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## ABSTRACT

Many politicians and voters believe that condominium development hastens gentrification. Indeed, there is a strong positive correlation between the presence of condos in a neighborhood and resident socio-economic status. We leverage the introduction of municipal regulations to study the causal effect of condo conversions on neighborhood attributes. Cities that restricted condo conversions experience a persistent decline in the condo share of the housing stock, relative to their neighboring suburbs and compared to metropolitan areas without such restrictions, even at city/suburb borders. Yet, areas with a higher condo share due to local regulations do not have residents with higher income or education levels.

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A online appendix is available at http://www.nber.org/data-appendix/w26170

## 1. Introduction

In recent decades the long-run exodus from central cities in the United States has slowed and, in some areas, reversed direction. Some of these new residents are higher socioeconomic status (SES) than the current population in cities, a phenomenon colloquially known as "gentrification." Many politicians and members of the public hold a strong (and untested) belief that condominium development contributes to gentrification because it allows residence in dense urban neighborhoods to be bundled with the income tax advantages and other benefits of homeownership that are attractive to high income households.

We test – and ultimately reject – that condo development in and of itself attracts significant numbers of high-SES residents to central cities. We do find strong *correlations* between the condo share of housing units and the income, education and racial composition of local residents. However, any observed correlation could be driven by the (endogenous) construction decisions of developers, who may respond to the perceived demand for condos in areas otherwise valued by high-income households.

We take advantage of variation in the passage of municipal codes regulating condominium conversions to identify the causal effect of condo availability on gentrification. The condominium only became a legally recognized form of owner-occupancy in the United States in the 1960s. In response, some cities – particularly large cities in coastal areas – passed restrictive regulations in the 1970s and 1980s, governing the conversion of multi-family buildings to condo units. These regulations functioned like a housing supply constraint, in that cities that passed such regulations have a lower condo share in their housing stock even today. Yet we find that variation in the condo share induced by differences in local regulations is *not* associated with 'gentrifying'

characteristics, including higher income or education level or lower Black share or share in poverty.

Our data analysis is based on newly collected archival information on the passage of city-level conversion ordinances for the 100 largest cities. We merge this information with data on the condo share of the housing stock at the Census tract level, taken from the Neighborhood Change Database in 1980 and a special Census extract in 2010. We compare 13 metropolitan areas anchored by a central city that passed a restrictive condo ordinance after 1980 to 50 metropolitan areas anchored by central cities that had not yet passed an ordinance by 2010.

Our findings derive from a triple-difference specification: we compare central cities that passed restrictive ordinances to those that never passed an ordinance before the initial passage of the law (1980) and afterwards (2010). Regardless of the city's regulatory structure, the suburbs in our sample did not regulate the process of converting rental units to condominiums, in part because few suburbs had a multi-family housing stock conducive to conversions in this period. So, as a third difference, we incorporate data on the suburban ring of each city, which allows us to control for common metropolitan level trends.

One concern is that suburban areas may follow a different growth trend than the core central city, and thus may not adequately control for metropolitan area trends. To address this concern, we conduct our analysis both for the full sample of city/suburban tracts and for a narrower sample of tracts close to the city/suburban border. Indeed, adjacent neighborhoods across borders are far more similar on baseline characteristics, yet we continue to find in this sample that policy-driven variation in condo construction affects the condo share in the housing stock but is not associated with resident characteristics.

According to a recent survey of the economics of gentrification, the current literature focuses on demand factors for gentrifying neighborhoods and offers "less understanding of the causal role of redevelopment decisions [and housing] supply constraints" on the gentrification process (Hwang and Lin, 2016, p. 21). Our paper highlights regulations that restrict the conversion of rental properties to condo use, acting as a constraint on the redevelopment cycle that can occur as aging housing stock in the central city is replaced, thereby attracting higher-income residents (Brueckner and Rosenthal, 2009). It is important to distinguish demand-driven from supply-led gentrification because they have different implications for policy. If the presence of new luxury housing supply leads to gentrification, some supply restrictions may be warranted. If, instead, gentrification is primarily due to rising demand for urban living, supply restrictions could "perversely amplify housing price increases and subsequent displacement effects" (Hwang and Lin, 2016, p. 10).

By ruling out the importance of one common housing supply regulation (restrictions on condo conversions), our paper bolsters the current consensus that gentrification primarily reflects a growing demand for urban living, such as a rising value that workers place on living close to their place of employment, a byproduct of higher work hours and increases in female labor force participation (Kahn, 2007; Edlund, Machado and Sviatschi 2021; Su, 2022). Falling crime rates and increasing availability of local amenities such as restaurants, shopping, and cultural venues, as well as the endogenous value placed on proximity to other wealthy residents themselves, may also play a role (Glaeser and Gottlieb, 2006; Ellen and O'Regan, 2010; Guerrieri, Hartley and Hurst, 2013; Foote, 2015; Diamond, 2016; Carlino and Saiz, 2019; Ellen, Horn and Reed, 2019; Baum-Snow and Hartley, 2020; Couture, et al. 2019; Couture and Handbury, 2020; Behrens, et al. 2022). Our analysis of condo regulations is related to papers using policy variation to identify the

effects of local rent control (Sims, 2007, 2011; Autor, Palmer, and Pathak, 2014, 2019; Diamond, McQuade and Qian, 2019) and spatial regression discontinuities across city/suburban borders to identify the effects of land use regulations and the valuation of public goods (Black and Machin, 2011; Boustan, 2012;Turner, Haughwout, and Van Der Klaauw, 2014).

## 2. The condominium and urban development

High-income households generally prefer owner-occupancy versus renting due to tax incentives, longer expected tenure, and other factors (Haines and Goodman, 1992; Rosenthal, 1988; Hoyt and Rosenthal, 1992; Collins and Margo 2001; Sinai and Souleles, 2005; Haurin, Herbert and Rosenthal, 2007; Ihrke and Faber, 2012; Goodman and Mayer 2018). With very few exceptions, however, it was nearly impossible for any household, regardless of income, to owner-occupy a "slice" of an urban multi-family residential building in the United States prior to the diffusion of the condominium legal form in the 1960s.[1]

The condominium form emerged and spread in the US in the 1960s for two reasons. First, high marginal federal tax rates on income in the aftermath of World War II raised the tax benefits associated with owner-occupancy, thereby increasing the demand for homeownership in all locations (Hansmann, 1991). Second, the tourism and retirement industries in sunbelt locations like Florida and Puerto Rico expanded in this period, augmenting demand for vacation homes. Puerto Rico, a US territory with a civil law tradition, was able to draw on existing legal infrastructure supporting the condominium form under civil codes to authorize condos on the island in 1951, and its real estate industry successfully lobbied Congress to legally recognize the condominium form in the Housing Act of 1961 and to permit the Federal Housing Administration to extend its mortgage insurance to condominiums (Leyser 1958; Ferrer and Stecher 1967; Bennett

2011, p. 254, 262; Lasner 2012, p. 41).[2] Condo-enabling legislation at the state level soon followed. By 1963, six states (Arkansas, Hawaii, Arizona, Kentucky, South Carolina, and Virginia) had enacted enabling legislation that gave a statutory basis to condominiums, largely copying the language of the Puerto Rican law. The FHA drafted a model statute that served as a further guide. By 1965, 43 states passed enabling legislation and the last state, Vermont, did so by 1969.

Condominium development expanded rapidly in the 1970s, primarily through the conversion of rental properties into condo buildings. This first generation of condo conversions was often met with public opposition, perhaps because it coincided with a tight housing market and a low rental vacancy rate (Judson, 1983). Local officials were concerned about reductions in the rental housing stock and the displacement of current tenants. For example, the Mayor of Washington D.C. testified to the Senate Committee on Banking, Housing, and Urban Affairs in 1979 that "[t]he conversion of rental apartments to condominium ownership has become a national phenomenon which has reached crisis proportions" (Committee on Banking, Housing, and Urban Affairs, 1979, p. 9). Newspapers blared alarmist headlines about "Condomania in Chicago" (Tamarkin, 1978) and "The Condo Squeeze" in Boston (Klibanoff and McNamara, 1981). To address these issues, some cities enacted ordinances to control the conversion process. These regulations included provisions that required notice periods for tenants of the upcoming conversion, rights of first refusal for existing tenants to purchase their units, or relocation assistance for existing tenants to move elsewhere (Fine, 1980). We describe our collection and coding of these municipal ordinances in Section 3 and the Online Appendix.

As the first wave of conversions of rental properties to condo began in the 1970s, tenant and community groups grew concerned that condo conversions would attract new high-income residents and displace old ones. Local groups proposed a series of new tenant protections, which

were supported by a wide array of legal and policy scholars. Here is one representative view from a law review article at the time: "Condominium conversion… alters the very character of a neighborhood … [c]entral [city] neighborhoods often contain deteriorating older buildings that are structurally sound and architecturally interesting. The buildings are seldom owner occupied and are usually low and middle-income rental properties. Gentrification occurs when developers purchase and rehabilitate these multi-unit structures for conversion into condominiums. Once they have been rehabilitated, these buildings attract new and affluent residents to the neighborhoods… Gentrification uproots lower income residents, forcing them to seek affordable housing in other neighborhoods. This 'displacement' process imposes inequitable burdens on those least able to bear them" (MacDonald 1983, pp. 957-9).

Local activists speculated that condo conversions would lead to gentrification by shifting housing units from rental units to owner-occupancy, thereby raising rents and displacing existing residents. As another law review article hypothesized: "The conversion of apartments to condominiums and cooperatives… depletes the supply of rental units and at the same time causes rental rates to rise in reaction to increased demand for the reduced pool of units… it is class biased, driving out persons with low and moderate incomes." This process is especially common in newly attractive downtown neighborhoods where "developers purchase buildings… displace lower income tenants, and then renovate the units for sale as condominiums to more affluent buyers." (Bryant and McGee, 1983, p. 62-64).

Policies toward condo conversions have remained a flashpoint of local conflict well after the initial wave of conversions in the 1970s and 1980s (Newman, 2008). Individual development projects are often taken to court in large cities like New York, Los Angeles and San Francisco under the current rules (see, e.g., Hughes 2015; Egelko 2018, 2021). For example, activists

objected to two building conversions in Los Angeles in 2017, arguing that the local vacancy rate fell below a crucial threshold that should block the right to convert rental units to condo (Reyes 2017). Over the past year, similar legislation restricting condo conversions in central cities has been proposed and adopted by larger suburbs, including Somerville, MA and Salem, MA in the Boston area and Skokie, IL near Chicago (Kelley, 2022; Luca, 2022; TRD Staff, 2022).

Other local activists and politicians have turned their attention to the construction of new condo developments (Badger, 2020; Chen, 2020; Dougherty, 2020). However, the case against new condo development is harder to make because new construction can also lower rents. New papers by economists and urban planners find that the construction of new market-rate buildings, even in low-income areas, tend to lower local rents, even if they also attract higher-income residents and higher-quality amenities (Li, 2021; Asquith, Mast and Reed, 2021; Pennington 2020).

**3. Data**

We compile data on the housing stock, population characteristics, and local regulation pertaining to condominium development for cities and suburbs. We use consistent-boundary Census tract data from the Neighborhood Change Database (NCDB) to measure housing stock and resident characteristics.

For the housing stock, our main outcome of interest is the condo share of housing units, but we also consider the total number of housing units and the share of units that are rented or owner-occupied. The Census Bureau has only publicly released data on the condo share of housing units at the tract level in 1980. We supplement this data with a special tract-level extract prepared for us by the Census Bureau with information on the condo share of housing units in 2010. To

ensure consistency across years, we define the condo share as the share of housing units made up of owner-occupied condominiums in both 1980 and 2010.[3] For resident characteristics, we focus on mean household income, share Black, share with a BA degree or above and share below the poverty line.

We expect that the local regulations will have a larger effect on multi-family units, which are more conducive to condo conversion. We define three subsets of Census tracts more "at risk" of condo development: tracts that, at baseline, had an above median share of units that are single-family attached (e.g., town houses); in buildings with 2-4 units (duplexes etc.); or in buildings with 5+ units.

To ensure greater consistency between central city and suburban tracts, we also create subsamples of neighborhoods that are close to a city-suburban border. First, we calculate the distance between each city tract and the closest suburban tracts in the same metro area, and vice versa. Then, we create subsamples of city/suburban tracts by percentile in the distance distribution, focusing on tracts that are in the $25^{h}$ percentile of distance (around one mile from the nearest cross-border tract) or in the $10^{th}$ percentile of distance (around half a mile from the nearest cross-border tract).

We collected archival data on municipal ordinances that govern aspects of the condo development process passed between 1970 and 2015 for the 100 largest cities. We reviewed the municipal codes of these cities, searching for the word "condominium" in the municipal code and identifying any local laws restricting condominium construction or conversion. We also searched the Proquest Historical Newspapers$^{TM}$ website for "condominium" and "ordinance" together with each city name to identify any earlier ordinances that could have been enacted and subsequently repealed. Once condominium provisions were identified, we used the name of the ordinance to

obtain the original regulation from online city records or to search through Proquest to identify the dates on which the ordinance was passed or amended.

We discovered that municipal ordinances pertaining to condo development focus on the *conversion* of existing rental housing stock to condominium ownership, not the construction of new condominium buildings, a process that has been far less regulated. Our reading of the municipal codes suggests that suburban towns rarely – if ever – passed restrictive condo ordinances, perhaps because few suburban towns had large quantities of relevant multi-family rental housing stock in 1970. If some inner-ring suburbs did pass relevant ordinances (and if such passage is correlated with the legislative activity of the neighboring city), our triple-difference estimates will be biased against finding an effect of regulation on the condo share of the housing stock.

We use the text of the municipal codes to construct an index of regulation severity ranging from 1 to 3 (see **Appendix B** for details and **Table B.1** for a typology of regulations included in each ordinance). The regulations serve as barriers to development so, for our main analysis, we categorize any municipality with an ordinance score of one or higher as having passed an ordinance.

Although we collected condo regulations for 100 cities, our sample contains only 72 metropolitan areas because many metro areas are anchored by multiple cities (e.g., San Francisco-Oakland, CA). Of the 72 metro areas in our analysis sample, 22 areas are anchored by central cities that passed an ordinance regulating the conversion of rental buildings into condos, and 50 areas are not. **Table A.1** reports metropolitan areas with and without a condo regulation; and, in **Table A.2**, among areas that enacted regulations, the associated dates of passage, and our assessment of regulation severity. Nine of the 22 regulated areas passed the relevant ordinance before 1980; these

are marked with an asterisk. We exclude these areas from our main analysis because we do not have information on the condo share of the housing stock before the regulation passed (our tract-level condo data begins in 1980). Thus, for our main results, we consider the 13 areas that passed a regulation in or after 1980 as 'treated' and the remaining 50 areas as 'control.'[4]

**Table 1** presents summary statistics for city and suburban Census tracts in our sample in 1980 and 2010, weighted by the number of households in the tract to reflect the average city and suburban household. In cities, the condo share of housing units increased from 1.6 percent in 1980 to 13.8 percent in 2010. The condo share also increased in suburbs, reaching 10.7 percent by 2010. Various aspects of the data suggest that condo units in cities are more likely to be conversions from previous rental stock, rather than new construction.[5] As we would expect, the city residents in our sample are lower SES and have a higher Black population share than the suburban residents throughout this period. The share of household heads (25 years or older) holding a BA degree is similar in both cities and suburbs, rising from around 18 percent in 1980 to 32 percent in 2010.

The condo share of the housing stock varies substantially across central cities, ranging from 2 percent in Fresno to 15 percent in Atlanta (see **Figure A.1**). Cities with a condo ordinance tend to be larger, more coastal and have higher housing prices today – including Boston, New York City, Philadelphia and Washington, DC on the East Coast; and Seattle, San Francisco and Los Angeles on the West Coast. Cities in the Midwest and the South were less likely to pass these regulations (see **Figure A.2**).[6]

## 4. The relationship between condo development and gentrification

We start by estimating the observational correlation between the condo share of housing units in a neighborhood and resident characteristics by OLS. We stack tract data from two decades – 1980 and 2010 – and estimate regressions of the following form:

$$y_{ijmt} = \alpha_i + \beta condo_{ijmt} + \delta_{mt} + \varepsilon_{ijmt} \qquad (1)$$

where *i* is an index of tracts in either the central city or suburb (*j* = jurisdiction type) of metropolitan area *m* in decade *t*. Let $condo_{ijmt}$ be the share of housing units in the tract that are condominiums. We consider the relationship between the condo share and a series of outcome variables ($y_{ijmt}$).

**Table 2** documents that Census tracts with more condo units also have higher SES residents. Column 1 begins with a simple cross-sectional version of equation (1) that does not include any location or time fixed effects. Panel A shows that, in the full housing stock, Census tracts with an additional 10 percentage points of condo share also have residents with higher mean household income (by 5 percent), higher share with at least a BA degree (4.3 percentage points), and lower Black share (by 0.8 percentage point). If we focus on a subsample of Census tracts that have a higher share multi-family and thus are more conducive to condo conversion, correlations are even stronger (Panel B).

We then estimate increasingly saturated versions of the model, first by adding a metropolitan area fixed effect ($\alpha_m$) and a decade fixed effect ($\delta_t$) (column 2); then by allowing each metropolitan area to have a decadal trend ($\delta_{mt}$) (column 3); and finally by replacing the metropolitan area fixed effect with a tract-specific fixed effect ($\alpha_i$), leveraging changes in the condo share within a tract over time (column 4). The metropolitan area-by-decade fixed effect ($\delta_{mt}$) captures any regional trends that are shared between the central city and suburbs of the same metropolitan area (e.g., a growing or declining industrial base that could attract certain residents to the local labor market).

The association between condo share of the housing stock and resident attributes attenuates substantially when controlling for metropolitan area trends or when considering changes in neighborhood housing stock over time. Comparing column 1 to either column 3 (metro trends) or column 4 (tract fixed effects), the coefficients are cut in half or more for most outcomes. The one exception is the relationship between condo share and percent Black when including only metro trends. Column 5 combines tract fixed effects and metro area trends. In this case, the relationships disappear entirely in the full housing stock and drop by at least 60 percent in the multi-family sample.

The sensitivity of the correlation is our first clue that the relationship between the condo share and resident attributes is likely not causal. Instead, we suspect that the correlation is driven by reverse causality. If high income residents prefer condos to rental units, developers may anticipate larger profits and thus, be more willing to undertake condo conversion projects in cities that are attractive to high-income residents for other reasons.

To consider this possibility we turn to variation in the condo share induced by municipal regulation. We start by documenting the association between the passage of restrictive municipal regulations and the condo share of the local housing stock. We then turn to the relationship between the passage of a restrictive ordinance and resident characteristics. As before, we stack tract data for two Census years ($t$ = 1980 and 2010) and estimate:

$$condo_{ijmt} = \alpha_i' + \pi_1 ORD_m \; x \; POST_t \; x \; CITY_j + \delta_{mt}' + \theta_{jt}' + \nu_{ijmt} \qquad (2)$$

The condo share of housing units in tract $i$ is now our outcome of interest ($condo_{ijmt}$). The main right-hand side variable is an interaction between three indicator variables: $ORD_m$ is equal to one for any tract in a metropolitan area anchored by a central city that passed a restrictive ordinance and zero otherwise; $POST_t$ is equal to one after the passage of restrictive legislation (2010) and

zero beforehand (1980); and $CITY_j$ is equal to one for any tract in a central city – regardless of whether that city passed an ordinance or not – and zero for all suburban tracts. Ordinances are only in place when the triple interaction is turned on: that is, in the central city ($CITY_j = 1$) of a metropolitan area in which an ordinance was passed ($ORD_m = 1$) after the ordinance passes ($POST_t = 1$). Note that all main effects and double interaction terms are absorbed into the fixed effects in equation (2), including metropolitan-wide trends in areas that pass an ordinance ($\delta'_{mt}$) and trends common to all central cities over time ($\theta'_{jt}$).[7]

In essence, this specification compares the evolution of the city-suburban gap in condo development over time in two types of metropolitan areas: those in which the central city passed restrictive regulations against condo conversion and those in which the central city did not. We expect that, after the passage of a restrictive ordinance, the city-suburban gap in the condo share of the housing stock will narrow in metropolitan areas anchored by a central city that regulates condo development ($\pi_1 < 0$).

The identifying assumption underlying this analysis is that the city-suburban gap in housing market attributes in areas that pass condo regulations would have evolved similarly to the gap in other metropolitan areas if not for the differences in local regulation. This assumption may not hold if, for example, suburban sprawl and the rise of exurbs was a more prominent part of metropolitan development in Sunbelt areas that were also less likely to pass condo regulations. We can minimize this concern by narrowing our attention to a sample of census tracts adjacent to city-suburban borders, focusing on inner-ring suburbs that are more similar to city neighborhoods and are less likely to differ across locations. To do so, we also estimate equation (2) using tracts that are near the city-suburban border using an increasingly narrow set of comparisons (specifically,

the 10th and 25th percentiles of the distance distribution), after verifying that various attributes of residents are more similar near city-suburb municipal borders (see **Appendix C** and **Table C.1**).

**Table 3** presents estimates of equation (2) for our triple-difference specification (full city-suburb and for subsamples more proximate to the border) relating the passage of local ordinances with the condo share of the housing stock (column 1). In the full housing stock, the passage of a restrictive ordinance is associated with a 2 percentage-point decline in the condo share of housing units (**Table 3, Panel A**). The effect is even larger and more statistically precise – a decline of 5 percentage points in the condo share – in tracts with above-median share of multi-family dwellings which are more conducive to condo conversion. In 2010, 10 percent of housing units in these tracts were condominiums, suggesting that restrictive ordinances lower the condo share by 50 percent. We continue to find a strong effect of restrictive condo ordinances on the condo share of the housing stock in sub-samples of tracts that are within one mile or half a mile of the border, particularly in neighborhoods with above median presence of multi-family units.

A further consequence of ordinances restricting condo conversions is that the share of units that are renter occupied increases, particularly in neighborhoods with a high share of multi-family units (**Table 3, Panel B**). Moreover, restrictions on condo development do not appear to increase the number of units in the housing stock. Although the passage of restrictive ordinances is associated with a rise in housing units in the city as a whole, this relationship disappears in samples closer to the city-suburban border. Thus, the regulations in question appear to shift the housing stock away from condo development and toward rental occupancy without encouraging a net increase in housing availability.

We find that restrictive ordinances lower the condo share of the housing stock, particularly in neighborhoods conducive to condo conversions. Thus, *if* condo development accelerated

gentrification, and given that conversion laws lower the condo share of the local housing stock, we would expect to find *fewer* high-income residents in cities that passed a restrictive ordinance. **Table 4** presents estimates of the presence of a restrictive condo ordinance on various measures of resident characteristics. We report coefficients on the triple interaction from equation (2), replacing the dependent variable with various measures of resident attributes. If anything we find that restrictive condo regulation affects resident attributes in the opposite direction to the standard narrative about gentrification. That is, areas that pass restrictive regulation have lower (rather than higher) poverty rates and black population shares, even though these relationships are not statistically significant. Residents in areas with restrictive condo regulations also have a higher mean income, even in the most conducive neighborhoods for condo conversions (panel B). The one relationship that goes in the "right" direction to support the gentrification claim is share with a BA: as the condo share of the housing stock declines, so too does the share of the population with a BA (but this relationship is not statistically significant and is small in magnitude).

**Appendix D** considers alternate specifications of the relationship between local regulation and aspects of the housing stock and population. In each case, we continue to find that restrictive ordinances were effective in shifting development away from condominiums, but this shift did not forestall gentrification.

## 5. Concluding Remarks

In recent years, some central city neighborhoods reversed decades of population decline, a phenomenon known as gentrification. Using census data and newly collected information on conversion ordinances, this paper considers – and ultimately rejects – a plausible supply side

explanation for gentrification: the diffusion of condominiums, which enabled higher-income households to own and occupy multi-family units in the urban core.

Overall, the empirical patterns provide little evidence that condo development leads to gentrification. First, the positive association between condo development and resident SES in the cross section dissipates when we look at changes in the condo share of the housing stock over time. Second, although local regulation of condo conversions were effective in reducing the condo share of the housing stock, these regulations do not affect the poverty rate, education levels or the Black share of the population. If anything, restricting condo development appears to attract higher-income residents, rather than the other way around.

Taken together, our results suggest that correlations between condo development and resident SES are driven by reverse causality, whereby developers choose to convert rental units into condo buildings in areas with pre-existing concentrations of well-to-do residents. The condominium form itself and the resulting ability of urban households to owner-occupy *per se* does not seem disproportionately to have attracted high-income households to central cities.

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[1] Before the condominium form emerged in the United States, the only way to participate in joint ownership of a multi-family dwelling was through informal partnership or housing cooperatives. Apart from the New York metropolitan area, Chicago (to a lesser extent) and a few other scattered locations, housing cooperatives were (and still are) very uncommon in the United States (Lasner, 2012).

[2] The origins of the condominium form date to twelfth century Germanic towns, before spreading elsewhere. The form was codified in the (original) Napoleonic code in France in 1806, which influenced other European countries and Latin America. The statutory basis for condominium development in civil law countries was strengthened by the passage of enabling legislation in the 1920s.

[3] In 1990, the first year that a question about condo status was asked for all housing units, 62.7 percent of condo units were owner-occupied. Note that data on condo status is available from the Census micro data on IPUMS from 1970 but is only available from previously published sources at the tract level in 1980. We cannot incorporate the micro data in 1970 into our analysis because city status (city versus suburb) is not available in that year.

[4] As a robustness check, we reincorporate the nine areas into the analysis and find similar main results; see **Table D.3**.

[5] First, as of 1980, cities had more multi-family housing units conducive to conversion (59 percent of city units compared with 33 percent in suburban units). Second, any condo unit in a building that was built before 1970 is almost certainly a condo conversion, given that the condominium legal form was first introduced in the 1960s. As of 2010, Census data suggests that 41 percent of condo units in central cities but only 13 percent of condo units in suburbs were built before 1970 and thus can be considered probable conversions.

[6] Some of the variation in condo share across metro areas is due to differences in the stock of multi-family dwellings, which are more conducive to condo conversion, but geographic variation in the condo share is still substantial even after controlling for this factor (compare **Panels A and B, Figure A.1**). Local political considerations can help to explain differences in the presence of condo ordinances across locations. Regulation often arose out of tenants' rights movements in the 1970s, which formed in areas where there was a substantial rental population at baseline *and* a rising demand for condo development.

[7] The tract fixed effects $\alpha_i'$ absorb the main effects of $CITY_j$ and $ORD_m$, as well as the double interaction between $CITY_j$ and $ORD_m$. The metropolitan area by decade fixed effects $\delta_{mt}'$ absorb the main effect $POST_t$ and the double interaction between $POST_t$ and $ORD_m$. This double interaction captures the fact that metropolitan areas anchored by a central city that passed a restrictive ordinance may follow different trends – for example, if they are more likely to implement other housing supply restrictions or if they are home to growing industries with highly-educated workers. The jurisdiction type by decade fixed effect $\theta_{jt}'$ absorbs the double interaction between $POST_t$ and $CITY_j$ This double interaction allows for central cities to follow a different trend than suburbs– for example, if there are general forces like improving urban amenities that attract high-income residents to downtown areas.

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Table 1: Trends in Housing Stock and Resident Attributes, Central Cities and Suburbs, 1980-2010

| | 1980 | 2010 |
|---|---|---|
| *Panel A: Central City Tracts* | (1) | (2) |
| Share Condo and Owner Occupied | 0.016 | 0.138 |
| Share Multi-Family | 0.589 | 0.559 |
| Ln Mean Household Income | 10.735 | 10.995 |
| Poverty Rate | 0.166 | 0.182 |
| Share Black | 0.235 | 0.251 |
| Share BA or More | 0.183 | 0.320 |
| *Panel B: Suburb Tracts* | | |
| Share Condo and Owner Occupied | 0.026 | 0.107 |
| Share Multi-Family | 0.330 | 0.322 |
| Ln Mean Household Income | 10.931 | 11.236 |
| Poverty Rate | 0.083 | 0.101 |
| Share Black | 0.075 | 0.123 |
| Share BA or More | 0.189 | 0.323 |

Notes: This table reports means of tract characteristics for central city tracts in Panel A and suburb tracts in Panel B. Column 1 reports means for 1980 and Column 2 reports means for 2010. The sample contains contain tracts from metro areas that contain the one-hundred largest cities by population. All means are weighted using the number of households.

Table 2: Relationship Between Resident Characteristics and Condo Share

Reported Coefficients on Condo Share

| *Panel A: Full Housing Stock* | (1) | (2) | (3) | (4) | (5) |
|---|---|---|---|---|---|
| Ln Mean Household Income | 0.506*** | 0.204*** | 0.168*** | 0.130 | 0.025 |
| | (0.110) | (0.056) | (0.049) | (0.105) | (0.088) |
| | [11.098] | [11.098] | [11.098] | [11.098] | [11.098] |
| Poverty Rate | −0.011 | −0.046*** | −0.038*** | −0.035** | −0.013 |
| | (0.012) | (0.012) | (0.014) | (0.015) | (0.012) |
| | [0.146] | [0.146] | [0.146] | [0.146] | [0.146] |
| Share BA or More | 0.426*** | 0.344*** | 0.340*** | 0.166*** | 0.141*** |
| | (0.067) | (0.039) | (0.036) | (0.027) | (0.021) |
| | [0.292] | [0.292] | [0.292] | [0.292] | [0.292] |
| Share Black | −0.082*** | −0.162*** | −0.160*** | −0.020 | −0.004 |
| | (0.023) | (0.029) | (0.033) | (0.024) | (0.033) |
| | [0.179] | [0.179] | [0.179] | [0.179] | [0.179] |
| Observations | 57,588 | 57,588 | 57,588 | 57,588 | 57,588 |
| *Panel B: Share 2-4 Units Above Median* | | | | | |
| Ln Mean Household Income | 0.726*** | 0.464*** | 0.426*** | 0.279*** | 0.166** |
| | (0.089) | (0.062) | (0.058) | (0.072) | (0.071) |
| | [10.977] | [10.977] | [10.977] | [10.977] | [10.977] |
| Poverty Rate | −0.068*** | −0.120*** | −0.113*** | −0.068*** | −0.045*** |
| | (0.014) | (0.019) | (0.019) | (0.014) | (0.013) |
| | [0.183] | [0.183] | [0.183] | [0.183] | [0.183] |
| Share BA or More | 0.470*** | 0.391*** | 0.390*** | 0.204*** | 0.187*** |
| | (0.052) | (0.031) | (0.031) | (0.026) | (0.024) |
| | [0.268] | [0.268] | [0.268] | [0.268] | [0.268] |
| Share Black | −0.212*** | −0.289*** | −0.282*** | −0.035 | −0.002 |
| | (0.031) | (0.041) | (0.047) | (0.029) | (0.046) |
| | [0.227] | [0.227] | [0.227] | [0.227] | [0.227] |
| Observations | 28,796 | 28,796 | 28,796 | 28,796 | 28,796 |
| Metro FE | No | Yes | No | No | No |
| Year FE | No | Yes | No | Yes | No |
| Tract FE | No | No | No | Yes | Yes |
| Metro x Year FE | No | No | Yes | No | Yes |

Notes: This table reports ordinary least squares results from regressing the listed outcome in each row on share condo and owner occupied and the listed fixed effects. Each point estimate is from a separate regression and we report the coefficient and standard error on share condo. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table 3: Relationship Between Housing Characteristics and Condo Conversion Ordinances

Reported Coefficients on the Triple Interaction of Ordinance × Post × City

| | Dependent Variable | | |
|---|---|---|---|
| | Share Condo and Owner-Occ. | Share Renter-Occ. | Ln Total Housing Units |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) |
| All Tracts | −0.020* | −0.001 | 0.210* |
| *(N = 57,588)* | (0.012) | (0.012) | (0.105) |
| | [0.091] | [0.331] | [7.369] |
| Within 25th Percentile Distance | −0.015 | 0.014 | 0.055 |
| *(N = 14,398)* | (0.014) | (0.010) | (0.070) |
| | [0.097] | [0.391] | [7.339] |
| Within 10th Percentile Distance | −0.021* | 0.008 | −0.033 |
| *(N = 5,758)* | (0.013) | (0.011) | (0.075) |
| | [0.093] | [0.395] | [7.324] |
| *Panel B: Share 2-4 Units Above Median* | | | |
| All Tracts | −0.054*** | 0.024** | 0.241*** |
| *(N = 28,796)* | (0.010) | (0.012) | (0.089) |
| | [0.096] | [0.412] | [7.317] |
| Within 25th Percentile Distance | −0.045*** | 0.031*** | 0.098 |
| *(N = 8,522)* | (0.015) | (0.011) | (0.064) |
| | [0.098] | [0.442] | [7.278] |
| Within 10th Percentile Distance | −0.043* | 0.028 | 0.026 |
| *(N = 3,694)* | (0.023) | (0.017) | (0.075) |
| | [0.094] | [0.434] | [7.282] |
| Tract FE | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect characteristics of the housing stock using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table 4: Relationship Between Resident Characteristics and Condo Conversion Ordinances

Reported Coefficients on the Triple Interaction of Ordinance × Post × City,
Ordinances Restrict Condo Conversions and Reduce Condo Share

| | Dependent Variable | | | |
|---|---|---|---|---|
| | Ln Mean HH Income | Poverty Rate | Share Black | Share BA or More |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) | (4) |
| All Tracts | 0.121*** | −0.033** | −0.036 | 0.006 |
| *(N = 57,588)* | (0.045) | (0.014) | (0.027) | (0.013) |
| | [11.098] | [0.146] | [0.179] | [0.292] |
| Within 25th Percentile Distance | 0.122** | −0.011 | −0.034 | 0.001 |
| *(N = 14,398)* | (0.051) | (0.011) | (0.025) | (0.014) |
| | [11.018] | [0.174] | [0.241] | [0.297] |
| Within 10th Percentile Distance | 0.103** | −0.010 | −0.024 | −0.006 |
| *(N = 5,758)* | (0.044) | (0.010) | (0.033) | (0.015) |
| | [11.009] | [0.170] | [0.248] | [0.292] |
| *Panel B: Share 2-4 Units Above Median* | | | | |
| All Tracts | 0.110** | −0.024** | −0.032 | −0.013 |
| *(N = 28,796)* | (0.046) | (0.012) | (0.033) | (0.013) |
| | [10.977] | [0.183] | [0.227] | [0.268] |
| Within 25th Percentile Distance | 0.104* | −0.012 | −0.034 | −0.013 |
| *(N = 8,522)* | (0.055) | (0.012) | (0.041) | (0.017) |
| | [10.912] | [0.203] | [0.279] | [0.272] |
| Within 10th Percentile Distance | 0.087 | −0.014 | −0.030 | −0.017 |
| *(N = 3,694)* | (0.063) | (0.014) | (0.044) | (0.019) |
| | [10.933] | [0.191] | [0.280] | [0.275] |
| Tract FE | Yes | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect resident characteristics using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

## Appendix A: Additional Figures and Tables

This appendix provides additional tables and figures that supplement the main text exhibits. These are displayed in order of reference in the main text.

Table A.1: List of Metropolitan Areas by Passage of Restrictive Condo Ordinance

| Passed Ordinance (Treatment Areas) | Did Not Pass Ordinance (Control Areas) |
|---|---|
| (1) | (2) |
| Baltimore-Columbia-Towson, MD | Albuquerque, NM |
| Boston-Cambridge-Newton, MA-NH* | Anchorage, AK |
| Chicago-Naperville-Elgin, IL-IN-WI* | Atlanta-Sandy Springs-Roswell, GA |
| Detroit-Warren-Dearborn, MI | Austin-Round Rock, TX |
| Fresno, CA | Bakersfield, CA |
| Indianapolis-Carmel-Anderson, IN* | Baton Rouge, LA |
| Lincoln, NE | Birmingham-Hoover, AL |
| Los Angeles-Long Beach-Anaheim, CA | Buffalo-Cheektowaga-Niagara Falls, NY |
| Minneapolis-St. Paul-Bloomington, MN-WI* | Charlotte-Concord-Gastonia, NC-SC |
| New York-Newark-Jersey City, NY-NJ-PA | Cincinnati, OH-KY-IN |
| Philadelphia-Camden-Wilmington, PA-NJ-DE-MD* | Cleveland-Elyria, OH |
| Portland-Vancouver-Hillsboro, OR-WA | Colorado Springs, CO |
| Reno, NV | Columbus, OH |
| Riverside-San Bernardino-Ontario, CA | Corpus Christi, TX |
| Sacramento-Roseville-Arden-Arcade, CA | Dallas-Fort Worth-Arlington, TX |
| San Diego-Carlsbad, CA* | Denver-Aurora-Lakewood, CO |
| San Francisco-Oakland-Hayward, CA* | Durham-Chapel Hill, NC |
| San Jose-Sunnyvale-Santa Clara, CA | El Paso, TX |
| Seattle-Tacoma-Bellevue, WA* | Fort Wayne, IN |
| Stockton-Lodi, CA | Greensboro-High Point, NC |
| Tucson, AZ | Houston-The Woodlands-Sugar Land, TX |
| Washington-Arlington-Alexandria, DC-VA-MD-WV* | Jacksonville, FL |
| | Kansas City, MO-KS |
| | Laredo, TX |
| | Las Vegas-Henderson-Paradise, NV |
| | Lexington-Fayette, KY |
| | Louisville/Jefferson County, KY-IN |
| | Lubbock, TX |
| | Madison, WI |
| | Memphis, TN-MS-AR |
| | Miami-Fort Lauderdale-West Palm Beach, FL |
| | Milwaukee-Waukesha-West Allis, WI |
| | Nashville-Davidson-Murfreesboro-Franklin, TN |
| | New Orleans-Metairie, LA |
| | Oklahoma City, OK |
| | Omaha-Council Bluffs, NE-IA |
| | Orlando-Kissimmee-Sanford, FL |
| | Phoenix-Mesa-Scottsdale, AZ |
| | Pittsburgh, PA |
| | Raleigh, NC |
| | Rochester, NY |
| | San Antonio-New Braunfels, TX |
| | Spokane-Spokane Valley, WA |
| | St. Louis, MO-IL |
| | Tampa-St. Petersburg-Clearwater, FL |
| | Toledo, OH |
| | Tulsa, OK |
| | Virginia Beach-Norfolk-Newport News, VA-NC |
| | Wichita, KS |
| | Winston-Salem, NC |

Notes: This table lists the treatment and control metro areas in the estimation sample that contain the one-hundred largest cities by population. Column 1 lists all metro areas that passed an ordinance restricting condo conversion and Column 2 lists all metro areas that did not pass an ordinance restricting condo conversion. Asterisks denote metro areas that passed an ordinance in the 1970s and are dropped from the primary analysis sample.

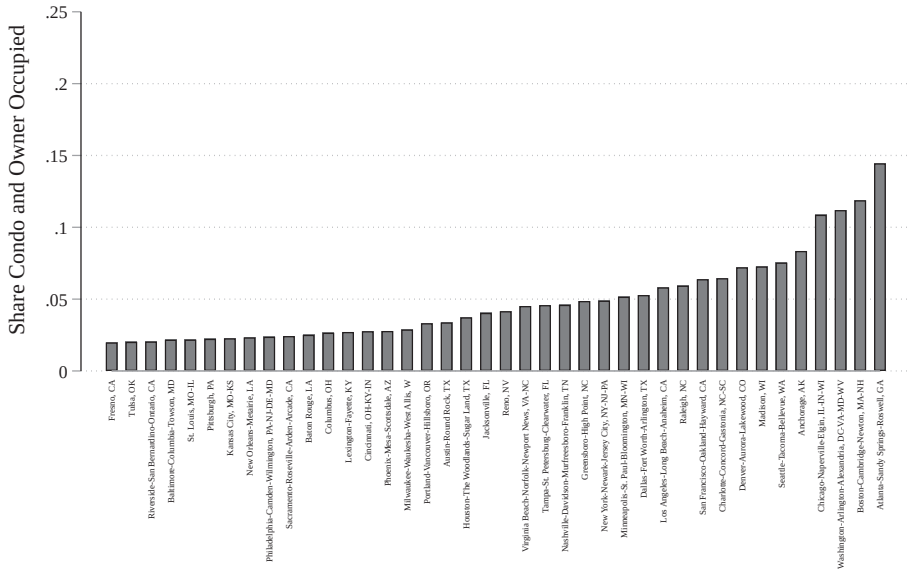
Table A.2: List of Metropolitan Areas which Passed Restrictive Condo Ordinance Along with Passage Year and Ordinance Severity

| | Passage Year | Ordinance Severity |
|---|---|---|
| | (1) | (2) |
| Baltimore-Columbia-Towson, MD | 1983 | 2 |
| Boston-Cambridge-Newton, MA-NH | 1979 | 2 |
| Chicago-Naperville-Elgin, IL-IN-WI | 1977 | 3 |
| Detroit-Warren-Dearborn, MI | 1980 | 3 |
| Fresno, CA | 1980 | 3 |
| Indianapolis-Carmel-Anderson, IN | 1975 | 1 |
| Lincoln, NE | 1980 | 1 |
| Los Angeles-Long Beach-Anaheim, CA | 1980 | 2 |
| Minneapolis-St. Paul-Bloomington, MN-WI | 1979 | 1 |
| New York-Newark-Jersey City, NY-NJ-PA | 1982 | 3 |
| Philadelphia-Camden-Wilmington, PA-NJ-DE-MD | 1979 | 3 |
| Portland-Vancouver-Hillsboro, OR-WA | 1980 | 2 |
| Reno, NV | 1980 | 3 |
| Riverside-San Bernardino-Ontario, CA | 2007 | 2 |
| Sacramento–Roseville–Arden-Arcade, CA | 1980 | 3 |
| San Diego-Carlsbad, CA | 1979 | 2 |
| San Francisco-Oakland-Hayward, CA | 1979 | 3 |
| San Jose-Sunnyvale-Santa Clara, CA | 2000 | 2 |
| Seattle-Tacoma-Bellevue, WA | 1978 | 2 |
| Stockton-Lodi, CA | 2009 | 2 |
| Tucson, AZ | 1995 | 2 |
| Washington-Arlington-Alexandria, DC-VA-MD-WV | 1976 | 3 |

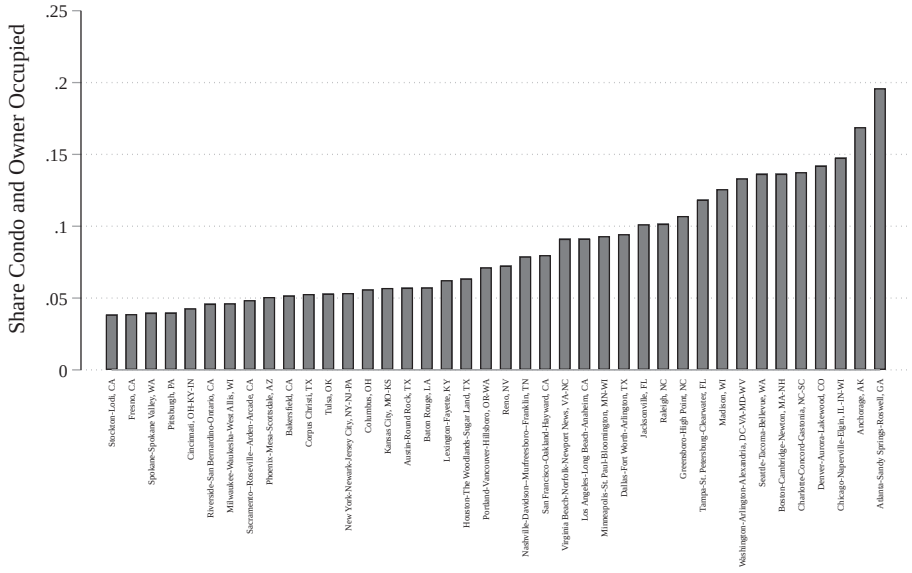
Notes: This table lists the metro areas that passed an ordinance limiting condominium conversions between 1970 and 2010, along with the passage year and the severity of the ordinance. See Appendix Table B.1 for additional details on the procedure used to code ordinance severity.

Figure A.1: Condo Share of the Housing Stock in Central Cities, 2010

Panel A: All Building Types

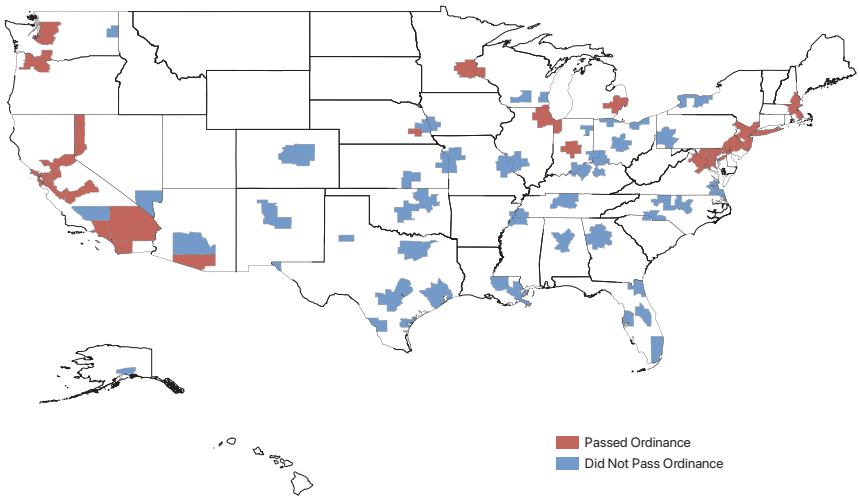



Panel B: Multi-Family Buildings




Note: This figure reports share condo and owner occupied in central cities from the estimation sample that we identify in the 3-year 2011 American Community Survey. Panel A reports the forty metro areas with the greatest condo share including all building types. Panel B reports the forty metro areas with the greatest condo share in multi-family buildings.

Figure A.2: Map of Metropolitan Areas in Sample by Passage of Restrictive Condo Ordinance




Notes: This figure displays the metro areas which passed and did not pass ordinances which limited condominium conversions between 1970 and 2010. Red shaded metro areas passed an ordinance which limited condominium conversions between 1970 and 2010. Blue shaded metro areas did not pass an ordinance in the same time period.

## Appendix B: Index of Regulation Severity

The municipal codes contain a substantial amount of detail about each regulation governing the conversion of dwelling units to condominiums, which we use to construct an index of regulation severity. The construction of the index is best illustrated by example, for which purpose we use the Detroit (MI) municipal code.

Detroit's code contains several restrictive provisions. First, prior to the transfer of title of any building containing four or more residential units for the purpose of a condominium conversion, the owner is required to offer the tenants of a majority of the rental units a joint right to match any third-party developer's offer of purchase (Detroit Municipal Code § 26-6-4, 2017). Second, the ordinance allows senior citizens residing in subsidized or otherwise low-rent apartments to execute a lifetime lease for their unit, with limited rent increases (Detroit Municipal Code § 26-6-5, 2017). Third, the ordinance also requires owners to provide the mayor, the city planning commission, and each tenant with 120 days notice of the intent to convert apartments to condominium ownership, prohibits evictions without cause during the notice period, and grants the tenants a 60-day right of first refusal to purchase their dwelling units as condominium estates (Detroit Municipal Code §§ 26-6-6, 26-6-7, 26-6-10, 2017). Finally, the regulation requires relocation assistance payments equal to one month's rent to be paid to any tenant of a subsidized or otherwise low-rent apartment (Detroit Municipal Code §§ 26-6-11, 2017). The notes to the code indicate that these provisions were enacted by Ordinance 400-H of 1980. Archives of the Detroit Free Press confirm that the ordinance was approved 4-1 by the Detroit City Council on July 30, 1980. Mayor Young vetoed the ordinance, objecting that, "A potential investor might go to a city that does not have such an ordinance," but the council voted 9-0 to override the veto on August 7 (Jackson 1980a; Jackson 1980b).

**Table B.1** provides a typology of the regulations included in each ordinance. As noted in the text, the ordinance severity for each city that enacted one can be found in Table A.2. Ordinances that include time frames and requirements for tenant notification of condominium conversions or offer tenants the right of first refusal are classified as a "1." Ordinances that went further to require tenant relocation assistance or tenant relocation payments are classified as a "2." Ordinances that impose a cap on the number of permissible annual condominium conversions, establish a minimum city-wide rental vacancy rate before conversions were permitted, grant some categories of tenants' lifetime leases, require the replacement of low-income rentals elsewhere, or require tenant approval for condominium conversion are classified as a "3." The regulations serve as barriers to development so, for our main analysis, we categorize any municipality with an ordinance score of one or higher as having passed an ordinance. As robustness, we consider differences by regulation intensity (see **Table D.2**).

Table B.1: Coding of Restrictive Condo Ordinance Severity

| | Law Severity | | |
|---|---|---|---|
| | 1 | 2 | 3 |
| | (1) | (2) | (3) |
| Vacancy Rate Minimum | | | X |
| Replacement of Low-Income Housing | | | X |
| Tenant Approval Required | | | X |
| Lifetime Lease | | | X |
| Annual Conversion Cap | | | X |
| Owner Occupancy Requirement | | X | X |
| Tenant Assistance/Relocation Payments | | X | X |
| Right of First Refusal | X | X | X |
| Notice of Conversion | X | X | X |
| FD/BC/Warranties/Right to Cancel | X | X | X |

Notes: This table provides additional details on the procedure used to grade condo ordinance severity.

## Appendix B References

Jackson, L., 1980a. Council OKs law to regulate condo switches, Detroit Free Press, July 31, B section, 4.

Jackson, L., 1980b. Council OKs GM loan plan, Detroit Free Press, August 7, C section, 8.

## Appendix C: City-Suburb Comparison

We verify our conjecture that city-suburban neighborhoods are more similar near municipal borders in **Table C.1**.

We regress various attributes of neighborhood residents at baseline (in 1980) on an indicator for being in the central city for the full sample of tracts and for tracts that are increasingly closer to the municipal border:

$$y_{ijm} = \sigma_m + \rho city_j + \lambda distance_{ijm} + \tau city_j \times distance_{ijm} + \phi_{ijm} \tag{C.1}$$

The regression also controls for distance to the city border interacted with the central city indicator. Our main coefficient of interest is $\rho$, which captures the mean differences in the resident attributes of interest between city and suburban tracts controlling for distance to the border.

Both for the full housing stock (Panel A) and for neighborhoods with above median multi-family dwellings (Panel B), the clear differences between city and suburban residents in income and race disappear at the border. For example, the 15 log-point gap in income (row 1) falls to a 2 log-point gap (not statistically significant) in a sample of tracts closer to the border (rows 2 and 3). The same is true to the 15 percentage-point gap in Black population share and the 6 percentage point gap in poverty in the full sample also disappear when considering a sample of tracts close to the border. The one counter-example is share of the population with a BA. Although there is no difference between city and suburban residents in this measure in the full sample in 1980, a 4 percentage-point gap emerges *at the border itself*, which may be due to cross-border differences in public school districts.

Table C.1: Differences in Resident Characteristics Between City and Suburb Tracts, 1980

Reported Coefficients on an Indicator for City Status

| | Dependent Variable | | | |
|---|---|---|---|---|
| | Ln Mean HH Income | Poverty Rate | Share Black | Share BA or More |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) | (4) |
| All Tracts | −0.153*** | 0.064*** | 0.151*** | 0.006 |
| *(N = 28,794)* | (0.044) | (0.012) | (0.032) | (0.014) |
| *(Mean Distance (mi.) = 4.6)* | [10.862] | [0.111] | [0.119] | [0.176] |
| Within 25th Percentile Distance | 0.021 | −0.002 | 0.047** | −0.019* |
| *(N = 7,199)* | (0.041) | (0.007) | (0.021) | (0.010) |
| *(Mean Distance (mi.) = 0.7)* | [10.855] | [0.119] | [0.160] | [0.191] |
| Within 10th Percentile Distance | 0.108 | 0.007 | 0.032 | −0.047*** |
| *(N = 2,879)* | (0.081) | (0.014) | (0.027) | (0.017) |
| *(Mean Distance (mi.) = 0.4)* | [10.865] | [0.112] | [0.160] | [0.189] |
| *Panel B: Share 2-4 Units Above Median* | | | | |
| All Tracts | −0.118*** | 0.061*** | 0.169*** | −0.003 |
| *(N = 14,398)* | (0.035) | (0.009) | (0.027) | (0.011) |
| *(Mean Distance (mi.) = 4.1)* | [10.747] | [0.143] | [0.169] | [0.157] |
| Within 25th Percentile Distance | 0.022 | −0.006 | 0.042* | −0.025* |
| *(N = 4,261)* | (0.057) | (0.008) | (0.025) | (0.014) |
| *(Mean Distance (mi.) = 0.7)* | [10.735] | [0.148] | [0.205] | [0.162] |
| Within 10th Percentile Distance | 0.092 | −0.012 | −0.030 | −0.038** |
| *(N = 1,847)* | (0.082) | (0.012) | (0.033) | (0.017) |
| *(Mean Distance (mi.) = 0.4)* | [10.777] | [0.135] | [0.201] | [0.163] |
| Metro FE | Yes | Yes | Yes | Yes |

Notes: This table reports tests of whether characteristics differ across city and suburb tracts using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Each row also lists the corresponding number of observations and mean distance to the city/suburb border for each sample. Reported distances are half of the calculated distance from the centroid-to-centroid procedure we use to approximate distance to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the indicator for city status. The regression also includes a linear measure of distance to the border that varies by city/suburb status and metro fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

## Appendix D: Robustness Checks

We consider three alternate specifications of the relationship between local regulation and aspects of the housing stock and population. In each case, we continue to find that restrictive ordinances were effective in shifting development away from condominiums, but this shift did not forestall gentrification.

**Table D.1** weights each Census tract by the number of underlying housing units. We continue to find that restrictive condo ordinances reduce the condo share and raise the renter share of the housing stock in neighborhoods with a high multi-family share at baseline.

**Table D.2** explores the possibility that more onerous regulations had a larger effect on condo development. Indeed, we find that each step on our coding of law severity (ranging from 1-3) results in a 2 percentage-point decline in the condo share of housing units, particularly again in neighborhoods most at risk of condo conversions. We note that this intensive margin specification assumes a linear relationship across ordinance severity levels. We do not have enough variation in the sample to test the importance of specific regulations.

Next, we incorporate the nine metropolitan areas anchored by cities that passed restrictive regulations in the 1970s into the analysis. We include these areas in **Table D.3** as part of the control group, because they always had regulations in the sample period (in both 1980 and 2010), and so they are "always treated." One benefit of doing so is that these areas are larger and more coastal, and so they may serve as better controls for cities that pass ordinances in our sample period. The substantive results do not change.

**Tables D.4** and **D.5** reproduce the full analysis for two alternative definitions of neighborhoods that are conducive to condo conversions: neighborhoods with above median share of units in attached single-family units (townhouses, Table D.4), or neighborhoods with above median share of units in buildings with 5+ units (apartment buildings, Table D.5). We find similar results when defining 'at risk' neighborhoods according to the presence of townhomes: areas with ordinances restricting condo conversion have lower condo shares and higher rental shares in the housing stock yet have no differences in resident attributes. The effect of the condo regulation on the condo share of housing units is present but weaker in areas with above median presence of large apartment buildings.

Table D.1: Relationship Between Housing Characteristics and Condo Conversion Ordinances, Weighting by Total Housing Units

Reported Coefficients on the Triple Interaction of Ordinance × Post × City

| | Dependent Variable | | |
|---|---|---|---|
| | Share Condo and Owner-Occ. | Share Renter-Occ. | Ln Total Housing Units |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) |
| All Tracts | 0.003 | −0.006 | 0.166** |
| *(N = 57,588)* | (0.023) | (0.016) | (0.063) |
| | [0.107] | [0.332] | [7.563] |
| Within 25th Percentile Distance | −0.005 | 0.004 | 0.034 |
| *(N = 14,398)* | (0.028) | (0.015) | (0.046) |
| | [0.119] | [0.403] | [7.538] |
| Within 10th Percentile Distance | −0.015 | −0.009 | −0.035 |
| *(N = 5,758)* | (0.021) | (0.017) | (0.057) |
| | [0.116] | [0.412] | [7.510] |
| *Panel B: Share 2-4 Units Above Median* | | | |
| All Tracts | −0.048*** | 0.023** | 0.144** |
| *(N = 28,796)* | (0.013) | (0.011) | (0.062) |
| | [0.113] | [0.410] | [7.508] |
| Within 25th Percentile Distance | −0.039*** | 0.017 | 0.045 |
| *(N = 8,522)* | (0.014) | (0.011) | (0.046) |
| | [0.120] | [0.452] | [7.463] |
| Within 10th Percentile Distance | −0.038** | 0.007 | −0.015 |
| *(N = 3,694)* | (0.017) | (0.010) | (0.053) |
| | [0.118] | [0.449] | [7.456] |
| Tract FE | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect characteristics of the housing stock using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects, and are weighted using total housing units. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 weighted by total housing units are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table D.2: Relationship Between Housing Characteristics and Condo Conversion Ordinances, Using 0-3 Coding of Ordinance Severity

Reported Coefficients on the Triple Interaction of Ordinance × Post × City

| | Dependent Variable | | |
|---|---|---|---|
| | Share Condo and Owner-Occ. | Share Renter-Occ. | Ln Total Housing Units |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) |
| All Tracts | –0.007 | –0.001 | 0.084** |
| *(N = 57,588)* | (0.005) | (0.005) | (0.039) |
| | [0.091] | [0.331] | [7.369] |
| Within 25th Percentile Distance | –0.005 | 0.005 | 0.014 |
| *(N = 14,398)* | (0.006) | (0.004) | (0.026) |
| | [0.097] | [0.391] | [7.339] |
| Within 10th Percentile Distance | –0.010** | 0.004 | –0.022 |
| *(N = 5,758)* | (0.005) | (0.005) | (0.026) |
| | [0.093] | [0.395] | [7.324] |
| *Panel B: Share 2-4 Units Above Median* | | | |
| All Tracts | –0.020*** | 0.008* | 0.093*** |
| *(N = 28,796)* | (0.004) | (0.005) | (0.030) |
| | [0.096] | [0.412] | [7.317] |
| Within 25th Percentile Distance | –0.020*** | 0.012*** | 0.033 |
| *(N = 8,522)* | (0.005) | (0.004) | (0.026) |
| | [0.098] | [0.442] | [7.278] |
| Within 10th Percentile Distance | –0.022** | 0.013 | 0.004 |
| *(N = 3,694)* | (0.009) | (0.008) | (0.029) |
| | [0.094] | [0.434] | [7.282] |
| Tract FE | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect characteristics of the housing stock using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. We replace the binary ordinance indicator from the main text with a linear measure ranging from zero to three. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table D.3: Relationship Between Housing Characteristics and Condo Conversion Ordinances, Adding 1970s Ordinance Passing Metros as Control Areas

Reported Coefficients on the Triple Interaction of Ordinance × Post × City

| | Dependent Variable | | |
|---|---|---|---|
| | Share Condo and Owner-Occ. | Share Renter-Occ. | Ln Total Housing Units |
| *Panel A: Full Housing Stock* | (1) | (2) | (3) |
| All Tracts | –0.039*** | 0.004 | 0.188* |
| *(N = 75,542)* | (0.014) | (0.012) | (0.097) |
| | [0.103] | [0.328] | [7.376] |
| Within 25th Percentile Distance | –0.015 | 0.005 | 0.045 |
| *(N = 18,886)* | (0.015) | (0.009) | (0.069) |
| | [0.108] | [0.391] | [7.344] |
| Within 10th Percentile Distance | –0.023 | 0.004 | –0.028 |
| *(N = 7,554)* | (0.014) | (0.009) | (0.071) |
| | [0.108] | [0.391] | [7.331] |
| *Panel B: Share 2-4 Units Above Median* | | | |
| All Tracts | –0.070*** | 0.022* | 0.208** |
| *(N = 37,770)* | (0.013) | (0.012) | (0.082) |
| | [0.108] | [0.407] | [7.331] |
| Within 25th Percentile Distance | –0.044*** | 0.015 | 0.087 |
| *(N = 11,442)* | (0.015) | (0.010) | (0.061) |
| | [0.110] | [0.437] | [7.295] |
| Within 10th Percentile Distance | –0.048* | 0.022 | 0.034 |
| *(N = 4,854)* | (0.025) | (0.016) | (0.064) |
| | [0.112] | [0.428] | [7.300] |
| Tract FE | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect characteristics of the housing stock using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. We add to the sample metros that passed an ordinance restricting condominium conversions in the 1970s to the sample and consider them as control areas. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses all tracts and Panel B uses tracts that have an above median concentration of 2-4 unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table D.4: Relationship Between Housing Characteristics and Condo Conversion Ordinances in Additional Neighborhood Subsamples

Reported Coefficients on the Triple Interaction of Ordinance × Post × City

| | Dependent Variable | | |
|---|---|---|---|
| | Share Condo and Owner-Occ. | Share Renter-Occ. | Ln Total Housing Units |
| *Panel A: Share SFA Above Median* | (1) | (2) | (3) |
| All Tracts | −0.056*** | 0.018 | 0.170* |
| *(N = 28,794)* | (0.013) | (0.014) | (0.095) |
| | [0.112] | [0.385] | [7.345] |
| Within 25th Percentile Distance | −0.045** | 0.027* | 0.088 |
| *(N = 8,112)* | (0.022) | (0.014) | (0.074) |
| | [0.105] | [0.430] | [7.311] |
| Within 10th Percentile Distance | −0.029 | 0.024 | 0.017 |
| *(N = 3,322)* | (0.026) | (0.020) | (0.092) |
| | [0.102] | [0.434] | [7.302] |
| *Panel B: Share 5+ Units Above Median* | | | |
| All Tracts | −0.030*** | 0.031*** | 0.198*** |
| *(N = 28,794)* | (0.011) | (0.010) | (0.071) |
| | [0.140] | [0.446] | [7.397] |
| Within 25th Percentile Distance | −0.017 | 0.015 | 0.057 |
| *(N = 8,538)* | (0.025) | (0.011) | (0.071) |
| | [0.141] | [0.478] | [7.388] |
| Within 10th Percentile Distance | −0.029 | −0.002 | −0.030 |
| *(N = 3,472)* | (0.021) | (0.011) | (0.074) |
| | [0.134] | [0.477] | [7.387] |
| Tract FE | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect characteristics of the housing stock using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses tracts that have an above median concentration of single-family attached homes in 1980 and Panel B uses tracts that have an above median concentration of 5-plus unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.

Table D.5: Relationship Between Resident Characteristics and Condo Conversion Ordinances in Additional Neighborhood Subsamples

Reported Coefficients on the Triple Interaction of Ordinance × Post × City,
Ordinances Restrict Condo Conversions and Reduce Condo Share

| | Dependent Variable | | | |
|---|---|---|---|---|
| | Ln Mean HH Income | Poverty Rate | Share Black | Share BA or More |
| *Panel A: Share SFA Above Median* | (1) | (2) | (3) | (4) |
| All Tracts | 0.050 | −0.010 | −0.013 | −0.004 |
| *(N = 28,794)* | (0.038) | (0.011) | (0.034) | (0.014) |
| | [11.029] | [0.167] | [0.208] | [0.284] |
| Within 25$^{th}$ Percentile Distance | 0.001 | 0.004 | −0.008 | −0.016 |
| *(N = 8,112)* | (0.048) | (0.011) | (0.036) | (0.017) |
| | [10.965] | [0.188] | [0.256] | [0.281] |
| Within 10$^{th}$ Percentile Distance | 0.057 | −0.006 | −0.005 | −0.016 |
| *(N = 3,322)* | (0.068) | (0.014) | (0.038) | (0.021) |
| | [10.967] | [0.184] | [0.260] | [0.278] |
| *Panel B: Share 5+ Units Above Median* | | | | |
| All Tracts | 0.064 | −0.010 | −0.018 | −0.003 |
| *(N = 28,794)* | (0.056) | (0.014) | (0.025) | (0.014) |
| | [10.994] | [0.181] | [0.209] | [0.291] |
| Within 25$^{th}$ Percentile Distance | 0.100 | −0.009 | −0.035* | 0.006 |
| *(N = 8,538)* | (0.064) | (0.011) | (0.020) | (0.013) |
| | [10.968] | [0.194] | [0.237] | [0.306] |
| Within 10$^{th}$ Percentile Distance | 0.111** | −0.011 | −0.039 | 0.001 |
| *(N = 3,472)* | (0.052) | (0.011) | (0.024) | (0.013) |
| | [10.969] | [0.187] | [0.242] | [0.302] |
| Tract FE | Yes | Yes | Yes | Yes |
| Metro x Year FE | Yes | Yes | Yes | Yes |
| Center City x Year FE | Yes | Yes | Yes | Yes |

Notes: This table reports tests of whether ordinances restricting condo conversion affect resident characteristics using different samples of tracts with varying distances to the city/suburb border and baseline housing composition. The dependent variable is listed in the column title. Each row lists any distance restriction that narrows the set of tracts used in the estimation and the corresponding number of observations, where percentile cutoffs are calculated from the distribution of tract distances to the city/suburb border. Panel A uses tracts that have an above median concentration of single-family attached homes in 1980 and Panel B uses tracts that have an above median concentration of 5-plus unit buildings in 1980. Each point estimate is from a separate regression and we report the coefficient and standard error on the triple interaction of Ordinance × Post × City. All specifications include tract, metro-by-year, and center city-by-year fixed effects. Standard errors clustered at the metro level are reported in parentheses. Dependent variable means from 2010 are reported in brackets. *** = significant at the 1 percent level, ** = significant at the 5 percent level, * = significant at the 10 percent level.