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Why Are Regulations Changed? A Parcel Analysis of Upzoning in Los Angeles

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Abstract

Planners, officials, and neighborhood groups often debate zoning changes, yet there is little empirical evidence explaining why zoning and other land use regulations are changed. I use logistic regression models to examine density-enabling rezoning (“upzoning”) in Los Angeles. I find that upzoning occurs where there are development opportunities combined with limited political resistance. Upzoning is most likely on well-located parcels zoned for low-intensity, non-residential uses. Meanwhile, homeowners – and particularly homeowners with access to valuable amenities – are associated with regulatory stasis. I conclude by recommending strategies for addressing homeowners’ concerns about higher density housing.

Keywords

housing, land use, neighborhood planning, real estate, zoning

Author biographical sketch

C.J. Gabbe is an assistant professor in Santa Clara University’s Department of Environmental Studies and Sciences. His research focuses on the political economy of zoning, and the effects of land use regulations on housing markets.

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Introduction

Urban economists and planners have made strong arguments for easing residential density limits based on housing price (Fischel 2005a; Glaeser and Gyourko 2002), environmental (Calthorpe and Fulton 2001), equity (Pendall 2000), and consumer choice (Levine 2006) rationales. “Upzoning” is a common colloquial term used to describe land use regulatory changes that allow higher development intensity. While planners, politicians, and neighborhood groups often discuss upzoning, its actual occurrence is more rare. New York City, during a period of “rapid” rezoning activity, upzoned about 5% of its lots between 2003 and 2009 (Been, Madar, and McDonnell 2014). Los Angeles, by contrast, upzoned about 1.1% of its land area between 2002 and 2014 (Gabbe 2016). This paper uses the case of Los Angeles to extend our limited empirical understanding of the determinants of municipal zoning change.

I conceptualize the upzoning of a specific parcel to be a function of housing demand factors, existing supply constraints, the influence of interest groups, local demographic and economic factors, neighborhood trends, and municipal policy drivers. I first create a parcel dataset with Los Angeles regulatory, site, and neighborhood characteristics between 2002 and 2014. I then specify logistic regression models to analyze the relationship between parcel upzoning and the potential determinants mentioned above.

I find that upzoning follows the path of development opportunity combined with least political resistance, and there is strong evidence of homeowners’ influence. Specifically, upzoning is least likely in areas with concentrations of homeowners coupled with desirable amenities like proximity to the beach and high-performing schools. Upzoning is most likely for parcels zoned for low-intensity land uses, and in neighborhoods with rising rents. All else equal, there are no significant associations between demographic variables and upzoning.

The determinants of zoning changes

Zoning codes emerged in the early twentieth century to separate single-family residences from industrial land uses, commercial areas, and apartments (Fischel 2004; Hirt 2007). Today, zoning codes typically prescribe what land uses are allowed by-right and as conditional uses, and the maximum development densities that are permitted (Hirt 2007; Hoch, Dalton, and So 2000). Changes to the zoning designation of a property must be approved by the municipal government, and can be initiated by either a property owner or the local government (Hoch, Dalton, and So 2000). Below I assess what we know about the determinants of zoning change.

Accessibility, amenities, and supply constraints

Demand and supply factors drive how much housing is built and where. Housing demand within a metropolitan area is influenced by natural amenities and human-created locational advantages (Anas, Arnott, and Small 1998; DiPasquale and Wheaton 1996). Examples of natural amenities include proximity to the ocean or a location with a view. Human-created locational advantages include accessibility to employment and cultural amenities (DiPasquale and Wheaton 1996).

Supply constraints may be natural or human-made (Saiz 2010). Natural features that constrain housing supply include water bodies, mountains, and wetlands (DiPasquale and Wheaton 1996; Saiz 2010). Some natural constraints may also have an amenity effect, if a parcel on a steep slope (a constraint) also has a view (an amenity). Land use regulations constrain housing supply by limiting locations and densities of new development, adding standards for lots and buildings, and shifting costs from a municipality to a developer (Deakin 1989). Lot size can also be a constraint since small lots – particularly lots smaller than 5,000 square feet – are more difficult to develop or redevelop (Landis et al. 2006).

Interest groups

Regulation is a product of competing interests seeking to rationally forward their self-interest, and this competition plays out through the political process (Posner 1974; Stigler 1971). A handful of powerful interests are most active in proposing and influencing land use decisions, particularly the real estate development industry (Babcock 1966; Fischel 2005a; Logan and Molotch 1987; Molotch 1976; Stigler 1971; Warner and Molotch 2000), business associations (Cooper, Nownes, and Roberts 2005; Heberlig, Leland, and Read 2014), neighborhood organizations (Babcock 1966; Fischel 2005a; Frieden 1979; Warner and Molotch 2000), and environmental groups (Frieden 1979; Fulton 2001). Interest groups use votes and/or campaign contributions to influence politicians (Downs 1957; Glaeser, Gyourko, and Saks 2005; Logan and Molotch 1987; Purcell 2000; Schone, Koch, and Baumont 2011). Homeowners, environmental groups, and owners of developed land are generalized as opposing growth, while owners of vacant land and the real estate development industry are viewed as pro-growth.

Scholars have operationalized competition between interest groups over land use and development in different ways. These have included vacant landowners versus neighboring owners of developed land (Hilber and Robert-Nicoud 2013); homeowners versus developers (Been, Madar, and McDonnell 2014); the median voter and farmers versus developers (Chanel, Delattre, and Napoléone 2014); homeowners and environmental groups versus developers (Hawkins 2014); and voters versus non-voting interest groups (Schone, Koch, and Baumont

2011). All of the studies above, with the exception of Been et al. (2014), took a cross-sectional view of zoning and development.

Homeowners and neighborhood associations are powerful interests in most cities, with an apparent economic rationale for opposing upzoning. Fischel (2004) argued that exclusionary regulations represent the "dominance of home-owners and their touchiness about their main asset" (p. 317). Existing homeowners have an incentive to protect the value of their homes, and they do not internalize the price increases for renters or future residents (Glaeser, Gyourko, and Saks 2005). A home's value can be "reduced by changes in nearby land use, increases in neighborhood traffic, increases in local taxes, and decreases in the local school's test scores" (Fischel 2005b, 400). Thus, the tendency for homeowners to become involved in local land uses issues. Although Fischel (Fischel 2005b; Fischel 2005a) mainly focused on suburban homeowners, scholars have applied his model to test homeowner influence in big cities like New York City and Los Angeles (Been, Madar, and McDonnell 2014; A. H. Whittemore 2012).

There has been little research on the determinants of zoning *change*. In the most relevant research on this topic, Been et al. (2014) assessed four aspects of the "growth machine" and "homevoter" theories in New York City: the presence and quality of public services, including schools, parks and transit; neighborhood market growth; neighborhood demographics, and voter turnout. The growth machine motivations were measured in terms of accessibility and amenities variables, while the homevoter motivations were measured in terms of homeownership rates. The authors used multinomial logistic regression models and found that neighborhood homeownership rates were associated with a higher probability of a parcel being downzoned and a lower probability of a parcel being upzoned. However, other relationships, including those related to city infrastructure capacity, were more ambiguous.

Neighborhood change, gentrification, and zoning

Neighborhoods change over time as a "result of past and current flows of households and resources— financial, social-psychological and time […]" (Galster 2001, 2121). Some neighborhoods experience periods of decline with others go through ascent or gentrification (Zuk et al. 2015). There are several reasons to expect links between neighborhood changes and zoning decisions. Neighborhoods in the midst of demographic shifts and/or investments in the built environment could be more likely to be subsequently upzoned, particularly if they align with housing demand drivers. Meanwhile, zoning changes that encourage large new developments may then accelerate the pace of neighborhood change. To measure gentrification, scholars have focused on housing prices, indicators of neighborhood investment or disinvestment, changes in the share of renters, socioeconomic and demographic changes, and measures of neighborhood investment potential (Zuk et al. 2015).

Race and economic status may influence the zoning changes that are proposed for a neighborhood, and local residents' abilities to repel or shape these changes. That is, low-income communities and community of color may have less power to influence zoning outcomes (Dubin 1992). Relatedly, Rabin (1990) proposes the concept of "expulsive zoning," meaning that cities are more likely to adopt incompatible zoning changes (e.g., rezone to allow non-residential uses near housing) in black neighborhoods, and these changes ultimately undermine the stability of local communities.

Fiscal and environmental policy motivations

Large central cities' motivations for adopting more permissive zoning requirements might include mitigating negative externalities from growth, increasing tax revenue, and reducing public service costs. Proponents of upzoning in transit-accessible areas argue that residential infill development will result in higher public transit ridership, less road congestion, better air quality, and fewer greenhouse gas emissions (Cervero 2004; Landis et al. 2006). This is the basis for California's statewide climate change mitigation policies focused on increasing residential densities near frequent-service public transit (Barbour and Deakin 2012).

Municipal land use decision-making intended to generate property and/or sales tax revenues in excess of service costs has been characterized as the "fiscalization of land use" (Misczynski 1986; Wassmer 2002; Lewis 2001). This has been particularly prominent in California, as 1978 voter-approved property tax limitations have increased municipalities' reliance on sales tax revenue (Lewis 2001; Schwartz 1997). It is unclear if residential density is the connection between urban form and public service costs. Some scholars have found higher densities to be associated with lower per capita costs for some services (Carruthers and Úlfarsson 2008; Carruthers and Ulfarsson 2003), while others have found positive or non-linear relationships (Ladd 1992; Ladd 1994).

Los Angeles as a case study

Planners and economists have gravitated toward studying land use regulations in California because of the state's size, growth rates, degree of metropolitan fragmentation, variety of regulations, and general regulatory restrictiveness. I study Los Angeles, California – the most populous city in America's most populous state – to contribute to our limited understanding of intra-city zoning variation, and to add to the small quantitative evidence base related to zoning and zoning changes.

Los Angeles has nearly 3.9 million residents spread across 469 square miles (United States Census Bureau 2013). It is a growing city within an expanding metropolitan region; by 2035, Los Angeles is projected to have 4.3 million residents (Southern California Association of Governments 2012). The city has residents and neighborhoods ranging from impoverished to some of the wealthiest in the world. While Los Angeles is sometimes portrayed as a city of sprawling suburban single-family housing (Ewing 1997), only about 38% of its housing units are detached single-family, and 64% of households rent their housing (United States Census Bureau 2013).

Land use regulations and residential growth politics have been highly contentious in the city of Los Angeles and its larger metropolitan area (Fulton 2001; Morrow 2013; A. H. Whittemore 2012). A well-known national regulatory survey, the Wharton Residential Land Use Regulatory Index, found the city of Los Angeles to be more than two standard deviations above the national mean on a measure of local political pressure related to development (Gyourko, Saiz, and Summers 2008). This is consistent with other municipalities in California, where strong local control of zoning represents "the most extreme example of autarky in land-use regulations of any U.S. state" (Quigley and Raphael 2005, 323). In California – unlike many states – rezonings and general plan amendments tend to go hand-in-hand because state law requires most jurisdictions' zoning to be consistent with the adopted general plan (Governor's Office of Planning and Research 2003). Additionally, California's environmental regulations – most notably the California Environmental Quality Act – are tightly interlaced with these land use regulations (Fulton 2005).

Several scholars have examined homeowners' and real estate interests' involvement in Los Angeles's zoning issues. Morrow (2013), focusing on 1965 to 1992, wrote that city of Los Angeles "communities with time, money, and resources (including social capital) can resist change while those unable to mobilize bear the burden of future growth" (p. 4). The city of Los Angeles has undergone several political regimes with different balances of homeowner and developer power, and today's local land use policy is dominated by "suburban anti-growth interests" (A. H. Whittemore 2012, 404). There is some consensus that the historical Southern California "growth machine" has been weakened, and single-family homeowners now have the upper hand (Fulton 2001; Purcell 2000; A. Whittemore 2010).

In this paper, I study Los Angeles zoning from 2002 to 2014. This period best matches the available zoning data with the city's modest post-2000 upzoning trend (Morrow 2013). This upzoning occurred after significant downzoning between 1960 and 1990 and relative zoning stasis between 1990 and 2000 (Morrow 2013; A. H. Whittemore 2012). As to whether my study period is "typical," history shows that planning and rezoning are often geographically and temporally lumpy, dependent on market and political conditions. But, it seems reasonable to expect Los Angeles's overall upzoning trend to continue given the metropolitan area's economic growth and housing affordability issues.

Data

To analyze the determinants of municipal upzoning, I create a detailed dataset of site, regulatory, and neighborhood characteristics for the approximately 780,000 parcels located in the city of Los Angeles (Los Angeles County Assessor 2012). These data are summarized in Table 1.

Regulations

Regulatory data are from the city of Los Angeles. The city's 2002 zoning data, the oldest available digitally, provide the baseline for this analysis. The 2014 zoning data, the most recent available at the time of writing, represent the other bookend. I use ArcGIS software to spatially join the geographic centroids of each parcel to its basic zoning attributes in 2002 and 2014. Using centroids standardizes locations over my study period since parcels can be split or combined over time.

Then, for each zoning class in the city – 65 zoning classes in 2002 and 85 in 2014 – I calculate the maximum allowable residential density based on the minimum lot size per residential unit defined in the municipal code and adopted specific plans (City of Los Angeles 2015b). For example, in the R3 (multiple dwelling residential) zone, the minimum lot size is 800 square feet per unit, or about 54 dwelling units per acre. I then calculate each parcel's maximum residential "capacity" in 2002 and 2014 by multiplying the parcel's lot size by its allowable residential density.[1] I assign an indicator variable representing where residential capacity increased – these are upzoned parcels (Figure 1).[2] I note that the indicator variable only represents successful upzoning, not proposed rezonings that were not approved, as I discuss later. Other planning and regulatory attributes include a location in an Adaptive Reuse Ordinance area, Historic Preservation Overlay Zone, and the age of each parcel's local community plan.

[Insert figure 1 here.]

Figure 1. Upzoned parcels in Los Angeles (2002-2014). Note: for formatting purposes, map excludes Los Angeles's southern "tail."

Housing and demographic characteristics

Most neighborhood characteristic and demographic variables are from the U.S. Census Bureau (United States Census Bureau 2000). For the homeownership measure, I assign each tract to one of three ordered categories: *low* for tracts in the bottom quartile of the city's neighborhoods, *medium* for tracts in the middle two quartiles, and *high* for tracts in the top quartile. For race and ethnicity, I create the same categories for each tract's black and Hispanic population shares. To measure neighborhood change prior to my study period, I calculate 1990-2000 tract-level changes in total housing units and median gross rent. I use the Longitudinal Tract Database crosswalk to reconcile boundary differences between 1990, 2000, and 2012 Census geographies (Logan, Xu, and Stults 2014).

Infrastructure and public services

Infrastructure and public services variables relate to rail transit and bus rapid transit (BRT), parks and open space, and school performance. First, I create an indicator variable representing if a parcel is within a half mile of a rail transit or BRT station (Center for Transit-Oriented Development 2011). For parks and open space, I use city land use data (Los Angeles City Planning Department 2014) to calculate the Euclidean distance from each parcel to the nearest park of at least a quarter acre. For school quality, I focus on elementary school standardized test scores, as measured by California's Academic Performance Index (API) 2013 Growth data (California Department of Education 2015). Given that open enrollment policies mean that nearly one-third of Los Angeles's children attend schools outside their attendance zone (Ledwith 2010), I create an inverse distance-weighted measure, with the scores of schools closest to each parcel weighted more than schools farther away.

Other measures of accessibility, amenities, and natural features

Other data relate to employment density, job accessibility, proximity to the nearest freeway ramp, proximity to the ocean, elevation, and slope. Employment density is calculated from 2000 Census Transportation Planning Package (CTPP) tract-level data (United States Department of Transportation 2000). The employment accessibility measure is from Lens (2014) based on 2000 CTPP data (United States Department of Transportation 2000). The Euclidean distance from each parcel to the nearest freeway ramp is calculated using CalTrans Enhanced National Highway System data (California Department of Transportation 2013). The Euclidean distance from each parcel to the ocean is calculated using USGS California shoreline data (Hapke, Reid, and Borrelli 2008). The elevation of each parcel centroid is calculated using the USGS ten foot digital elevation model for Los Angeles County (United States Geological Survey 2006). Lastly, the slope in degrees of every parcel is calculated using the USGS digital elevation model and ArcGIS Slope tool (Esri 2011; United States Geological Survey 2006).

[Insert Table 1 here.]

Methods

My conceptual model is that parcel upzoning is a function of housing demand and supply factors, the influence of local homeowners, municipal fiscal policy goals, socioeconomic and demographic factors, and neighborhood housing trends. In general, demand factors and municipal policy objectives would be expected to lead to upzoning. Strong homeowner interests, in contrast, would most likely hinder upzoning proposals.

Logistic regression models

Logistic regression models are appropriate for analyzing relationships between a binary dependent variable and a set of covariates (Hosmer, Lemeshow, and Sturdivant 2013). I specify logistic regression models in the general form of Equation 1. The dependent variable is a binary measure of whether a parcel was upzoned between 2002 and 2014. Predictors relate to amenities, accessibility, natural features, land use regulations, infrastructure, population and employment density, median household income, neighborhood demographics, and neighborhood changes. I include City Council district fixed effects to control for unobservable within-city variation related to geographic and political factors. I cluster standard errors by Census tract to account for dependence between nearby observations.

Equation 1. Logistic regression model of parcel upzoning

$$\begin{aligned} Upzoning_i = \; & \alpha + \beta_1 Accessibility_i + \beta_2 Amenities_i + \beta_3 Natural_i + \beta_4 Regulations_i + \beta_5 Municipal_i \\ & + \beta_6 Homeowner_i + \beta_7 Demographics_i + \beta_8 NeighborhoodChange_i + \beta_9 CityCouncil_i \\ & + \varepsilon_i \end{aligned}$$

I specify separate models for parcels initially zoned for single-family housing ("SF" parcels) and those that were not ("non-SF" parcels).[3] I split these two types of parcels because the literature and Los Angeles-specific policies indicate different decision processes given strong single-family neighborhood protections in local policy.

Logistic regression results are commonly reported as the natural log of odds (Hosmer, Lemeshow, and Sturdivant 2013). To aid in interpretation I report odds ratios. The odds ratios in this paper represent the odds of a parcel being upzoning compared with the odds of a parcel not being upzoned. Statistically significant values greater than one show that as the predictor variable increases, so do the odds of a parcel being upzoned. Values lower than one show that as a predictor increases, the odds of upzoning decrease.

Negative binomial regression model

Although this paper is focused on a binary upzoning outcome, as a robustness check I model the determinants of new residential development capacity added through upzoning. Here instead of a binary outcome, the dependent variable is a count of a parcel's additional residential development *capacity* from upzoning. I estimate that the city added zoning capacity for a maximum of 116,000 new units on the parcels that were upzoned (Gabbe 2016). I mostly focus on the logit model results for two reasons. First, this paper is focused on what makes upzoned parcels different from other parcels. Second, the upzoned development capacity estimate does not take into account site-specific development limitations, so I view it as a rough approximation.

The most commonly used regression models for count data are Poisson and negative binomial (Hilbe 2014). The statistically significant likelihood ratio test indicates that a negative binomial model is more appropriate than a Poisson model (UCLA Statistical Consulting Group 2016). I specify negative binomial models for SF and non-SF parcels in the general form of Equation 2. The single-family parcel model failed to converge – because few single-family parcels were upzoned, and the counts of new development capacity are low – and I thus only report the results from the non-SF model.

Equation 2. Negative binomial regression model of new residential development capacity through upzoning

$$\begin{aligned}&Growth\ in\ Residential\ Development\ Capacity_i\\&\quad = \alpha + \beta_1 Accessibility_i + \beta_2 Amenities_i + \beta_3 Natural_i + \beta_4 Regulations_i + \beta_5 Municipal_i\\&\quad + \beta_6 Homeowner_i + \beta_7 Demographics_i + \beta_8 NeighborhoodChange_i + \beta_9 CityCouncil_i\\&\quad + \varepsilon_i\end{aligned}$$

Addressing the endogeneity of zoning and housing markets

Endogeneity is a methodological issue in most of the literature on land use regulations and housing markets (Quigley and Rosenthal 2005). At issue is the simultaneity of influences; neighborhood characteristics affect zoning, and zoning affects neighborhood characteristics (Pogodzinski and Sass 1994; Quigley and Rosenthal 2005). I address endogeneity in two ways in both models. First, I incorporate a dependent variable that represents zoning change, rather than cross-sectional characteristic of zoning. Second, given that zoning decisions are related to existing land uses and demographics, I control for each parcel's baseline characteristics.

Results and discussion

Upzoning was relatively rare in Los Angeles, with about 1.1% of the city's land area upzoned in the twelve-year study period. Below, Table 2 summarizes the regression results from the citywide models. The non-single-family model fits better than the single-family model. The McFadden's R-squared statistic for the non-SF model was 0.39 compared with 0.17 for the single-family model. Many of the upzoned single-family parcels were in the San Fernando Valley, and it was more difficult to predict where these would be located.

The parcels with the highest likelihood of being upzoned were near downtown or at the urban fringe, zoned for employment uses (e.g., industrial, warehousing, etc.), and in neighborhoods with rising rents. Upzoning was less likely in neighborhoods with higher shares of homeowners, nearer to the beach, and in neighborhoods with higher standardized test scores.

At the end of this section, I compare these results with the determinants of new housing capacity (the negative binomial model).

[Insert Table 2 here.]

Accessibility

There are no significant associations between freeway access, rail and BRT proximity or employment accessibility and the odds of a parcel being upzoned. In terms of transit – a high profile driver of planning – there are several other reasons why Los Angeles's increasing transit-orientation is not indicated in the regression results. One is that the city's rail and BRT lines run through some areas that already had permissive zoning, including downtown Los Angeles. Another is that some upzoning around stations was approved prior to 2002, such as the Vermont/Western specific plan for four stations (City of Los Angeles 2001). Additionally, some transit-oriented policy initiatives were either recently adopted or are still tentative, including the draft transit neighborhood plans around ten rail stations (City of Los Angeles 2013a; Los Angeles Department of City Planning 2015). Lastly, the Hollywood Community Plan – a major plan to densify near rail transit – was halted by a lawsuit and is currently being revised (Zahniser 2013). It is reasonable to expect different results if this study was repeated in five or ten years.

Amenities

Parcels nearer to the beach and higher performing elementary schools are generally associated with lower odds of upzoning. For non-SF parcels, for every mile farther from the beach, the odds of a parcel being upzoned increase by 56%. For single-family parcels, there is no significant association. School performance is associated with lower odds of upzoning non-SF parcels. For every one hundred-point increase in neighborhood API score, the odds of a non-SF parcel being upzoned decrease by 11%. There is no significant association between school performance and single-family parcel upzoning.

In terms of open space, there is no significant association citywide between proximity to a park and upzoning. General park proximity may be so common that it is not a major driver of demand. Over 80% of parcels in the city are within a half-mile of a moderately sized park. Lastly, there are no significant associations between elevation and upzoning.

Steep slopes

There is no significant association between steep slopes and upzoning for non-SF parcels. However, somewhat surprisingly, single-family parcels on steep slopes have nearly three times higher odds of being upzoned. This may be because 25% slopes may not represent a major development constraint; steep slopes may represent a view, which drives demand and increases the likelihood of upzoning; and/or single-family sites with steep slopes may have been historically overlooked and are now being viewed as a building opportunity.

Regulations and lot characteristics

A handful of pre-existing regulatory characteristics affect whether a parcel was upzoned. First, historic preservation overlay zones (HPOZ) effectively stop zoning changes. A non-SF parcel located in a HPOZ is associated with 96% lower odds of upzoning. There were only about a dozen such HPOZ parcels modestly upzoned between residential categories. There were no single-family parcels in HPOZs upzoned between 2002 and 2014.

Zoning designations in place in 2002 affect subsequent upzoning. Overall, lower-intensity parcels are more likely to be upzoned than higher intensity ones. Parcels zoned for parking, manufacturing, and agricultural uses are much more likely to be upzoned than multifamily or commercial zoned parcels. Relatedly, parcels where allowable densities exceed 100 dwelling units per acre are unlikely to be further upzoned, demonstrating the ceiling to the city's baseline allowable density. Additionally, there is no significant relationship between a parcel being located in an adaptive reuse ordinance (ARO) area and being upzoned. These areas already tend to have permissive density allowances, which limits the extent to which there is further upzoning.

Lastly, I analyze the relationship between community plan updates and zoning decisions. Community plans are the city's district-level plans to implement the citywide general plan (City of Los Angeles 2015a). For non-SF parcels, for every year since a community plan was last updated, there are about 16% lower odds of a parcel being upzoned. This supports the idea that zoning is an implementation tool of planning, and upzoning is more likely with prior planning. There is no significant association between plan age and upzoning in single-family neighborhoods. Lastly, I looked at lot size. For non-SF parcels, there is no significant relationship between lot size and the likelihood of upzoning a parcel. One reason is that large-scale city-initiated upzonings, like specific plans, include parcels of a variety of sizes. For SF parcels, there is a small positive relationship between parcel size and upzoning. This shows that larger parcels, including agricultural parcels, are more likely to be rezoned than smaller single-family lots.

Homeowner interests

The results from both models support the homevoter hypothesis. A parcel in a neighborhood with a higher share of homeowners is much less likely to be upzoned. This holds true for both non-SF and single-family parcels, and is the most consistent result across both sets of models. For non-SF parcels, the odds of upzoning in an area with a medium homeownership share (middle two quartiles) are about 82% lower than one in a neighborhood with a low homeownership share (bottom quartile). The odds of upzoning a non-SF parcel in a high ownership neighborhood (top quartile) are about 96% lower than in a low ownership neighborhood. For single-family parcels, the odds lower by 82% and 93% respectively.

Population and employment density

There were mixed results in terms of population density and upzoning. Non-SF parcels in neighborhoods with higher population density were more likely to be upzoned. This illustrates development pressures in urbanized areas. Meanwhile, SF parcels in lower density areas are more likely to be upzoned. This is reasonable since many of the upzoned single-family parcels were originally zoned for agricultural uses, and located at the edge of the city. Citywide, there are no significant associations between employment density and the odds of upzoning a parcel.

Neighborhood demographic and socioeconomic factors

I include measures of median household income, black population share, and Hispanic population share. I find no significant relationships between these variables and the odds of upzoning. From the descriptive statistics we might expect there to be differences for black and Hispanic neighborhoods. For example, 22% of parcels are in neighborhoods with more than 7% black population share (neighborhoods in the top quartile), while 16% of upzoned parcels were in these neighborhoods. However, after controlling for other factors, these differences were not statistically significant. Further research is certainly needed to better understand how communities of color influence, and are influenced by, zoning changes. In particular, it would be important to focus on neighborhoods with the largest and/or fastest-changing shares of residents who are black or Hispanic.

Neighborhood change

I hypothesize that market trends from 1990-2000 (e.g., new housing development and rising rents) could lead to more upzoning during the 2002-14 period. I find mixed results. There is no significant relationship between changes to the number of housing units in a neighborhood between 1990 and 2000 and the likelihood of a parcel being upzoned. This may be because housing growth occurred in areas with existing development capacity, so no further upzoning was necessary.

However, non-SF parcels in neighborhoods with faster-rising rents are more likely to be upzoned. For every one hundred dollars that a tract's median rent increases between 1990 and 2000 (in nominal dollars), the odds of a non-SF parcel being upzoned increase by 74%. This illustrates real estate developer interests in the rezoning process. However, on single-family parcels, rising rents decrease the likelihood of a parcel being upzoned; for every one hundred dollar increase, the odds decrease by about 27%. This is because upzoned SF parcels are mostly located in the suburban San Fernando Valley, where the rental market was weaker. A useful future extension of this research would examine what was built on these parcels (if anything) after the upzonings were approved.

Comparing the determinants of upzoning and new development capacity

Although the focus of this paper is explaining why some lots are upzoned rather than others, as a robustness check I examine the determinants of new residential development capacity. The results are largely similar (table not shown). Consistent with the logit upzoning model, Los Angeles's new residential capacity is likely to be further from the beach, in neighborhoods with lower school test scores, on sites that did not previously allow residential development, in areas with newer community plans, and in neighborhoods with fewer homeowners.

There are three main differences. First, the city is more likely to add new development capacity by upzoning parcels nearer to freeways. This highlights the continued value placed on auto accessibility in Los Angeles. Second, capacity is more likely to be added in lower elevation areas, which are the most urbanized parts of the city. Third, this model shows no significant relationship between the degree of upzoning and rising rents in the 1990-2000 period. One explanation is that some of the biggest upzonings were initiated by the city through specific plans, and these initiatives were based less on market factors than on other policy priorities. Overall, despite these differences, both sets of modeling results suggest the same basic story about upzoning.

Opportunities for future research

The limitations of this study suggest opportunities for future scholarship. First, future research would ideally assess three possible zoning outcomes: no zoning change, upzoning approved, and upzoning denied. That is, we could analyze the characteristics of unsuccessful upzoning proposals; unfortunately zone change denial data are not available in a systematic form for Los Angeles. As a result, this paper may underestimate the influence of the determinants by essentially combining parcels with no zoning change and upzoning denied. This is probably a minor issue in this case. Anecdotally, from talking with several local planners and developers, I learned that developers in Los Angeles try to avoid entering unpredictable discretionary processes, including proposing zoning changes that they think are likely to be denied. This points to another gap for future research: better understanding how developers' prior knowledge of what is likely to be approved influences their decisions about whether to propose an upzoning in the first place.

Conclusions and policy implications

This research finds that homeowners – and especially those with access to valuable amenities – are associated with regulatory stasis. The current political dynamic in Los Angeles, and undoubtedly many other American cities, is one in which the most desirable areas are also the most difficult to upzone. This presents a major barrier to using infill development to focus urban growth, as envisioned by local, regional, and state policymakers.

We need to better understand why and how some urban interests oppose growth. For instance, if a small vocal minority of homeowners can successfully fight zoning change, it is entirely possible for neighborhoods with moderate or low homeownership rates to successfully oppose growth. Additionally, there may be opposition from commercial property owners or other stakeholders. A good example is Hollywood, where a small group of litigious local property owners has fought zoning change and new development.

My findings suggest that there is some relatively "low hanging fruit" for rezonings and new development. Upzoning is most likely on sites with lower-intensity land uses, like parking, agriculture, and manufacturing. This is consistent with basic economic theory about the transition of land uses to the highest and best use in a growing city. Upzoning these types of parcels usually represents a sizable increase in allowable density. Parking, agriculture, and manufacturing parcels also tend to be located nearer fewer residents (and homeowners). This helps explain how upzoning takes the path of least resistance in terms of proximity to existing residents. But, this could be problematic over the long-term, because there is a limited supply of such land in higher-demand locations, and redevelopment for residential uses may have adverse impacts on local employment.

To overcome conflicts over zoning, planners will need to tailor neighborhood and citywide solutions to increase density. If local residents are concerned about protecting their access to amenities and existing neighborhood character, planners can partially mitigate these concerns through clearly written and predictably applied urban design standards, and linking new development with public improvements. Additionally, some consistent citywide policy changes may be more politically feasible than piecemeal neighborhood-scale policy changes. For example, the city could systematically reduce minimum parking standards near transit stations (rather than selectively in certain station areas). Lastly, when restrictive regulations hinder regional housing needs – particularly near transit – state intervention to allow higher densities should be a last resort. In short, upzoning will take a nuanced approach at the neighborhood and citywide scales.

Tables

Table 1. Descriptive statistics of parcel variables

	Non-single-family parcels			*Single-family/residential estate/agricultural parcels*		
Variable	**Obs**	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
Distance to freeway ramp (miles)	350,866	0.82	0.70	437,472	1.12	0.85
Employment accessibility measure (2000)	350,866	617.31	190.36	437,472	473.27	177.67
Within a half mile of a rail or BRT station (indicator)	350,866	0.19	0.39	437,472	0.06	0.23
Distance to beach (miles)	350,866	10.23	4.42	437,472	11.36	4.97
Neighborhood API score	350,866	80.79	5.32	437,472	83.08	5.64
Distance to quarter-acre park (miles)	350,866	0.29	0.22	437,472	0.31	0.24
Elevation (in 100s of feet)	350,866	3.91	3.27	437,472	6.80	4.00
Slope above 25% (indicator)	350,866	0.15	0.36	437,472	0.21	0.41
Lot size (acres)	350,866	1.21	7.21	437,472	0.32	2.64
Historic Preservation Overlay Zone (2002, indicator)	350,866	0.02	0.13	437,472	0.01	0.08
Residential development allowed (2002, indicator)	350,866	0.90	0.30	437,472	1.00	0.00
Over 100 units/acre allowed (2002, indicator)	350,866	0.20	0.40	437,472	0.00	0.00
Adaptive Reuse Ordinance area (2002)	350,866	1.06	0.23	437,472	1.00	0.01
Years since last Community Plan update (based on 2014)	350,865	15.18	3.40	437,471	16.08	2.90
Population density (2000, in 1000s of persons/sq. mi.)	350,705	13.37	10.24	435,827	7.05	4.73
Employment density (2000, in 1000s of jobs/sq. mi.)	350,866	7.30	14.70	437,472	2.31	3.68
Share owner-occupied housing units (2000)	350,705	0.34	0.21	435,827	0.63	0.21
Median household income (2000, in 1000s of $US)	350,705	38.19	19.70	435,827	60.43	31.25
Share black (2000)	350,705	0.12	0.16	435,827	0.09	0.17
Share Hispanic (2000)	350,705	0.44	0.28	435,827	0.31	0.26
Change in tract housing units (1990-2000, in 100s of units)	350,705	0.45	2.46	435,827	0.32	1.83
Change in tract median gross rent (1990-2000, in 100s of nominal $)	350,705	1.14	1.33	435,827	2.18	2.73

Table 2. Logistic regression results for upzoning (odds ratios)

VARIABLES	(1) Non-SF Parcels Odds Ratio	(2) SF Parcels Odds Ratio
Distance to freeway ramp (miles)	0.651	0.952
	(0.181)	(0.146)
Employment accessibility measure (2000)	0.997	0.997
	(0.00459)	(0.00319)
Within a half mile of a rail or BRT station (indicator)	0.656	0.937
	(0.238)	(0.338)
Distance to beach (miles)	1.563***	1.139
	(0.171)	(0.113)
Neighborhood API score	0.888*	1.049
	(0.0411)	(0.0536)
Distance to quarter-acre park (miles)	0.871	0.503
	(0.855)	(0.305)
Elevation (in 100s of feet)	0.683	0.869
	(0.151)	(0.0625)
Slope above 25% (indicator)	1.275	2.929***
	(0.637)	(0.794)
Lot size (acres)	0.990	1.016**
	(0.0138)	(0.00510)
Historic Preservation Overlay Zone (2002, indicator))	0.0377***	
	(0.0260)	
Residential development allowed (2002, indicator)	0.136***	
	(0.0637)	
Over 100 units/acre allowed (2002, indicator)	0.00558***	
	(0.00680)	
Adaptive Reuse Ordinance area (2002)	2.953	
	(2.124)	
Years since last Community Plan update (based on 2014)	0.840***	1.022
	(0.0379)	(0.0570)
Population density (2000, in 1000s of persons/sq. mi.)	1.045*	0.897**
	(0.0201)	(0.0318)
Employment density (2000, in 1000s of jobs/sq. mi.)	0.971	0.981
	(0.0308)	(0.0492)
Medium homeownship vs. low homeownership tract	0.180**	0.175***
	(0.112)	(0.0889)
High homeownership vs. low homeownership tract	0.0417***	0.0646***
	(0.0395)	(0.0378)
Median household income (2000, in 1000s of $US)	1.024	1.008
	(0.0213)	(0.0118)

Medium black share tract vs. low black share tract	1.502	0.872
	(0.742)	(0.261)
High black share tract vs. low black share tract	0.185	1.243
	(0.176)	(0.682)
Medium Hispanic share tract vs. low black share tract	0.929	1.338
	(0.378)	(0.480)
High Hispanic share tract vs. low black share tract	0.340	1.197
	(0.207)	(0.778)
Change in tract housing units (1990-2000, in 100s of units)	1.032	0.925
	(0.116)	(0.0438)
Change in tract median gross rent (1990-2000, in 100s of nominal $)	1.735***	0.731**
	(0.256)	(0.0852)
Observations	350,688	431,198
City Council District FE	YES	YES

Robust standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05

Note: for SF model, missing variables predict the results perfectly or were perfectly collinear.

References

Anas, Alex, Richard Arnott, and Kenneth A. Small. 1998. "Urban Spatial Structure." *Journal of Economic Literature* 36 (3): 1426–64.

Babcock, Richard F. 1966. *The Zoning Game: Municipal Practices and Policies*. Madison, WI: University of Wisconsin Press.

Barbour, Elisa, and Elizabeth A. Deakin. 2012. "Smart Growth Planning for Climate Protection." *Journal of the American Planning Association* 78 (1): 70–86. doi:10.1080/01944363.2011.645272.

Been, Vicki, Josiah Madar, and Simon McDonnell. 2014. "Urban Land-Use Regulation: Are Homevoters Overtaking the Growth Machine?" *Journal of Empirical Legal Studies* 11 (2): 227–65. doi:10.1111/jels.12040.

California Department of Education. 2015. "Academic Performance Index (API)." *California Department of Education*. http://www.cde.ca.gov/ta/ac/ap/.

California Department of Transportation. 2013. "California Enhanced National Highway System (NHS)." California Department of Transportation. http://www.dot.ca.gov/hq/tsip/gis/datalibrary/Metadata/NHS_Map21.html.

Calthorpe, Peter, and William B. Fulton. 2001. *The Regional City: Planning for the End of Sprawl*. Washington, DC: Island Press.

Carruthers, John I., and Gudmundur F. Ulfarsson. 2003. "Urban Sprawl and the Cost of Public Services." *Environment and Planning B* 30 (4): 503–522.

Carruthers, John I., and Gudmundur F. Úlfarsson. 2008. "Does 'Smart Growth' Matter to Public Finance?" *Urban Studies* 45 (9): 1791–1823. doi:10.1177/0042098008093379.

Center for Transit-Oriented Development. 2011. "TOD Database." *Center for Transit-Oriented Development*. December. http://toddata.cnt.org/.

Cervero, Robert. 2004. *Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects*. Vol. 102. Transportation Research Board. http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_102.pdf.

Chanel, Olivier, Laurence Delattre, and Claude Napoléone. 2014. "Determinants of Local Public Policies for Farmland Preservation and Urban Expansion: A French Illustration." *Land Economics* 90 (3): 411–33. doi:10.3368/le.90.3.411.

City of Los Angeles. 2001. "Vermont/Western Transit Oriented District Specific Plan." Los Angeles Department of City Planning. http://planning.lacity.org/complan/specplan/pdf/VermontWesternTOD.pdf.

———. 2013a. "Cornfield Arroyo Seco Specific Plan." Los Angeles Department of City Planning.

———. 2013b. "Los Angeles General Plan: Housing Element 2013-2021." Los Angeles Department of City Planning. http://planning.lacity.org/HousingInitiatives/HousingElement/Text/Ch2.pdf.

———. 2015a. "General Community Plans." *Los Angeles Department of City Planning*. http://planning.lacity.org/GP_Complans.html.

———. 2015b. "Los Angeles Planning and Zoning Code." American Legal Publishing Corporation. http://www.amlegal.com/nxt/gateway.dll/California/lapz/municipalcodechapteriplanningandzoningco/chapterigeneralprovisionsandzoning/article2specificplanning-zoningcomprehen?f=templates$fn=default.htm$3.0$vid=amlegal:lapz_ca$anc=.

Cooper, Christopher A., Anthony J. Nownes, and Steven Roberts. 2005. “Perceptions of Power: Interest Groups in Local Politics.” *State & Local Government Review* 37 (3): 206–16.
Deakin, Elizabeth. 1989. “Growth Controls and Growth Management: A Summary and Review of Empirical Research.” In *Understanding Growth Management: Critical Issues and a Research Agenda*. Washington, DC: Urban Land Institute.
DiPasquale, Denise, and William C. Wheaton. 1996. *Urban Economics and Real Estate Markets*. Englewood Cliffs, N.J: Prentice Hall.
Downs, Anthony. 1957. “An Economic Theory of Political Action in a Democracy.” *The Journal of Political Economy* 65 (2): 135–150.
Dubin, Jon C. 1992. “From Junkyards to Gentrification: Explicating a Right to Protective Zoning in Low-Income Communities of Color.” *Minnesota Law Review* 77: 739–802.
Esri. 2011. “Slope (Spatial Analyst).” *ArcGIS Resource Center*. June 29. http://help.arcgis.com/En/Arcgisdesktop/10.0/Help/index.html#//009z000000v2000000.htm.
Ewing, Reid. 1997. “Is Los Angeles-Style Sprawl Desirable?” *Journal of the American Planning Association* 63 (1): 107–26. doi:10.1080/01944369708975728.
Fischel, William A. 2004. “An Economic History of Zoning and a Cure for Its Exclusionary Effects.” *Urban Studies* 41 (2): 317–40. doi:10.1080/0042098032000165271.
———. 2005a. *The Homevoter Hypothesis: How Home Values Influence Local Government Taxation, School Finance, and Land-Use Policies*. Cambridge, MA: Harvard University Press.
———. 2005b. “Politics in a Dynamic View of Land-Use Regulations: Of Interest Groups and Homevoters.” *The Journal of Real Estate Finance and Economics* 31 (4): 397–403. doi:10.1007/s11146-005-3289-x.
Frieden, Bernard J. 1979. *The Environmental Protection Hustle*. Cambridge, MA: MIT Press.
Fulton, William B. 2001. *The Reluctant Metropolis: The Politics of Urban Growth in Los Angeles*. Baltimore, MD: Johns Hopkins University Press.
———. 2005. *Guide to California Planning*. 3rd ed. Point Arena, Calif: Solano Press Books.
Gabbe, Charles J. 2016. “Do Land Use Regulations Matter? Why and How?” Doctoral Dissertation, University of California, Los Angeles.
Galster, George. 2001. “On the Nature of Neighbourhood.” *Urban Studies* 38 (12): 2111–24. doi:10.1080/00420980120087072.
Glaeser, Edward L., and Joseph Gyourko. 2002. “The Impact of Zoning on Housing Affordability.” Working Paper 8835. Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w8835.
Glaeser, Edward L., Joseph Gyourko, and Raven Saks. 2005. “Why Have Housing Prices Gone Up?” Working Paper 11129. Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w11129.
Governor’s Office of Planning and Research. 2003. “General Plan Guidelines.” Sacramento, CA: State of California. https://www.opr.ca.gov/docs/General_Plan_Guidelines_2003.pdf.
Gyourko, Joseph, Albert Saiz, and Anita Summers. 2008. “A New Measure of the Local Regulatory Environment for Housing Markets: The Wharton Residential Land Use Regulatory Index.” *Urban Studies* 45 (3): 693–729. doi:10.1177/0042098007087341.
Hapke, Cheryl, Dave Reid, and Mark Borrelli. 2008. “The National Assessment of Shoreline Change: A GIS Compilation of Vector Cliff Edges and Associated Cliff Erosion Data for

the California Coast." USGS Western Coastal and Marine Geology. http://pubs.usgs.gov/of/2007/1112/.

Hawkins, Christopher. 2014. "Competing Interests and the Political Market for Smart Growth Policy." *Urban Studies* 51 (12): 2503–22. doi:10.1177/0042098013512875.

Heberlig, Eric, Suzanne Leland, and Dustin Read. 2014. "Local Politics, Organized Interests, and Land-Use Policy: A Research Note Analyzing the Perceptions of Urban Planners Working in City Government." *Urban Affairs Review* 50 (6): 890–903. doi:10.1177/1078087414522411.

Hilbe, Joseph M. 2014. *Modeling Count Data*. New York, NY: Cambridge University Press.

Hilber, Christian A. L., and Frédéric Robert-Nicoud. 2013. "On the Origins of Land Use Regulations: Theory and Evidence from US Metro Areas." *Journal of Urban Economics* 75 (May): 29–43. doi:10.1016/j.jue.2012.10.002.

Hirt, Sonia. 2007. "The Devil Is in the Definitions." *Journal of the American Planning Association* 73 (4): 436–50. doi:10.1080/01944360708978524.

Hoch, Charles J., Linda C. Dalton, and Frank S. So, eds. 2000. *The Practice of Local Government Planning*. 3rd ed. Washington, DC: International City/County Management Association.

Hosmer, David W., Stanley Lemeshow, and Rodney X. Sturdivant. 2013. *Applied Logistic Regression*. Third edition. Wiley Series in Probability and Statistics 398. Hoboken, NJ: Wiley.

Ladd, Helen F. 1992. "Population Growth, Density and the Costs of Providing Public Services." *Urban Studies* 29 (2): 273–295.

Ladd, Helen F. 1994. "Fiscal Impacts of Local Population Growth: A Conceptual and Empirical Analysis." *Regional Science and Urban Economics* 24 (6): 661–86. doi:10.1016/0166-0462(94)90006-X.

Landis, John D., Heather Hood, Guangyu Li, Thomas Rogers, and Charles Warren. 2006. "The Future of Infill Housing in California: Opportunities, Potential, and Feasibility." *Housing Policy Debate* 17 (4): 681–725. doi:10.1080/10511482.2006.9521587.

Ledwith, Valerie. 2010. "The Influence of Open Enrollment on Scholastic Achievement among Public School Students in Los Angeles." *American Journal of Education* 116 (2): 243–62. doi:10.1086/649493.

Lens, Michael. 2014. "Employment Accessibility among Housing Subsidy Recipients." *Housing Policy Debate* 24 (4). doi:10.1080/10511482.2014.905966.

Levine, Jonathan. 2006. *Zoned Out: Regulation, Markets, and Choices in Transportation and Metropolitan Land Use*. Washington, DC: Resources for the Future.

Lewis, Paul G. 2001. "Retail Politics: Local Sales Taxes and the Fiscalization of Land Use." *Economic Development Quarterly* 15 (1): 21–35. doi:10.1177/089124240101500102.

Logan, John R., and Harvey Luskin Molotch. 1987. *Urban Fortunes: The Political Economy of Place*. Berkeley, CA: University of California Press.

Logan, John R., Zengwang Xu, and Brian J. Stults. 2014. "Interpolating US Decennial Census Tract Data from as Early as 1970 to 2010: A Longitudinal Tract Database." *The Professional Geographer* 66 (3): 412–420.

Los Angeles City Planning Department. 2014. "Los Angeles General Plan Land Use Shapefile." http://planning.lacity.org/mapgallery/mapgallery_gisdata/mapgallerydata.htm.

Los Angeles County Assessor. 2012. "Assessor Parcels – 2012 Tax Roll." http://egis3.lacounty.gov/dataportal/.

Los Angeles Department of City Planning. 2015. “About Transit Neighborhood Plans.” *Los Angeles Transit Neighborhood Plans*. http://www.latnp.org/about-the-project/.
Misczynski, Dean J. 1986. “The Fiscalization of Land Use.” *California Policy Choices* 3: 127–50.
Molotch, Harvey. 1976. “The City as a Growth Machine: Toward a Political Economy of Place.” *American Journal of Sociology* 82 (2): 309–32.
Morrow, Gregory D. 2013. “The Homeowner Revolution: Democracy, Land Use and the Los Angeles Slow-Growth Movement, 1965-1992.” University of California, Los Angeles.
Pendall, R. 2000. “Local Land Use Regulation and the Chain of Exclusion.” *Journal of the American Planning Association* 66 (2): 125–142.
Pogodzinski, J.M., and Tim R. Sass. 1994. “The Theory and Estimation of Endogenous Zoning.” *Regional Science and Urban Economics* 24 (5): 601–30. doi:10.1016/0166-0462(94)02059-0.
Posner, Richard A. 1974. “Theories of Economic Regulation.” Working Paper 41. Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w0041.
Purcell, Mark. 2000. “The Decline of the Political Consensus for Urban Growth: Evidence from Los Angeles.” *Journal of Urban Affairs* 22 (1): 85–100. doi:10.1111/0735-2166.00041.
Quigley, John M., and Steven Raphael. 2005. “Regulation and the High Cost of Housing in California.” *The American Economic Review* 95 (2): 323–28.
Quigley, John M., and Larry A. Rosenthal. 2005. “The Effects of Land Use Regulation on the Price of Housing: What Do We Know? What Can We Learn?” *Cityscape* 8 (1): 69–137.
Rabin, Yale. 1990. “Expulsive Zoning: The Inequitable Legacy of Euclid.” In *Zoning and the American Dream*. Chicago, IL: APA Planners Press.
Saiz, Albert. 2010. “The Geographic Determinants of Housing Supply.” *The Quarterly Journal of Economics* 125 (3): 1253–96. doi:10.1162/qjec.2010.125.3.1253.
Schone, Katharina, Wilfried Koch, and Catherine Baumont. 2011. “Modeling Local Growth Control Decisions in a Multi-City Case: Do Spatial Interactions and Lobbying Efforts Matter?” *Public Choice* 154 (1–2): 95–117. doi:10.1007/s11127-011-9811-1.
Schwartz, Jonathan. 1997. “Prisoners of Proposition 13: Sales Taxes, Property Taxes, and the Fiscalization of Municipal Land Use Decisions.” *S. Cal. L. Rev.* 71: 183.
Southern California Association of Governments. 2012. “2012 RTP Adopted Growth Forecast.” Los Angeles, CA: Southern California Association of Governments. http://www.scag.ca.gov/Documents/2012AdoptedGrowthForecastPDF.pdf.
Stigler, George J. 1971. “The Theory of Economic Regulation.” *The Bell Journal of Economics and Management Science* 2 (1): 3. doi:10.2307/3003160.
UCLA Statistical Consulting Group. 2016. “Negative Binomial Regression.” *UCLA Institute for Digital Research and Education*. Accessed June 24. http://www.ats.ucla.edu/stat/stata/dae/nbreg.htm.
United States Census Bureau. 2000. “2000 United States Census.”
———. 2013. “2013 American Community Survey 1-Year Estimates.”
United States Department of Transportation. 2000. “Census Transportation Planning Package.” United States Department of Transportation Bureau of Transportation Statistics. http://www.transtats.bts.gov/Tables.asp?DB_ID=630.
United States Geological Survey. 2006. “2006 10-Foot Digital Elevation Model (DEM) – LAR-IAC – Public Domain.” http://egis3.lacounty.gov/dataportal/2011/01/26/2006-10-foot-digital-elevation-model-dem-public-domain/.

Warner, Kee, and Harvey Luskin Molotch. 2000. *Building Rules: How Local Controls Shape Community Environments and Economies*. Boulder, CO: Westview Press.

Wassmer, Robert W. 2002. “Fiscalisation of Land Use, Urban Growth Boundaries and Non-Central Retail Sprawl in the Western United States.” *Urban Studies* 39 (8): 1307–1327.

Whittemore, Andrew. 2010. “The Regulated City: The Politics of Land Use Regulation in Los Angeles, 1909-2009.” University of California, Los Angeles.

Whittemore, Andrew H. 2012. “Zoning Los Angeles: A Brief History of Four Regimes.” *Planning Perspectives* 27 (3): 393–415. doi:10.1080/02665433.2012.681140.

Zahniser, David. 2013. “Judge Deals Major Blow to Hollywood Growth Plan.” *Los Angeles Times*, December 11. http://www.latimes.com/local/lanow/la-me-ln-judge-hollywood-growth-plan-20131211-story.html.

Zuk, Miriam, Ariel H. Bierbaum, Karolina Gorska, Trevor Thomas, Anastasia Loukaitou-Sideris, Paul Ong, and Karen Chapple. 2015. “Gentrification, Displacement and the Role of Public Investment: A Literature Review.” Working Paper. San Francisco, CA: Federal Reserve Bank of San Francisco.

Endnotes

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[1] In 1986, Los Angeles voters approved Proposition U, which limited development in commercial zones to a floor area ratio of 1.5 across much of the city (City of Los Angeles 2013b). High housing densities would be difficult or impossible to develop in affected zones, except perhaps in buildings composed of small studio apartments. However, since my primary focus here is on changes to regulations, I retain the base dwelling per acre estimates to compare 2002 and 2014 regulations.

[2] I estimate that 60% of Los Angeles's upzonings were initiated by property owners, while 40% were the result of new city-initiated plans.

[3] Single-family parcels include parcels zoned for agricultural uses (A1 and A2 zoning designations) because these zones allow detached dwellings.