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Authors

Kim, Jae Hong, PhD

Marantz, Nicholas J, PhD

Osutei, Nene

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Jae Hong Kim, Ph.D., Associate Professor
Nicholas J. Marantz, Ph.D., Assistant Professor
Nene Osutei, Ph.D. Candidate
Department of Urban Planning and Public Policy, University of
California, Irvine

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16. Abstract In California, there has been a growing concern about housing unaffordability and its negative consequences, but it has remained unclear how transportation is related to this issue. This report synthesizes the literature on the causes and consequences of local growth control which has been viewed as one of the most significant barriers to expanding housing supply and thus managing travel demand more effectively. Emphasis is on what insights can be gained from the literature and what further research is needed to better understand how transportation influences and is influenced by growth control actions.					
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Executive

Summary

Executive Summary

Amid increased concerns about housing unaffordability in California and other parts of the nation, there is a growing recognition among researchers and policy makers that rising housing prices and the lack of affordable units in job rich areas can pose significant challenges to achieving sustainable development and the vision of more equitable transportation. Consequently, local growth control measures and similar land use regulations that restrict housing supply have received renewed attention, but little is known about how transportation may influence and be influenced by the rise of these local actions.

This research synthesizes a sample of 62 studies published over the last four decades on the causes and consequences of local growth control regulations. These studies are classified in this report based on their level of analysis (e.g., individual attitudes, city or regional activities) and their findings about varying motives for, and outcomes of, local growth control actions with emphasis on insights that may be useful for policymakers as well as practitioners.

The literature on the adoption of growth control measures, such as growth moratoriums, density restrictions, and public facilities requirements, has identified a broad range of potential determinants to explain why communities adopt growth controls, including voter preferences, citizen mobilization (or participation in the policy process), and various community characteristics. Although growth control actions have often been viewed through the lens of social class, the empirical studies are equivocal regarding whether or not this process is really driven by elites or upper-class homeowners. Also, while several studies have shown that traffic congestion was among the primary concerns of residents who favored stricter control of growth, it remains unclear to what extent traffic congestion is responsible for the enactment of local growth controls. The literature suggests that (large-scale) transportation projects can trigger the rise of growth control initiatives in some contexts, but it should be stressed that the motivations behind growth control may vary across contexts and change over time. Local governments also tend to act strategically and respond to what other (neighboring) jurisdictions do rather than making their growth decisions independently.

As for the consequences of growth control, the literature has focused on how growth controls might affect local growth patterns, housing market dynamics, and a community's sociodemographic composition. The findings are somewhat mixed, which is in part attributable to the use of varying measurement strategies and data sources. Several studies, however, have reported evidence that locally-adopted restrictive regulations exclude low income and minority residents making it difficult to create more just and inclusive communities. These local effects can also impact how households (especially those who are disadvantaged) are spatially distributed within a region and thereby affect households' travel patterns and the performance of regional transportation systems. More research is needed to gain a more complete understanding of the mechanisms of displacement and the (varying) effects of growth controls on different groups of households and different modes of transportation.

Contents

Introduction

Academics, policy makers, and others increasingly recognize that rising housing costs and the shortage of affordable units in job-rich areas of California and other parts of the nation can lead to lengthy commutes and pose significant challenges to achieving sustainable transportation and development patterns. From a transportation equity perspective, declining housing affordability is even more problematic, as it pushes vulnerable population groups out to the areas where housing is more affordable but jobs (and other amenities) are sparsely located, and public transit options more limited.

Although no single factor can fully explain the rise of this critical issue in many cities and regions, local growth control measures and/or strict land use regulations have increasingly been criticized for their contribution to housing unaffordability and its negative consequences. Dozens of empirical studies, summarized by Quigley and Rosenthal (2005), Gyourko and Molloy (2015), and Monkkonen et al. (2020), have shown that stringent land use regulations can affect the housing supply. Rising housing costs have been linked to declining interregional mobility, which limits the economic prospects of lower-skilled workers by making it difficult for them to move to regions with more opportunities (Moretti, 2013; Ganong and Shoag, 2017). The lack of affordable housing may also restrict access to areas that offer the greatest prospects for economic success (Acolin and Wachter, 2017), and can impose significant hardships on lower-income households who may be displaced from their homes in high-cost areas and forced to move to less expensive outlying areas and face increased commuting times (see e.g., Sultana, 2002; Harkness and Newman, 2005; Newman and Holupka, 2015).

This report synthesizes the literature on the causes and consequences of local growth control and similar land use regulations with emphasis on their relation to transportation. We conducted a literature search in January 2020 and reviewed a sample of 62 relevant (empirical) studies that have been published over the last four decades.¹ Table 1 in the Appendix lists these studies, and the following sections present what we learned from the literature. It is the hope that this research synthesis will enable us to gain a more nuanced understanding of varying motives and outcomes of growth control, some of which are associated with transportation directly or indirectly.

¹ We identified these 62 publications through a two-step process. First, we searched for publications with the term “local growth control,” using two scholarly databases (EBSCO Academic Search Complete and the Web of Science) and found 27 journal articles providing an empirical investigation of the causes and/or consequences of growth control or similar land use regulations. Second, we checked all publications that were cited by at least three of the 27 articles from the first step and those citing at least three of these articles. The second step enabled us to include an additional set of 35 relevant journal articles for our research synthesis.

The Causes of Growth Control

Studies analyzing the causes of growth control use several units of analysis. First, we discuss studies focusing on individuals and their attitudes toward growth control. Then, we discuss studies that analyze the actions of different jurisdictions (e.g., cities and counties). Lastly, we discuss other studies that do not fall into the above two categories, but enable us to better understand the mechanisms by which local growth control arises.

Individual-level Studies

Some of the 32 studies reviewed which investigated the causes of local growth control adoption analyzed relevant voting patterns to better understand the motivations behind those favoring various local growth control ballot initiatives. More specifically, in the literature, a great deal of attention was paid to the following hypotheses, as Connerly and Frank (1986, p.573-575) summarized:

- Social class hypothesis, positing that attitudes about growth and environmental issues are largely shaped by social class, particularly among upper-class homeowners who may use growth control programs to exclude the less affluent from their communities.
- Age hypothesis, positing that younger individuals are more likely to be in favor of environmental protection and thus support growth control initiatives.
- Environmental attitudes hypothesis, positing that support for environmental conservation leads to support for growth controls.
- Political attitudes hypothesis, positing that one's support for growth control is highly associated with political ideology and attitudes regarding government interventions.
- Community context hypothesis, positing that rapidly increasing population or growth rates are likely to shape residents' anti-growth sentiment.

One of the most consistently reported findings from the individual-level studies is greater support for growth control by those concerned with environmental protection. For instance, Gottdiener and Neiman (1981) investigated who voted yes for Measure R — entitled “Taxpayers’ Initiative Ordinance to Reduce Costly Urban Sprawl by Preserving Riverside’s Citrus and Agricultural Lands, Its Unique Hills, Arroyos, and Victoria Avenue” — which was adopted by the City of Riverside, California in 1979. Using data collected from a one percent random sample of the city’s registered voters, they found those voting for the measure showed more “support for greater government involvement in protecting the environment (p.62).” In their study using data from a telephone survey of residents in Florida, Connerly and Frank (1986) came up with a similar finding that individuals who favored environmental protection were more likely to support growth control. Bollens (1990) also detected evidence supporting the environmental attitudes hypothesis. He analyzed votes concerning a November 1988 local referendum to impose a one-year moratorium on new development in Cape Cod, Massachusetts and found “significantly greater support for growth limitation ... among those who believed that the environment on the Cape was not being protected adequately (p.55).”

The individual-level studies, however, did not provide unequivocal support for the other hypotheses, including the social class hypothesis. Gottdiener and Neiman (1981) stressed that their results do not support claims that local growth control

draws particular support from affluent residents. In their analysis of voters who supported the Riverside Measure R initiative, they found that income, socioeconomic status, and years of schooling obtained by voters were unrelated to support for the measure. Bollens (1990) also reported the lack of support for this hypothesis, though his study showed some notable associations between growth control advocacy and voters' employment and occupational status. He noted that "[t]he absence of support here for the social-class theory of growth limitation is not unique. Other researchers have found that patterns of growth-control advocacy at the level of the individual respondent fail to support the status-antigrowth relationship found at the aggregate citywide level. ...Empirical support of the social-class hypothesis at the aggregate citywide level thus may not be a result of individual-level factors but of factors relating to the process of political mobilization of a city's residents (p.53)."

It is important to stress that the motivations behind growth control may change over time. Baldassare and Wilson (1996) highlighted this important point through an examination of the attitudes toward growth among residents in Orange County, California. They used data from annual surveys conducted in 1982, 1991, and 1993 which asked "Do you think that government regulations in your city or community aimed at controlling growth are too strict, about right, or not strict enough? (p.463)." The authors observed that support for stricter growth controls peaked in 1991 before gradually declining afterwards. While their analysis showed that female residents and residents with a lower quality-of-life were more likely to support growth control in all three surveys, other factors less consistently predicted residents' attitudes toward growth control over time. Household income, for instance, was positively associated with support for stricter growth controls in the 1982 survey but had no association with growth controls in the 1991 and 1993 surveys. Conversely, the relationship between residents' perceptions of rapid growth and increased support for growth controls was not significant until the 1991 and 1993 surveys, which also coincided with peak support for stricter measures. As the authors noted, the inconsistency in these findings might reflect the evolving nature of the mechanisms behind local growth control at different points in time.

The individual-level research reviewed suggested that the rise of local growth control might be associated with residents' concerns about traffic congestion, although this connection was not examined as extensively as other hypotheses in the literature. Some individual-level studies asked residents whether traffic congestion was one of their major concerns. For instance, Connerly and Frank (1986) asked Florida residents to name "what they felt to be the most important problems facing the state" and found transportation cited more frequently among residents who favored stronger growth controls. Bollens (1990) also found that traffic congestion ranked high as a problem impacting quality-of-life in his survey of Cape Cod residents. Gottdiener and Neiman (1981) surveyed whether or not those employed in the household commuted more than 10 miles but did not find that it affected support for Measure R significantly.

Jurisdiction-level Studies

A relatively larger number of studies examined the dynamics of growth control at the jurisdiction level. Here, the focus is on which cities or counties are more likely to adopt growth control measures and why. These studies were designed and carried out in various ways — some used surveys/interviews of city mayors or planning directors/officials (see e.g., Maurer and Christenson, 1982; Donovan and Neiman 1992; Neiman and Fernandez, 2000), while others focused on the presence or absence of certain growth control measures (or similar land use regulations). In terms of study areas, a great deal of attention has been paid to California cities, given the prevalence of growth control in the state, the high rate of housing cost increases, and the widespread use of local ballot measures. In our sample of 62 articles, 22 studies provided a city-level investigation of the causes of growth control, and 7 out of the 22 focused on cities in California.

While it varies across studies, much of the jurisdiction-level research was centered around several (theoretical) perspectives, some of which were conceptually connected to the hypotheses examined by individual level studies discussed in the preceding subsection. According to Nguyen (2009, p.26-31), the perspectives include:

- Growth pressures, viewing growth control as a response to rapid increases in population size or growth rates and associated increases in taxes, traffic congestion, pollution, infrastructure demand, and so forth.
- Community status, viewing growth control as a phenomenon mainly arising in wealthy communities to avoid unwanted types of development and exclude some population groups.
- Metropolitan hierarchy, viewing growth control as an instrument used to improve the collective social standing of a jurisdiction relative to others within its metropolitan region.
- Strategic interaction, viewing growth control as a local action to remain economically competitive with neighboring jurisdictions and to guard against unwanted spillovers from other jurisdictions.

The empirical findings are mixed regarding the effects of some key variables that represent these perspectives, suggesting that these explanations may not hold in all circumstances. For instance, many studies used past growth rates to capture the growth pressures in and around sample cities, but the significance of this variable was not consistent across studies. Protash and Baldassare (1983) examined the local conditions that influenced growth control by surveying officials from 97 Northern California municipal planning agencies. They found that growth rates in the 1960-70 period across the municipalities were significant predictors of both population growth and the adoption of growth control between 1970 and 1975. Also, Neiman and Fernandez (2000) surveyed local planning officials in seven Southern California counties for their attitudes and perceptions regarding restrictions on local residential development and found past growth rates to be a consistent predictor of growth control. However, other studies, such as Maurer and Christenson (1982), Baldassare and Protash (1982), and Logan and Zhou (1990), detected no (or limited) evidence of such effects of past growth rates on growth control.

One notable exception to the generally mixed nature of the empirical findings is the importance of strategic interactions among local governments (i.e., regulatory actions of one locality can influence the actions of other localities, particularly neighboring jurisdictions). Brueckner (1998) provided a pioneering study on these mechanisms using a spatial lag model, and more recent studies have paid explicit attention to the interactions among localities. The evidence of strategic interactions is almost unequivocal in studies focused on the United States and other countries, such as France. Nguyen (2009), for instance, stressed that “the only hypothesis that was strongly supported by the logistic regression analyses was strategic interaction (p.25).” Schone et al. (2013) also found support for the presence of strategic interactions in their analysis of the determinants of the “taxe locale d’équipement” (local development tax) in France. In addition, Chanel et al. (2014) showed that changes in developable land in municipalities in the Provence-Alpes-Cote d’Azur region over time was impacted by the size and growth rate of neighboring municipalities.

Less is known about how city-level transportation attributes may contribute to (or limit) the rise of growth control. While many studies mentioned traffic congestion (or other transportation issues) as a concern behind the adoption of growth control, most of them did not take transportation into account in their empirical analysis. Only a few studies explicitly considered transportation in measuring growth control or identifying city-level determinants. Neiman and Fernandez (2000) constructed an additive index for their investigation of the varying degrees of restrictions on residential development across cities in Southern California from various survey questions including: “Is there any formal policy in your city to affect residential growth rates by requiring that traffic standards be satisfied before new development occurs? (p.301).” and found an association between socio-economic status indicators and more stringent restrictions. Brueckner (1998) tested a

county-wide traffic congestion variable (DELAY) in his analysis, but the results did not show that it had any significant effect. In explaining the lack of significance, he stated that “[s]ince DELAY is computed at the county level and covers freeways but not city streets, it [may not precisely capture] ... local traffic congestion. (p.461).”

Other Studies

Our sample of 62 articles also includes other types of studies investigating the drivers behind local growth control which cannot be classified into the above two categories (individual- and jurisdiction-level studies). Some of them, such as Dyble (2007) and Whittemore (2012), provide a historical account of the rise of growth control, particularly the process of forming growth control regimes (i.e., coalitions of stakeholders advocating a legal agenda aimed at regulating development activities). Some other studies examine the process of rezoning and/or the opposition that arises in response to new development to help identify the complex mechanisms by which growth is accommodated (see e.g., Gabbe, 2019; Whittemore and BenDor, 2019).

Again, conclusions with regard to some of the widely assumed hypotheses in these studies are mixed, including the importance of homeownership or class bias in the adoption of growth controls. On the one hand, studies such as Whittemore (2012) highlight the important role of homeowners in the formulation of antigrowth regimes, particularly in Los Angeles where a combination of statewide regulations, local ballot initiatives, and successful lawsuits filed on behalf of homeowner associations in the 1970s and 1980s, shifted the balance of power in land use policy from developers to antigrowth elites.² On the other hand, Gabbe (2019) found the effect of homeownership on rezonings in three Santa Clara County cities were insignificant. His analysis showed the lack of upzoning in most neighborhoods, defying the conventional wisdom that it is particularly harder to build in areas dominated by owner-occupied housing. Based on their analysis of the public comments gathered from planning commission hearings for 330 rezoning applications for residential development in Henrico County, Virginia between 1986 and 2016, Whittemore and BenDor (2019) found that higher homeownership rates were actually associated with lower numbers of individuals expressing concerns about rezonings for residential development, perhaps because “homeowners were often represented by individuals from homeowners’ associations speaking on behalf of large numbers of people (p.7-8).”

Notably, some of these studies lend insight into the ways in which transportation and the rise of growth control are intertwined. For example, Dyble’s (2007) case study of Marin County, California provides an in-depth exploration of the county’s transportation-oriented growth control (or “freeway revolts”) and shows that transportation investment projects can trigger growth control. According to the author, despite Marin County’s pro-growth political establishment throughout the 1960s, a proposed freeway linking the county to San Francisco united property owners, business leaders, environmentalists, and politicians in support of growth control. As many growth control advocates secured political power at the county and state levels, “[t]hey described transportation policy as a means of limiting population growth and development — a major reversal — recognizing that local government officials could effectively reduce pressure for growth and new development by putting a halt to road construction (p.51).” In subsequent decades, the extent of the county’s transportation-based growth control regime was reflected in various open-space and agricultural preservation programs which were largely funded through private initiatives due to reduced tax revenues in the state following the passage of

² See Fischel (2001) for a more general discussion of this mechanism, namely the *homevoter hypothesis* that he developed by extending Tiebout’s (1956) work with emphasis on the critical role of zoning and associated capitalization in a system of local governance.

Proposition 13. However, as the author pointed out although these growth control measures successfully limited the county's population growth rate, they might exacerbate housing shortages, sprawl, and development pressures across the Bay Area.

As in the individual- and jurisdiction-level studies, some of these other studies also suggest that traffic congestion is one of the main concerns leading residents to support growth control initiatives.³ Whittemore and BenDor (2019) reported that "[t]he most common topic of concern was traffic volumes, with 33.0 percent of the 994 individuals expressing some concern about this (p.5)." Furthermore, the proponents of growth control appear to highlight this concern in pursuing the adoption of new local growth control measures. According to Glickfeld et al. (1986) who studied over 150 local ballot measures in California from 1971 to 1986, "[p]amphlets often include[d] photographs of new subdivisions and traffic congestion designed to induce voters to support limits on new residential growth (p.130)."

³ See also Pendall (1999b) and Manville and Osman (2017) for relevant discussions.

The Consequences of Growth Control

The remaining studies in our sample examined the consequences of growth control and/or similar land use regulations limiting development. As in the previous set of studies concerning the causes of growth control, city-level examinations are most common in this group. Our sample includes 30 studies classified into the ‘consequences’ group with 18 of these studies using cities (or equivalent areas) as the primary unit of analysis. Six studies use larger geographies, such as counties and metropolitan statistical areas (MSAs), as the unit of analysis, and the remainder focus on smaller geographies.

City-level Studies

While the city-level studies vary in many ways, most of them focus on one of the following three variables: growth patterns, housing market dynamics, and sociodemographic composition. Studies analyzing *growth patterns* assess the impact of growth controls on subsequent development. Articles focusing on *housing market dynamics* typically analyze changes in home prices. Finally, several studies address changes in *sociodemographic composition*. We discuss each of these outcomes in turn.

Growth Patterns

First, a considerable number of studies have examined whether the adoption of growth controls affects cities’ growth, typically measured in terms of housing or population change. Some of these studies suggest that growth controls actually have limited effect on future levels of growth. Explanations for this vary. Growth control can sometimes arise merely as “attempts by elites at providing the symbolic appearance of prudent planning (Donovan and Neiman, 1995, p.782).” (See also Logan and Zhou, 1990, p.126.) It may also be possible that local growth control, like all other policy measures, does not work as intended for other reasons, including ineffective implementation.

These possibilities were supported by some early studies reporting the lack of significant effects of growth control. For instance, in their article titled “Do suburban growth controls control growth?” Logan and Zhou (1989) compared responses of city planning officials gathered in the 1973 International City Management Association survey with census data from 1970 and 1980 to analyze the impact of growth control on local growth. They tested five types of growth control measures and found that only environmental impact statement requirements and environmental zoning had a significant impact, when controlling for other possible causes of community change. Landis (1992) also cast doubt on the effectiveness of growth control in reducing local rates of population growth in his investigation of “the experiences of seven midsized California cities that adopted stringent growth control programs during the late 1970s and early 1980s, ... [in comparison with those] of six otherwise similar communities that did not (p.489).” His analysis showed little difference between the two groups, leading him to conclude that “[v]iewed over a ten-year period, local growth control programs, ... have been largely irrelevant to the management of urban growth (p.502).” Donovan and Neiman (1995) tackled this issue using data from their mail survey of planning directors for nearly 150 Southern California cities conducted in 1988, and contrary to expectation, their regression analysis indicated that population increase was relatively faster in growth controlled cities than their counterparts.

Other studies, however, have shown that local growth control did have a significant deterrent effect on the growth of the city’s population or housing stock. Nguyen (2007) compiled data on land use ballot measures between 1986 and 1989 and

conducted an analysis to assess their impacts. Her findings revealed that such controls significantly reduce growth in housing units, particularly in suburban locales and cities with higher incomes or relatively faster employment growth rates, suggesting that local growth control actions “are not merely symbolic, but actually slow down housing growth (p.142).” Shen (1996) used the San Francisco Bay Region as a test case to measure the spatial impacts of local growth controls over time. Through an analysis of the disparity between projected and actual 1990 population distributions, the author found evidence of the significance of growth control policies for some measures. Furthermore, Jackson (2016) found that land use regulations can limit housing supply significantly in his panel analysis of residential building permit data and respective land use restrictions from 402 California cities.

Only a few studies have investigated the possibility that local growth control programs redirect growth to neighboring communities. Levine (1999) looked at counts of housing units to determine whether growth management policies enacted by 490 California jurisdictions led to any change in the total number of housing units or the relocation of construction activities to adjacent jurisdictions. He concluded that growth control measures, which removed land from development, required less intense development, or downsized existing development densities, significantly reduced the number of both renter and owner-occupied housing units in the jurisdiction which enacted them and that the result of “[t]he reduction has most likely been a shift towards less-controlled jurisdictions rather than an absolute decrease in housing units (p.2065).” Byun et al. (2005) also explored homebuilding activity across California in a similar manner. Their analysis indicated a distinct pattern of housing spillovers flowing from urban coastal cities to peripheral communities.

Housing Market Dynamics

An issue that has drawn equal, if not more, attention, is how growth control programs shape the local housing market, in particular, changes in housing prices. Growth controls can result in a rapid housing price escalation for both supply- and demand-side reasons, particularly when it induces “amenity improvements and subsequent increases in demand ... [in addition to] supply constraints and greater costs of development (Kim, 2011, p.41).”

The findings are mixed, which is not very surprising. On the one hand, some studies found growth controls had significant impacts on housing prices. For instance, using quarterly data for 17 planning areas in Montgomery County, Maryland between 1982 and 1987, Pollakowski and Wachter (1990) reported that (1) “land-use regulations raise housing and developed land prices within a locality;” (2) “spillover effects exist across localities;” and (3) “the effects of zoning and growth management controls taken together exceed their impact when separately measured (p.323).” On the other hand, some other studies in our sample yielded small or statistically insignificant effects. Landis (1992) found that housing was more affordable in some of the growth control cities than comparable cities lacking controls. The author offered three possible explanations for this finding: (1) “[growth controls] primarily served to regularize the development cycle;” (2) “growth displaced from one city can easily and costlessly be accommodated in nearby or adjacent communities;” and (3) “price effects of localized growth control may be quite small in relation to other regionwide forces (p.497-498).” Schuetz (2009) focused on the impacts of zoning regulations on the rental housing market in 187 cities across eastern and central Massachusetts, reporting that the effect of permitting multifamily unit lots by right on reducing rents was very small, and that multifamily units allowed by special-permit had no significant association with rents. However, the author acknowledged that this might be due in part to the state’s affordable housing law that permitted subsidized multifamily housing to be built in otherwise restricted areas and may have artificially lowered these rents.

To some extent, the mixed findings can be attributed to variation in the way local growth control programs are designed or implemented across cities and regions. A considerable number of city-level studies showed that the consequences might vary by type of regulation. In particular, Pendall (2000), Byun et al. (2005), and Jackson (2016) found that restrictive low-

density zoning tended to generate more significant impacts on housing supply than other types of regulation. Furthermore, given that some communities enact multiple restrictions on development, Jackson (2016) states that:

[S]everal of the restrictions have a significant negative impact on new construction, while others have a significant positive effect. This important result is obfuscated by the use of more aggregated regulatory measures, like those that dominate the literature. Aggregate measures are generally used ... on the grounds that they may be the best proxy available for the overall regulatory environment of a community. However, the fact that development is stimulated by some regulations and stymied by others suggests that null results from the use of aggregate regulatory indices may be due to offsetting effects, rather than the absence of any effect (p.53).

It is important to note that some recent studies direct attention to the linkages between growth control (or land use regulations) and housing market booms/busts. Glasgow et al. (2012) compared survey responses on growth control policies and attitudes toward growth from 297 California municipalities with foreclosure activity data from 2008 and 2009. Their analysis showed areas with growth control had fewer foreclosures perhaps due to “more cautious local government policy approaches to residential growth (p.64),” suggesting that even after controlling for factors such as the availability of land to expand and demographic composition, local policy decisions can play an important role in mitigating the impact of broader macroeconomic forces. However, Chakraborty et al. (2013) reported a positive association between zoning restrictiveness and foreclosures. According to the authors, it appeared that “restrictive zoning ... forestall[ed] a mix of housing type and uses and increase[d] mortgage default rates that [might] potentially lead to foreclosure (p.436).”

The mixed findings may in part be attributable to different measurement strategies employed. Many studies of growth controls rely on surveys of municipal planners (Monkkonen et al., 2020), which may lead to different responses depending on which official answers the questions. Lewis and Marantz (2019) compared two surveys administered to the same municipalities nearly contemporaneously and found — in many cases — the same municipality provided incompatible responses to substantively similar (or identical) questions. Murray and Schuetz (2019) and O’Neill et al. (2019) compared a more recent survey of California planners to objective measures of the relevant phenomena and found striking differences, raising concerns about the validity of survey-based measures.

Sociodemographic Composition (Exclusionary Consequences)

One of the most important concern in the growth control literature is whether growth controls limit housing opportunities for low-income households and minorities. By design, most growth control programs impose restrictions on certain types of development that could expand housing opportunities to diverse groups of people. Higher rental prices resulting from the restriction on the supply of housing due to growth control could also push out some current residents.

Some studies in our sample pay explicit attention to the potential exclusionary consequences of local growth control and discuss how it could impede efforts to create more just and inclusive communities (see e.g., Donovan and Neiman, 1995; Levine 1999; Pendall, 2000; Nguyen, 2007). These studies generally examine changes in the socioeconomic composition of municipalities adopting growth controls. For instance, in their study of cities in Southern California, Donovan and Neiman (1995) found that restrictive growth controls were associated with a relative decline in the number of Black city residents in 1990 compared to 1980, whereas they showed little impact on the percentage of Hispanic residents.

Levine (1999) examined the impacts of local growth control on a range of variables in a similar fashion but using data for a larger number of jurisdictions (490 cities and counties) in California. He found that an increase in the number of enacted

growth control measures was associated with fewer local Black and Hispanic residents, perhaps due to the significant displacement of rental units found in his study. Based upon a national survey of 1158 jurisdictions, Pendall (2000) found that cities with several land use controls had significantly smaller concentrations of Black and Hispanic residents in 1980 and declining shares of both population groups between 1980 and 1990. Nguyen's (2007) analysis of ballot box growth control measures in California cities indicated that such measures were associated with fewer Hispanic residents, but not Black residents, as compared with cities that did not adopt growth controls.

Although the city-level studies in our sample did not address transportation-related consequences explicitly, it would be possible to imagine the (potential) implications of growth control and other land use regulations for transportation, given their impacts on the housing market and growth dynamics. From a transportation equity perspective, the possible exclusionary consequences reported in the above studies deserve special mention, as the evidence indicates disproportionate impacts on minorities and other vulnerable population groups.

Regional Studies

A smaller number of studies address county or regional-level growth control dynamics. These are important since, as mentioned above, growth control measures can often have impacts beyond the individual city that enacts them.

As with the city-level studies described above, some studies summarized in this section focus on housing supply. Feiock (1994), for instance, analyzed all 67 Florida counties over a six-year period (1986-1991). His GLS (generalized least squares) pooled regression showed that growth management requirements in Florida led to fewer building permits being issued. Of particular importance were concurrency requirements, which established minimum public service levels as a condition for local governments to approve new development projects and were associated with a quarterly reduction of 55 building permits per county. Mayer and Somerville (2000) examined both static and dynamics effects of land use regulations, including growth control/management programs, within MSAs and found that they reduced the level of new construction and the housing industry's responsiveness to changes in the market for housing. In particular, this study showed that the following two regulation metrics had significant negative impacts on new housing supply at the regional level: the estimated length of time required for subdivision approval and the number of growth control/management techniques.

As in the city-level studies, some regional studies consider the possible residential displacement and other exclusionary consequences of growth control programs. In this case, the larger unit of analysis enables researchers to use indices that can capture the spatial segregation of two or more population groups within regions. For example, Rothwell's (2011) MSA-level study showed that density restrictions can lead to a higher degree of racial segregation. Both the direction and significance of the relationship were quite robust to different model specifications and segregation metrics. This finding is in line with some of the city-level studies highlighting the exclusionary consequences of growth controls, such as Donovan and Neiman (1995), Levine (1999), and Pendall (2000).

Pendall's (1999a) county-level analysis of the impacts of land use controls on sprawl indicates that the type of growth regulation is important, consistent with some city-level studies. Specifically, using data for 159 growing counties in the 25 largest US metropolitan areas, he found that building permit caps (limits on the number of units that can be built) and low-density zoning (typically through mandating large lot sizes) may aggravate sprawl, whereas ordinances requiring the construction of adequate public facilities before a building permit can be issued appears to discourage sprawl. His analysis did not show a significant impact on sprawl for either residential moratoria or urban growth boundaries (limiting where development can and cannot occur).

Intracity Studies

Our sample also includes some recent studies which focus on detailed development patterns under the influence of growth control/management or similar land use regulations. For instance, Carrión-Flores and Irwin (2017) examined how a public facilities moratorium and minimum lot size zoning in exurban Medina County, OH might affect residential land development. The authors analyzed data for over 6,000 land parcels in the county and measured the effects of the policies using pooled logit and fixed effect logit models. Their results indicate that the county's minimum lot size restrictions significantly reduced the probability of residential construction.

Focusing on the Portland metropolitan area, Kim (2013) attempted to unravel the mechanisms of residential development, when land development was prohibited in certain areas due to regulations. He employed a spatial market disequilibrium model to estimate how population density distribution in the region would differ from its observed pattern, if development had not been regulated. The analysis conducted at a one-square-mile grid cell level showed that the unmet demand for housing development might be pushed out to other jurisdictions, even across state borders. It further suggested that land use regulations implemented without cooperation among jurisdictions may not be able to contain development effectively.

The findings reported by these micro-level studies highlight the important role of growth control (or land use regulations, more generally) in shaping the spatial structure of metropolitan areas. Moreover, given that transportation is largely determined by the way a metropolitan region is spatially organized, it is evident that growth control can have significant transportation implications. Kim and Hewings (2013), although not included in our sample, demonstrate this possibility by showing that strict land use regulations can increase commuting time by limiting the relocation of population within a metropolitan region in response to changing employment patterns. Shoag and Muehlegger (2015) also reported that stricter land use regulations are associated with longer commuting times. According to their analysis, "high income workers and highly educated workers are those whose commute times increase the most with land-use regulation (p.492)."

While research conducted at a more disaggregated level tends to report statistically significant results, not all such studies have concluded that growth control always matters. Agarwal (2015) provided an interesting examination of the linkages between local policies (including local growth control) and employment center growth in which the author identified 47 distinct employment centers in the Los Angeles metropolitan region, but the study ended up with insignificant estimates for the effect of growth control. He interpreted this finding to mean "a general lack of effectiveness of local government policies in the complex dynamics of employment center growth (p.204)."

Conclusion

This research informs ongoing state-wide efforts to achieve a more systematic coordination of housing and transportation planning initiatives by providing a synthesis of relevant academic research. Specifically, we reviewed several bodies of literature concerning the causes and consequences of local growth control which has been viewed as one of the most significant barriers to expanding housing supply in job-rich areas and other desired locations and thus managing travel demand more effectively. By doing so, we attempted to provide some insights into the complex mechanisms of housing-transportation interactions, including how traffic congestion, among other factors, might induce local growth control and how resultant housing supply constraints would shape household residential location and travel decision-making.

This review shows that the rise of growth control and its implications vary widely and cannot be easily explained by a single formula or a standardized process. Both among the individual- and jurisdiction-level studies, the findings are mixed regarding key determinants of local growth controls and the circumstances under which a locality is likely to adopt relatively more restrictive regulations. This is also true in the case of research on the consequences of growth control, which report varying effects of growth control measures on future growth patterns, housing market dynamics, and socio-demographics — sometimes significant but not always.

How is growth control related to transportation? While the sampled studies shed some light on the (bidirectional) linkages, answering this question requires more research. Traffic congestion (or people’s concern or perception of this issue) has been widely assumed to stand behind growth control, but it remains unclear to what extent traffic congestion triggers the adoption of (or political support for) growth control measures. One could even question whether there exists a real causal relationship or whether traffic congestion is just used as a rationale to justify growth control driven by other (perhaps hidden) motives. Our understanding of the transportation consequences of growth control is similarly limited, even though it has been increasingly recognized that local growth control can modify the way households (and destinations) are spatially distributed and thereby significantly affect travel patterns and the workings of transportation systems. More research is needed to fully understand the (possibly) varying effects on different groups of people and businesses, different modes of transportation, and different locations.

As shown throughout this report, local growth controls (or new layers of regulations) can arise for various reasons, and such regulations are more likely to be adopted where the governance structure is highly fragmented and parochial concerns dominate. The studies reviewed in this synthesis can help us deal with the increasingly prevalent local controls and associated challenges, but we conclude with a call for further research with more detailed measurement strategies and additional data sources to obtain a more complete understanding of varying motives and outcomes of growth controls. Future studies that capture subtle changes in growth control approaches and relate them to housing and transportation dynamics would be particularly useful. It would also be valuable to examine the ramifications of growth control for transportation equity and explore ways to address the equity issue in various contexts.

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Appendix

Table 1. Reviewed Studies

Author(s)	Year	Title	Category	California-oriented?
Dowall	1980	An examination of population-growth-managing communities	Causes	
Gottdiener & Neiman	1981	Characteristics of support for local growth control	Causes	Yes
Baldassare & Protash	1982	Growth controls, population growth, and community satisfaction	Causes	Yes
Maurer & Christenson	1982	Growth and nongrowth orientations of urban, suburban and rural mayors: Reflections on the city as ...	Causes	
Protash & Baldassare	1983	Growth policies and community status: A test and modification of Logan's theory	Causes	Yes
Connerly & Frank	1986	Predicting support for local growth controls	Causes	
Landis	1986	Land regulation and the price of new housing lessons from three California cities	Consequences	Yes
Schwartz et al.	1986	Research design issues and pitfalls in growth control studies	Consequences	Yes
Glickfeld et al.	1987	Trends in local growth control ballot measures in California	Causes	Yes
Katz & Rosen	1987	The interjurisdictional effects of growth controls on housing prices	Consequences	Yes
Logan & Zhou	1989	Do suburban growth controls control growth?	Consequences	
Bollens	1990	Constituencies for limitation and regionalism: Approaches to growth management	Causes	
Logan & Zhou	1990	The adoption of growth controls in suburban communities	Causes	
Pollakowski & Wachter	1990	The effects of land-use constraints on housing prices	Consequences	

Author(s)	Year	Title	Category	California-oriented?
Donovan & Neiman	1992	Citizen mobilization and the adoption of local growth control	Causes	Yes
Landis	1992	Do growth controls work? A new assessment	Consequences	Yes
Feiock	1994	The political economy of growth management	Consequences	
Richer	1995	Explaining the vote for slow growth	Causes	Yes
Donovan & Neiman	1995	Local growth control policy and changes in community characteristics	Consequences	Yes
Baldassare & Wilson	1996	Changing sources of suburban support for local growth controls	Causes	Yes
Shen	1996	Spatial impacts of locally enacted growth controls: The San Francisco Bay Region in the 1980s	Consequences	Yes
Brueckner	1998	Testing for strategic interaction among local governments: The case of growth controls	Causes	Yes
Levine	1999	The effects of local growth controls on regional housing production and population redistribution in California	Consequences	Yes
Pendall	1999	Do land-use controls cause sprawl?	Consequences	
Neiman & Fernandez	2000	Local planners and limits on local residential development	Causes	Yes
Mayer & Somerville	2000	Land use regulation and new construction	Consequences	
Pendall	2000	Local land use regulation and the chain of exclusion	Consequences	
Romero & Liserio	2002	Saving open spaces: Determinants of 1998 and 1999 "antisprawl" ballot measures	Causes	
Vogt & Marans	2003	Open space neighborhoods: Residents' views on new forms of development	Causes	
Howell-Moroney	2004	Community characteristics, open space preservation and regionalism: Is there a connection?	Causes	
Howell-Moroney	2004	What are the determinants of open-space ballot measures? An extension of the research	Causes	

Author(s)	Year	Title	Category	California-oriented?
Liu & Vanderleeuw	2004	Economic development priorities and central-city and suburb differences	Causes	
Solecki et al.	2004	The geography of support for open-space initiatives: A Case Study of New Jersey's 1998 Ballot Measure	Causes	
Byun et al.	2005	Spillovers and local growth controls: An alternative perspective on suburbanization	Consequences	Yes
Landis	2006	Growth management revisited: Efficacy, price effects, and displacement	Consequences	Yes
Dyble	2007	Revolt against sprawl: Transportation and the origins of the Marin County growth-control regime	Causes	Yes
Nyugen	2007	Local growth control at the ballot box: Real effects or symbolic politics?	Consequences	Yes
Mohamed	2008	Who would pay for rural open space preservation and inner-city redevelopment? Identifying support for ...	Causes	
Nyugen	2009	Why do communities mobilize against growth? Growth pressures, community status, metropolitan hierarchy ...	Causes	Yes
Schuetz	2009	No renters in my suburban backyard: Land use regulation and rental housing	Consequences	
Chakraborty et al.	2010	The effects of high-density zoning on multifamily housing construction in the suburbs of six US ...	Consequences	
Hawkins	2011	Electoral Support for Community Growth Management Policy	Causes	
O'Neill et al.	2011	Why environmentally constrained towns choose growth controls	Causes	
Rothwell	2011	Racial enclaves and density zoning: The institutionalized segregation of racial minorities in ...	Consequences	
Zhao	2011	Managing urban growth in a transforming China: Evidence from Beijing	Consequences	
Whittemore	2012	Requiem for a growth machine: Homeowner preeminence in 1980s Los Angeles	Causes	Yes

Author(s)	Year	Title	Category	California-oriented?
Glasgow et al	2012	Local development policies and the foreclosure crisis in California: Can local policies hold back national tides?	Consequences	Yes
Schone et al.	2013	Modeling local growth control decisions in a multi-city case: Do spatial interactions and lobbying efforts ...	Causes	
Chakraborty et al.	2013	Zoning restrictiveness and housing foreclosures: Exploring a new link to the subprime mortgage crisis	Consequences	
Kim	2013	Measuring the containment and spillover effects of urban growth boundaries: The Case of the Portland ...	Consequences	
Paulsen	2013	The effects of growth management on the spatial extent of urban development, revisited	Consequences	
Chanel et al.	2014	Determinants of local public policies for farmland preservation and urban expansion: A French illustration	Causes	
Delattre et al.	2015	Combining discourse analyses to enrich theory: The case of local land-use policies in South Eastern France	Causes	
Agarwal	2015	An examination of the determinants of employment center growth: Do local policies play a role?	Consequences	Yes
Hortas-Rico	2015	Sprawl, blight, and the role of urban containment policies: Evidence from US cities	Consequences	
Jackson	2016	Do land use regulations stifle residential development? Evidence from California cities	Consequences	Yes
Carrión-Flores & Irwin	2017	A fixed effects logit model of rural land conversion and zoning	Consequences	Yes
Pendall et al.	2018	The growth of control? Changes in local land-use regulation in major US Metropolitan Areas from ...	Causes	
Jackson	2018	Regulation, land constraints, and California's boom and bust	Consequences	Yes
Gabbe	2019	Local regulatory responses during a regional housing shortage: An analysis of rezonings in Silicon Valley	Causes	Yes
Whittemore & BenDor	2019	Opposition to housing development in a suburban US County: Characteristics, origins, and consequences	Causes	
Lewis & Marantz	2019	What planners know: Using surveys about local land use regulation to understand housing development	Consequences	Yes

