The Social Divide of Urban Land-Use Regulatory Changes: Evidence from Chile

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Abstract

Urban land-use regulations define the way cities grow. But the impact of land-use controls goes beyond the physical shape of a city, as these rules and practices strongly influence the social and economic relationships within an urban area. Recent theoretical and empirical work has suggested that homeowners increasingly influence land-use decisions to hinder the densification of well-located neighborhoods in big cities. In turn, low regulated densities would be one of the primary explanations for the affordability housing crisis in many metropolitan areas worldwide. We explore this argument and other potential factors affecting land-use decisions by analyzing a unique database comprising all lots located in 14 districts in Santiago, the capital of Chile, where 40% of the Chilean population lives. Our dataset covers an area of approximately 151 square kilometers. It contains information on all land-use regulatory changes affecting the 155,462 lots between 2003 and 2019, and on the urban infrastructure and socio-demographic characteristics of the neighborhoods in which the lots are located. We find that the share of high-income residents is strongly associated with land-use changes that, over time, maintain a regulatory status quo, freezing the possibility of constructing denser housing projects. The association is particularly pronounced in urban areas predominantly composed of single-family housing, and it does not depend on whether the lot is located in areas with easy access to transportation networks. Moreover, we find that the size of the area involved in zoning changes does not reduce the importance of affluent residents. We conclude that socioeconomic status is a potential key driver of urban politics in unequal and segregated cities like Santiago, and, arguably, an even more relevant factor than other demographic and infrastructure factors that previous theoretical and empirical contributions have proposed.

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1. Introduction

Urban land-use rules and practices substantially influence the shape of a city and the social and economic relationships that occur within the urban boundaries (Foster 2006). Their interaction with positive agglomeration externalities and other economic forces has led to an increased concentration of economic activity in urban areas (Schleicher 2010). Indeed, there is a broad consensus that dense cities are desirable, although there are sizeable density costs (Ahlfeldt and Pietrostefani 2019; Duranton and Puga 2020).

Urban development is a highly regulated field. In most, if not all, legal regimes, a complex network of government agencies at different territorial levels has the authority to implement rules that affect how cities grow. Local governments often have legal tools to adopt the ultimate norms that define the possibilities and limitations for developing real estate and other urban projects. Therefore, understanding the political and social dynamics that influence local land-use regulatory processes and their consequences is critical to address cities' policy challenges.

Land-use decisions may favor density and other positive outcomes by allowing mixed uses and reasonably dense developments. However, on the other hand, city land-use regulations may reinforce existing urban inequalities and prevent access to opportunities for vulnerable groups through exclusionary zoning practices. Our paper aims to shed light on the determinants of urban regulation.

There is a debate about the extent to which regulation contributes to the affordability housing crisis that many metropolitan areas worldwide are confronting. This crisis is reflected in the rapid rise of urban land prices and the exclusion of many (current and potential) residents who cannot afford to live in those cities. From a theoretical perspective, land use regulations that limit housing supply could be one of the factors behind the previously mentioned housing crisis (Gyourko and Molloy 2015). A theoretical and empirical consensus is that urban

regulation is positively correlated with land values (Quigley and Rosenthal 2005; Ihlanfeldt 2007; Glaeser, Gyourko, and Saks 2005; Brueckner 2009; Saiz 2010).

The increasing recognition of the role that urban land-use decisions play in some of the most acute social problems affecting cities has stimulated recent theoretical and empirical work on the social and political factors determining how urban areas are regulated. However, there is still little evidence available, being a topic where the theory goes ahead of the empirical (Gyourko and Molloy 2015), and it is highly concentrated in U.S. metropolitan areas.

Until recently, the dominant theoretical framework used to understand the processes affecting land-use regulations was the "growth machine theory", which affirms that the real estate industry is the most influential actor behind the decisions taken by city officials on the uses of urban land (Molotch 1976). Increasingly, however, the literature has argued, along with supporting empirical studies, that property owners have become an influential actor in the regulation of city land (Been, Madar, and McDonnell 2014; Gabbe 2018). The "homevoter hypothesis", a theoretical framework elaborated to explain the regulatory dynamics of suburban enclaves, has been transformed into the dominant theory to understand the factors affecting city land-use regulatory dynamics (Fischel 2005).

Schleicher (2012) argues that homeowners face fewer obstacles to collective action relative to the industry and housing consumers; hence, Schleicher argues that homeowners have become the most crucial stakeholder shaping land use regulatory changes. Indeed, Clarke and Freedman (2019) find that a price premium in houses governed by homeowners associations (HOA) is correlated with the stringency of local land use regulation. Moreover, people living in HOA neighborhoods are, on average, more affluent and racially segregated.

This article's main objective is to provide evidence on the key factors that may influence urban land-use regulatory changes, and to test some of the arguments the literature has provided. We use data from 14 centrally-located municipalities in Santiago, the capital of

Chile, where around 7 million people live—40% of the country's population. We built a database with all the changes made between April 2003 and October 2019 on the maximum floor area ratio (FAR) in the zoning plans of each municipality covered by the database. The FAR is one of the most critical norms used by local governments in urban areas to define the density and height of the constructions allowed in a specific neighborhood. The database contains the FAR and all its changes in the study period at the lot level of the whole area comprising the 14 municipalities. The study area includes approximately 151 square kilometers—more than twice the area of Manhattan, to give a well-known comparative unit for illustration. Our analysis focuses on three possible outcomes that involve changes to the FAR at the lot level in the study period. First, whether the modification implied a stricter land-use norm permitting a less dense real estate development in that lot ("downzoning"). Second, whether the change sets a more flexible standard, allowing denser and taller constructions ("upzoning"). Third, whether there was no change in the FAR at the lot level in the study period.

We also include other sources of information collected from different administrative databases to examine if the land-use changes we observe are related to the socioeconomic characteristics and infrastructure variables of the neighborhoods in which those changes were made. We test three factors influencing urban-land use regulatory changes: homeowners, high-income residents, and accessibility to transport networks.

Our main finding is that the presence of high-income residents is strongly correlated with a lower probability of upzoning. We also find that the high presence of homeowners is associated with a lower likelihood of downzoning. The latter result departs from the previous empirical literature because it has been suggested that property owners seek to maximize their land's value by blocking strict land use regulations. We also find that the relationship between high-income residents and land use regulations less likely to become more flexible over time

is more robust in the lots belonging to blocks with a majority of single-family housing. Therefore, in low-density urban areas where affluent people live, the probability of altering the land use regulatory status quo is lower relative to places where lower-income groups live. In these areas, homeownership does not seem to be a relevant factor. According to our analyses, the potential influence of affluent residents is not mitigated by the accessibility of the lots to transportation networks nor by zoning changes involving larger urban areas where we would expect a more decisive real estate industry lobby. Therefore, the evidence we provide on Santiago points to socioeconomic status as one of the fundamental mechanisms affecting city land-use decisions in a way that leads to a regulatory status quo.

Our paper makes several contributions to the previous literature. We provide evidence on a relevant urban policy issue from a different urban context than the ones examined before, which mostly has centered on the regulatory dynamics affecting U.S. cities. The institutional setting we examine has some differences that may provide important lessons. One of the peculiarities of the U.S. local zoning landscape is that most regulatory changes are made by rezoning a particular piece of land. That reduces the transaction costs for homevoters to oppose the legal changes and increases the costs for collective action of the real estate industry and housing consumers. In Chile, land-use changes are made more comprehensively, following a strict institutional procedure, which levels the field for all relevant interest groups to organize and push their agendas. Therefore, high-income residents having more influence indicates that socioeconomic status is becoming a potent driver of urban politics. We also believe that the database we assembled provides more comprehensive and detailed information than the information used in other studies, which allows for a more robust empirical examination of the variables of interest.

The paper unfolds in the following way. In Section 2, we analyze the theoretical and empirical literature that has examined the politics of land-use decision-making, and we describe

the institutional setting we discuss in this paper. Section 3 describes the data assembled and our method, and presents descriptive statistics. Section 4 offers and analyzes the main results of the regression models used. Finally, Section 5 discusses the main findings and concludes.

2. Background & Literature Review

2.1 Theories and Evidence on Land-Use Regulatory Changes

Urban development is a contested political space because land-use decisions strongly impact the interests of different groups. Therefore, many interest groups often try to participate and push for their agendas at the local instances where the corresponding authorities make the major decisions that shape urban growth within cities. Explaining the influence of interest groups on local land-use decisions has increasingly been the subject of relevant academic work. However, there is a scarcity of systematic evidence testing the theories that have been elaborated.

Until recently, the dominant theory about the political economy of land-use decision-making was conceptualizing cities as "growth machines". This theory is associated with the sociologist Harvey Molotch, who, in a seminal paper published in 1976, argued that any city or locality expresses the interests of local elites, and growth is one of their critical motivations (Molotch 1976). In the subsequent work he developed with John Logan, they argue that urban politics is heavily influenced by a coalition of the real estate industry and local elites to facilitate economic growth through local decisions (Logan & Molotch 1987). They suggest that private developers exert their influence on local authorities through campaign contributions and lobbying, which is how urban officials share the benefits that the real estate companies obtain from decisions that impact the rents and prices of their properties.

The economist William Fischel proposed an alternative theory to understand the factors that shape land-use decisions, coining the "homevoter hypothesis" (Fischel 2005). Fischel

argues that property owners are the main force behind zoning policies because they are the most directly affected by local land-use decisions. The homeowners represent the primary voters in local elections, and their votes will be strongly influenced by their perceptions of which local decisions maximize the values of their properties. Therefore, local authorities have strong incentives to favor this group by adopting decisions that increase the value of the homes in their districts.

The homevoter theory was primarily conceived to understand the political dynamics of U.S. suburbs. These are urban areas characterized by relative social homogeneity and where detached single-family housing predominates. The local community's collective action costs are relatively low in these places. Therefore, homevoters can pressure local authorities to make land-use decisions consistent with the municipality's social and physical character.

Recent empirical evidence suggests that the homevoter theory provides a realistic picture of land-use politics not only in socially homogeneous suburban districts, but also in large and diverse urban areas. Been, Madar, and McDonnell (2014) studied rezoning initiatives in New York City between 2002 and 2009. They found that in neighborhoods with a high rate of residents that own their homes, there is a lower probability of upzoning and a higher probability of downzoning. Gabbe (2018) did a similar analysis for the city of Los Angeles and found that neighborhoods with a high presence of homeowners and good-quality urban amenities are associated with a lower probability of upzoning. Both studies do not see clear associations between neighborhood income and land-use changes. Along similar lines, Ellickson (2020) studied, from a historical perspective, zoning policies in several metropolitan areas in the USA. He found that most localities built under a rule limiting developments to detached single-family housing have never changed that rule, despite all socio-demographic changes that have occurred since then.

Other recent empirical studies—that do not examine land-use changes—have highlighted homeowners' critical influence in the metropolitan areas' local politics. Einstein, Palmer, and Glick (2019) coded thousands of documents reflecting citizen participation in urban planning commissions in 97 cities and towns of the Boston metropolitan area and found that homeowners were more likely to participate relative to renters. Among those who participate, most individuals oppose the construction of new housing. Hankinson (2018), using surveys, measured the attitudes of homeowners and renters toward developing new housing projects. He found that homeowners antagonize new housing and renters have a similar attitude in urban contexts where housing prices are high. In these places, renters favor new housing supply, but not in their neighborhoods. The author concludes that if the land-use institutional regime allows the opposition to selected projects, renters may join homeowners in blocking the housing supply.

Schleicher (2012) has explained the political-economic factors that have led big cities to impose housing development and density restrictions. He argues that local land-use decisions are made in an institutional context that favors the consideration of specific developments or rezoning initiatives rather than sweeping citywide changes to land-use regulations. In this institutional structure, residents directly affected by the proposed changes can impose their preferences over other interest groups, such as housing consumers or the real estate industry, who face higher costs to intervene in localist decisions. Ellickson (2020) elaborates on several hypotheses that may complement Schleicher's explanations on why homeowners oppose land-use regulatory changes that allow denser housing developments in their neighborhoods. One of the central hypotheses proposed by Ellickson is that residents have a psychological predisposition to maintain the status quo in their communities. Homeowners could sell their property at much higher prices if a real estate company is interested in building a high-rise project. However, many downsides may be brought by the change from a lower to a higher

density residential area, such as traffic, noise, and pollution, which may lead people to prefer to keep the status quo, especially considering that individuals give more weight to losses than gains.

The literature so far has focused mainly on the influence of homeowners on land-use policies, and little has been found or argued about whether any heterogeneous effects depend on the income status of the individuals affected by zoning changes. This is an essential gap in the literature, considering that one of the most defining characteristics of prominent and diverse cities is their inequality (Florida 2017). The political and social dynamics of high-income urban areas differ from those of low-income neighborhoods. Our paper aims to fill that gap by providing systematic evidence on whether socioeconomic status constitutes a relevant variable to explain land-use regulatory changes.

2.2 Socioeconomic and housing background in Santiago, Chile

Chile is a country that has made significant economic, social, and institutional progress in the last decades, especially since the return to democracy in 1990. Its GDP per capita more than doubled in the past two decades and is the highest in the Latin American region (OECD 2021). The country has significantly reduced the level of poverty during the past decades. Chile has an open-market economy, with strong protection of private property rights and good law enforcement. However, increasing widespread dissatisfaction with the political system led to a social crisis in October 2019 and a subsequent process of constitutional replacement, which is currently ongoing (OECD 2021).

Despite decades of social and economic progress, Chile still faces significant policy challenges. One of these challenges refers to the housing sector. One critical indicator is the "quantitative housing deficit," which is the number of dwelling units needed to accommodate the requirements of individuals who lack access to housing or live in a unit that must be

replaced (Ministerio de Vivienda y Urbanismo 2020b). According to official statistics, Chile reduced its housing deficit from around 520,000 units in 2002 to approximately 390,000 in 2017 (Ministerio de Vivienda y Urbanismo 2020b). However, recent studies suggest that the housing deficit has increased in the past couple of years, to more than 400,000 units or even more than 500,000 units, depending on the estimations that have been released (Ministerio de Vivienda y Urbanismo 2021; Centro de Políticas Públicas UC and Déficit Cero 2022). Additionaly, it is very likely that the pandemic has had an important impact in the housing sector, whose exact magnitude is still unknown.

A dramatic example of the policy challenges in Chile's housing sector is the exponential growth of the number of people living in informal settlements in the last few years. The pattern is relatively similar to the one observed in the housing deficit. These communities decreased in the late 1990s and 2000s, but have increased their extent and population density lately. According to the Ministry of Housing and Urbanism 2019 cadaster, 802 informal settlements hosted 47,050 families in the country. The figures represent a significant increase from the 2011 cadaster that reported 657 settlements with 27,378 families (Ministerio de Vivienda y Urbanismo 2020a). Moreover, the pandemic has forced many individuals to relocate to a settlement. New official statistics estimate that the number of families living in an informal settlement in Chile exploded during the pandemic, reaching around 71,000 families (Ministerio de Vivienda y Urbanismo 2022).

The vast majority of the housing deficit is represented by families who live with relatives or friends, a condition in Chile called "allegamiento". Many of them live in severe overcrowding conditions. When individuals living in "allegamiento" are asked about their reasons for living with others, 30% respond that they cannot afford to buy or rent a dwelling with their income. Also, a 14% indicate that they need to save money, which suggests that a significant portion of them cannot afford a dwelling unit by their means (Ministerio de

Desarrollo Social 2018). Similarly, the cadaster on informal settlements conducted in 2019 reports that 31% of the settlers justify their informal situation by pointing to the fact that rental housing is too expensive. In turn, 12% say their income is too low to afford housing, and 24% say they need family independence. Therefore, for most people living in informal settlements, housing is beyond their financial reach (Ministerio de Vivienda y Urbanismo 2020a).

The evidence on the evolution of the housing market in Chile is not favorable for low-income individuals. The data indicates that housing prices have increased significantly during the past decade, a threefold increase relative to the rise in workers' salaries (Vergara-Perucich and Aguirre-Nuñez 2020). And the subsidies provided by the government, mainly consisting of lump sums targeted to low-income individuals to buy a used or new dwelling unit, have increasingly become ineffective in giving them access to formal housing in urban markets (Razmilic 2010; Gil 2019).

2.3 Institutional Setting: Land-Use Regulation in Santiago, Chile

Chile's primary legal framework governing urban development is constituted by the General Law of Urbanism and Construction ("Ley General de Urbanismo y Construcción"), approved in 1976, and reformed on several occasions afterward. This statute contains general rules and principles regulating urban planning and city growth processes. The previously mentioned law is detailed and complemented by the General Ordinance of Urbanism and Construction ("Ordenanza General de Urbanismo y Construcción"), a decree adopted by the President in 1992 that has been subject to multiple reforms afterward.

Public actors establish the norms that define urban land uses through the urban planning process regulated by the above-mentioned legal framework. According to Chile's legal framework, different public agencies intervene in the adoption of "regulatory plans" ("planes reguladores"), which are norms established at the regional and municipal levels that define the

geographical boundaries of urban land, zoning, and the rules governing the construction on that land.

Similar to other countries, municipalities in Chile have the power to elaborate local regulatory plans, which, according to Chilean law, are ultimately responsible for establishing the rules that define land uses within their jurisdictions. The General Ordinance states that local regulatory plans should address issues such as the definition of city limits, the identification of land for squares and parks, and the designation of areas or buildings that should be treated as historic preservation sites. The previously mentioned ordinance also states that local regulatory plans should address each neighborhood's zoning, and adopt land-use rules such as the floor area ratio, maximum heights, and maximum densities, among other norms.

The elaboration of local regulatory plans is a complex political process that balances the public interest with private rights. If interest groups have an undue influence on the rules adopted by a municipal plan, this may generate unsustainable urban growth that would hinder the achievement of public goals. On the other hand, if a local plan imposes too many restrictions on private property rights, it may affect homeowners' legitimate—and legally valid—expectations and cause aggregate welfare losses. This is why the elaboration and change of local plans are heavily regulated.

In Chile, the General Law of Urbanism and Construction and the General Ordinance of Urbanism and Construction contains several norms that govern the elaboration and change of local plans. The Law states that any modification (or elaboration) of an urban regulatory plan must be transparent, participative, and pass several stages. Even before a local plan is elaborated or modified, the local authorities have to present to the local community the diagnostic, main objectives, and leading changes that aim to be achieved (a target image or "imagen objetivo"). This is then subject to processes of community participation and input (article 28 octies of the General Law of Urbanism and Construction). The modification of the

local plan must go through several phases, after which it has to be approved by the Municipal Council (article 43 of the General Law of Urbanism and Construction). The stages include (1) informing the neighbors that will be affected, (2) organizing one or more public meetings with the local community to expose the main elements of the regulatory change, (3) consulting the opinion of the "Local Council of Civil Society Organizations", (4) presenting the changes proposed after the public meetings to the whole local community for 30 days to allow them to get informed and propose modifications, (5) organizing a new public meeting to present a report that summarizes all the comments, and (6) establishing a new period of a maximum of 30 days to receive more comments after the last public meeting (article 43 of the General Law of Urbanism and Construction). The law also states that the draft of the new local regulatory plan must be sent to the Ministry of the Environment for an environmental impact assessment (article 43 of the General Law of Urbanism and Construction).

Complying with all the requirements established by law to adopt or modify a local regulatory plan involves significant resources, time, and institutional capacity. That is why there are strong asymmetries among local plans regarding their level of sophistication and how updated they are to confront contemporary policy issues. The Ministry of Housing and Urbanism has calculated that, on average, it takes six years to elaborate a local regulatory plan, and many municipalities rely on the advice and resources of the central government to update their corresponding plans (Ministerio de Vivienda y Urbanismo 2013).

Qualitatively oriented case study research has documented strong social conflicts between public and private actors because of the modification of a local regulatory plan in Chile's urban areas, motivated by the desire that the plan may favor specific interests (Wellington Caulkins 2020; Ubilla-Bravo 2020; Gil and Bucarey 2021). However, there is a lack of studies that provide systematic quantitative data on the social and political factors that influence Chile's urban land use regulations. As mentioned, this is part of a global problem

related to the difficulties in accessing comprehensive data sources on land use regulatory dynamics, a gap we aim to fill with this paper.

3. Data and Methods

3.1 Data

For this paper, we built an original dataset on land use regulatory changes between 2003 and 2019. We obtained the dataset's initial information by hiring TOCTOC, a Chilean tech real estate marketplace company. TOCTOC used Chile's Transparency Act to ask every municipality in our sample for modifications to their urban regulatory plan within the study period. The data provided by TOCTOC did not cover the whole timeframe and study area required for this research project. Hence, with the assistance of a team of research assistants and students, we had to complement the data provided by TOCTOC with information we obtained directly from local ordinances and municipal regulatory plans. These are the instruments adopted by local governments in Chile to establish the rules governing real estate development within their jurisdictions. Our database contains information on the land use regulations applied between 2003 and 2019 to 155,462 lots located in 14 municipalities in Santiago, the capital of Chile, covering an area of approximately 151 square kilometers.

We have the maximum FAR allowed for every lot included in our sample in April 2003 and October 2019. We focus on the FAR because this is one of the critical land use regulations defining the construction possibilities in urban areas. Indeed, the height and the density of any real estate development depend significantly on the FAR. Our dependent variable corresponds to the difference between the FAR in the baseline and the endline. There are three possible categories in which the variation between 2003 and 2019 can be classified. A lot was "upzoned" if it had a more permissive (higher) FAR in 2019 than in 2003. A lot was "downzoned" if it

had a more restrictive (lower) FAR in 2019 than in 2003. A lot is "not rezoned" when it has the same FAR in 2019 as in 2003.

Table 1 presents descriptive statistics of all lots in our sample. It shows the number of lots that were subject to each outcome we study (upzoned, downzoned, not rezoned), the surface covered in square meters, the (surface-weighted) mean FAR per lot at baseline and endline and the mean of the difference and the percent variation of the FAR.

Table 1: Intensity of FAR changes per square meter

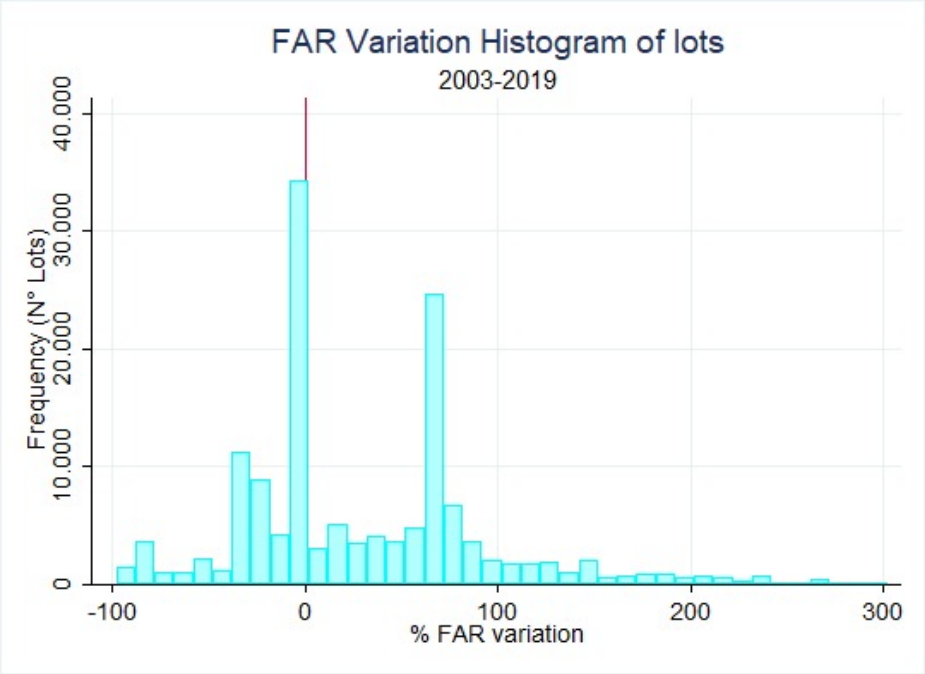
FAR	(1) Observations	(2) Area	(3) Before	(4) After	(5) Difference	(6) Variation
Upzoned	81,623	27,292,408	1.4	2.4	1.0	72.3%
Downzoned	37,297	31,399,664	7.4	1.9	-5.5	-74.3%
Not Rezoned	36,542	92,959,556	4.5	4.5	0.0	0%
Total	155,462	151,651,628	4.5	3.6	- 0.96	- 0.3%

Notes: In columns (1) through (4), the Table shows descriptive statistics of all lots studied in Santiago between 2003 and 2019 by FAR rezoning outcomes, weighted by the lot's area. The FAR's mean is presented before (at 2003, the baseline period, column 3) and after the modifications (at 2019, the endline period, column 4). Columns (5) and (6) show the difference and average percent variation between the baseline and the endline as a percentage of the baseline value.

Table 1 shows that the surface covered by the upzoned lots is significantly smaller than the other outcomes. Moreover, while upzoned lots almost double the maximum FAR, downzoned lots are, on average, reduced to one-fifth of their original value. Therefore, the intensity of land-use regulatory changes in the case of downzoning is higher than in upzoning processes.

Figure 1 summarizes the distribution of the percentage variation of the maximum FAR between the endline and baseline for lots inside a rezoning project. The range of changes is extensive, with the most frequent regulatory change being a reduction in the maximum FAR of -10% and 0. Also, most upzoning projects increase the maximum FAR by less than twofold.

Figure 1. FAR variation



Our key variables are socioeconomic status and ownership at the baseline year. We obtain the socioeconomic information from Chile's 2002 population census, which contains each household's socioeconomic (national level) decile. We aggregate the socioeconomic information at the block level to avoid ambiguities or biases due to the differences between lots and households' geographic locations. We average the decile of each household in a block and use this value for all the lots in that block. For the ownership information, we use the same database to obtain the share of owner-occupied dwellings of each block.

For the control baseline variables, we built a transport infrastructure proximity variable by calculating the distance to the subway and urban highway networks in 2001 using GIS network analysis tools. With the same tools, we compute the distance to green areas.

We also obtain property-level information from Chile's Internal Revenue Service (SII) and the National Municipal Information System to control for the properties' year of construction and their fiscal value (used to calculate property taxes). Finally, we control for the

number of households, population, and the share of people with tertiary education using the 2002 Census data.

3.2 Methods

To estimate the impact of the key independent variables on the probability that a lot experiments a land use regulatory change, we estimate the following linear probability model:

$$\delta_i = \beta_0 + \beta_1 I_{high\ SES} + \beta_2 Ownership_{t0,i} + \sum_{n \in N} \gamma_n Z_{n,t0,i} + \epsilon_i \quad (1)$$

where δ_i is the dummy variable that takes the value of 1 when the lot i is upzoned and 0 otherwise. We also estimate the same model for δ_i being one if the lot is downzoned. As one of our central hypotheses is that Santiago's income inequality is associated with land use regulatory changes, we use $I_{high\ SES}$, which is a dummy variable that takes the value of 1 if the socioeconomic status of the block where the lot is located belongs to the highest decile. The other key variable that we examine in our models is ownership. $Ownership_{t0,i}$ is a dummy that is 1 when the average rate of owner-occupied dwellings of each lot's block is above the mean. $Z_{n,t0,i}$ represents baseline control variables associated with the lot i, such as distance to highways and subways.[1]

To understand whether socioeconomic status and ownership rate are complementary driving forces of regulatory changes, we also estimate a model where both variables are interacted:

$$\delta_i = \beta_0 + \beta_1 I_{high\ SES} + \beta_2 Ownership + \beta_3 \cdot I_{high\ SES}\ Ownership + \sum_{n \in N} \gamma_n Z_{n,t0,i} + \epsilon_i \quad (2)$$

We use the normalized version of the ownership rate to simplify the interpretation. Thus, in this case β_1 is the change in the probability of being upzoned (or downzoned) for the 10th

[1] For robustness, we also present the results using the socioeconomic level as a continuous variable and the ownership rate to be continuous and normalized to have a mean of zero.

socioeconomic status decile relative to all other quintiles. β_3 is the parameter of interest representing the complementarity between these two variables.

4. Results

4.1 Main Results

The tables presented in this section show the results of estimating the first equation indicated in the methodology section to test whether income and ownership are key factors associated with land use regulatory changes. Each column and panel in every Table shown below are from a different regression.

Table 2 summarizes the results when the key variables are assessed independently. Panel A examines downzoning, and panel B is upzoning. Column (1) shows the estimates without including controls. Column (2) is the exact specification as (1) but controls for the baseline FAR. Suppose a lot with a more stringent initial regulation is more likely to be upzoned than a lot with a more permissive initial condition, for example. In that case, our estimation would be biased because the regulation prevents new developments (whereas the more permissive ones may not), affecting the likelihood of an upzoning. Controlling for the baseline FAR directly addresses this and other related issues.

Table 2: Influence of socioeconomic level and ownership rate on regulatory changes.

Panel A: Rezoning outcome: FAR downzoning				
	(1)	(2)	(3)	(4)
90th to 100th SES 2002 (D)	-9,44	-8,25	-6,37	-1,08
	(5,89)	(5,86)	(5,73)	(5,39)
Ownership above mean (D)	-16,52***	-15,95***	-13,16***	-10,95**
	(4,86)	(4,89)	(4,78)	(4,63)
FAR in 2003	No	Yes	Yes	Yes
Distance to transport infrastructure	No	No	Yes	Yes
Year of construction	No	No	No	Yes
Observations	155,462	155,462	155,462	155,462
R-squared	0,07	0,07	0,08	0,10
Panel B: Rezoning outcome: FAR upzoning				
	(1)	(2)	(3)	(4)
90th to 100th SES 2002 (D)	-12,78**	-16,44**	-13,45**	-14,95**
	(6,34)	(6,66)	(6,29)	(6,52)
Ownership above mean (D)	-4,47	-6,23	-1,79	-2,42
	(4,77)	(4,69)	(4,84)	(4,61)
FAR in 2003	No	Yes	Yes	Yes
Distance to transport infrastructure	No	No	Yes	Yes
Year of construction	No	No	No	Yes
Observations	155,462	155,462	155,462	155,462
R-squared	0,04	0,07	0,10	0,11

Standard errors in parentheses

Notes: The table reports coefficients from lot level regression and robust standard errors (clustered by zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. Regressions are run at the lot level but weighted by the lot's surface area. Each panel and column are from a separate regression. The dependent variable is the FAR outcome. For Panel A, the FAR outcome is "FAR downzoning", a dummy that takes the value of 1 if the lot of the square meter has a more restrictive FAR regulation in November 2019 than in May 2003, and zero otherwise. For Panel B, the FAR outcome is "FAR upzoning", a dummy that takes the value of 1 if the lot has a more permissive FAR regulation in November 2019 than in May 2003, and zero otherwise. The variable "90th to 100th SES 2002 (D)" is a dummy equal to 1 if the neighborhood's socioeconomic status in the census 2002 is the country's tenth decile. The variable "Ownership 2002 above mean (D)" is a dummy variable equal to 1 if the average neighborhood's owner-occupied dwellings in the Census 2002 are greater than the sample's mean. Each column adds covariates progressively. Column 1 shows the regression results that only control for socioeconomic status and ownership. Column 2 also controls for the floor-to-area ratio in 2003, column 3 controls for the minimum distance to the transport infrastructure (subway or urban highway), and column 4 also controls for the year of lot's construction. All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data on land use for 2001 and 2010, georeferenced blocks, and the 2002 Census from the Chilean Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Column (3) includes the minimum distance to the main transportation network as a control (i.e., a subway station or an urban highway), and column (4) also controls for the dwelling's year of construction.

The different specifications estimated in Table 2 reveal two main results. A lot whose residents belong to the wealthiest decile at the baseline year is significantly less likely to be upzoned over the years, and those with above-mean ownership rates at the baseline year are

less likely to be downzoned. The point estimates are stable across specifications and are statistically significant at conventional levels.

Our preferred specification includes all the controls and is presented in column 4. Panel A reveals that a lot with an above-mean rate of owner-occupied dwellings is 11 percentage points less likely to be downzoned (Column 4, coefficient -10.95). Panel B shows that the lots whose residents are among the wealthiest decile are 15 percentage points less likely to be upzoned (Column 4, coefficient -14.95).

These results suggest that in the neighborhoods where the wealthy residents are concentrated, it becomes more difficult to reform land use regulations to allow more dense housing or real estate developments over time. On the other hand, in the neighborhoods with a high concentration of homeowners, relative to places with a higher share of renters, it becomes less likely to reform land use regulations that would make them stricter over time. We interpret that in those blocks with a high proportion of homeowners, this group would like to maximize the property's value and therefore intend to hinder limitations on the large development projects that can take place by selling their property.

We estimate a similar set of regressions to study our main results' robustness by using additional and alternative covariates. Table 3 summarizes the results and shows that the results are robust when we control for the number of households, population, and education level. However, it reveals that the results are not robust to include municipality fixed-effects. The explanation is that the source of variation in our variables of interest in Santiago is primarily across municipalities and not within municipalities. In other words, municipalities in Santiago are very socially homogeneous; therefore, our main results follow each municipality's socioeconomic level.

Table 3 - Robustness to adding additional controls (2003-2019).

Panel A: Rezoning outcome: FAR downzoning					
	(1)	(2)	(3)	(4)	(5)
90th to 100th SES 2002 (D)	-1,08	-1,61	-1,60	-2,80	0,91
	(5,39)	(5,36)	(5,36)	(5,28)	(3,54)
Ownership above mean (D)	-10,95**	-10,33**	-10,87**	-10,92**	-3,72
	(4,63)	(4,45)	(4,56)	(4,55)	(4,00)
FAR in 2003	Yes	Yes	Yes	Yes	Yes
Distance to transport infrastructure	Yes	Yes	Yes	Yes	Yes
Year of construction	Yes	Yes	Yes	Yes	Yes
Log households	No	Yes	No	No	No
Log population	No	No	Yes	Yes	Yes
Share of tertiary education	No	No	No	Yes	Yes
Municipality dummies	No	No	No	No	Yes
Observations	155,462	155,462	155,462	155,462	155,462
R-squared	0,10	0,11	0,11	0,11	0,34
Panel B: Rezoning outcome: FAR upzoning					
	(1)	(2)	(3)	(4)	(5)
90th to 100th SES 2002 (D)	-14,95**	-15,29**	-15,45**	-16,34**	-0,42
	(6,52)	(6,50)	(6,51)	(6,48)	(2,67)
Ownership above mean (D)	-2,42	-2,03	-2,35	-2,38	-2,74
	(4,61)	(4,51)	(4,56)	(4,55)	(2,16)
FAR in 2003	Yes	Yes	Yes	Yes	Yes
Distance to transport infrastructure	Yes	Yes	Yes	Yes	Yes
Year of construction	Yes	Yes	Yes	Yes	Yes
Log households	No	Yes	No	No	No
Log population	No	No	Yes	Yes	Yes
Share of tertiary education	No	No	No	Yes	Yes
Municipality dummies	No	No	No	No	Yes
Observations	155,462	155,462	155,462	155,462	155,462
R-squared	0,11	0,11	0,11	0,11	0,40

Standard errors in parentheses

Notes: The table reports coefficients from lot level regression and robust standard errors (clustered at zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. Regressions are run at the lot level but weighted by the lot's surface area. Each panel and column are from a separate regression, all of which controls for the FAR in 2003, the minimum distance to the transport infrastructure (subway or urban highway), and the year of the construction in the lot. The dependent variable is the FAR outcome. In Panel A, the FAR outcome is "FAR downzoning", a dummy that takes value one if the lot of the square meter has a more restrictive FAR regulation in November 2019 than in May 2003, zero otherwise. In Panel B, the FAR outcome is "FAR Upzoning", a dummy that takes value one if the lot has a more permissive FAR regulation in November 2019 than in May 2003, zero otherwise. The variable "90th to 100th SES 2002 (D)" is a dummy equal to one if the neighborhood's socioeconomic status in the census 2002 is the tenth decile of the country. The variable "Ownership 2002 above mean (D)" is a dummy variable equal to one if the average neighborhood's owner-occupied dwellings in the Census 2002 are greater than the sample's mean. Each column adds covariates to the main specification (Table 1's column 4). Column 2 also controls for the block's (log) households. Column 3 has the same covariates as column 1 and controls for the block's (log) population. Column 4 also controls for the share of the block's population with higher education degrees. Column 5 also controls for municipality dummies. All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data for 2001 and 2010, georeferenced blocks, and the 2002 Census by Chile's Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.2 Heterogeneity

We estimate our preferred specification for the following different subsamples to study the heterogeneity of the relationship between socioeconomic status and ownership on the one hand and land use regulatory reforms on the other:

1. Lots belong to blocks where single-family housing is above the median.
2. Lots belong to blocks with a high concentration of residents from the wealthiest decile.
3. Lots do not belong to blocks with a high concentration of residents from the wealthiest decile.
4. Lots are part of land use regulatory changes covering a surface area above the mean.

The rationale for separating the analysis into different subsamples is to explore the following hypotheses. First, the main results presented above should be even stronger in low-density areas where single-family housing is majoritarian. The incentives to freeze the land use regulations are more potent because, as the literature has suggested, people prefer the regulatory status quo to keep their neighborhoods' physical and social characteristics. Second, the social factors associated with land use changes may be different for areas with and without the high presence of wealthy residents. Third, when land use regulatory changes are part of comprehensive zoning reforms that cover extensive urban land areas, the influence of residents might be mitigated by the lobby of the real estate industry.

Table 4 reports the results of estimating our preferred specification using the four subsamples mentioned above. It reveals that the association between a lower probability of upzoning for lots initially belonging to blocks from the wealthiest decile is larger when the share of single-family housing is above the median (see Panel B, column 1), confirming our hypothesis. Also, Table 4's columns 2 and 3 show that ownership has a differential incidence

depending on whether the lots belong to the wealthier neighborhoods. It is a relevant factor associated with land use changes only in the former. Finally, column 4 suggests that the association between wealth and a lower chance of upzoning is not heterogenous across significant land use changes. Therefore, in those institutional processes, we cannot infer that other factors mitigate the influence of residents.

Table 4: Heterogeneity analyses.

Panel A: Rezoning outcome: FAR downzoning				
	(1) High share of single-family housing	(2) 10th SES decile	(3) Other SES deciles	(4) Large changes
90th to 100th SES 2002 (D)	4,12			-4,36
	(4,59)			(5,25)
Ownership above mean (D)	2,39	-12,00**	-4,13	-6,86
	(4,46)	(5,04)	(5,14)	(4,97)
Observations	77,807	27,946	127,516	95,673
R-squared	0,36	0,23	0,09	0,11
Panel B: Rezoning outcome: FAR upzoning				
	(1) High share of single-family housing	(2) 10th SES decile	(3) Other SES deciles	(4) Large changes
90th to 100th SES 2002 (D)	-38,72***			-15,31**
	(9,44)			(7,37)
Ownership above mean (D)	-0,35	-15,90***	5,30	-3,21
	(3,61)	(5,53)	(5,61)	(5,35)
Observations	77,807	27,946	127,516	95,673
R-squared	0,29	0,07	0,11	0,12

Standard errors in parentheses

Notes: The table reports coefficients from lot level regression and robust standard errors (clustered at zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. Regressions are run at the lot level but weighted by the lot's surface area. Each panel and column are from a separate regression, all of which control for the FAR in 2003, the minimum distance to the transport infrastructure (subway or urban highway), and the year of the construction in the lot. The dependent variable is the FAR outcome. In Panel A, the FAR outcome is "FAR Downzoning", a dummy that takes value one if the lot of the square meter has a more restrictive FAR regulation in November 2019 than in May 2003, zero otherwise. In Panel B, the FAR outcome is "FAR Upzoning", a dummy that takes value one if the lot has a more permissive FAR regulation in November 2019 than in May 2003, zero otherwise. The variable "90th to 100th SES 2002 (D)" is a dummy equal to 1 if the neighborhood's socioeconomic status in the census 2002 is the tenth decile of the country. The variable "Ownership 2002 above mean (D)" is a dummy variable equal to one if the average neighborhood's owner-occupied dwellings in the Census 2002 are greater than the sample's mean. Column 1 shows results for lots in the block where the share of single-family housing is above the median. Column 2 shows results for the highest socioeconomic decile, while column 3 shows results for the first nine socioeconomic deciles of the sample. Column 4 shows results for lots that are part of an extensive modification. All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data for 2001 and 2010, georeferenced blocks, and the 2002 Census by Chile's Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

To understand how ownership and wealth are associated with changes in urban regulations, we estimate the model in Eq. (1) but adding an interaction between the two dummies. Table 5 highlights that the combination of both factors is more strongly associated with a lower probability of regulatory changes.

Table 5: Influence of the interaction between socioeconomic level and ownership on regulatory changes.

Panel A: Rezoning outcome: FAR downzoning	
10th socioeconomic decile and low ownership rate	7.54
	(7.89)
1st-9th socioeconomic decile and high ownership rate	-6.07
	(5.24)
10th socioeconomic decile and high ownership rate	-11.14**
	(5.13)
Observations	155,462
R-squared	0.11
Panel B: Rezoning outcome: FAR upzoning	
10th socioeconomic decile and low ownership rate	-4.85
	(7.37)
1st-9th socioeconomic decile and high ownership rate	3.30
	(5.58)
10th socioeconomic decile and high ownership rate	-16.33***
	(5.13)
Observations	155,462
R-squared	0.11

Standard errors in parentheses

Notes: The table reports coefficients from lot level regression and robust standard errors (clustered by zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. Regressions are run at the lot level but weighted by the lot's surface area. Each panel and column are from a separate regression. The dependent variable is the FAR outcome. In Panel A, the FAR outcome is "FAR downzoning", a dummy that takes value one if the lot has a more restrictive FAR regulation in November 2019 than in May 2003, zero otherwise. In Panel B, the FAR outcome is "FAR upzoning", a dummy that takes value one if the lot has a more permissive FAR regulation in November 2019 than in May 2003, zero otherwise. The regressions control for the floor-to-area ratio in 2003, the minimum distance to the transport infrastructure (subway or urban highway), and the year of the construction in the lot. All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data for 2001 and 2010, georeferenced blocks, and the 2002 Census by Chile's Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

4.3 Logit specification

To test the robustness of our results further, we estimate logit models. First, in Table 6, we follow the same logic as in our main specification in which the outcomes are either downzoning or not (results in column 1) or upzoning or not (column 2). The results are entirely consistent with our previous analyses. Belonging to the wealthiest deciles is strongly associated with a

lower probability of upzoning and a high ownership rate with a lower likelihood of downzoning.

Table 6: Robustness to a different regression – Binomial Logit model (2003-2019).

	(1) Downzoning	(2) Upzoning
90th to 100th SES 2002 (D)	-1,58	-6,77***
	(5,71)	(2,33)
Ownership above mean (D)	-8,98**	-0,19
	(4,12)	(1,51)
Observations	155,462	155,462

Standard errors in parentheses

Notes: The Table reports the marginal effects from the lot level logit regression and robust standard errors (clustered at zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. The regression is run at the lot level and weighted by the lot's surface area. The regression controls for the FAR in 2003, the minimum distance to the transport infrastructure (subway or urban highway), and the year of the construction in the lot. The variable "90th to 100th SES 2002 (D)" is a dummy equal to one if the neighborhood's socioeconomic status in the census 2002 is the tenth decile of the country, zero otherwise. The variable "Ownership 2002 above mean (D)" is a dummy variable equal to one if the average neighborhood's owner-occupied dwellings in the Census 2002 are greater than the sample's mean, zero otherwise. Columns 1 and 2 are the downzoning and upzoning outcomes from the logit regression (dummy dependent variable). All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data for 2001 and 2010, georeferenced blocks, and the 2002 Census by Chile's Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

We also extend the model to allow for differentiation between all possibilities. The outcome is not a dummy variable but a categorical variable that takes a different value for each of the three cases: downzoning, no rezoning, and upzoning. Table 7 summarizes the results of the estimation with all variables included. We also find that belonging to the wealthiest decile is strongly associated with a lower probability of upzoning and that a high ownership rate is associated with a lower likelihood of downzoning. However, because this model explicitly considers the absence of change as an outcome, we can also see that a high ownership rate is strongly associated with no regulatory changes.

Table 7: Robustness to a different regression - Multinomial-Logit (2003-2019).

	(1) Downzoning	(2) No change	(3) Upzoning
90th to 100th SES 2002 (D)	-5,26	12,45	-7,19***
	(6,95)	(8,16)	(2,45)
Ownership above mean (D)	-12,27**	12,87**	-0,60
	(5,14)	(5,90)	(1,68)
Observations	155,462	155,462	155,462
R-squared			

Standard errors in parentheses

Notes: The Table reports the marginal effects from the lot level multilevel-logit regression and robust standard errors (clustered at zoning in the baseline level) multiplied by 100 to give the % effect of a one-unit increase in the key variables. The regression is run at the lot level and weighted by the lot's surface area. The regression controls for the FAR in 2003, the minimum distance to the transport infrastructure (subway or urban highway), and the year of the construction in the lot. The variable "90th to 100th SES 2002 (D)" is a dummy equal to one if the neighborhood's socioeconomic status in the census 2002 is the tenth decile of the country. The variable "Ownership 2002 above mean (D)" is a dummy variable equal to 1 if the average neighborhood's owner-occupied dwellings in the Census 2002 are greater than the sample's mean. Columns 1, 2, and 3 are the downzoning, no change, and upzoning outcomes from the multilevel-logit regression (categorical dependent variable). All regressions include an intercept (not shown). Source: Own calculations using our dataset on land use and zoning regulation, the Chilean Internal Revenue Service (SII) data for 2001 and 2010, georeferenced blocks, and the 2002 Census by Chile's Census Bureau (INE).

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

5. Discussion and Conclusion

The adoption of land use regulations is a very technical and often obscure institutional process. However, it has enormous economic, social, and political implications. Recent research has tried to reveal the political and economic factors behind land use decisions in a context where there are still significant barriers to accessing the data necessary to make academic contributions to the vital policy debates surrounding the regulation of city land. This paper aims to fill that gap by examining an original database constructed by the authors that contain information on the principal land use regulations that have constrained real estate development in the past 20 years in Santiago, the capital of Chile. Most of the previous evidence collected and examined on the factors affecting land use regulations refer to U.S. suburban contexts, where social and political factors make the influence of homeowners particularly salient.

Nevertheless, urban contexts are different. In principle, it should be a more level field for the participation of all stakeholders with essential stakes behind the adopted land use regulations. However, the evidence of land use regulations and their determinants in inner cities

is scarce and mostly centered on U.S. metropolitan areas (Been, Madar, and McDonnell 2014; Gabbe 2018; Hilber and Robert-Nicoud 2013). This paper provides evidence from a vast urban area of one of Latin America's largest and most economically vibrant cities. Moreover, we use administrative records to codify the land use regulations that apply to all lots belonging to a vast urban area in Santiago during 20 years. The latter differentiates this study from recent research that uses cross-sectional data, and that carries out the analysis using survey data (Hilber and Robert-Nicoud 2013; Gyourko, Hartley, and Krimmel 2021).

The results of this paper highlight the importance of socioeconomic status as a factor associated with land-use regulatory changes. Our analysis suggests that in neighborhoods with a high concentration of residents from the higher-income decile, it becomes more difficult to adopt land use regulations that allow the construction of more dense housing developments. This result means that for upzoning processes, socioeconomic status seems to be a relevant factor relative to others identified by the previous literature, such as the presence of homeowners. Concerning downzoning processes, we find the contrary: the concentration of homeowners is associated with lower chances of land use regulatory changes that become stricter over time.

Our results differ from what the previous literature has found. They suggest that in high-income urban neighborhoods, its residents exert intense pressure to freeze land use regulations, regardless of whether this group is composed chiefly of homeowners. Recent evidence from U.S. metropolitan areas indicates that homeownership – and not socioeconomic status- is one of the most important factors influencing the trend toward stricter land use controls (Been, Madar, and McDonnell 2014; Gabbe 2018; Hilber and Robert-Nicoud 2013). Moreover, our analysis shows that homeownership is correlated with a lower probability of downzoning, which suggests that the primary interest of this group is to have a favorable regulatory environment for the construction of profitable housing projects and not the prevention of dense

developments. The exception occurs in affluent neighborhoods. Therefore, homeownership is undoubtedly an essential driver of urban politics, but not in the direction pointed out by the literature. Those preventing more flexible norms in the urban space are affluent residents who aim to keep their neighborhoods' social and physical character.

The association between high-income residents and land use regulations is even stronger when we restrict our sample to lots that belong to blocks where the share of single-family housing is above the median. In those neighborhoods, we do not observe a statistically significant relationship between the presence of homeowners and the probability of downzoning. In the previously mentioned neighborhoods, we only find a strong link between the concentration of affluent neighbors and a lower likelihood of upzoning. This is consistent with what the literature has described in the U.S. context, which refers to the fact that there is firm land use regulatory inertia in low-density places (Ellickson 2020). However, the determinant seems to be socioeconomic status rather than homeownership.

We also find that the association between homeownership and land use regulatory changes is restricted to areas with a high concentration of residents in the wealthiest decile. Homeownership does not seem to be a relevant factor in land use regulations in all the other blocks located outside the more affluent urban areas. It is plausible to conclude that in these areas, the real estate industry faces less resistance from the neighbors in pushing for a more favorable regulatory environment, which ultimately would depend on how local authorities respond to those interests.

Two possible mitigating factors to the influence of high-income residents and homeowners that the literature has suggested are the accessibility to transportation networks, and the implementation of zoning changes that cover large urban areas. Ellickson (2020) argues that installing a new transit corridor may motivate homeowners to support more flexible land use regulations, given the possibility of profits from the eventual dense developments that are

usually located close to those corridors. We find that the association between a high proportion of wealthy residents and a lower probability of upzoning is unaffected by the accessibility to transportation networks, except for a slight reduction of the coefficient mentioned above. The same happens for the relationship between the concentration of homeowners and a lower probability of downzoning. Therefore, our analysis suggests that the influence of these actors is not necessarily affected by the lots' accessibility.

Concerning land use regulatory changes affecting large urban areas, Schleicher (2012) has argued that modern developments in land use law in the United States favor the consideration of changes to zoning maps that are limited to specific and small areas. In these settings, developers face high costs to convince decision-makers to make regulatory changes to allow dense real estate developments because those developments would likely affect the neighboring properties, triggering resistance from the neighbors. For this latter group, it is easier to coordinate to lobby local authorities to block the proposed changes. By contrast, it is more difficult for developers and potential housing consumers to generate collective action that would outweigh the eventual benefits. However, in significant zoning changes, the cost-benefit analysis might be more favorable for the real estate industry, considering that the change may affect more companies. In our models, where we focused on the lots that are part of land use changes covering a surface area above the mean, the association between high-income residents and a lower probability of upzoning holds. Affluent neighbors seem to make their voices heard regardless of the size of the land use modification adopted.

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Appendix

Robustness to different independent variable for Downzoning (2003-2019).

	(1)	(2)	(3)	(4)
SES 2002 (C)	-0,57	-0,24	0,41	1,79
	(1,64)	(1,65)	(1,62)	(1,43)
Ownership share (C)	-38,74***	-36,81***	-30,37**	-23,34*
	(13,21)	(13,30)	(12,99)	(12,81)
FAR in 2003	No	Yes	Yes	Yes
Distance to T.I.	No	No	Yes	Yes
Year of contruction	No	No	No	Yes
Observations	151651628	151651628	151651628	151651628
R^2	0,05	0,05	0,07	0,10

Standard errors in parentheses

Robustness to different independent variable for Upzoning (2003-2019).

	(1)	(2)	(3)	(4)
SES 2002 (C)	-3,13	-3,84*	-2,91	-3,01
	(1,99)	(2,07)	(1,95)	(1,97)
Ownership share (C)	-0,23	-4,42	4,68	4,17
	(13,87)	(13,96)	(13,86)	(13,61)
FAR in 2003	No	Yes	Yes	Yes
Distance to T.I.	No	No	Yes	Yes
Year of contruction	No	No	No	Yes
Observations	151651628	151651628	151651628	151651628
R^2	0,02	0,05	0,09	0,09

Standard errors in parentheses

Table A1. Characterizations of the lots, weighted, by FAR's outcome

	All lots	**Outside rezoning project**	**Inside rezoning project**		
			Upzoned	Downzoned	Not-rezoned
Near metro	6.8%	0.62%	9.8%	14%	0.97%
Near highways	5.5%	3.4%	14%	5.5%	2.1%
Near green area	24%	12%	49%	46%	4.7%
SES 2002 national level	8.1	8.4	7.4	7.8	9.2
SES 2002 sample level quintiles	3.7	4	3.1	3.5	4.5
High fiscal value	68%	79%	36%	59%	86%
Ownership	73%	78%	71%	66%	70%
Organizations relative to population	26%	12%	37%	48%	1.1%
Construction previous 1973	35%	17%	60%	59%	29%
Changes PRC previous 2003	4.9%	0.01%	14%	8%	4.8%
FAR baseline	4.6	2.3	1.2	8	1.1
Observations	124,705	10,036	76,191	20,170	17,022

The Table shows descriptive statistics (means values of dummy variables multiplied by 100 to give the % of the variable in the observations and coefficient values of categorical variables on their own) for

independent variables for characterizations all lots, weighted by the lot's surface area, by height rezoning outcome.

Table A2. Relationship between SES and Ownership interaction with rezoning outcome

Dependent variable:	(1)	(2)
Rezoning outcome	FAR Downzoning	FAR Upzoning
c.SES 2002	-0.130	-0.341
	(3.022)	(2.645)
c.Own 2002	-9.951**	15.793***
	(4.050)	(2.791)
c.SES 2002 # c.Own 2002	1.185*	-1.957***
	(0.605)	(0.414)
FAR Baseline Control	YES	YES
Accessibility Control	YES	YES
Observations	44,658	44,658
R-squared	0.376	0.336

The Table reports coefficients from lot level regression and robust standard errors (clustered at the type of modification level) multiplied by 100 in SES variables case and by 10 in Own variables case, to give the % effect of a one-unit increase in the key variable (1 decile in SES variables cases or 0.1 share in Own variable cases). The dependent variable is the FAR outcome. The variable "FAR Downzoning" is a dummy that takes the value of 1 if the lot of the square meter has a more restrictive FAR regulation in november 2019 than in may 2003, or 0 if not. The variable "FAR Upzoning" is a dummy that takes the value of 1 if the lot has a more permissive FAR regulation in november 2019 than in may 2003, or 0 if not. Each column is from a separate regression. The variable "c.SES 2002" is a continuous variable of the average neighborhood's socioeconomic status in 2002 census. The variable "c.Own 2002" is a continuous variable of the average neighborhood's share of owner-occupied dwellings in 2002 census. The variable "1.SES 2002 # c.Own 2002 (m=0)" is the interaction between the variable "1.SES 2002 (q5)" and variable "c.Own 2002 (m=0)". Regressions are run at the lot level but weighted by the lot's surface area. All regressions include an intercept (not shown). Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1