

# Here Come the Tall Skinny Houses: Assessing Single-Family to Townhouse Redevelopment in Houston, 2007–2020

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## Abstract

*Contemporary research has documented a recent and widespread boom in the construction of “townhouses,” or land-efficient single-family houses, both detached and attached, in Houston. Contrary to popular portrayals of Houston as a Wild West of unrestricted land use, a deliberate reform in 1998 that was subsequently extended in 2013, in fact, made this townhouse boom possible. It drastically reduced permissible minimum lot sizes citywide. This article builds on this emerging body of literature to specifically focus on cases in which formerly single-family parcels were subdivided into small lots for townhouse construction between 2007 and 2020. It argues that Houston’s phenomenon of single-family-to-townhouse (SF2TH) redevelopment offers a glimpse of what other U.S. cities might expect to occur were they to repeal large lot single-family zoning and other binding restrictions to allow for widespread construction of widely desired small-lot single-family housing products in formerly low-density neighborhoods. The findings suggest that SF2TH redevelopment accounts for less than one-fifth of overall townhouse development, that it tends to take place on larger lots in the urban core occupied by small, old houses, that it produces relatively reasonably priced houses, and that it predominantly takes place in neighborhoods with higher-than-average house values prior to the period analyzed. The latter result is inconsistent with a view of gentrification as a primary driver of SF2TH redevelopment. This article also examines the pattern of “block votes,” or the pattern of usage of a petition mechanism that allows homeowners to opt out of townhouse development on their own blocks, and finds that clusters of block votes generally adjoin clusters of SF2TH redevelopment but with relatively little overlap.*

## Introduction

What would happen if a large U.S. city decided to open up parcels on streets dominated by existing large-lot, detached single-family houses to denser development? Furthermore, what if this redevelopment took the form of a replacement of existing freestanding houses with multiple houses on much smaller lots? Given the century-long dominance of single-family zoning in the United States (Hirt, 2015), these questions might seem like an exercise in alternative history. However, this article argues that, in fact, the recent experience of Houston provides instructive answers.

Despite its libertarian image as the only big American city without zoning, Houston is decidedly in the business of regulating land use. Starting in the late 1990s, policymakers made a deliberate decision to drastically reduce required minimum lot sizes for houses—at first only within the city’s urban core (15 percent of the city’s land area) and later citywide. As a foundational article by Gray and Millsap (2020) convincingly demonstrates, this sea change in land use regulation set off an urban townhouse boom that led to the construction of tens of thousands of tall, skinny houses in less than two decades, introducing a new housing product type and changing the urban landscape of entire neighborhoods in the process. The resulting houses are locally known as *townhouses* regardless of whether they are attached (that is, they touch on their side walls) or are technically, if barely, freestanding. They sit on lots that are minuscule by typical U.S. standards—even by big city U.S. standards. Notably, however, Houston-style townhouses are usually owned “fee simple,” that is, homeowners own their house and the land underneath it. In this regard, Houston townhouses represent a different outcome than what other U.S. cities have been recently pursuing in relaxing land use regulations on residential blocks, through which planners tend to work toward redevelopment into small-lot, medium-density multifamily, or “missing middle,” development.

Therefore, this article examines the results of Houston’s townhouse boom with a view toward drawing useful lessons for other cities contemplating similar reforms. This article builds on Gray and Millsap’s (2020) research and focuses on a subset of Houston’s townhouse phenomenon: Townhouses developed via the acquisition and teardown of existing single-family parcels and the subsequent resubdivision of parcels to accommodate multiple new townhouses. This process represents the type of redevelopment—which is shorthand herein as single-family-to-townhouse (SF2TH) redevelopment—that some proponents of single-family zoning repeal hope and that detractors fear will happen in zoned cities.

The rest of this article proceeds as follows. It begins by reviewing debates over single-family zoning and notes recent developments that suggest its longstanding impregnable status—the “zoning straitjacket” in the memorable formulation of legal scholar Ellickson (2021)—is weakening. Next, it relies on Gray and Millsap (2020) and others to provide a brief overview of the regulatory system, and reforms to it, that have allowed SF2TH units to take root in Houston. After introducing the datasets and methods, the article presents various descriptive statistics and logistic model results in three successive sections that allow for answering basic questions about the quantity, timing, physical characteristics, and spatial patterns of SF2TH units, plus their association with neighborhood change. It also presents results about the extent of “block votes,” an only-in-Houston regulatory mechanism that allows homeowners to opt out of townhouse redevelopment on their own block—but *only* on their own block—and that arguably paved the way for the reforms to

be broadly acceptable to the public in the first place (Gray and Millsap, 2020). It ends with a summary of the topline findings and some reflections on what they might mean for other U.S. cities contemplating the end of single-family zoning.

In brief, SF2TH redevelopment is comparatively rare on the citywide scale but concentrates in particular locations, particularly within the urban core—much more so than townhouse development in general. The most likely parcels for SF2TH redevelopment are large (when controlling for other characteristics) with old, small, existing single-family houses. New SF2TH units are, although not cheap, on the whole relatively modestly priced in the median case. Contrary to many common assumptions, gentrification is not a particularly illuminating framework for predicting where SF2TH redevelopment will concentrate. Also, contrary to common assumptions, SF2TH redevelopment does not appear to be associated with a gain in children despite the relative spaciousness of the new houses and their desirable locations—in fact, locations with concentrations of SF2TH redevelopment lost children more rapidly than the city as a whole in the past two decades. The unexpectedness of some of the findings underscores that research on Houston’s unique land use trajectory is a rewarding enterprise with lessons for other cities. The article accordingly closes with several suggestions for further research.

## **Background**

Houston is often posited as an exceptional case, given its unique status as the only large U.S. city that eschews zoning. This section begins with an overview of the current state of zoning reform efforts in low-density neighborhoods in the United States, then reviews the case of Houston and how it both aligns with and departs from these broader trends. It closes with a brief terminological note on the use of “R1” as a shorthand for single-family zoning.

### **Single-Family Zoning: No Longer Untouchable?**

If an outside observer were asked to identify the single characteristic that best distinguishes how land use is regulated in the United States compared with its peer countries, chances are high that single-family zoning, or R1,<sup>1</sup> would win (Hirt, 2015). The concept certainly is not unique to the United States, but it has arguably been taken further here than anywhere else, even when compared with other high-income, sparsely populated countries such as Canada and Australia (Hirt, 2015; Whittemore and Curran-Groome, 2022). Concerted action from the emerging professionalized real estate industry and the federal government starting about a century ago led to the rapid adoption of R1 in most localities, a process that was largely complete after just several decades (Weiss, 1987; Whittemore, 2021).

In the 1960s, the concept of R1 and related regulatory tools, such as minimum lot sizes, particularly in suburbs, experienced a serious challenge on the grounds of racial exclusion. The efforts of the advocacy planner, Paul Davidoff, and others led to a series of “anti-snob zoning” reforms in such locations as New Jersey, where it was imposed by the courts, and Massachusetts, where it was legislated. Some local governments, beginning with Montgomery County in

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<sup>1</sup> This article follows Manville, Monkkonen, and Lens’ (2020) use of this terminology; it refers to a common (although not universal) shorthand for the most restrictive single-family zones in municipal zoning ordinances.

Maryland, adopted inclusionary zoning ordinances as a means of counteracting the exclusionary effects of single-family zoning and related land use regulations such as minimum lot sizes. Still, the net effect of this wave of reforms was to leave R1 almost entirely unchallenged by the time it had receded (Whittemore, 2021).

The status quo persisted for decades, right up until the present day. A recent *New York Times* analysis of 11 mostly large cities shows that the percentage of residentially zoned land reserved for single-family uses is startlingly high in most of them, such as 81 percent in Seattle and 79 percent in Chicago (Badger and Bui, 2019). Of the 11, only New York City, the great *sui generis* exception to the general U.S. patterns of low-density land uses and automobility reliance, and to a lesser extent Washington, D.C., stand apart as cities with less than most of their residential land zoned R1 (King, Smart, and Manville, 2022). The predominant status quo in most places, such as the suburbs of Chicago, is one in which a demolished single-family house is replaced (if it is replaced at all) with the only economically viable option under R1: A new single-family house much larger and pricier than the one it supplants (Charles, 2013). Trends for decades toward public participation mechanisms of greater frequency and scope have largely served to amplify the most vocal nearby homeowners' objections to any net gain whatsoever in units on an R1 parcel (Einstein, Glick, and Palmer, 2019; Lemar, 2021).

However, something shifted within only the past half decade or so, and cracks in the firmament of R1 have begun to grow and spread. Whittemore (2021) argues that this time, unlike in the 1960s, the critique has originated from the urban economics literature and has also emphasized racial exclusion and housing unaffordability within large cities, as contrasted with the suburban emphasis in Davidoff's heyday (also see Mangin, 2014). Academics have recently launched direct attacks on R1, even as several zoned cities, most notably Minneapolis but also the likes of Olympia and Walla Walla in Washington have repealed it within their boundaries (Manville, Monkkonen, and Lens, 2020; Wegmann, 2020a). Most dramatically of all, entire states, including California, Maine, and Oregon, now require a large number of their jurisdictions to jettison R1.

It would be a mistake to conclude from these recent trends that the disappearance of R1 throughout the United States in the medium term is a foregone conclusion. Even many planning academics still oppose its eradication or at least view it with trepidation on various grounds, from infrastructural effects to inequitable outcomes, such as gentrification to unaffordable post-redevelopment housing to the lack of an aspirational housing package with the same universal appeal as large-lot single-family living (Chakraborty, 2020; Etienne, 2020; Kendig, 2020; Searle and Phibbs, 2020). Among the voting public, R1 may be more popular still. The sheer weight of the status quo means that even if a stronger consensus around the benefits of doing away with R1 were to emerge, it would be acted on unevenly across jurisdictions and slowly in the aggregate. One helpful historical analogy is with minimum off-street parking requirements. Thanks to foundational research by Shoup (2021) and others, the concept retains few principled defenders today. However, under the sheer weight of status quo bias and the popularity of parking among ordinary people, parking requirements continue to remain the law of the land in most cities, suburbs, and towns in the United States.

One of the obstacles to the further spread of R1 repeal is a paucity of evidence about its actual effects. One reason is a classic chicken-and-egg problem: It has happened in few places, and in those very recently, with a global pandemic drastically upending housing development in the United States since early 2020. What limited evidence exists does not show dramatic results. Kuhlmann (2021) used a clever research design that exploited boundary effects between Minneapolis and its neighboring suburbs to find that the much-ballyhooed recent citywide replacement of R1, with zones permitting triplex construction, had modestly boosted land prices but yielded few triplexes. It is possible that the zoning reform was a necessary but not sufficient condition to induce the actual construction of a novel housing product type. After all, although the city increased the number of units that can be accommodated on a formerly R1 parcel, it did not appreciably increase the total square footage that can be built on one of those parcels. If one thinks of the envelope of a new building on a previously R1 lot in Minneapolis as a box, the box can split into three, but the box cannot be any bigger.

In the specific case of Minneapolis, it may be that the demand is not sufficient for three small units rather than one large house on a parcel (Hamilton, 2020). It is also possible that triplexes—an example of so-called “missing middle,” or lowrise, middle-density housing—suffer from the perception among buyers that it is “stuck in the middle,” in that it offers neither the privacy nor individualized ownership and control of a single-family house nor the amenities, security, and views of an apartment or condominium in large midrise or highrise developments (Furth, 2020; Parolek, 2020). Another possibility that must be considered is that the reform is in its early days, and small builders will take a while to pivot to building a product type unfamiliar to both them and their buyers (Kuhlmann, 2021). Time should soon tell.

At any rate, an informed observer is left with vanishingly few empirically documented cases demonstrating how housing developers might respond to R1 repeal in cases for which it is a binding constraint for builders’ decisions (Gabbe, 2018). The average American now lives in a census tract with less than 15 percent of the tract-level population-weighted density that prevailed in 1940 (King, Smart, and Manville, 2022). Not surprisingly, cases in which densities within a neighborhood, let alone a whole city, have increased rather than decreased are rare and even rarer in areas previously developed with housing opposed to former industrial or commercial lands (Romem, 2016).<sup>2</sup> One possibility is to turn to historical analogues, such as instances of the replacement of single-family houses with what are sometimes called “dingbat” apartments in Oakland during the 1960s (Banham, 1971; Smith, 1964).<sup>3</sup> However, these comparisons suffer from the obvious drawback of the vast changes to both the supply and demand sides of housing development that have unfolded during the past half century or more.

However, Houston provides an instructive, albeit counterintuitive, case to learn from. Although it is famously the only large, unzoned city in the United States, it engaged in a large-scale effort to

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<sup>2</sup> Some of the most striking cases—above all in California—of cities in which densities have increased rather than decreased since the 1960s can be attributed at least to a substantial degree to widespread densification via the addition of unpermitted housing, through either conversion or construction. See Wegmann (2015) and Wegmann and Mawhorter (2017).

<sup>3</sup> The construction of dingbats in Oakland and other California cities largely took place where zoning already permitted higher density construction on what had been originally developed as single-family lots; thus, the historical analogue with R1 repeal today goes only so far.

increase the permitted density of residential development, and it did so relatively recently but also long enough ago that its on-the-ground effects are observable. Recent scholarship has done a great deal to illuminate this heretofore underreported story in U.S. big city land use reform, to which the next subsection turns.

### The Unique Case of Houston

A tradition of scholarship examines Houston's unique system of land use regulation, dating back to at least Siegan's seminal book *Land Use Without Zoning*, published in 1972.<sup>4</sup> Among U.S. cities alone, Houston put zoning adoption to a plebiscite on three occasions—in 1948, 1962, and 1993—and its voters found it wanting each time (Gray and Millsap, 2020). A powerful narrative has developed in which Houston's voters, confronted with a choice between an orderly but restrictive regulatory regime versus a messier but more dynamic pro-free enterprise system, opted for the latter, perhaps in keeping with the city's general ethos and nationwide reputation (Gray and Millsap, 2020).

However, it would be a mistake to assume that Houston lacks land use regulation. Instead, it regulates land use not with zoning but with a series of citywide ordinances that restrict much of what is regulated in any other U.S. city, such as minimum lot sizes and off-street parking requirements, but without reference to zone districts. Furthermore, private deed restrictions are viewed as a central mechanism deployed by the city to control land use. Texas state law includes a special provision that grants special powers to Houston (and to no other Texas city) to use its regulatory and enforcement machinery to encourage and enforce private deed restrictions. These deed restrictions are not transparent in the same way as zoning, and so their scope is much more difficult to quantify than in zoned cities, but one informed observer estimated that private deed restrictions cover about one-fourth of private parcels in Houston (Kapur, 2004).

Legal scholars such as Lewyn (2004) and Kapur (2004) have argued that what might be termed "Houston exceptionalism" is overblown and that, in fact, on-the-ground land use patterns seen there differ little from other automobile-dominated Sunbelt cities that similarly grew explosively in the postwar era. Pendall, Puentes, and Martin (2006), in presenting a taxonomy of land use regulatory regimes across the United States, viewed the cities and suburbs of Texas as belonging to a distinctive category of land use regime but did not see fit to exclude Houston from it. For the purposes of this article, however, Houston really is a place apart in one critical way: It has seen a boom in townhouses since the turn of the millennium, likely unique among big cities in the United States in its scale and extent.

Gray and Millsap (2020) provide the definitive account of the 21st century Houston townhouse boom, with Park and Guajardo (2021) and Hamilton (2023) subsequently adding important empirical and historical perspectives. The brief summary that follows relies heavily on their accounts.

As Stephen Fox (2000: 23) notes, from a nadir in the local oil and gas sector, "the recovery of Houston's economy in the second half of the 1990s resulted in a boom in new, expensive, inner-

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<sup>4</sup> As an indication of the resurgent interest in Houston's unique system of land use regulation, George Mason University recently reissued an updated edition of Siegan's book.

city row house construction.” Gray and Millsap (2020) observe that the townhouse boom preceded the city of Houston’s seminal townhouse-promoting reform in 1998. Those legal reforms then augmented this initial shift in market conditions. After 1998, townhouse development could proceed more smoothly in a “by right” fashion. Developers no longer had to undergo the more costly and uncertain process of seeking variances to the subdivision ordinance.

The heart of the 1998 reform was a reduction in the required minimum lot size for detached single-family houses from 5,000 to 3,500 square feet inside Interstate 610, an area generally regarded as the city’s urban core or “Inner Loop.” Furthermore, for cases in which developers provided compensating open space within a redevelopment or else met several performance standards, the resubdivided house lots could get as small as 1,400 square feet (Hamilton, 2023). To put these sizes in context, one recent analysis shows that the median area for new single-family house lots in U.S. metropolitan areas ranges from 6,098 square feet in El Paso to 43,560 square feet (or exactly one acre) in Bridgeport, Connecticut (Kolomatsky, 2022).

The reduced minimum lot sizes exist alongside other regulations that are highly permissive, such as a citywide height limit of 75 feet for structures adjacent to single-family houses and a requirement of a scant three feet of separation (even less under some conditions) for a detached townhouse from its neighbor to the side (Hamilton, 2023). Required front setbacks range from none at all to 25 feet, depending on the type of street (Hamilton, 2023). Although the required off-street parking of two spaces per unit is not unusually permissive, it is easily accommodated in a “tuck-under,” or first-story, garage in a typical townhouse and, in any case, aligns with many homebuyers’ expectations.

The upshot of the lot size reforms coupled with other key regulations was that developers could now build, by right, a housing product that they wanted to build and that their customers wanted to buy. Townhouses could not be built quite everywhere—for instance, preexisting deed restrictions and more recent “block votes” (detailed explanation to follow) preclude some single-family parcels from being redeveloped into townhouses. Still, an enormous area was opened to “by-right” townhouse development.

Despite the locally used moniker, many of these so-called “townhouses” are technically fully detached houses; for this reason, Park and Guajardo (2021) dubbed them “detached townhouses.” Nevertheless, even the detached variant of townhouses à la Houston are unlikely to be confused with the popular image of a typical American single-family detached house. They are much taller—commonly three stories tall and sometimes four or even five stories, as permitted under a generous citywide 75-foot height limit—occupy comparatively tiny footprints, and sit on tiny lots, very often with minimal or nonexistent yard space (exhibit 1).



### Exhibit 1

Various Examples of Townhouse Developments in the Greater Heights Area of the Inner Loop to the Northwest of Downtown Houston

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Source: Sandra Wegmann

Houston's minimum lot size reforms were so well received in the housing market and in the political arena that, in 2013, they were extended to all areas inside the city served by sewers (Hamilton, 2023). It is an intriguing, and to date unanswered, question as to why such substantial reforms passed to begin with and were subsequently expanded. Gray and Millsap (2020) make a convincing argument that the key to success was providing homeowners with a mechanism to opt out of townhouse development on their own blocks, thus defusing what would otherwise be a potent source of opposition.

In Houston, homeowners can petition for their own residential block to be incorporated into one (or both) of two types of special districts, Special Minimum Lot Size (SMLS) and Special Minimum Building Line (SMBL) district, that consist of either one or two adjoining block faces. These districts peg land use regulations to preexisting lot sizes or setbacks rather than the citywide standards. Both SMLS and SMBL districts, thereby, severely constrain or altogether halt economically viable subdivision of existing large parcels containing single-family houses into smaller parcels appropriate for townhouses. These districts are formed by city ordinance rather than private deed restrictions and thus can be thought of as a form of opt-in zoning. Formation of



one of these districts is a straightforward process requiring at least majority support of the affected homeowners (the specifics vary), but at a minimum, the proposed regulation must match what exists on at least 70 percent of the existing lots (or 60 percent in a historic district). Forming a SMLS or SMBL district is loosely analogous to the homeowner-initiated process commonly used to form historic districts in many cities, but the former is more from the bottom up. Whereas new historic districts normally need the approval of an elected or appointed body, a proposal for a new SMLS or SMBL district in Houston is highly likely to pass if enough property owners support it. On formation, both types of districts—hereafter jointly referred to as “block vote” districts—automatically sunset after 40 years, whereupon a new petition would be required to renew them.

Gray and Millsap (2020) argue that block votes force homeowners to weigh the tradeoffs between maintaining the physical character of their own block and the possibility of increased property values unlocked by future townhouse redevelopment. By contrast, in conventional zoning, a citywide elected body votes on whether or not to change zoning on a given parcel or in a particular district, and so a homeowner’s ability to act on their preferences for their own block is less direct. In Houston, homeowners who most vehemently object to townhouse redevelopment near them have a hyperlocal mechanism to which they can turn, which may reduce their motivation for changing the rules that prevail beyond their own blocks.

Estimates of how many townhouses were built since the seminal reform in 1998 vary according to the exact time periods and methodologies used, but it is clear that the number is large. Gray and Millsap (2020) found more than 25,000 townhouses built between 1999 and 2016, Park and Guajardo (2021) found nearly 39,000 from 2005 to 2018, and Wegmann (2020b) found more than 34,000 from 1998 to 2020. Regardless of the details of the differing methodologies and estimates, what is clear is that the scale is considerable; for instance, one of these analyses found that post-1998 townhouses now account for 4 percent of all housing units citywide, 8 percent inside the Inner Loop, and no less than 43 percent of net housing units added citywide since 1990 (Wegmann, 2020b). The transformation is not evenly distributed—some neighborhoods remain untouched by townhouse redevelopment, while others, like Rice Military, 3 miles north by northwest from Downtown Houston, have experienced a total transformation in their urban form in only two decades (Gray and Millsap, 2020).

Although recent research has revealed a great deal about townhouse redevelopment in Houston, more is to be learned. After all, the studies previously mentioned deal with townhouse redevelopment as a whole, whether it took place on large former single-family parcels, formerly commercial or industrial land, or other large nonresidential parcels. Arguably a study is needed that specifically examines the subset of Houston’s post-1998 townhouse development activity, in which formerly single-family parcels have been resubdivided into townhouse lots. These cases could provide additional clues as to how redevelopment might proceed in existing residential neighborhoods at buildout—neighborhoods that are the locus of both reformers’ ambitions and much popular opposition—after reforms to land use regulations. This subcategory of redevelopment is the object of the empirical investigation described in what follows.

## A Brief Note on Terminology

This article is premised on our claim that Houston's minimum lot size reforms represent one path other cities could take toward R1 repeal. In actuality, this premise is not quite precise. Lot size requirements, on their own, are far from the only mechanisms enforcing the dominance of large-lot single-family uses across the landscape, and removing them will not necessarily permit major changes to the status quo. Typical American land use regulations also include use restrictions (that is, allowing but a single unit per parcel); setback requirements and impervious cover and height restrictions; elements of other, nonzoning ordinances that favor large-lot single-family housing over more land-efficient housing types; and procedural laws that do the same. Bronin (2023) calls this status quo "zoning by a thousand cuts;" in her analogy, any form of housing other than a single-family house on a large lot is bled to death.

Even so, the Houston reforms are a useful stand-in for R1 repeals. Houston, unlike most zoned cities, before 1998, lacked many of the mechanisms that in other cities limit the density of single-family housing. That left minimum lot size requirements as the sole binding constraint (Gabbe, 2018). Once it was lifted, townhouse development ramped up dramatically. For that reason, the example of Houston is instructive because it is analogous to what might happen if a typical zoned city simultaneously lifted the various interlocking barriers that prevent redevelopment of R1 lots into townhouses—which is what most proponents of R1 repeal have in mind.

Moreover, the Houston reforms only represent *one* path away from R1 zoning. They still produce single-family housing (that is, townhouses), just on smaller lots than before. Still, this path is meaningful, even without reforms to legalize more multifamily housing. Houston-style townhouses (as this article quantifies in the following) are arguably such a dramatic departure from the R1 status quo that they are different in kind and not just degree from large-lot single-family houses. They are not "missing middle" housing in the purist sense but do meet Hamilton's (2020) definition of "stickplex" housing, or housing forms that combine efficient use of land with inexpensive construction techniques (Parolek, 2020). In this regard, they represent a singular case in the recent evolution of single-family dominated city neighborhoods in the United States, one which this article proceeds to examine in detail.

## Data and Methods

This article poses the research question: "What are the observable characteristics of SF2TH redevelopments in Houston?" This article tackles this research question by dividing it into several subquestions.

1. What is the overall quantity of SF2TH redevelopment and incorporation of single-family parcels into block vote districts?
2. What is the temporal pattern of SF2TH redevelopment, that is, how has it fluctuated over time?
3. What are the characteristics of SF2TH redevelopments in comparison with what they replaced?
4. What are the geographic patterns of SF2TH redevelopment and block votes, that is, in what types of locations have they occurred?
5. How have the neighborhoods around SF2TH redevelopments changed over time?

To answer these subquestions, this investigation relies on an analysis of property tax records from the Harris Central Appraisal District (HCAD) for the years 2005 (the earliest available in electronic form) through 2020, inclusive.<sup>5</sup> To identify parcels on which SF2TH redevelopments have occurred, the analysis takes advantage of a supplementary dataset that HCAD maintains known as a “tieback table,” in which for every year, lots that have been newly created via lot subdivision are noted and linked to the property identifications of (now defunct) parcels from previous years. SF2TH redevelopments are defined as cases in which (1) a parcel HCAD initially classified as one of the “residential” categories is (2) linked to later parcels occupying the same land area, and where (3) a house on a parcel of less than 5,000 square feet occupies each of the subsequent parcels (that is, below the pre-1998 minimum lot size and, therefore, conforming to the vernacular definition of a “townhouse” in Houston). By collecting information on both the pre- and post-SF2TH parcels as linked groups of one parcel (pre-redevelopment) to two or more (post-redevelopment), it is possible to address research subquestion 3.

All cases of SF2TH redevelopment are linked to a geographic information system spatial representation (that is, a shapefile) of all 2020 parcels, performed with Quantum Geographic Information System, or QGIS, software. Shapefiles were obtained from the city of Houston’s website, representing both forms of block votes (SMLS and SMBL).<sup>6</sup> These block votes were combined into a single layer, that is, with no distinction in the analysis between SMLS and SMBL. The analysis of block votes considers only single-family parcels that, as of 2007 (the year of the earliest identified SF2TH redevelopment in the dataset), were not then incorporated in a block vote district, and it considers only block vote districts that were either formed in 2007 or later or else were pending as of August 2022.

Some of the analyses rely on sociodemographic characteristics at the census tract level. These are obtained from decennial census data from the year 2000 (that is, shortly after the enactment of the townhouse reforms and the most recent data available prior to the beginning of this analysis period in 2005) and 5-year American Community Survey (ACS) data collected in the years from 2015 through 2019. The latter are preferred over the more recent 2016–2020 ACS data due to difficulties in data collection during the pandemic year of 2020 and considerable missingness in reported 2016–2020 ACS data. This analysis uses all census tracts in Harris County that contain at least one parcel in the city of Houston in use as single-family housing as of 2005.

Some of the previously summarized calculations provide two binary dependent variables: Redevelopment of a given initially single-family parcel from 2007 to 2020 and its actual or pending incorporation into a block vote from 2007 to August 2022 for the logistic regression models described in the following section. These models are performed with the general linear model (glm), command in the R programming language. Other calculations previously noted create the

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<sup>5</sup> Most of the city of Houston lies within Harris County, although small portions are in Fort Bend and Montgomery Counties. This study ignores the latter two counties, as Houston’s territories within both are small and lie at the most distant fringes of the city, thus are unlikely to have had significant SF2TH redevelopment.

<sup>6</sup> As of October 6, 2022, these shapefiles were available from [https://www.houstontx.gov/planning/Min-Lot\\_Size-Min\\_Bldg\\_Line.html](https://www.houstontx.gov/planning/Min-Lot_Size-Min_Bldg_Line.html).

dependent variables for each of the two models: One predicting SF2TH redevelopment and the other predicting block votes.<sup>7</sup> Appendix A provides more detail on the two logit models.

### Hypotheses for Models

Model 1 tests a hypothesis that large original lots, old original houses, and small original houses will be associated with greater probability of redevelopment into townhouses, as all these characteristics would be expected to increase the likelihood that homeowners sell to developers. One would expect a negative relationship with central business district distance, that is, for parcels closer to downtown Houston to be likelier to redevelop. A quadratic relationship with tract house prices in the year 2000 is also hypothesized, based on Gray and Millsap's (2020) finding, that overall, Houston townhouse development was most concentrated in middle-income neighborhoods. These areas have property values high enough to support redevelopment but low enough that their residents are less likely to have initiated or maintained deed restrictions that would restrict redevelopment.

The relationships with sociodemographic variables test the proposition that townhouse redevelopment in Houston is a story of gentrification. If gentrification is a dominant mechanism, then one would expect a greater likelihood of redevelopment in tracts that have higher Black and Hispanic populations, more children, and a less college educated population in 2000, prior to the period examined. This analysis, on the other hand, hypothesizes that Houston's unusually permissive land use regulations allow small-lot redevelopment to concentrate in more privileged neighborhoods (as measured before the time period under analysis) than would be typically seen in a large U.S. city.

Because block votes are expected to occur in reaction to SF2TH redevelopment, although the models as structured can only detect associations rather than a causal relationship, coefficients for Model 2 are expected to be broadly similar to those in Model 1. For the added variable of SF2TH units within the same census tract, a quadratic relationship is modeled because of an anticipated saturation effect. More SF2TH redevelopment nearby leads to a greater likelihood of a block vote in response but only up to a point. Once the area nearby is sufficiently saturated with townhouse redevelopment, according to this view, enacting a block vote is less worthwhile and thus becomes less likely past the threshold.

### Results

This section reports the results in three parts. The first reports descriptive statistics that shed light on the first three subquestions listed in the prior section—that is, (1) on the quantity of SF2TH redevelopment and block votes, (2) the timing of SF2TH redevelopment, and (3) a comparison of pre- versus post-redevelopment characteristics of parcels. The next reports the results of the two logit models to shed light on subquestion 4 on the geographic patterns of SF2TH redevelopment and block votes. The last analyzes sociodemographic trends from 2000 to 2015–2019 to answer subquestion 5—that is, to show how neighborhoods containing SF2TH redevelopment concentrations have changed over time.

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<sup>7</sup> Exhibit 8 in the appendix summarizes all these variables' values.

## **Basic Characteristics of Townhouse Subdivisions and Block Votes**

Using the methods described in the previous section, 1,392 SF2TH redevelopments were identified in the HCAD data spanning from 2005 to 2020, yielding 5,359 identified townhouse units, each lying on its own new parcel, produced via the SF2TH process. The earliest of these townhouse units were built in 2007 and the most recent in 2020. It must be acknowledged that this method has not identified all SF2TH units in Houston; those whose lots were subdivided prior to 2005 would not be identified. It is also possible that this technique relying on tieback tables may have missed some SF2TH subdivisions due to inaccurate or incomplete records.

The figure of 5,359 SF2TH units is not directly comparable with Gray and Millsap's (2020) finding that 25,269 townhouse-style parcels were created between 1998 and 2016, because the time periods do not entirely overlap. Still, a very rough comparison suggests that SF2TH redevelopments yielded less than one-fifth of the total post-1998 townhouses developed in Houston. Presumably the remainder have been constructed on larger parcels, many of them commercial or industrial rather than residential. The results further suggest that, notwithstanding Houston's 21st-century townhouse boom, SF2TH redevelopment is a relatively rare event. Out of 282,770 identified single-family parcels in the dataset not included within a block vote district as of 2007, only 0.5 percent underwent SF2TH subdivision between 2007 and 2020. A considerably higher, but still small, number of parcels, or 13,302 (4.7 percent of the total), were incorporated into block vote districts during the same period.

## **SF2TH Subdivision Over Time**

Exhibit 2 shows the number of SF2TH redevelopment events by year between 2007 and 2020. Starting from a minuscule number (only four), the phenomenon rises in the latter part of the decade of the 2000s, then declines (although by no means disappears) during the Great Recession after 2008.<sup>8</sup> However, it quickly resumes its upward growth after 2010 and proceeds to skyrocket through 2015. After 2015, a large decline ensues—although not to anywhere close to zero—perhaps as a delayed effect of a downturn in the locally important oil and gas economy (of which Houston is regarded as the global capital) due to a collapse in global crude prices during 2014. From 2016 to 2020, activity is relatively steady.

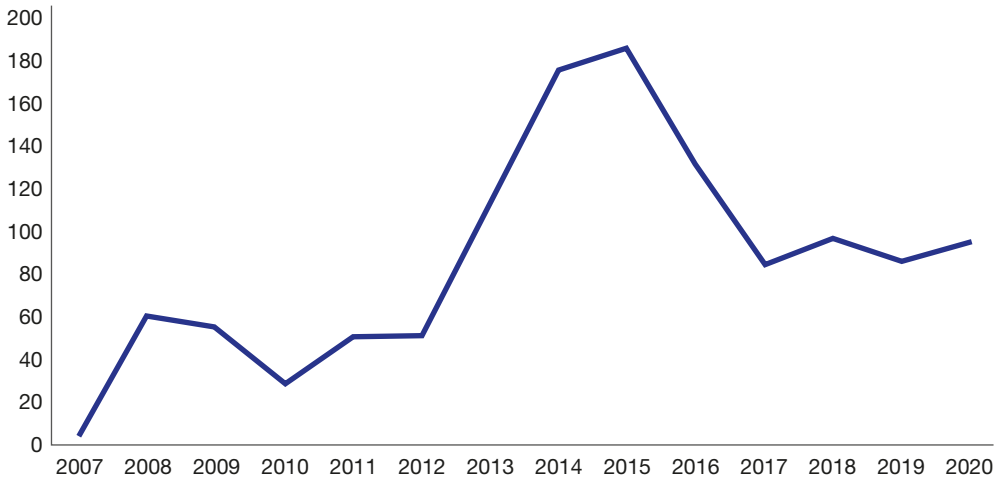
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<sup>8</sup> Note that the very low number for 2007 should be treated with caution, because the dataset does not include redevelopments of parcels classified as “residential” prior to 2005. This analysis would have missed any 2007 redevelopments linked to parcels before 2005.

## Exhibit 2

Completed Single-Family-to-Townhouse Redevelopments by Year in Houston, 2007 to 2020

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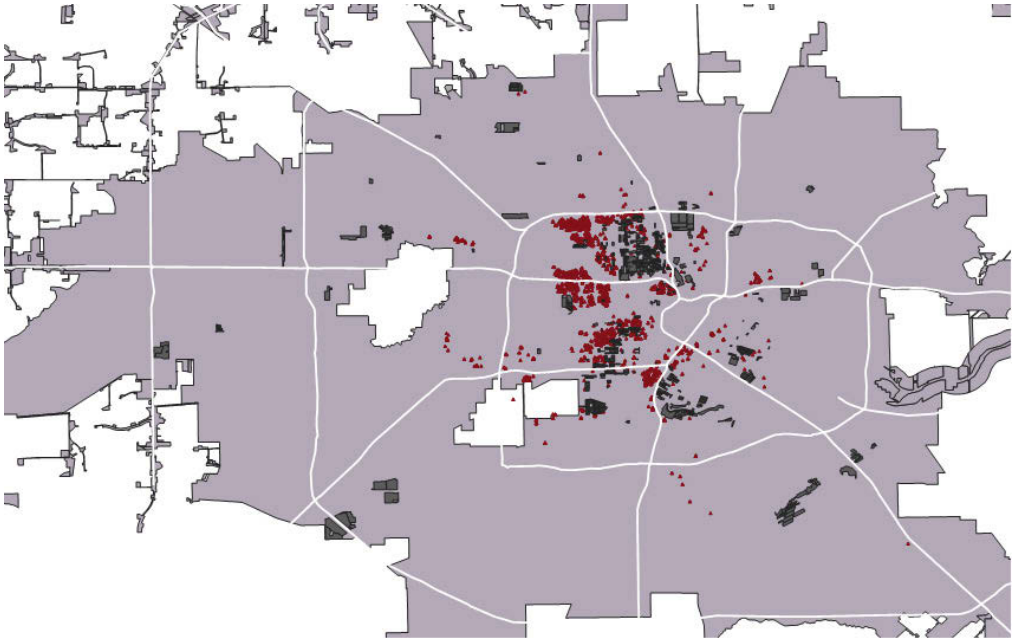
Note: The figure for 2007 may be low, because the dataset does not include subdivided parcels that link to unsubdivided parcels from before 2005.  
Source: Harris County Appraisal District (HCAD) data, with calculations by authors

### Geography of SF2TH Subdivision

Exhibit 3 shows the locations of SF2TH units completed from 2007 to 2020, along with the block votes enacted during that period. It is immediately notable that SF2TH redevelopment is overwhelmingly concentrated inside the Inner Loop (visible as the white roadway circling around Downtown Houston). Only a minuscule number of SF2TH units (just 3.4 percent of the total) lie beyond the Inner Loop. This very small share is in contrast to the prior results that Wegmann (2020b) found, in which only 53 percent of townhouses overall built from 1999 to 2015 were within the Inner Loop. Thus, SF2TH development appears to be a more intensely urban phenomenon than townhouse development in Houston in general. Reasons could include higher land prices in the Inner Loop that make custom-built designs built in small increments more feasible for builders, the higher sales prices needed to justify teardowns of existing houses, or a lower prevalence of homeowners' associations that might serve to thwart such development.

### Exhibit 3

#### Single-Family-to-Townhouse Redevelopments in Houston



Notes: Single-family-to-townhouse redevelopments are black circles, block votes are in dark grey, freeways are white lines, and the Houston city limits are in light grey. Some fringe areas of the city that contain no redevelopments or block votes are omitted from view. For reference, Downtown Houston, containing no block votes or redevelopments, is located inside the smallest freeway loop visible. The Inner Loop, commonly regarded as Houston's urban core and containing the bulk of redevelopments and block votes, is the area inside the larger of the two visible complete freeway loops.

Source: Image by authors, using data from Harris Central Appraisal District

Block vote districts are mostly, although not exclusively, close to large concentrations of single-family-to-townhouses, although there is little overlap between the two. Indeed, the dissimilarity index for block votes and SF2TH redevelopment at the tract level is just under 0.84.<sup>9</sup> Instead, clusters of SF2TH units and nearby large patches of block votes seem to exist within clumps of roughly 1 to 4 miles in diameter primarily to the northwest, west, and south of Downtown Houston. In the macroscale, these clusters are spatially concentrated, in the sense that only 121 of the 660 Harris County census tracts in Houston have either at least one SF2TH unit, at least one block vote, or both. One could summarize the spatial pattern by remarking that block votes and SF2TH units are clustered together when one is zoomed out but separated from each other in mostly homogenous clusters when zoomed in. Exhibit 4 provides an illustrative example.

<sup>9</sup> The dissimilarity index, commonly used as a measure for residential racial segregation, ranges from 0 (perfectly unsegregated) to 1 (perfectly segregated). Intuitively, the index of 0.84 means that 84 out of 100 block vote parcels would have to move to different tracts to achieve a perfectly proportionate balance of block votes and SF2TH townhouses by tract.



## Exhibit 4

### Single-Family-to-Townhouse Redevelopments in the West of Downtown Houston



*Notes: Single-family-to-townhouse redevelopments are shown as red dots, and block votes are shown in dark grey in a swath of the northwest quadrant of Houston's Inner Loop. Both redevelopments and block votes tend to group together in clusters that are relatively near each other but mostly nonoverlapping. Source: Image by authors, using data from Harris Central Appraisal District*

A small although nontrivial number of block votes are beyond the Inner Loop and, in some cases, a considerable distance from any identified SF2TH redevelopments. It is possible that nearby (non-SF2TH) redevelopment motivated the formation of these districts as a preemptive measure to prevent it in the future, or perhaps as a means of restricting or altering other forms of anticipated redevelopment, such as single-family teardown and replacements.

### Pre Versus Post-Single-Family-to-Townhouse Redevelopment

Having examined the macro characteristics of the SF2TH redevelopments—their number, temporal pattern, and geographic distribution—now to turn to the characteristics of the redevelopments. First, their scale: Redevelopments are mostly very small. If one thinks of a redevelopment as an event that begins with the demolition of one or more existing structures on a single-family lot, then results in a number of townhouses built on smaller lots subdivided from the original lot, then the most common version of this event yields only two townhouses. The median redevelopment event yields four townhouses. Notwithstanding the small net gain in units, Houston is a rare example—beyond the still relatively small number of cities in which permitted accessory dwelling units have been built in nontrivial numbers—in which small-lot redevelopment processes yield net gains in housing units. The typical counterfactual in many other large cities is a one-for-one replacement of a (small and deteriorated) single-family house with a (large and new) single-family house.

Exhibit 5 summarizes a number of metrics that in various ways compare conditions before and after SF2TH redevelopment for all 1,392 parcels in the dataset on which it occurred. The unifying theme is a drastic intensification in the use of these parcels, as one would expect. After all, for a builder to expend the capital to acquire an existing property, demolish its existing use, and replace it with new housing units requires a substantial increase in value. Exhibit 5 allows for this dynamic to be quantified via various indicators.

**Exhibit 5**

Various Indicators Comparing Single-Family-to-Townhouse Redevelopment Ex Ante Versus Ex Post

Indicator	Pre-redevelopment	Post-redevelopment
Median house construction date	1936	2014
Median lot size	6,500 sf	2,105 sf
Median built floor area	1,348 sf (pre-redevelopment parcel)	2,483 sf (all newly-created townhouse units)
Ratio of new total built square footage to previous total built square footage	1	4.2 (median; 1st quartile = 2.2; 3rd quartile = 6.6)
Improvement-to-land (I/L) assessed value ratio	0.14 (median)	2.14 (median)
Ratio of new assessed property value to previous property value	1	3.2 (median; 1st quartile = 1.7; 3rd quartile = 5.1)
Total citywide taxable property value	\$319 million	\$1.914 billion

*Source: Harris County Appraisal District (HCAD) data, with calculations by authors*

First, in the median case, an old house (built in 1936) is demolished and replaced with new townhouses (built in 2014). The median lot of 6,500 square feet is split into new, smaller lots with a median size of only 2,105 square feet. The original, relatively small house with a median of 1,348 square feet of floor area is replaced with new townhouses that collectively have 4.2 times the floor area as the one single-family house demolished to make way for them. Furthermore, in the median case, *each* new individual townhouse unit includes considerably more living space than the original house that was torn down (2,483 versus 1,348 square feet).

According to one metric, the improvement-to-land (I:L) ratio, which measures the value of the building as HCAD assessed compared with the assessed value of the land on which it sits—and whose significance Landis et al. (2006) explained—post-redevelopment sees the parcel far much more efficiently used. The I:L ratio leaps from 0.14 predevelopment to 2.14 for the median townhouse created in the process—a 15-fold increase. Measured in a different way, the total assessed value on the parcel jumps more than threefold from before versus after redevelopment. Aggregated together, the SF2TH parcels represented \$319 million of taxable value for the city, county, school district, and other entities reliant on property tax revenues prior to redevelopment compared with \$1.914 billion in value afterward. Although this analysis does not attempt to quantify increased needs for municipal services generated by lot subdivision, it seems highly likely that SF2TH units represent a considerable fiscal net positive for taxing entities, including the city, county, and kindergarten through 12th grade school districts.

## Affordability

The median SF2TH unit had an assessed value of \$340,000 (\$133 per square foot) as of 2020—much less than the median citywide assessed value of single-family houses built 2007 or later on unsubdivided parcels, which was \$545,000 (\$176 per square foot).<sup>10</sup> Assessed values, opposed to sales price data, should be treated with caution, but rough comparisons are still instructive. Values of SF2TH units varied greatly, with an interquartile range of \$213,000. This wide range suggests that SF2TH units in Houston span the full gamut from bargain to high-end products and everything in between.

When one considers that most SF2TH units are easily spacious enough for a four-person household, their newness, and their predominant location inside the Inner Loop, \$340,000 is a comparatively modest price. Under a reasonable set of assumptions, it was affordable to a household earning 105 percent of the metropolitan median household income in October 2020, although, of course, major changes have transpired in interest rates and other market conditions since.<sup>11, 12</sup> Compared with other big and growing U.S. cities, it is notable that a newly built, family-sized housing product with a central location is within reach of middle-income Houston households in the median case.

## Summary

To summarize, SF2TH redevelopment on the citywide scale is a relatively rare event; the same is true of block votes—presumably mostly conducted in response to nearby SF2TH redevelopment—although less so. Although precise quantification is not possible, it is clear that SF2TH redevelopment represents a small share of townhouse development in Houston overall. After a slow start during and immediately following the Great Recession, SF2TH redevelopment has steadily produced new housing, albeit not without fits and starts. SF2TH redevelopment is overwhelmingly concentrated in the urban core, more so than townhouse development as a whole. It represents a considerable intensification of urban land use, whether measured from a built form or property tax generation standpoint. Even so, the typical end product, although by no means cheap, is reasonably affordable to many middle-income homebuyers. Having reviewed some of the general characteristics of SF2TH redevelopment, the article now turns to an analysis of the locational factors that predict where it—along with its close companion, block vote district formation—is most likely to take place.

## Predicting Townhouse Redevelopment and Block Votes From 2007 to 2020

Exhibit 6 summarizes the two logit model runs, predicting SF2TH redevelopment (Model 1) and block vote incorporation (Model 2). A discussion of the results from Model 1 follows.

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<sup>10</sup> Unless otherwise indicated, all dollar figures are rounded to the nearest \$1,000.

<sup>11</sup> This calculation uses Fannie Mae's (n.d.) Homebuying Mortgage Calculator and assumes the following: 5-percent downpayment, 2.8-percent interest rate for a 30-year mortgage, and no homeowner's association fees (as is typical for Houston townhouses) but includes property taxes, homeowner's insurance, and private mortgage insurance in addition to principal and interest. These costs are assumed to total no more than 30 percent of gross household income. In 2020, the median family income for Greater Houston was \$78,800 (HUD, 2020).

<sup>12</sup> This calculation also does not account for the likely understatement of HCAD's assessed house values compared with real-world prices.

**Exhibit 6**

Logit Model Results for Single-Family-to-Townhouse Redevelopment (Model 1) and Block Vote Incorporation (Model 2)

	<b>Model 1 (SF2TH logit): Single-family parcel (as of 2007) undergoes subdivision into townhouse lots, 2007–2020</b>		<b>Model 2 (Block Vote logit): Single-family parcel not in a block vote district (as of 2007) is incorporated into a block vote, 2007–August 2022</b>	
Intercept	– 52.58	2.97***	11.70	(1.01)***
<b>Original Lot and Structure Characteristics</b>				
Original lot size (acres)	0.51	(0.14)***	0.47	(0.032)***
Original structure year built	– 0.028	(0.0015)***	– 0.011	(0.00051)***
Original structure interior area (sf)	– 0.00026	(0.000041)***	0.00015	(0.000013)***
Distance from CBD (miles)	– 0.55	(0.022)***	– 0.059	(0.0048)***
<b>Tract-level Characteristics, Year 2000</b>				
Median house value (1999 USD)	0.000019	(0.0000024)***	0.000026	(0.00000085)***
Median house value (1999 USD), squared	– 3.50E-11	(4.18E-12)***	– 5.56E-11	– 1.73E-12***
Population share under age 18	– 1.71	(0.96)	– 4.41	(0.26)***
Population share Black non-Hispanic	– 1.37	(0.35)***	5.23	(0.10)***
Population share Hispanic	– 0.58	(0.44)	7.88	(0.13)***
Share of people ages 25+ with bachelors or higher	– 1.89	(0.60)**	5.89	(0.17)***
<b>SF2TH Townhouses in Tract, Built from 2007–2020</b>				
SF2TH townhouses in tract			0.012	(0.00066)***
SF2TH townhouses in tract, squared			– 0.000057	(0.0000028)***
n		282,742		282,742
Nagelke pseudo r <sup>2</sup>		0.293		0.259

\*\*\**p* < 0.001; \*\**p* < 0.01; \**p* < 0.05; *p* < 0.1

SF2TH = single-family-to-townhouse.

Note: Standard errors are shown in parentheses.

Sources: Harris County Appraisal District (HCAD) and American Community Survey data, with calculations by authors

The four original lot and structure characteristic coefficients are all highly significant and have the expected signs. As hypothesized, parcels that are larger and that contain older and smaller existing houses and that are closer to downtown are all likelier to redevelop when controlling for the other variables in the model. The relationship of house value to redevelopment also behaves as expected. Confirming Gray and Millsap’s (2020) finding that townhouse development in general is most common in upper-middle-income locations, the year 2000 median tract house value coefficient and its square in Model 1 point toward the likelihood of SF2TH redevelopment peaking, all else equal, in tracts with a median house value of \$271,000 (with a 95-percent confidence interval spanning from \$165,000 to \$442,000) in 2000. This value compares with an overall year 2000 average tract-level median income house price of \$91,000.<sup>13</sup>

<sup>13</sup> See exhibit 8 in the appendix.

The sociodemographic variable coefficients tell a somewhat mixed story. Tracts with fewer Black residents in 2000 are more likely to redevelop, cutting against the notion that SF2TH redevelopment is a phenomenon of gentrification. On the other hand, parcels in tracts with lower college education levels are likelier to redevelop. A very weak negative relationship is between the number of children in the tract and the likelihood of SF2TH redevelopment; Hispanic population share has no relationship at all. Although these results are mixed, taken in tandem with the finding previously reported about tract house prices, certainly no compelling reason exists to strongly associate SF2TH redevelopment from 2007 to 2020 with gentrification. Instead, it appears to concentrate in tracts that had fewer Black and college educated residents but higher-than-typical house prices, as of 2000.

The Model 2 results bear many similarities to Model 1, suggesting that many of the basic factors that drive SF2TH redevelopment are also associated with greater likelihood of a given parcel being incorporated into a block vote district. For instance, as with SF2TH redevelopment, block votes are likelier on larger parcels, with older houses, closer to downtown, and in neighborhoods with above median house prices as of 2000 (peaking at \$233,000 compared with \$271,000 for Model 1).

The differences between Model 2 and Model 1 are instructive. Unlike SF2TH redevelopment, block votes are more likely on parcels that contain *larger* houses; perhaps their owners (being less likely to resubdivide their own lot) are more motivated to act to prevent what they regard as out-of-scale townhouse redevelopment from taking place nearby. Block votes are more likely to take place in tracts that have more children and college-educated adults; one could imagine neighbors organizing to thwart SF2TH redevelopment in the name of maintaining a tranquil, child-friendly atmosphere. One could also imagine more educated residents having more ability to navigate the block vote district formation procedures. Intriguingly, parcels in tracts with more Black and Hispanic residents are sharply more likely to join a block vote district.

Model 2 has a variable not present in the SF2TH model (Model 1), along with its squared term: The number of SF2TH units built during the period from 2007 to 2020 within the same census tract as the parcel in question. As previously discussed, the supposition here is that the presence of SF2TH redevelopment nearby may spur homeowners to organize a block vote as a defensive measure against townhouse redevelopment on their own street, although this analysis ignores the relative timing of these events and thus can only yield a loose association. The sign and significance of the squared term suggest, as with the house value variable, a quadratic relationship between SF2TH units and block vote likelihood. The probability of a block vote covering a parcel between 2007 and 2022 peaks with 104 townhouse units created in the same census tract from 2007 to 2020 (with a 95-percent confidence interval from 84 to 115). Below that amount, block votes, all else equal, are less likely, presumably because townhouse encroachment is a less alarming prospect. If more than 106 townhouses per tract, block votes also become less likely, suggesting a critical level of townhouse saturation, past which homeowners begin to calculate that it is no longer worthwhile to bother with organizing a block vote.

Models 1 and 2 have Nagelke pseudo  $r^2$  values of nearly 0.29 and 0.26, respectively. Thus, they are reasonably predictive, given that many factors governing lot-by-lot redevelopment and block

vote formation, such as a given homeowner household's readiness to sell, the presence of nearby blighted properties, or social relations on a given residential block are idiosyncratic.

### Townhouse Redevelopment and Neighborhood Change

Although some of the model results previously reviewed relate, at least indirectly, SF2TH redevelopment with gentrification, it is also useful to use simple descriptive statistics to build a portrait of how the neighborhoods in which this type of townhouse development predominates have changed during this century. Exhibit 7 captures these changes from 2000 in the decennial census to 2015 through 2019 in the ACS. Sociodemographics in the mean census tract containing SF2TH units (middle column) are compared with the same for the mean census tract containing unsubdivided single-family parcels (right column). To provide a concrete example from the top row of exhibit 7, the average parcel that underwent SF2TH redevelopment was in a census tract in which the share of the population under age 18 dropped 7.4 percentage points between 2000 and 2015–2019 (center column). Meanwhile, the average single-family parcel that did *not* undergo SF2TH redevelopment was in a tract whose under-18 share decreased only 2.3 percentage points during that same period (right column). Therefore, SF2TH parcels tended to be in tracts that lost children at a faster rate than single-family parcels that were not redeveloped into townhouses.

#### Exhibit 7

**Average Tract-Level Change From 2000 to 2015–2019 for Subdivided (SF2TH) Versus Unsubdivided Parcels**

	Subdivided Parcels	Unsubdivided Parcels
Percent of population under age 18	– 7.4 pp	– 2.3 pp
Percent of population over age 65	– 0.2 pp	+1.8 pp
Percent of population non-Hispanic Black	– 3.8 pp	– 5.2 pp
Percent of population non-Hispanic White	+16.8 pp	– 6.4 pp
Percent of population Hispanic	– 21.0 pp	+10.7 pp
Median Family Income (nominal dollars)	+ \$109,667	+ \$29,520
Percent of adults 25+ with bachelors degree or higher	+38.3 pp	+6.2 pp
Percent of occupied housing units owner-occupied	+11.6 pp	– 3.1 pp
Median owner-occupied house price (nominal dollars)	+\$315,401	+\$134,195
Population density per square mile	+1,986	+270
<i>Number of parcels</i>	<i>1,371</i>	<i>281,400</i>

*pp = percentage point change.*

*SF2TH = single-family-to-townhouse.*

*Sources: Harris County Appraisal District (HCAD), US Decennial Census, and American Community Survey data, with calculations by authors*

The mean SF2TH unit in the dataset is in a census tract that in the 21st century has, by all indicators, disproportionately gained in Houston's most historically advantaged populations. White<sup>14</sup> residents are up by 17 percentage points, although Black and Hispanic residents are down 4 and 21 percentage points, respectively. These demographic trends took place in the context of substantial densification: The median density of the average SF2TH tract leapt by almost 2,000

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<sup>14</sup> "White" refers to "non-Hispanic White" throughout.



extra people per square mile (an increase of nearly 39 percent) compared with less than 300, on average, in the unsubdivided parcels' tracts.

The average SF2TH tract gained in median family income by a whopping almost \$110,000 compared with under \$30,000 for the tract housing the average unsubdivided single-family parcel. The median house price shot up by \$315,000 in the former versus only \$134,000 in the latter. Homeownership rate trends diverged, increasing nearly 12 percentage points in the former compared with a drop of 3 percentage points in the latter.<sup>15</sup>

The share of senior households in the mean SF2TH tract remained basically unchanged versus a slight increase (1.8 percentage points) in the tract of the mean unsubdivided parcel. The divergence was greater for children, as previously noted, that is, a 7.4-percentage-point drop for subdivided versus drop of 2.3 percentage points for unsubdivided parcels.

Do these changes represent gentrification as it is commonly understood? In the average case, no: The mean SF2TH unit is in a tract that had substantially more White residents in 2000, was essentially identical in income, and had considerably higher median house values compared to unsubdivided parcels (40 percent White for tracts containing SF2TH units versus 30 percent White for tracts containing unsubdivided parcels, \$48,000 versus \$47,000 of median family income, and \$128,000 versus \$90,000 of house value, respectively). SF2TH redevelopment, it appears, disproportionately took place in somewhat advantaged tracts near the urban core and helped those neighborhoods grow their advantaged populations. Consider the typical pattern in most growing U.S. cities, such as nearby Austin, where land use regulations largely shield advantaged neighborhoods from infill development and housing unit densification and, instead, shunt it to historically marginalized (and less heavily regulated) areas in the urban core, thus fueling gentrification. Houston represents an entirely different trajectory (Tretter, 2016).

## Takeaways and Lessons

How should one summarize the Houston experience of SF2TH redevelopment—something that could be thought of as Houston's two-decade long experiment in repealing (erstwhile) large lot single-family zoning via allowing redevelopment into townhouses? Although it is of course important to be cautious about generalizing from one city to another, some of the topline takeaways from the empirical findings previously presented may be instructive for other large, hot market, U.S. cities, or at least those seeking to legalize townhouse-style redevelopment of large single-family lots. The following paragraphs summarize these takeaways.

**The removal of binding constraints can spur change.** At the risk of stating the obvious, the removal of a binding constraint on a form of development can greatly speed up the proliferation of that form of development (Gabbe, 2018). Just as prior research has demonstrated that minimum lot size requirements altered the quantity and character of greenfield suburban development throughout Texas and townhouse redevelopment in Houston in general, the 1998 reforms appear to have

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<sup>15</sup> Here, it is worth recalling that exhibit 7 presents simple associations between parcel status (subdivided into townhouses or not), with the various sociodemographic and other indicators shown. Causation cannot be inferred directly. Still, the simplest explanation for the observed trends is that locations with rapidly increasing incomes and property values were, all else equal, likely more attractive for redevelopment, including SF2TH, where regulations and private deed restrictions allowed.



facilitated substantial SF2TH redevelopment in Houston (Gray and Furth, 2019; Gray and Millsap, 2020). The results in this article do not permit a comparison before and after the 1998 reforms because the data span only the period from 2005 to 2020, but SF2TH redevelopment in Houston accelerated post-Great Recession to a pace likely not seen in any other U.S. city in recent times.

**Single-family-to-townhouse redevelopment is a comparatively rare event on the citywide scale.** Even though the 1998 lot size reforms and their later extension could be viewed as major success stories in spurring the production of townhouses, townhouse development on formerly single-family lots is relatively rare even under Houston's near-ideal conditions. Although it must be recognized that these estimates are likely not perfect, the analysis in this article found that only 0.5 percent of single-family lots underwent SF2TH redevelopment between 2007 and 2020. Even ambitious and successful reforms to R1 such as Houston's, in other words, are unlikely to spur rapid transformation in the single-family stock at the scale of a whole U.S. city. Most single-family housing is likely to stay single-family housing in the first decades after reform.

The same might not be true, however, at the neighborhood scale. Certain neighborhoods may be ideally situated for redevelopment and face more rapid change. Indeed, certain Houston neighborhoods, such as Rice Military and Montrose, were radically transformed by SF2TH redevelopment during the period analyzed.

**In Houston, townhouses on formerly single-family parcels are less numerous than those built on formerly nonresidential parcels.** The share of overall post-1998 townhouse development in Houston that took the form of redevelopment of formerly single-family parcels was likely less than 20 percent, although due to data limitations, the true percentage cannot be calculated precisely from the data analyzed for this article. This low share likely reflects multiple factors. The economies of scale achievable on larger (i.e., nonresidential) tracts may be attractive to developers. Existing residential neighborhoods may be subject to restrictive covenants limiting redevelopment. Even in a liberal regulatory regime, opposition from neighbors may still impede the redevelopment of parcels in established single-family neighborhoods. Moreover, the specific design of Houston's lot size reduction ordinances likely incentivizes the acquisition of larger parcels—developers can reach smaller townhouse lot sizes, for instance, if they provide common open space in their developments. This incentive could spur them to prefer larger, commercial parcels over smaller, residential ones in many cases. Whatever the exact reason, it is obvious that even where the development of a given housing product is allowed on both commercial and residential land, Houston's experience shows that it is not an inevitability that the latter will predominate.

**Single-family-to-townhouse redevelopment represents a significant intensification of land use and fiscal yield where it occurs.** Although SF2TH redevelopment represents a less dramatic physical transformation than, say, the replacement of a single-story strip mall with a midrise apartment building, it still results in a notable increase in how intensively the affected parcels are used. The median SF2TH redevelopment produces 4.2 times more floor area on the parcel than what existed before the prior single-family house on it was torn down. Notably, redevelopment increased both the density and the unit sizes of housing compared with what existed on the same parcels pre-redevelopment. These redevelopments provided more housing per household, not only per acre.

The increased valuation for property taxation purposes for all the properties that underwent SF2TH redevelopment was fully sixfold higher post-redevelopment compared with pre-redevelopment, suggesting that SF2TH redevelopment is almost certainly a fiscal winner for the city and other taxing districts even when considering additional demand for municipal services.

**Single-family-to-townhouse redevelopment is much likelier in the urban core and on certain parcels (large lots with old, small existing houses).** Notwithstanding the rarity of SF2TH redevelopment on the citywide scale, in Houston, it has concentrated in particular locations. It is intensely concentrated in the urban core—much more so than townhouse development in general, which already has a notable urban tilt. Likely, the acquisition and teardown of an existing single-family house requires considerable land values for it to be justified for SF2TH redevelopment. It is most likely to take place on larger single-family parcels where the existing house is small and old or low in value relative to the land on which it sits. This most recent finding, of course, has implications for those concerned about historic preservation in Houston or in other cities contemplating repealing R1.

**Block votes are comparatively rare citywide but apparently effective in keeping SF2TH redevelopment out of certain neighborhoods.** Block votes are comparatively rare on the citywide scale. Only 4.7 percent of single-family lots not in a block vote district as of 2007 came to be covered by one, or had one pending, by 2022. This percentage is higher than the share of such parcels that underwent SF2TH redevelopment (0.5 percent), but it is obvious that providing the block vote mechanism did not come anywhere close to halting SF2TH redevelopment on the citywide scale. If one takes a “zoomed-out” perspective, then block votes do not impede SF2TH redevelopment.

However, a “zoomed-in” perspective gives a more nuanced interpretation. Areas with heavy concentrations of block votes tend to border on, but mostly not overlap with, areas with a lot of SF2TH redevelopment. Thus, it can be inferred that certain sizable areas of the city that might otherwise be expected to have market conditions favorable for SF2TH redevelopment seem to have many blocks where this redevelopment has been thwarted.<sup>16</sup> This dynamic can be seen in the patchwork spatial pattern of large areas of concentrated townhouse redevelopment adjoining other large areas that are thick with block votes. This finding buttresses Gray and Millsap’s (2020) supposition that block votes allow homeowners to confront tradeoffs between property values and their aversion to immediately proximate redevelopment, with varying results according to the particular mix of life circumstances and preferences of homeowners on a given block.

**The spatial patterns of SF2TH redevelopment are not consistent with gentrification as a primary explanatory factor.** The hypothesis that gentrification was a primary driver of SF2TH redevelopment does not fit well with our empirical results. For a neighborhood to be commonly understood to be gentrifying during a given period requires two ingredients: (1) A population that,

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<sup>16</sup> Some evidence in favor of this supposition: Generally speaking, parcels with lower I:L ratios are less intensively used in relation to their land value, thus can be expected to be more prone to redevelopment (Landis et al., 2006). Among the parcels in the dataset with valid property values, analysis finds that unsubdivided properties incorporated into block votes during the time period analyzed here had a median I:L ratio of 0.94, significantly less than for unsubdivided properties never incorporated into block votes, or 1.90. As a point of reference, parcels that underwent SF2TH redevelopment had a median I:L ratio of 0.14 versus 1.85 for those that did not (exhibit 5). These results are consistent with the idea that block votes are likely suppressing at least some SF2TH redevelopment. The authors thank Emily Hamilton for suggesting this comparison.

at the beginning of the time period, includes an overrepresentation of historically marginalized groups and (2) a trajectory of change over time in which the share of advantaged groups increases. To be sure, SF2TH redevelopment in Houston is consistent with the second requirement. It is concentrated in tracts that from 2000 to 2015–2019 lost children, Black, and Hispanic residents and gained White residents, college educated adults, owner-occupied housing share, and house values. However, it does not meet the first requirement: When controlling for other relevant factors, SF2TH redevelopment was more likely to occur in neighborhoods with above average (although not the highest) property values and with fewer Black residents, as of 2000.

In other words, the pattern of SF2TH redevelopment is not consistent with a narrative that an influx of townhouse development led to Houston's historically disadvantaged groups having to leave their neighborhoods. Instead, it seems to have been a case of neighborhoods that were modestly wealthy to begin with getting wealthier. Neighborhoods with low house values may have had insufficient land values to attract developers or homebuyers, and the highest cost blocks may have been more likely to already have protective deed restrictions in place. Block votes may have played some role in the latter, although they were similarly most likely to be used in neighborhoods in the upper middle, rather than the top, of the citywide distribution of house values. It seems plausible that high-income blocks are more likely to have already had deed restrictions in place, and thus have less need for block votes, but this supposition must be thought of as conjecture for the time being.

Although novel building forms, such as the tall and narrow dimensions of townhouses, often serve for many as a visual totem of gentrification by contrasting with existing familiar building types, the evidence does not strongly support the association in the case of Houston. Certainly, one can find examples of gentrifying neighborhoods, such as Third Ward immediately south of Downtown Houston, which experienced a spate of SF2TH redevelopment from 2000 to 2015–2019, but this pattern was not predominant. An implication for other U.S. cities is that a broad-based, citywide repeal of R1 that effectively sparks redevelopment may result in somewhat more advantaged neighborhoods soaking up some of the housing demand now channeled to gentrifying neighborhoods.

**Single-family-to-townhouse redevelopment does not appear to be associated with a gain in children.** Many observers have lamented the lack of new housing in urban cores that is suitable for families with children. Houston has vigorously addressed this issue by pursuing regulatory changes that have allowed for the construction of tens of thousands of relatively spacious single-family townhouses that, in principle, could accommodate families with children. However, the tracts that have seen SF2TH redevelopment at the highest rates have lost children faster since 2000 than the city as a whole. It is impossible to know from our results if this loss of children is due to other factors, such as fear of crime or perceived low quality of public schools, or if townhouses are still not viewed in Houston as family-friendly housing (perhaps because of a lack of yard space or vertical layouts), despite their comparative spaciousness vis-à-vis apartments or other land-efficient housing types. It is also possible that the availability of townhouses resulted in a slower decline in the child population than would otherwise have been the case. However, one takeaway for cities

contemplating R1 repeal is that townhouse redevelopment may not on its own be a panacea for attracting children to the urban core.

### **What Remains Unknown**

Although the research reviewed in this article sheds light on the 21st century phenomenon of SF2TH redevelopment in Houston, much more is to be learned. Although it produced a reasonable estimate and portrait of SF2TH transformations, it would be valuable to compare these transformations more precisely with other forms of townhouse redevelopment in Houston, such as those originating from commercial or industrial parcels. It would also be valuable to compare the various forms of townhouse redevelopment with other forms of small-lot redevelopment, above all the teardown and one-for-one replacement of single-family houses or the construction of single-family houses on vacant lots. Property tax data may offer opportunities to make inferences about the characteristics of the people who sold SF2TH parcels versus the incoming townhouse buyers. Finally, the recent proliferation of impactful scholarship from political scientists delving into land use regulation suggests the potential for new insights from analyzing block vote patterns against traditional precinct-level election data (Einstein, Glick, and Palmer, 2019; Trounstein, 2018). Of course, more broadly, one cannot say how the lessons learned from this path away from R1 zoning extend to other reform strategies focused on “missing middle” housing or higher-density development.

### **Conclusion**

What should other cities contemplating R1 repeal learn from Houston’s experience of having allowed townhouses to appear on single-family-dominated blocks a quarter century ago? Houston shows that a robust supply response exists provided that market conditions are ripe and the new land use regulations allow for the construction of a product that builders want to build and homebuyers want to buy (one or both of which seems to have been absent in Minneapolis’ recent much-celebrated repeal of R1). At the same time, R1 repeal is unlikely to transform the face of an entire city over a short period. Instead, its rough equivalent in Houston proceeded incrementally, lot by lot, in certain areas much more than others, but at a pace and scale that was relatively modest in the aggregate. Houston’s experience suggests that R1 repeal is unlikely, on its own, to exacerbate gentrification. There is even reason to think that repeal might alleviate gentrification by channeling a higher share of new development to middle-income neighborhoods.

Small-lot townhouse development may also open up new possibilities, such as allowing for below-market, family-friendly homeownership opportunities by nonprofit builders. The relatively modest prices of many new SF2TH units implies that the public subsidies needed to bring them within reach of below median households would not be outlandish. Even in its purely market-driven form, townhouse redevelopment on single-family parcels offers considerable benefits, such as intensified usage of urban land, an increased tax base, and the production of newly built, well-located, family-sized housing units that in the median case are much cheaper than large-lot single-family equivalents.

Ultimately, one must weigh the drawbacks and benefits of SF2TH redevelopment in Houston against the status quo that exists in other high-demand large cities. Precisely where single-family-townhouse redevelopment in Houston has been likeliest to take place—on spacious, centrally located parcels, occupied by small, old houses, in neighborhoods that lean affluent—is where one might expect to see the demolition of single-family houses and their replacement with large, new, and expensive single-family houses in many other U.S. cities. If the loss of older, deteriorated single-family housing stock in such locations is difficult, impossible, or perhaps even undesirable to halt, then it is worth asking what is a worthwhile replacement. The recent experience of Houston with infill townhouses offers an intriguing and, within the context of the United States, unusual answer.

## Appendix A

### Model Specifications

The models for redevelopment are as follows:

#### Model 1

$$\text{logit}(p_{\text{SF2TH}}) = \beta_0 + \beta_1 X_{\text{ORIG}} + \beta_2 X_{\text{CBDdist}} + \beta_3 x_{\text{thv00}} + \beta_4 x_{\text{thv00}}^2 + \beta_5 X_{\text{isd00}} + \varepsilon$$

Model 1 predicts  $p_{\text{SF2TH}}$ , or the probability that a given single-family parcel in Houston undergoes redevelopment into townhouse lots at any point between 2007 and 2020.  $\beta_0$  is the y-intercept, and  $X_{\text{ORIG}}$  is a vector of original lot and house characteristics (original lot size, year original structure was built, and original structure floor area). To account for location,  $X_{\text{CBDdist}}$ , the “as the crow flies” distance in miles from the centroid of the parcel’s tract to Houston’s City Hall, is included.  $x_{\text{thv00}}$  is the median house value, as of 2000, in the parcel’s tract. The model also includes a squared term, because of the hypothesized quadratic relationship between tract house value and probability of redevelopment. Finally, the model includes  $X_{\text{isd00}}$ , a vector of tract sociodemographic characteristics in the year 2000 (population share under age 18, percent Black non-Hispanic, percent Hispanic, and share of adults ages 25 and older with a bachelor’s degree or higher), plus an error term.

The model for block votes is almost identical to Model 1 but with one difference, noted in the following paragraph.

#### Model 2

$$\text{logit}(p_{\text{BV}}) = \beta_0 + \beta_1 X_{\text{ORIG}} + \beta_2 X_{\text{CBDdist}} + \beta_3 x_{\text{thv00}} + \beta_4 x_{\text{thv00}}^2 + \beta_5 X_{\text{isd00}} + \beta_6 X_{\text{SF2TH}} + \beta_7 x_{\text{SF2TH}}^2 + \varepsilon$$

Instead of modeling the probability of a lot undergoing redevelopment into townhouses, as in Model 1, Model 2 models  $p_{\text{BV}}$ , the probability that a lot that was not in a block vote district as of the beginning of 2007 is incorporated into a block vote district sometime between 2007 and August 2022, inclusive. The independent variables are all the same as in equation 1, except they also include  $x_{\text{SF2TH}}$ , the number of SF2TH units built within the same census tract as the parcel at any time between 2007 and 2020, inclusive. A squared term for  $x_{\text{SF2TH}}$  is included.

## Appendix B

### Exhibit 8

Descriptive Statistics for the Dependent and Independent Variables in the Logistic Models

	Mean	Median	Min	Max	Standard Deviation
<b>Dependent Variables</b>					
Initially single-family lot as of 2005 underwent subdivision from 2007 to 2020 (dummy)	0.00484	0	0	1	0.0694
Initially single-family lot as of 2005 was incorporated into a block vote between 2007 and August 2022 (dummy)	0.0467	0	0	1	0.211
<b>Original Lot and Structure Characteristics</b>					
Original lot size (acres)	0.212	0.174	0.0230	9.975	0.223
Original structure year built	1960	1959	1840	2016	19
Original structure interior area (sf)	1,731	1,521	300	9,992	887
Distance from CBD (miles)	8.25	8.00	0.29	26.64	3.98
<b>Tract-level Characteristics from U.S. Census, Year 2000</b>					
Median house value (1999 USD)	\$90,442	\$64,295	\$17,500	\$1,000,001	\$85,481
Population share under age 18	0.278	0.292	0.0296	0.471	0.0623
Population share Black non-Hispanic	0.281	0.101	0.000595	0.983	0.327
Population share Hispanic	0.366	0.301	0.00283	0.972	0.275
Share of people ages 25+ with bachelors or higher	0.221	0.132	0.00445	0.817	0.214
<b>SF2TH Townhouses in Tract, Built from 2007–2020</b>					
SF2TH townhouses in tract	11.88	0	0	719.00	56.64

CBD = central business district. SF2TH = single-family-to-townhouse.

Sources: Harris County Appraisal District (HCAD), US Decennial Census, and American Community Survey data, with calculations by authors

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