely to be more subjective than a question about whether a policy is in place or about an easily quantifiable zoning standard. See Jackson (2018, p. 134) for a detailed discussion of the use of the land supply constraint question as a measure of land supply constraints. The most precise interpretation of this variable is as a measure of planners' impressions of land supply constraints.

One clear limitation of this study is the potential for endogeneity, since the survey responses were collected at the end of the period measured in the dependent variable; it is possible that cities changed their policies and practices in response to the volume of housing development, rather than the other way around. This is a common pitfall of survey research and highlights the need for follow-up studies using the survey data when more data becomes available.

[13] The survey question clearly distinguishes inclusionary housing policies from local implementation of state density bonus law, which has some similar features to inclusionary policies, but which is mandatory in all cities across California.

Table 3. Summary statistics for policy variables included in model for the estimation sample of 218 incorporated jurisdictions in California

Policies (Terner California Residential Land Use Survey)	Mean	Std. Dev.	Min	Max
Growth management:				
Has your jurisdiction annexed new land in the past five years? *0=no, 1=yes*	.248	-	0	1
Is your jurisdiction subject to an urban growth boundary? *0=no, 1=yes*	.349	-	0	1
Does your jurisdiction limit the number of housing units built in a year? *0=no, 1=yes*	.083	-	0	1
Zoning regulations:				
How much land is zoned to allow single-family development? *6-point scale from almost none to almost all*	3.826	.835	1	6
How much land is zoned to allow non-residential development? *6-point scale from almost none to almost all*	2.826	.735	2	6
How much land is zoned to allow multifamily development? *6-point scale from almost none to almost all*	2.387	.756	1	5
What is the maximum allowable density for single-family development? *# units per acre*	6.648	2.776	1	25
How many parking spaces are required per multifamily unit? *# parking spaces*	2.133	.519	0	4
Approval process:				
Do single-family projects with 5+ homes require city council approval? *0=no, 1=yes*	.280	-	0	1
How often are complete single-family project applications approved? *6-point scale from almost never to almost always*	5.583	.709	2	6
Do projects with some affordable units require more or less approval time? *5-point scale from 3+ months faster to 3+ months slower*	3.220	.677	1	5
Affordable housing:				
Does your jurisdiction encourage or require inclusionary affordable housing?				
No inclusionary policy	.482	-	-	-
Inclusionary housing encouraged	.179	-	-	-
Inclusionary housing required	.339	-	-	-
Development constraints:				
How much does the supply of developable land constrain development? *5-point scale from not a constraint to severe constraint*	3.206	1.440	1	5
How often do local citizens actively oppose housing development? *6-point scale from almost never to almost always*	3.028	1.323	1	6

All summary statistics calculated for the estimation sample of 218 incorporated jurisdictions, with the exception of the question of the amount of zoned for multifamily development, which has one missing value and 217 total observations. This variable is not included in the model since it is largely collinear with the amount of land zoned for single-family and non-residential development.

Local land use policies and planning practices are associated with increased housing development in some cases and decreased housing development in others. Single-family homes appear to be particularly affected.

Table 4 shows the results of negative binomial regressions modeling the effects of local land use policies and practices on housing development. The models include measures of growth management policies, zoning regulations, the approval process, affordable housing policies, and development constraints collected in the Terner California Residential Land Use Survey, as well as control variables for city characteristics. The three models analyze the effects of local housing policies on the number of total housing units, single-family units and multifamily units permitted in California cities from 2010 through 2017.

Overall, local policies are more clearly associated with single-family development than with multifamily development. Only two relationships between policies and multifamily development are statistically significant: Both multifamily parking requirements and the amount of land zoned to allow single-family development are associated with reductions in multifamily development. In contrast, single-family development is associated with seven of the policy variables included in the analysis.

Growth management policies such as annexations, urban growth boundaries, and building permit limits appear to particularly influence single-family development. Unsurprisingly, annexations are associated with substantial increases in single-family development (IRR 1.640, $p<.001$). The association between annexations and multifamily development is also positive, though smaller and not statistically significant. Overall, annexations are associated with a 50 percent increase in the number of units permitted (IRR 1.499, $p<.01$).

Urban growth boundaries are associated with more single-family and total development. Cities subject to an urban growth boundary permit 40.5 percent more single-family units ($p<.05$) and 38.6 percent more units overall ($p<.01$). This association is not simply an artifact of regional differences; when regional fixed effects are included in the models the positive relationship increases in magnitude and remains statistically significant. This finding may seem counterintuitive, but it may be an indication that urban growth boundaries are working as intended. Urban growth boundaries are meant to limit expansion of development beyond existing urban areas and at the same time encourage more housing development within established cities.

Building permit caps effectively limit single-family development. Cities that limit the number of building permits they issue in a year permit only half as many single-family units as cities with no limit, controlling for other factors (IRR .541, $p<.01$).

Zoning regulations have distinct associations with single-family and multifamily development. Single-family development is positively associated with the amount of land zoned for non-residential development (IRR 1.394, $p<.001$), while multifamily development is negatively associated with both the amount of land zoned for single-family development (IRR .669, $p<.01$) and multifamily parking requirements (IRR .587, $p<.05$).

Both the share of applications approved and faster approval times are associated with more housing development. A one-unit increase in the share of single-family applications approved is associated with a 25.1 percent increase in single-family units permitted ($p<.01$) and a 17.7 percent increase in total units permitted ($p<.05$). Cities where projects with affordable units took longer in the approval process had 17.9 percent fewer units permitted on average, controlling for other factors ($p<.01$). In this case, both IRRs for single-family and multifamily development suggest a negative relationship (the single-family IRR is .921, and the multifamily IRR is .932), but neither association is statistically significant. Nevertheless, because longer approval times seem to similarly inhibit both single-family and multifamily development, the association with overall development is much stronger than the association with either type of development alone.

Encouragement of affordable housing is linked with more single-family development, but inclusionary requirements are not. Cities that encourage the inclusion of affordable housing in market-rate projects permitted an average of 42.1 percent more single-family housing units than those without any inclusionary policy, controlling for other factors ($p<.05$).

Table 4. Estimated incidence rate ratios from negative binomial regressions analyzing the effects of policies on the number of housing units permitted in California cities, 2010 to 2017

Independent variables:	**Dependent variable: # units permitted, 2010-17** Total units	Single-family	Multifamily
Questions from the Terner Center California Residential Land Use Survey.	Exposure variable: Total number of housing units, 2010		
Growth management:			
Has your jurisdiction annexed new land in the past five years?	1.499 **	1.640 ***	1.459
0=no, 1=yes	*.191*	*.235*	*.285*
Is your jurisdiction subject to an urban growth boundary?	1.386 **	1.405 *	1.324
0=no, 1=yes	*.172*	*.200*	*.241*
Does your jurisdiction limit the number of housing units built in a year?	.738	.541 **	1.051
0=no, 1=yes	*.154*	*.114*	*.379*
Zoning regulations:			
How much land is zoned to allow single-family development?	.938	1.106	.669 **
6-point scale from almost none to almost all	*.080*	*.102*	*.089*
How much land is zoned to allow non-residential development?	1.174	1.394 ***	.989
6-point scale from almost none to almost all	*.097*	*.127*	*.135*
What is the maximum allowable density for single-family development?	1.044	1.022	1.074
# units per acre	*.035*	*.035*	*.051*
How many parking spaces are required per multifamily unit?	.873	1.301	.587 *
# parking spaces	*.114*	*.182*	*.136*
Approval process:			
Do single-family projects require city council approval?	.947	1.015	.734
0=no, 1=yes	*.121*	*.138*	*.161*
How often are complete single-family project applications approved?	1.177 *	1.251 **	1.195
6-point scale from almost never to almost always	*.089*	*.106*	*.128*
Do projects with affordable units require more or less approval time?	.821 **	.921	.932
5-point scale from 3+ months faster to 3+ months slower	*.057*	*.095*	*.107*
Affordable housing:			
Does your jurisdiction encourage or require inclusionary affordable housing? *(reference category: no inclusionary policy)*			
Inclusionary housing encouraged	1.254	1.421 *	1.265
	.182	*.228*	*.283*
Inclusionary housing required	1.092	1.245	.968
	.160	*.201*	*.249*
Development constraints:			
How much does the supply of developable land constrain	.927	.894 *	.975
5-point scale from not a constraint to severe constraint	*.045*	*.044*	*.072*
How often do local citizens actively oppose housing development?	.975	.947	1.014
6-point scale from almost never to almost always	*.043*	*.044*	*.068*
N	218	218	218

Robust standard errors in italics below incidence rate ratios. *$p<0.05$, ** $p<0.01$, *** $p<0.001$

All models include characteristics measured in 2000: total population, employment access, commute mode, housing density with a quadratic term, housing built before 1980, homeownership rate, for sale vacancy rate, and median house value.

Inclusionary requirements, on the other hand, have an indeterminate relationship with housing development across all three models.

Land supply constraints are associated with reductions in single-family and total housing development. Planners' assessment of the severity of land supply constraints is associated with reduced single-family housing development: A one-unit increase in severity is associated with a 10.6 percent decrease in single-family units permitted ($p<.05$). Perceived citizen opposition to development, on the other hand, is not significantly associated with the number of units permitted.

Even though fewer of the policy variables are clearly related to multifamily development, this does not necessarily mean that local housing policies have less of an impact on multifamily development. Multifamily development may be influenced by more factors outside the scope of this analysis, resulting in greater unexplained variation.

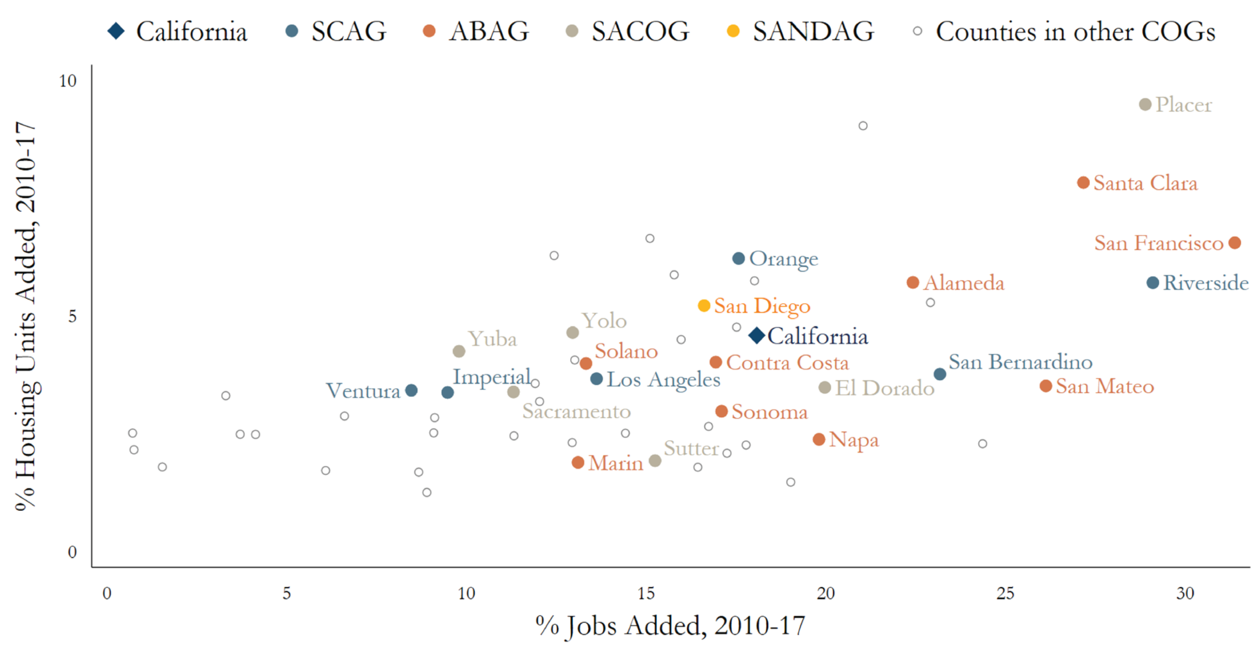
Question 3. How severe is the housing development shortfall in different parts of California, and what are the implications for young people?

These findings show how housing policies enacted in local jurisdictions, across the 482 incorporated cities and 57 unincorporated county areas of California, can influence the type and amount of housing built in the state. Together with the city characteristics that either facilitate or inhibit new housing construction, these local policies have a cumulative impact on the bigger picture of California housing development.

Housing growth lagged far behind job growth, and the discrepancy was especially stark in the San Francisco Bay Area and the greater Los Angeles region.

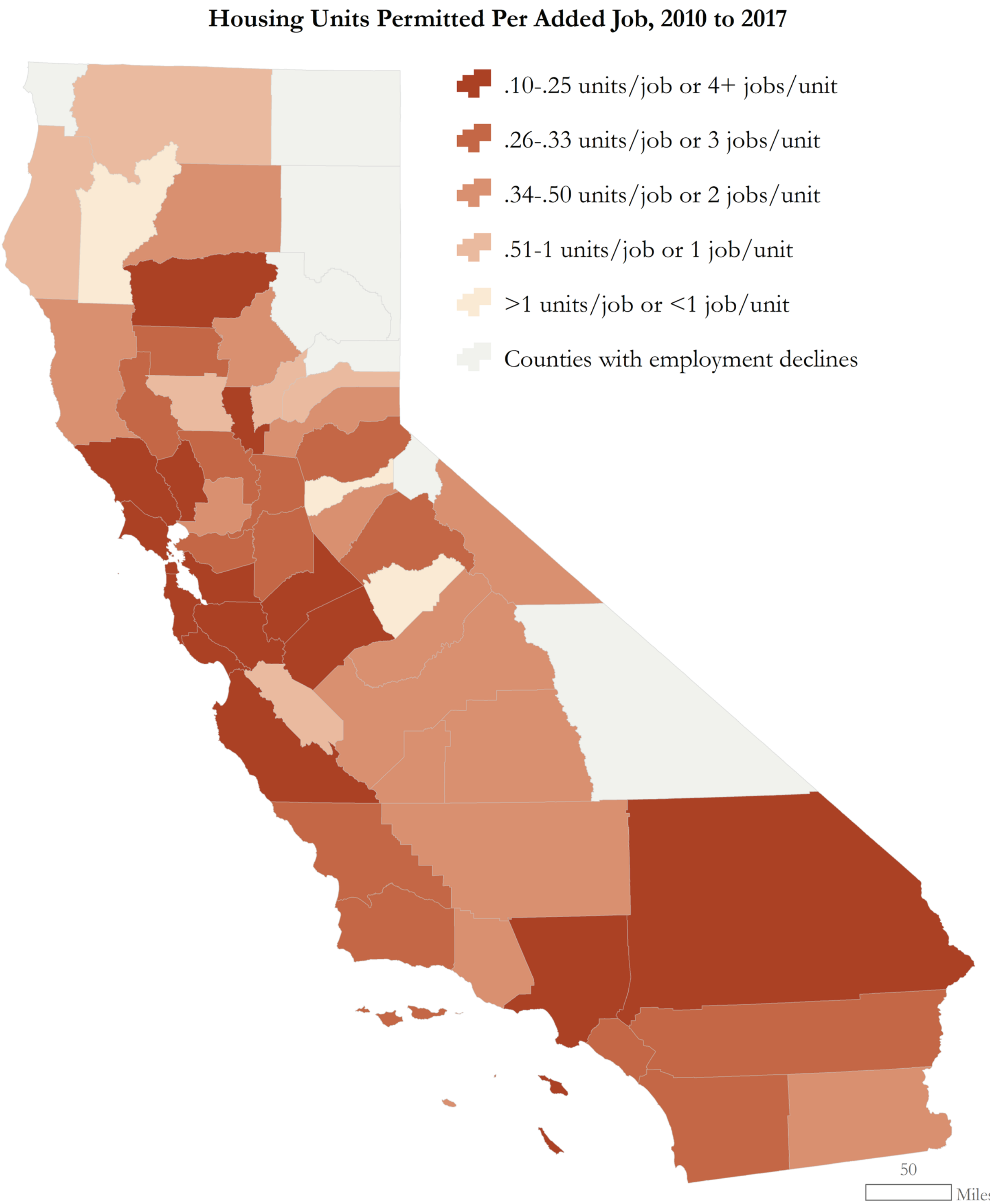
Figure 6 and Figure 7 provide county-level comparisons of employment increases with increases to the housing stock through permitted construction from 2010 through 2017. In the City and County of San Francisco, employment increased by 28 percent, while permitted construction added only 5.5 percent to the housing stock. Marin County had lower employment growth, an 8.4 percent increase, but only added 1.8 percent to the housing stock.

Figure 6. Percent change in employment versus percent added to the housing stock through permitted construction in California counties, 2010 to 2017



Data Sources: U.S. Census Bureau Building Permits Survey, https://www.census.gov/construction/bps/; U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages, https://www.bls.gov/cew/datatoc.htm

Figure 7. Map of housing units permitted per added job in California counties, 2010 to 2017



Data Sources: U.S. Census Bureau Building Permits Survey, https://www.census.gov/construction/bps/; U.S. Bureau of Labor Statistics Quarterly Census of Employment and Wages, https://www.bls.gov/cew/datatoc.htm

Table 5 presents the results in another way. In San Francisco, 6.7 new jobs were added for every additional housing unit permitted; in Napa County, 6.8 new jobs were added for every housing unit permitted; and in San Mateo County, 5.8 new jobs were added for each housing unit permitted. For California as a whole, the ratio of new jobs to newly permitted housing units was 4:1. With such extreme demand and supply imbalances extending throughout the entire region, housing prices reached new heights above even the previous peak during the 2000s. In a span of five years, the median house values in Alameda, Contra Costa, Napa, San Francisco, San Mateo, and Santa Clara counties increased by between 12.5 percent and 18.1 percent, and median rents increased by between 10.4 percent and 21.1 percent. Solano, Sonoma, and Marin counties experienced slightly lower increases, though in the case of Marin County housing prices were already the highest in the Bay Area. The housing shortfall was somewhat gentler in the Los Angeles and San Diego regions; counties had added jobs/housing ratios of between 2.3 and 4.1 new jobs per added housing unit. Price increases were still substantial, especially in Orange, Riverside, San Bernardino, and San Diego counties.

Table 5. Percent change in employment and housing units permitted and change in housing prices in selected California counties, 2010 to 2017

	% Change in Jobs, 2010-17	% Added Housing Units, 2010-17	*Difference*	# Added Jobs Per Permitted Unit	Median House Value, 2017 $		*% Change*	Median Gross Rent, 2017 $		*% Change*
					2008-2012	2013-2017		2008-2012	2013-2017	
California										
State Total	18.1	4.6	***-13.5***	*4.2*	$410,874	$443,400	***7.9***	$1,294	$1,358	***5.0***
Association of Bay Area Governments										
ABAG Total	24.1	5.3	***-18.7***	*5.0*						
Alameda	22.4	5.7	***-16.7***	*4.3*	$551,079	$649,100	***17.8***	$1,354	$1,547	***14.3***
Contra Costa	16.9	4.0	***-12.9***	*3.3*	$464,280	$522,300	***12.5***	$1,434	$1,600	***11.6***
Marin	13.1	1.9	***-11.2***	*6.3*	$867,663	$908,800	***4.7***	$1,710	$1,863	***8.9***
Napa	19.8	2.4	***-17.4***	*9.7*	$492,749	$560,500	***13.7***	$1,388	$1,541	***11.0***
San Francisco	31.4	6.6	***-24.8***	*6.9*	$803,661	$927,400	***15.4***	$1,549	$1,709	***10.4***
San Mateo	26.1	3.5	***-22.6***	*8.7*	$785,681	$917,700	***16.8***	$1,649	$1,973	***19.6***
Santa Clara	27.2	7.8	***-19.3***	*4.6*	$702,735	$829,600	***18.1***	$1,614	$1,955	***21.1***
Solano	13.3	4.0	***-9.3***	*2.7*	$310,912	$342,000	***10.0***	$1,337	$1,407	***5.3***
Sonoma	17.1	3.0	***-14.1***	*4.9*	$461,177	$513,300	***11.3***	$1,330	$1,456	***9.4***
Southern California Association of Governments										
SCAG Total	16.3	4.3	***-11.9***	*4.0*						
Imperial	9.5	3.4	***-6.1***	*2.9*	$166,747	$167,700	***0.6***	$776	$805	***3.7***
Los Angeles	13.6	3.7	***-9.9***	*4.2*	$474,448	$495,800	***4.5***	$1,270	$1,322	***4.1***
Orange	17.6	6.2	***-11.3***	*3.7*	$575,374	$620,500	***7.8***	$1,586	$1,693	***6.7***
Riverside	29.1	5.7	***-23.4***	*3.5*	$265,532	$304,500	***14.7***	$1,245	$1,251	***0.5***
San Bernardino	23.2	3.8	***-19.4***	*5.2*	$258,469	$280,200	***8.4***	$1,176	$1,182	***0.5***
Ventura	8.5	3.4	***-5.0***	*2.6*	$498,315	$520,300	***4.4***	$1,549	$1,643	***6.1***
San Diego Association of Governments										
San Diego County	16.6	5.2	***-11.4***	*3.4*	$448,869	$484,900	***8.0***	$1,372	$1,467	***6.9***

Young people are forming fewer households and buying fewer homes.

These price increases have especially strong impacts on young adults establishing households for the first time or attempting to buy their first home. Table 6 shows per capita headship, homeownership, and rentership rates for young adults aged 25-34—those mostly far along enough in their careers to live independently from their parents. These figures show the percentage of the population aged 25-34 who are household heads, household heads who own their homes and household heads who rent their homes. At this stage of adulthood, a little over a third are household heads, a much smaller percentage are homeowners, and a little over a quarter are renters.

In California as a whole, young adult headship rates declined from 37.6 percent to 34.7 percent, a 2.9 percentage point decrease over five years. Per capita homeownership rates fell from 10.4 percent to 9.1 percent, a 1.3 percentage point decrease. Per capita rentership fell from 27.2 percent to 25.6 percent, a 1.6 percent decrease. There were much steeper declines of over 6 percentage points in Marin, Napa, and Imperial counties, particularly for young adult rentership. More central counties such as Alameda, Contra Costa, and Santa Clara also saw large declines of between 3.5 and 3.9 percentage points, driven by decreases in both per capita homeownership and rentership. The only figure in the entire table that does not represent a decline is for per capita ownership in San Francisco County, which remained exactly the same at a very low rate of 5.6 percent. Declines were somewhat gentler in Southern California and San Diego, still mostly larger than the state figures. While the decreases in overall young adult headship in the San Francisco Bay Area tended to be led by declines in per capita rentership rates, in the Los Angeles and San Diego regions declines in per capita ownership contributed more to the overall headship losses.

These widespread declines in headship rates reflect the severe consequences of the housing shortfall for young adults. As housing prices in California's urban centers have skyrocketed, those with lower incomes have moved away to less expensive parts of California, or away from the state entirely (Romem & Kneebone, 2018). Many of those who remain are still unable to afford to buy or rent their own home—they live with their parents or other relatives or double up with roommates in order to make ends meet. Others who can afford rent cannot afford to buy a home and remain as renters longer than previous generations of young people. These delays in household formation and homebuying at the beginning of adulthood can have compounding effects across peoples' lives, impacting both their current well-being and future prospects (Clapham, 2005; Mendenhall et al., 2014).

Table 6. Per capita headship rates, homeownership rates, and rentership rates for young adults aged 25-34 in selected California counties, 2008-12 to 2013-17

	Per Capita Headship Rate for Ages 25-34			Per Capita Ownership Rate for Ages 25-34			Per Capita Rentership Rate for Ages 25-34		
	2008-2012	2013-2017	*Diff.*	2008-2012	2013-2017	*Diff.*	2008-2012	2013-2017	*Diff.*
California									
State Total	37.6	34.7	***-2.9***	10.4	9.1	***-1.3***	27.2	25.6	***-1.6***
Association of Bay Area Governments									
ABAG Total	38.9	35.5	***-3.5***	9.8	8.6	***-1.2***	29.1	26.9	***-2.2***
Alameda	39.1	35.3	***-3.8***	9.9	8.6	***-1.3***	29.2	26.7	***-2.5***
Contra Costa	37.9	34.0	***-3.9***	13.7	11.9	***-1.8***	24.2	22.1	***-2.1***
Marin	38.7	31.9	***-6.8***	7.9	7.4	***-0.5***	30.8	24.5	***-6.3***
Napa	39.3	32.9	***-6.4***	10.7	8.9	***-1.8***	28.6	24.1	***-4.5***
San Francisco	43.1	40.4	***-2.8***	5.6	5.6	***0.0***	37.5	34.8	***-2.8***
San Mateo	35.8	32.6	***-3.2***	8.8	8.4	***-0.4***	27.0	24.2	***-2.8***
Santa Clara	38.0	34.4	***-3.5***	10.0	8.1	***-2.0***	27.9	26.4	***-1.5***
Solano	38.6	36.0	***-2.5***	13.2	11.6	***-1.6***	25.4	24.5	***-0.9***
Sonoma	38.4	35.4	***-3.0***	11.1	10.5	***-0.6***	27.3	25.0	***-2.3***
Southern California Association of Governments									
SCAG Total	35.5	32.4	***-3.1***	9.5	8.0	***-1.6***	26.0	24.5	***-1.5***
Imperial	32.1	25.3	***-6.8***	12.5	10.9	***-1.6***	19.6	14.4	***-5.2***
Los Angeles	36.3	33.3	***-3.1***	7.5	6.2	***-1.3***	28.8	27.1	***-1.8***
Orange	33.9	31.7	***-2.3***	9.4	8.0	***-1.4***	24.5	23.7	***-0.9***
Riverside	34.6	31.3	***-3.4***	15.7	13.5	***-2.2***	18.9	17.8	***-1.1***
San Bernardino	35.4	32.2	***-3.3***	13.5	10.9	***-2.6***	21.9	21.3	***-0.7***
Ventura	33.2	29.4	***-3.9***	10.7	8.9	***-1.8***	22.6	20.4	***-2.1***
San Diego Association of Governments									
San Diego County	40.6	37.3	***-3.2***	10.3	8.6	***-1.7***	30.3	28.7	***-1.6***

Policy Implications

The imbalances between job growth and housing development, swift price increases, and declines in young adult housing attainment emphasize the severity of the housing shortfall and the urgency of taking action. Yet the findings in this paper serve as a reminder that there are a number of underlying factors that stand in the way of building housing. Some of these are out of the control of local policymakers. For example, in established cities with an older housing stock, existing buildings and land ownership patterns complicate infill development and redevelopment efforts. Cities with limited employment access or weak housing demand are unlikely to see much housing development. Land use regulations alone cannot solve issues with the existing built environment, land configuration, and housing demand.

However, the paper also offers evidence that cities can use their control over the development process to limit access to housing, sometimes in problematic ways. The finding that less housing is built in cities with both higher homeownership rates and White populations is sadly consistent with existing research on NIMBY opposition to local housing development (Lewis & Baldassare, 2010; Scally & Tighe, 2015; Whittemore & BenDor, 2018). These studies examined opposition to building multifamily or affordable housing; it is striking that in this study cities with more homeowners and larger white populations had less single-family development. This finding serves as yet another warning that racial exclusion from White communities continues to limit housing opportunities for people of color (Briggs, 2005; Dawkins, 2017; Galster & Killen, 1995; Galster & Sharkey, 2017).

It is also concerning to find that cities where people tend to commute by transit, bicycle, or walking have not seen increases in multifamily development. California has sustainability policies in place that are intended to address climate change by driving housing development to locations that will reduce long commutes and greenhouse gas emissions (Mawhorter, Galante, & Martin, 2018). This finding suggests that California's sustainability policies have yet to lead to discernible shifts in development.

This paper also reveals concrete steps jurisdictions can take to facilitate more housing development. Growth management practices, zoning regulations, the approval process, and affordable housing policies all contribute to policy environments that either enable or inhibit development. For regional governments, this research suggests that urban growth boundaries can be effective at encouraging housing development in existing areas. For local governments, removing existing building caps would be a good place to start, though this would affect only a small proportion of cities.

Zoning regulations are much more widespread, and this analysis points to two main areas that could improve the environment for development: increasing the amount of land zoned for multifamily development and reducing parking requirements, especially for multifamily housing. Cities can also exercise their discretion to improve both approval rates and approval times. These may seem like vague targets, and they will be difficult to meet without quantifiable data on both approval rates and approval times so that researchers, advocates, and the public can make comparisons across cities and track cities' performance over time. The Terner California Residential Land Use Survey is a step towards greater accountability on these measures, and this initial evidence suggests that the approval process is worth more in-depth study.

The finding that more housing is built in cities that encourage inclusionary housing also deserves deeper analysis. The fact that voluntary inclusionary incentives are related to increased development, but inclusionary requirements are not, suggests that the intent to encourage affordable housing makes a difference and that flexibility in applying inclusionary incentives may be helpful. This also suggests that incentives may be preferable to an outright requirement. This result should be taken with caution, however, since for much of the period of this analysis, California cities were prohibited from applying inclusionary requirements to new rental housing projects. Further research is needed to understand how inclusionary policies work in California after the passage of Assembly Bill 1505 in 2017, which restored local jurisdictions' power to enact inclusionary policies for rental housing.

Finally, the finding that land supply constraints are associated with reduced housing development may not be a surprise. Still, it reinforces the call for jurisdictions to reexamine their zoning ordinances, especially the amount of land that is zoned to allow multifamily development. While many jurisdictions do not have the option to annex more land, they can revise their regulations to increase the amount of housing that can be built on the land they already have. Without explicit attention to utilizing existing land more effectively in all jurisdictions, there will be little progress towards meeting the housing needs of California's population.

Conclusion

California's housing deficits have been compounding since at least 1990, and the resulting affordability crisis jeopardizes the future of the state. The lack of affordable housing erodes both the well-being of California's residents and the continued economic prosperity of the state, especially in the vibrant urban regions of the San Francisco Bay Area, Los Angeles, and San Diego, but also in smaller cities and rural areas. It is a particularly bad sign that young people are unable to form households or purchase homes and that so many are leaving the state. Thankfully, policymakers, journalists, and the public have started to pay close attention to housing problems and look for solutions, along with housing advocates and researchers.

It is clear that the current housing shortfall is so severe that it will take a long time to build enough housing to ease the affordability crisis. State-level policies must be put in place to protect vulnerable residents, whether low-income renters at higher risk of eviction and displacement, aging homeowners on fixed incomes, or young people trying to find a foothold in a white-hot housing market. Still, in the long run, the only way to correct this shortfall is to build enough housing to meet current and future housing needs.

This research helps build an understanding of both the impediments to housing development and potential policy solutions at the city level. The good news is that local land use policies and planning practices can make a difference for housing development. The bad news is that housing development mostly remains a problem of collective action: Each jurisdiction is caught between the urgent need for more housing at the regional level and all the local incentives to discourage new housing development, as well as the fixed constraints that make development more difficult. Finding a solution to this problem will require sacrifices and likely a fundamental shift in governance that begins to prioritize some regional over local interests. This will be politically difficult (an understatement), but the rewards will be great: to ensure that California remains not only the most populous state in the nation, but also the best place to live for generations to come.

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Technical Appendix

Question 1: Summary Statistics

City Characteristics (2000 Census data)	Mean	Std. Dev.	Min	Max
Size and density:				
Total population (ln)	10.1	1.4	4.5	15.1
Population density (ln)	8.0	0.9	2.9	10.1
Commuting pattern:				
Percent drove to work >45 mins	15.9	8.2	1.4	49.2
Housing stock:				
Percent of housing built since 1990	14.9	11.4	0.0	68.6
Percent of housing built 1970 to 1989	38.2	14.2	3.2	84.1
Percent of housing built 1940 to 1969	38.4	16.4	0.8	83.9
Percent of housing built before 1940	8.5	9.7	0.0	70.5
Housing market:				
Homeownership rate	60.8	14.1	16.0	97.1
For-sale vacancy rate	1.5	1.3	0.0	8.3
Median house value	$369,348	$298,052	$60,806	$1,475,880
Demographic characteristics:				
Percent non-Hispanic White	53.8	25.6	1.0	95.0
Percent foreign born	22.0	13.0	0.0	57.0

All summary statistics calculated for the estimation sample of 456 incorporated jurisdictions.

Region (based on MSAs, COGs, and rural areas)	Number of incorporated cities in estimation sample
Los Angeles-Long Beach-Anaheim MSA Los Angeles and Orange County	121
Southern California Association of Governments (outside MSA) Imperial, Riverside, San Bernardino, and Ventura	63
San Francisco-Oakland-Hayward MSA Alameda, Contra Costa, Marin, San Francisco, and San Mateo	61
Association of Bay Area Governments (outside MSA) Napa, Santa Clara, Solano, and Sonoma	36
Sacramento Area Council of Governments El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba	21
San Diego Association of Governments San Diego County	18
Northern California Butte, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Nevada, Plumas, Shasta, Sierra, Siskiyou, Tehama, and Trinity	36
Central Coast Monterey, San Luis Obispo, Santa Barbara, and Santa Cruz	29
Central Valley Fresno, Kern, Kings, Madera, Merced, San Benito, San Joaquin, Stanislaus, and Tulare	62
Sierras Alpine, Amador, Calaveras, Inyo, Mariposa, Mono, and Tuolumne	9
Total	*456*

Question 2: Model Specification Notes

The policy measures are from the Terner California Land Use Regulation Survey. Most prior studies using land use survey data have collapsed multiple indicators into indexes to capture a set of related concepts, such as zoning regulations or the approvals process, and then further combined these sub-indexes into an overall index of the strength of local regulations (Gyourko, Saiz, & Summers, 2008). However, initial factor analysis revealed that this approach would significantly reduce the sample size due to missing data.

In many cases data is missing not because the respondent did not answer the question, but simply because their jurisdiction did not have any of the type of development necessary to answer the question. For example, we asked about approval times for (a) single-family and (b) multifamily projects (1) consistent with general plan and zoning, (2) requiring a conditional use permit or variance, (3) requiring a general plan or zoning amendment, and (4) requiring an EIR or similar environmental review process. We also allowed cities to respond that they had no recent projects of this type, to improve the precision of the estimates.

Another concern is that combining variables would dilute the signal from particular questions if they are measuring slightly different things. In addition to these considerations about missing data and signal dilution, indexes make it more difficult to disentangle the specific policies when interpreting the results, so they can be less useful for suggesting best practices. Instead of indexes, I use key representative questions to characterize a city's growth management practices, zoning regulations, approval process, affordable housing policies, and development constraints. I first chose theoretically relevant concepts to characterize each of these five domains, and then selected survey questions to represent each concept, prioritizing questions with a large number of responses and more variation in the responses. With a relatively small sample size of slightly over 200 survey responses, I also prioritized parsimony.

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