Local Land-Use Regulations: Incentives for Adoption and Desirability of State-Level Override Laws

by

Jan K. Brueckner
Department of Economics
University of California, Irvine
3151 Social Science Plaza
Irvine, CA 92697
e-mail: jkbrueck@uci.edu

June 2026

Abstract

This paper demonstrates both the incentives for imposing local land-use regulation as well as its inefficiency, using a theoretical model that is simple and accessible. Although the theme of the paper is somewhat familiar from older work, an updated analysis has value given the striking recent emergence of state-level overrides of local land-use regulations in the US, which the model's social planner would support. These overrides, which are directed at the problem of housing unaffordability, represent an historic phenomenon because regulation of land-use has been the responsibility of local governments in the US for well over a hundred years. As a result, it is important for theoretical analysis to demonstrate their desirability.

Local Land-Use Regulations: Incentives for Adoption and Desirability of State-Level Override Laws

by

Jan K. Brueckner[†]

1. Introduction

Policy makers in the US increasingly view local land-use regulations as an important cause of housing unafforability. By limiting housing supply though various mechanisms, these regulations are thought to raise housing prices and rents, putting homeownership out of reach for many households and straining the budgets of renters. In response, several state legislatures have passed laws that override some local regulations, a revolutionary change given that regulation of land-use has been the province of local governments in the US since the early 1900s. Since local governments and many of their constituents treasure this power, these state overrides have been highly controversial politically.

In California, the first override law (SB 1069) passed in 2016, and it banned most local obstacles to the approval of accessory dwelling units (ADUs), which are small backyard houses that can expand a city's stock of rental dwellings. Several other states later passed similar ordinances. In 2021, California passed another law (SB 9) that removed obstacles to the densification of parcels with single-family zoning, allowing the existing house to be replaced by as many as four duplex-style units.[1] Oregon passed a similar law (HB 2001) in 2019, and a 2001 Massachusetts ordinance (the MBTA Communities Law) required multi-family zoning near transit stops, as did another California law (SB 79) passed in 2025, which allows construction of buildings of up to 9 stories near transit.[2] The four latter laws constitute "upzoning" ordinances, and the effects of such laws are now being studied empirically, complementing a large previous

[†] I thank David Agrawal, Kangoh Lee, and Weihua Zhao for comments. The usual disclaimer applies.

[1] ADU law has had a larger effect, partly because the "duplex law" requires that the owner of the single-family parcel remain on the site, impeding its sale to a developer. See Brueckner and Thomaz (2024) on ADUs and Garcia and Alameldin (2023) on the duplex law.

[2] For California media stories, see Castelman (2024) on ADUs and Flemming and Zahniser (2005) on SB 79.

literature on the housing-price effects of land-use regulations.[3]

Many observers view local land-use regulation as partly driven by NIMBY ("not in my backyard") concerns, and these sentiments are one reason why overrides may generate fierce political opposition in state legislatures. NIMBY opposition arises partly because the housing-supply increase resulting from upzoning or related regulatory changes may put downward pressure on housing prices, angering homeowners. In addition, denser development in a city may generate negative externalities while ultimately raising city populations, effects that may be unwanted by many residents. The legislative processes in some states have managed to overcome such opposition, resulting in the passage of local override ordinances.

Are such override laws in the public interest? Majorities in the state legislatures that passed these laws evidently thought so. But what does economic reasoning tell us? On the one hand, existing homeowners lose from the lower housing prices that may follow from the laws. But these lower property values help in the transition to homeownership, and lower rents benefit renter households, while also allowing greater savings toward a home purchase. On the other hand, the externalities from denser, more-developed cities may negatively affect homeowners and renters alike.

The purpose of the present paper is to theoretically illustrate the incentives that lead to local restrictions on housing development and to show that the resulting outcome is economically inefficient, reducing social welfare. The paper develops a simple model where NIMBY concerns are captured by a negative effect from a city's population size in the utility functions of its residents. The local governments imposing the development restrictions are controlled either by the absentee landowners who own all the city's land or by the city's renter households. In either case, the analysis shows that development restrictions may be imposed. A state-level social planner, however, would impose no restrictions, justifying an override of local regulations by the state, which improves overall welfare.

Since these conclusions are not entirely new to the literature, why is there a need for current paper? The reasons are twofold. First, the closest related theoretical work is by now quite

[3] On upzoning, see Büchler and Lutz (2024), Greenaway-McGrevy, Pacheco and Sorensen (2021), Greenaway-McGrevy and Phillips (2023), Liao (2026), Gandhi and Nagpal (2026), and Tanrisever (2026). For a survey of the literature on regulation's effects, see Gyourko and Molloy (2015).

old, raising the value of an updated paper that provides a rationale for today's striking and unprecedented state overrides of local land-use regulations. Second, the current framework is more straightforward and accessible than previous models, allowing readers to better see why land-use regulations are imposed and why they are inefficient.

Some previous analyses portrayed development restrictions using monocentric-city models, where the restrictions limit the distance to the city boundary. Examples are the papers of Engle, Navarro and Carson (1992), Helsley and Strange (1995), and Brueckner (1995). As in the current model, city land is typically owned by absentee landowners in these models, with city residents being renters, although the framework of Brueckner and Lai (1996) included resident landowners along with renters. In contrast to the spatial detail in these models, the current framework is non-spatial, offering simplication. For other theoretical approaches to modeling land-use regulation, see Hilber and Robert-Nicoud (2013) and Turner, Haughwout and Van Der Klauuw (2014).[4]

The plan of the paper is as follows. Section 2 explains the structure of the model, while section 3 explores the incentives for imposition of development restrictions. Section 3.1 analyzes the case where local governments are controlled by absentee landowners, while governments in section 3.2 are controlled by renters. Section 4 analyzes the problem of a state social planner, while section 5 offers conclusions.

2. Model setup

For simplicity, the state contains just two cities, denoted 0 and 1, with equal developable land areas $\hat{L}$ and a combined population of $2\hat{n}$. The model suppresses a city's spatial structure, so that commuting costs are absent, and housing production is also suppressed, with residents consuming land directly. All residents, who are mobile across cities, have the same preferences over land consumption, denoted q, and nonland consumption, denoted c. In addition, individuals prefer living in a smaller city, with utility decreasing in the city population n, an externality effect that may capture unmodeled congestion and other NIMBY concerns. Preferences are

[4] For an analysis of the land-use constraints imposed by tribal norms in Africa, see Picard and Selod (2026).

assumed to be quasi-linear, with the utility of a city i resident, $i = 0, 1$, given by

$$u(c_i, q_i, n_i) \;\equiv\; c_i \;+\; v(q_i) \;-\; \alpha n_i, \tag{1}$$

where $v(\cdot)$ is increasing and strictly concave. Residents have identical incomes equal to y, which come from equal endowments of the nonland good. The land in each city is owned by absentee landowners, with a separate owner group for each city.

Residents' dislike of a large population may lead a city's government to restrict its developed land area, keeping it below the maximal amount $\hat{L}$. The city's developed area, denoted L_i, must satisfy $L_i \leq \hat{L}$, an equality that holds strictly when a development restriction is imposed. Cities choose their developed areas in non-cooperative fashion to maximize a particular objective function, taking account of the state economy's equilibrium conditions, one of which captures the intercity mobility of residents.

Letting p_i denote the rental price per unit of land in city i, a resident's choice of land consumption satisfies $v'(q_i) = p_i$. The state economy's equilibrium conditions also include

$$n_0 q_0 \;=\; L_0 \tag{2}$$

$$n_1 q_1 \;=\; L_1 \tag{3}$$

$$n_0 \;+\; n_1 \;=\; 2\hat{n} \tag{4}$$

The first two conditions indicate that total land consumption in each city equals the developed land area, while the third condition says that the city populations sum to $2\hat{n}$.

The final equilibrium condition, which reflects the mobility of the population, requires that the residents achieve the same utilities in city 0 and city 1. To state this condition, let the first-order condition $v'(q_i) = p_i$ for land consumption be rewritten as $p_i = p(q_i)$, where $p(q_i)$ is the inverse demand function for land, equal to $v'(q_i)$ (yielding $p' = v'' < 0$). Using the residents' budget constraints to eliminate c_0 and c_1 in (1), this condition is written

$$y \;-\; p(q_0)q_0 \;+\; v(q_0) \;-\; \alpha n_0 \;=\; y \;-\; p(q_1)q_1 \;+\; v(q_1) \;-\; \alpha n_1. \tag{5}$$

The four conditions in (2)-(5) yield solutions for the four unknowns q_0, q_1, n_0, and n_1.

The equal-utility condition in (5) can be written in terms of a single unknown, n_0, by substituting from (2)-(4). Using (2) and (4) to write $q_0 = L_0/n_0$ and $q_1 = L_1/n_1$, and using (4) to write $n_1 = N - n_0$, (5) becomes, after cancelling y,

$$-p\left(\frac{L_0}{n_0}\right)\frac{L_0}{n_0} + v\left(\frac{L_0}{n_0}\right) - \alpha n_0 \;=\; -\,p\left(\frac{L_1}{2\hat{n} - n_0}\right)\frac{L_1}{2\hat{n} - n_0} + v\left(\frac{L_1}{2\hat{n} - n_0}\right) - \alpha(2\hat{n} - n_0). \quad (6)$$

This condition determines the city-0 population as a function of L_0 and L_1, the developed land areas in the two cities.

Total differentiation of (6) shows how city 0's population n_0 changes when L_0 increases. Simplification occurs because the term $[-p(L_0/n_0) + v'(L_0/n_0)][\partial(L_0/n_0)/\partial L_0]$ yielded by differentiating the LHS expression equals zero by the first-order condition, as do analogous terms from differentiating the RHS, leaving only terms involving p' and α. Dropping the vanishing terms and rearranging then yields

$$\frac{\partial n_0}{\partial L_0} \;=\; \frac{-p'\left(\frac{L_0}{n_0}\right)\frac{1}{n_0}}{-p'\left(\frac{L_0}{n_0}\right)\frac{L_0}{n_0^2} \;-\; p'\left(\frac{L_1}{2\hat{n}-n_0}\right)\frac{L_1}{(N-n_0)^2} \;+\; 2\alpha} \;>\; 0, \quad (7)$$

given $p' < 0$.

City 0's population gain from a higher L_0 is natural, and the mechanism is as follows. When L_0 increases holding n_0 fixed, $q_0 = L_0/n_0$ increases and land rent falls in city 0 given $p' < 0$, making it more attractive relative to city 1. Population then increases in city 0 and falls in city 1, reversing the increase in q_0 and thus raising city 0's land rent back toward its original level while reducing rent in city 1. While these rent changes reduce city 0's attractiveness relative to city 1, the population shift compounds this impact through the population-disutility effect, further reducing city 0's relative attractiveness. Eventually, enough people will have moved to re-equalize utilities between the two cities. Importantly, the appearance of α in the denominator of (7) shows that a higher value of α reduces $\partial n_0/\partial L_0$. Therefore, when the population-disutility effect is strong, a smaller population increase suffices to re-equalize utilities after an increase in L_0.

The increase in population does not fully offset the higher L_0, so that individual land consumption rises in city 1 after the increase in its development land area. This conclusion follows because

$$\frac{\partial \frac{L_0}{n_0}}{\partial L_0} \simeq 1 - \frac{L_0}{n_0}\frac{\partial n_0}{\partial L_0} = 1 - \frac{-p'\left(\frac{L_0}{n_0}\right)\frac{L_0}{n_0^2}}{-p'\left(\frac{L_0}{n_0}\right)\frac{L_0}{n_0^2} - p'\left(\frac{L_1}{2\hat{n}-n_0}\right)\frac{L_1}{(N-n_0)^2} + 2\alpha} > 0 \qquad (8)$$

using (7), where $\simeq$ denotes proportionality, with the multiplicative factor $1/n_0$ suppressed. The inequality follows because the ratio term in (8) is less than 1. Note that multiplication of (7) by L_0/n_0 in generating (8) makes the numerator term in (8) equal to the first denominator term, so that the denominator is larger than the numerator.

Positivity of (8) shows the L_0-induced increase in n_0 from (7) is not sufficient to offset the increase in L_0 itself, so that the ratio L_0/n_0 and thus q_0 rises.[5] Since a higher α makes the population gain from a higher L_0 smaller from above, it follows that the increase in q_0 is larger when the population-distutility effect is stronger, as can be seen from inspection of (8).

3. The choice of development-area restrictions

3.1. Absentee landowners control the city government

With the responses to an increase in city 0's development area L_0 derived, attention now turns to the city's choice of L_0. As explained above, the city's residents are assumed to be renters, with its land owned by absentee owners, as is common in many urban and public-economics models. Initially, the city government is assumed to be controlled by these absentee landowners, choosing L_0 to serve their interests while not considering the welfare of local residents. In a subsequent section, a renter-controlled government is analyzed. When serving absentee landowners, the government seeks to maximize the city's total land rent, which accrues to the landowners as income.[6] While the absentee owners are not city residents, their preference

[5] Note that a full offset, which keeps L_0/n_0 and thus land rent at their original values, would leave city 0 less attractive than originally, given the utility loss from the higher n_0.

[6] Maximizing a local-government objective function subject to a mobility constraint like (5) is common in urban and public economics, most prominently in the tax-competition literature, where capital is mobile. See Wilson (1999) for a survey and Agrawal, Breuillé and Le Gallo (2025) for a recent contribution.

for higher total rents is meant to mimic the views of homeowners in actual cities.[7]

With undeveloped land generating no rent, the government chooses L_0 to maximize the total rent expression $p\Big(\frac{L_0}{n_0}\Big)L_0$. In doing so, the government behaves noncooperatively, viewing city 1's development area (L_1) as fixed. The first-order condition for L_0 is given by

$$p\left(\frac{L_0}{n_0}\right)\left[1 \;+\; \frac{p'(\frac{L_0}{n_0})}{p(\frac{L_0}{n_0})}\,\frac{L_0}{n_0}\left(1 \;-\; \frac{L_0}{n_0}\frac{\partial n_0}{\partial L_0}\right)\right] \;=\; 0. \tag{9}$$

This condition, which requires that the bracketed expression equals zero, characterizes an interior solution with restricted development, where $L_0 < \hat{L}$. Since p' is negative and the term in parentheses is positive from above, (9) has a chance of being satisfied at some interior L_0 value. However, a corner solution with all the city's land developed may arise, as discussed below. The second-order condition for the maximization problem is assumed to be satisfied (see further discussion below).

The first-order condition in (9) captures two opposing forces. On the one hand, an increase in L_0 raises the amount of land developed, which tends to increase total rent, an effect captured by $p\Big(\frac{L_0}{n_0}\Big)$ times the 1 in the bracketed expression. On the other hand, the higher L_0 raises individual land consumption, an effect captured by the positive parenthetical expression in (9). This increase reduces unit land rent, as captured by the negative $p'\Big(\frac{L_0}{n_0}\Big)$ factor outside the parentheses. The optimal L_0 is chosen to balance these positive and negative effects.

Since (8) and thus (9) involves L_1, the first-order condition in (9) yields city 0's reaction function, which gives the optimal L_0 as a function of L_1. It can be shown that this function is upward sloping, with $\partial L_0/\partial L_1 > 0$. City 1 has an analogous upward-sloping reaction function, and as usual, the Nash equilibrium is generated by the intersection of the two reaction functions.[8] Given the symmetry of the cities, this equilibrium will have identical populations and development areas in the two cities. Therefore, $n_0 = n_1 = \hat{n}$ holds, with each city

[7] Brueckner and Lai (1996) analyze a spatial development-restriction model where the cities contain immobile resident landowners (who own all the city's land) along with renters, a setup that approximates the homeowner/renter composition of actual cities. However, analysis of a similar model is not workable in the current framework.

[8] Stability of the equilibrium requires that the reaction-function slopes are less than 1, but this requirement is not guaranteed and must be assumed.

containing half of the state's fixed population of $2\hat{n}$. In addition, the development areas satisfy $L_0 = L_1 = L$, where L is the common equilibrium area, an endogenous quantity. Even though city 0's government expects that it can reduce n_0 by restricting L_0, with city 1's government having a parallel expectation, these expectations are not fulfilled in the symmetric Nash equilibrium, with the state's total population equally divided between the cities.

To facilitate analysis of the equilibrium, note that the terms in (9) multiplying the parenthetical term equal the (inverse) price elasticity of demand for land. To state clearcut conclusions, it is useful impose the further assumption that this elasticity is a constant. This outcome emerges when the land-utility function v in (1) is a power function, equal to q^{β}. Then the price elasticity equals $\beta - 1 < 0$, where $\beta < 1$ is required for $v'' < 0$.[9] It is convenient to use the positive parameter ϵ representing the absolute the elasticity, with $\epsilon = 1 - \beta$ and $-\epsilon$ giving the actual elasticity. Note that the regular (as opposed to inverse) demand elasticity is given by $1/\epsilon$.

While the expression multiplying the parenthetical expression in (9) is thus replaced by $-\epsilon$, the parenthetical expression itself can be rewritten in terms of $-\epsilon$. To do so, symmetry is imposed and (8) is simplified (first equality) and multiplied by $(\hat{n}/p)/(\hat{n}/p)$ (second equality) and finally rewritten in terms of the elasticity ϵ (third equality), after multiplying by p/p:

$$1 - \frac{L}{\hat{n}}\frac{\partial n_0}{\partial L_0} = \frac{-p'\left(\frac{L}{\hat{n}}\right)\frac{L}{\hat{n}^2} + 2\alpha}{-2p'\left(\frac{L}{\hat{n}}\right)\frac{L}{\hat{n}^2} + 2\alpha} = \frac{-\frac{p'\left(\frac{L}{\hat{n}}\right)}{p\left(\frac{L}{\hat{n}}\right)}\frac{L}{\hat{n}} + \frac{2\alpha\hat{n}}{p\left(\frac{L}{\hat{n}}\right)}}{-\frac{2p'\left(\frac{L}{\hat{n}}\right)}{p\left(\frac{L}{\hat{n}}\right)}\frac{L}{\hat{n}} + \frac{2\alpha\hat{n}}{p\left(\frac{L}{\hat{n}}\right)}} = \frac{\epsilon p\left(\frac{L}{\hat{n}}\right) + 2\alpha\hat{n}}{2\epsilon p\left(\frac{L}{\hat{n}}\right) + 2\alpha\hat{n}}. \qquad (10)$$

The first-order condition in (9) then becomes

$$1 - \epsilon\frac{\epsilon p\left(\frac{L}{\hat{n}}\right) + 2\alpha\hat{n}}{2\epsilon p\left(\frac{L}{\hat{n}}\right) + 2\alpha\hat{n}} = 0, \qquad (11)$$

which determines L as functions of the behavioral parameters α and ϵ (as well as $\hat{n}$). It can be shown that, given constancy of the demand elasticity, the second-order condition for the city's maximization problem is satisfied at this symmetric equilibrium.

[9] With a power function, the first-order condition $v'(q) = p$ is given by $\beta q^{\beta-1} = p$, so that $\partial p/\partial q = (\beta-1)\beta q^{\beta-2}$ and $\epsilon = -(\partial p/\partial q)(q/p) = -(\beta-1)\beta q^{\beta-2}q/\beta q^{\beta-1} = 1-\beta$.

Manipulation of (11) allows the condition to be written in the following, more-compact form:

$$\frac{2\alpha\hat{n}}{p\left(\frac{L}{\hat{n}}\right)} \;=\; \frac{\epsilon(\epsilon-2)}{1-\epsilon}. \tag{12}$$

Positivity of the RHS expression in (12) is required for an L solution to exist, and this condition requires that the elasticity satisfies $1 < \epsilon < 2$. If instead $\epsilon \geq 2$, the expression is zero or negative, so that $\epsilon < 2$ must hold. But if $\epsilon < 1$ also holds, then the expression is again negative, so that $1 < \epsilon < 2$ is required. Rewriting these conditions in terms of the regular demand elasticity $1/\epsilon$, they reduce to $1/2 < 1/\epsilon < 1$, implying that demand must be inelastic ($1/\epsilon < 1$) but not too inelastic ($1/\epsilon > 1/2$). While inelasticity of demand is needed for the rent increase from restricting L_0 to offset the loss of development area, the upper bound on inelasticity ($1/\epsilon > 1/2$) evidently arises through the particular features of the model.

The effects of the behavioral parameters on L can be inferred directly from (12). Suppose that α increases, indicating a greater utility loss from a higher city population. Then the increase in the LHS expression must be cancelled by an increase in $p\left(\frac{L}{\hat{n}}\right)$ that leaves the expression's magnitude unchanged, an increase that requires a decrease in L given $p' < 0$. If instead the demand elasticity increases, which can be shown to reduce the RHS expression, the LHS expression must also decrease, again requiring a larger $p\left(\frac{L}{\hat{n}}\right)$ and thus a smaller L. Summarizing, the signs of these comparative static derivatives are as follows:

$$\frac{\partial L}{\partial \alpha} \;<\; 0, \quad \frac{\partial L}{\partial \epsilon} \;<\; 0. \tag{13}$$

To see the intuition behind the effect of α, note that the ratio expression in (11) is proportional to $1 \;-\; \frac{L_0}{n_0}\frac{\partial n_0}{\partial L_0} = \partial(L_0/n_0)/\partial L_0$, which gives positive the effect of L_0 on individual land consumption q_0. As discussed above, this positive effect arises because population n_0 rises more slowly than L_0 itself when L_0 increases, a consequence population's negative effect on utility, whose magnitude is captured by α. Moreover, as discussed above, the population increase from an increase in L_0 is smaller the larger is α, which in turn makes the increase in individual land consumption larger. This latter conclusion can be seen in ratio expression in

(11), which is increasing in α. As explained above, in choosing L_0, landowners balance the gain from more land developed against the associated loss from lower unit rent, which follows from greater individual land consumption. Since this unit-rent loss is greater when α is large, a consequence of the larger increase in individual consumption when L_0 rises, landowners have less incentive to expand the development area when α is large, leading to $\partial L/\partial\alpha < 0$. In this way, greater consumer aversion to a large city population alters the best L_0 from the point of view of landownwers.[10]

The intuition behind the effect of ϵ on L_0 is similar. When ϵ is large, the unit rent decrease from an increase in L_0 is large, greatly raising the relative attractivness of city 0 and prompting a larger increase in n_0 and thus a smaller increase in consumption q_0. This effect is captured by the decrease in the ratio term in (11) when ϵ rises, and by itself tends to limit the unit rent decline from a larger L_0. But the larger ϵ amplifies the rent loss from any particular q_0 increase via the multiplicative ϵ factor in (11), and this effect is enough to make the rent decrease from a greater L_0 larger when ϵ is higher. In other words, the ϵ times ratio term in (11) increases ϵ, so that the unit rent decline is smaller once the leading minus sign is accounted for. With this negative effect greater, landowners have less incentive to expand the development land area when ϵ is large, yielding $\partial L/\partial\epsilon < 0$.

While development restrictions thus become tighter when α or ϵ increase, these effects pertain to an interior solution. But as noted above, a corner solution with $L = \hat{L}$ is possible, an outcome that occurs if (11) is positive when evaluated at $L = \hat{L}$. However, since the preceding discussion shows that (11) is decreasing in both α and ϵ, large enough values will make (11) negative at $L = \hat{L}$, in which case an interior solution becomes optimal. Thus, an increase in population aversion or the inverse demand elasticity can lead a city without development restrictions to adopt them.

3.2. Renters control the city government

Now suppose that renters, rather than absentee landowners, control the city government.

[10] Note that if $\alpha = 0$, then the LHS of (11) reduces to $1 - \epsilon/2$. If $\epsilon < 1/2$, indicating that the regular demand is very elastic ($1/\epsilon > 2$), then (11) would then be positive, indicating desirability of the corner solution $L = \hat{L}$, but otherwise, the smallest possible L would unrealistically be preferred.

The goal of city 0's government is then to maximize the utility of a representative resident by choice of L_0. Utility is given by

$$y \;-\; p\Big(\frac{L_0}{n_0}\Big)\frac{L_0}{n_0} \;+\; v\Big(\frac{L_0}{n_0}\Big) \;-\; \alpha n_0. \tag{14}$$

In differentiating (14), the term $[p-v']\partial(L_0/n_0)/\partial L_0$ again vanishes by the optimality condition for land consumption, so that the first-order condition for L_0 is given by

$$-p'\Big(\frac{L_0}{n_0}\Big)\frac{L_0}{n_0}\frac{\partial(L_0/n_0)}{L_0} \;=\; \alpha\frac{\partial n_0}{\partial L_0}. \tag{15}$$

This condition equates the benefit from an L_0-induced reduction in rent (LHS) to the loss from a higher population. The same steps as before are used to simplify (15): the leading p' is converted into an elasticity expression, and the derivatives on both sides, given by (7) and (8), are simplified by substitution of the elasticity. After these steps, (15) evaluated under symmetry reduces to

$$\frac{(\epsilon/\hat{n})\,\big(\epsilon p\big(\frac{L}{\hat{n}}\big) \;+\; 2\alpha\hat{n}\big) \;-\; \alpha\epsilon\hat{n}/L}{2\epsilon p\big(\frac{L}{\hat{n}}\big) \;+\; 2\alpha\hat{n}} \;=\; 0. \tag{16}$$

The numerator must equal zero at the solution to (16); satisfaction of the second-order condition is not guaranteed and must be assumed.

Setting the numerator of (16) equal to zero and rearranging yields $\frac{\epsilon p(L/\hat{n})}{\alpha\hat{n}(\hat{n}/L-2)} = 1$, and unlike (12), this equation does not give comparative-static results by inspection since both the numerator and denominator are decreasing in L. Instead, the analysis proceeds by total differentiation of (16)'s numerator, which yields an ϵ-derivative of $2\epsilon p/\hat{n} > 0$ and an α-derivative of $\epsilon(2 - \hat{n}/L) = -\epsilon^2 p/\alpha n < 0$, after substituting using the zero value of the numerator. The derivative of (16)'s numerator with respect to L is proportional to $\alpha\hat{n}(2-\hat{n}/L)\epsilon+\alpha\hat{n}^2/L$, which is ambiguous in sign.[11] The sign is positive if $\epsilon < 1$,[12] but the expression is decreasing in ϵ

[11] Factoring out $\epsilon/\hat{n}$, the L-derivative is proportional to $\epsilon p'/\hat{n} + \alpha\hat{n}^2/L^2$ which is in turn proportional to $-\epsilon^2 p + \alpha\hat{n}/L^2$ after rewriting p' in terms of ϵ. Using (16) to eliminate $\epsilon^2 p$, this expression reduces to the one in the text.

[12] This conclusion follows because the expression in the text can be rewritten as $2\alpha\epsilon\hat{n} + (\alpha\hat{n}^2/L)(1-\epsilon)$.

given $2 - \hat{n}/L < 0$ and is therefore negative for sufficiently large ϵ. The signs of the derivatives of (16)'s numerator are therefore: ϵ [+], α [−], L [−(+) for ϵ large (small)]. The signs of the comparative-static derivatives are thus:

$$\text{large } \epsilon: \quad \frac{\partial L}{\partial \alpha} < 0, \quad \frac{\partial L}{\partial \epsilon} > 0; \qquad \text{small } \epsilon: \quad \frac{\partial L}{\partial \alpha} > 0, \quad \frac{\partial L}{\partial \epsilon} < 0. \tag{17}$$

One might expect that a higher population disutility α would reduce L because a lower L lowers the now more-disliked population. Conversely, a higher ϵ would increase L because the L-induced price decline is beneficially larger when ϵ is large. These expectations arise from focusing narrowly on the α factor on the RHS of (15) and the p' factor on the LHS, which depends on ϵ. However, the results in (17) show that these expectations are confirmed only when ϵ is large. The reason is that the L_0-derivatives on both sides of (15) themselves each depend on both α and ϵ, exerting effects beyond those of the focal multiplicative terms just mentioned.

To see the implications of these patterns, suppose that (16) is positive when evaluated at $L = \hat{L}$, so that the optimum is a corner solution with no development restrictions, a possibility discussed above in the absentee-landowner case. What changes in the parameters would prompt the city governments to then institute restrictions, setting $L < \hat{L}$? Since the numerator of (16) is decreasing in α and increasing in ϵ, a large increase in α or a large decrease in ϵ could flip the numerator's sign from positive to negative, making a development restriction ($L < \hat{L}$) optimal. Note that if ϵ remains large, a further increase (decrease) in α (ϵ) will tighten the restriction by further reducing L, given (17). But if ϵ is small, these further changes raise L *back toward the corner solution*.[13]

4. The state planner's solution

4.1. Main analysis

The preceding analysis has shown that a city government serving either the interests of the city's absentee landlords or its renters may wish to impose a development restriction.

[13] If $\alpha = 0$, then (16) reduces to $\epsilon/2\hat{n} = 0$, which cannot be satisfied.

Recognizing the negative population externality, would a state planner seek to follow a similar policy? While city governments favored the interests of just one stakeholder group, a planner would focus instead on overall welfare. With the cities being symmetric, the planner would necessarily pursue a symmetric social optimum, where the state's population is equally divided between the cities, yielding city populations of $\hat{n}$. As a result, the planner is unable to address the population externality, recognizing that the populations of both cities cannot be reduced without leaving some state residents unhoused. This view contrasts with that of an individual city government, which believes it can reduce its city's population by restricting development, viewing the other city's development area as fixed, even though the city populations end up being equal in equilibrium. With the planner imposing equal populations, the remaining choice is the level of a common development area for the two cities. As shown below, the planner prefers to set the development area equal to $\hat{L}$ in each city, so that a development restriction is not imposed, with all the land in each city consumed by its residents.

With quasi-linear utility, the welfare of the city residents and absentee landowners can be aggregated by summing total land rents and renter utilities across both cities, with the result giving the state welfare function. Welfare is then equal to

$$2Lp\left(\frac{L}{\hat{n}}\right) \;+\; 2\hat{n}\left[y \;-\; p\left(\frac{L}{\hat{n}}\right)\frac{L}{\hat{n}} \;+\; v\left(\frac{L}{\hat{n}}\right) \;-\; \alpha\hat{n}\right], \tag{18}$$

where the bracketed term is individual utility, which is multiplied by total population $2\hat{n}$. Importantly, because the rental income of landowners in the first term equals the total land rent paid by renters (the second term in brackets times $2\hat{n}$), these expressions cancel. The welfare expression in (18) thus reduces to

$$2\hat{n}\left[y \;+\; v\left(\frac{L}{\hat{n}}\right) \;-\; \alpha\hat{n}\right], \tag{19}$$

which is increasing in L. Therefore, the planner sets L at the largest possible value, given by $L = \hat{L}$, so that all the land in each city is developed.

As a result, the symmetric interior L solutions that may be chosen by the city governments in section 2, which satisfy $L < \hat{L}$, lead to a lower total welfare level than the state planner's solution. The state government should therefore override the decisions of the city governments, forcing them to develop their entire land areas.

4.2. The case of asymmetric cities

Suppose that instead of being symmetric, the cities have unequal land areas. Since the interior Nash equilibrium, which determines the sizes of restricted development areas in the two cities, is independent of cities' overall land areas, the chosen areas themselves remain symmetric despite this land-area asymmetry. In this situation, would the social planner again require each city to develop its entire land area, leading to asymmetric development areas? To explore this question, it is helpful to start with the symmetric planning solution, where each city develops all its land, and then let city 0's area increase, asking whether the planner would correspondingly raise the city's development area.

With the residents' rental expenditures again cancelling the rental incomes of absentee landowners in the welfare function, welfare in the potentially asymmetric case equals $2\hat{n}y$ plus

$$n_0\left[v\left(\frac{L_0}{n_0}\right) \; - \; \alpha n_0\right] \; + \; n_1\left[v\left(\frac{\hat{L}}{n_1}\right) \; - \; \alpha n_1\right], \tag{20}$$

where L_1 has been replaced by the planning value $\hat{L}$ and $n_1 = 2\hat{n} - n_0$. Now suppose that city 0's land area rises above $\hat{L}$, allowing the development area L_0 to increase in step. Letting v_i, $i = 0, 1$, denote the v functions evaluated at L_i/n_i, the derivative of (20) with respect to L_0 is computed, using (8) to write the effect on v_0's L_0/n_0 argument in terms of $\partial n_0/\partial L_0$. After rearrangement of terms, the derivative reduces to

$$\begin{aligned} v_0' \; + \; &\left(2\alpha(\hat{n} - n_0) \; - \; v_0'\frac{L_0}{n_0} \; + \; v_0 \; - \; \alpha n_0 \; - \; (-v_1'\frac{\hat{L}}{n_1} \; + \; v_1 \; - \; \alpha n_1)\right)\frac{\partial n_0}{\partial L_0} \\ &= \; v_0' \; + \; 2\alpha(\hat{n} - n_0)\frac{\partial n_0}{\partial L_0}, \end{aligned} \tag{21}$$

The equality follows from substituting p_0 (p_1) in place of v_0' (v_1') and using the equal-utility condition (6), which eliminates all but the first term within the large parentheses. It can be shown that the derivative of (21) with respect to L_0 (the second derivative) is negative under the constant-elasticity assumption.

Starting at the symmetric planning solution, where $n_0 = \hat{n}$, (21) equals the positive term v_0', indicating that, when city 0's land area increases marginally above $\hat{L}$, the planner would raise the development area L_0 in step. But if city 0's land area is more than marginally larger than $\hat{L}$, further increases in L_0 are possible. As L_0 rises above $\hat{L}$ toward this larger value (and n_0 rises above $\hat{n}$), (21) decreases, becoming ambiguous in sign, with the second term now negative (recall $\partial n_0/\partial L_0 > 0$). The derivative may then reach zero, and if this zero point occurs before all the city's land is used, so that welfare is maximized when some land is left undeveloped, then the planner will impose this outcome. If (21) remains positive, however, the planner will require development of all the city's land.

Intuitively, the negative externality resulting from a rising population might reverse the initial welfare gain, causing the planner to leave some of city 0's land area undeveloped. These forces can be seen in (21), where v_0' captures the gain from the L_0-induced increase in land consumption, while the second term captures the disutility from the L_0-induced increase in population. However, the planner will always override the outcome in the symmetric Nash equilibrium, requiring the city with the smaller land area (city 1) to develop all of its land and city 0 to develop more land than city 1 but not necessarily its full land area.

5. Conclusion

This paper has demonstrated both the incentives for imposing local land-use regulation as well as its inefficiency, using a theoretical model that is simple and accessible. Although the theme of the paper is somewhat familiar from older work, an updated analysis has value given the striking recent emergence of state-level overrides of local land-use regulations in the US, which the model's social planner would support. These overrides, which are directed at the problem of housing unaffordability, represent an historic phenomenon because regulation of land-use has been the responsibility of local governments in the US for well over a hundred years. As a result, it is important for theoretical analysis to demonstrate their desirability.

References

Agrawal, D.R., Breuillé, M.L., Le Gallo, J., 2025. Tax competition with intermunicipal cooperation. *National Tax Journal* 78, 5-43.

Brueckner, J.K., 1995. Strategic control of growth in a system of cities. *Journal of Public Economics* 57, 393-416.

Brueckner, J.K., Lai, F.-C., 1996. Urban growth controls with resident landowners. *Regional Science and Urban Economics* 26, 125-144.

Brueckner, J.K., Thomaz, S., 2024. ADUs in Los Angeles: Where are they located and by how much do they raise property value? *Real Estate Economics* 52, 885-907.

Büchler, S., Lutz, E., 2024. Making housing affordable? The local effects of relaxing land-use regulation. *Journal of Urban Economics* 143, article 103689.

Castleman, T., 2024. Backyard ADUs booming in L.A. County. Why these surprising cities are building the most. *Los Angeles Times*, July 30.

Engle, R., Navarro, P., Carson, R., 1992. On the theory of growth controls. *Journal of Urban Economics* 32, 269-283.

Flemming, J., Zahniser, D., 2025 A historic housing bill is on Newsom's desk. Cities are scrambling to figure out how it works. *Los Angeles Times*, Oct. 3.

Garcia, D., Alameldin, M., 2023. Californias HOME Act turns one: Data and insights from the first year of Senate Bill 9. Terner Center, UC Berkeley. `ternercenter.berkeley.edu/research-and-policy/sb-9-turns-one-applications/`

Gandhi, S., Nagpal, G., 2026. Relaxing floor area ratio: Housing supply and affordability in India. Unpublished paper.

Greenaway-McGrevy, R., Pacheco, G., Sorensen, K., 2021. The effect of upzoning on house prices and redevelopment premiums in Auckland, New Zealand. *Urban Studies* 58, 959-976.

Greenaway-McGrevy, R., Phillips, P.C., 2023. The impact of upzoning on housing construction in Auckland. *Journal of Urban Economics* 136, article 103555.

Gyourko, J., Molloy, R., 2015. Regulation and housing supply. In: Duranton, G., Henderson, J.V., Strange, W.C. (Eds.), *Handbook of Regional and Urban Economics*, Vol.

5. Elsevier, pp. 1289-1337.

Helsley, R.W., Strange, W.C., 1995. Strategic growth controls. *Regional Science and Urban Economics* 25, 435-460.

Hilber, C.A.L., Robert-Nicoud, F., 2013. On the origins of land use regulations: Theory and evidence from US metro areas. *Journal of Urban Economics* 75, 29-43.

Liao, H.-L., 2026. The effect of rezoning on local housing supply and demand: Evidence from New York City. *Regional Science and Urban Economics* 117, article 104188.

Picard, P.M., Selod, H., 2026. Customary land conversion in sub-Saharan African cities. *Journal of Economic Geography* 26, 39-60.

Tanrisever, I., 2026. Upzoning and neighborhood change: Evidence from Los Angeles. Unpublished paper, UC Irvine.

Turner, M.A., Haughwout, A., Van Der Klaauw, W., 2014. Land use regulation and welfare. *Econometrica* 82, 1341-1403.

Wilson, J.D., 1999. Theories of tax competition. *National Tax Journal* 52, 269-304.