Journal of Urban Economics 124 (2021) 103337

Contents lists available at ScienceDirect

Journal of Urban Economics

journal homepage: www.elsevier.com/locate/jue

The local residential land use regulatory environment across U.S. housing markets: Evidence from a new Wharton index ☆

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A B S T R A C T

We report results from a new survey of local residential land use regulatory regimes for nearly 2,500 primarily suburban communities across the United States. Key stylized facts are documented and compared to findings from a previous survey (Gyourko, Saiz, Summers, 2008). We are able to observe how the local regulatory environment has changed in over 800 communities in both samples. This represents the first consistent nationwide data documenting changes in residential land use regulation at the local jurisdictional level. Finally, we discuss how these changes can and should broaden the research questions for housing and urban economists investigating the local residential land use environment.

1. Introduction

High house prices, especially in America's larger coastal markets, have spawned growing concerns about housing affordability for middle class, not just low income, households. The potential role of local residential land use restrictions in helping to generate such high prices is an issue of growing importance in the public and academic spheres. In the public arena, this led to a host of policy responses on both sides of the aisle, including a 2019 Presidential Executive Order establishing a White House Council on Eliminating Regulatory Barriers to Affordable Housing and the Biden Administration's plans to eliminate local regulations.[1] Regionally, this has been a topic of public debate in California especially, with recently proposed legislation that would have restricted localities from stopping residential construction in certain circumstances. In addition, the rise of a Yes In My Back Yard (YIMBY) political movement is a relatively new development in various parts of the country ranging from California and Oregon to Minnesota.[2] The academic literature on the topic also has grown substantially in recent years.[3]

☆ We appreciate the excellent work of Laura Gooderis and her colleagues at the International City Managers Association (ICMA) in helping implement the new survey used in this paper. The paper has benefited from the comments of three referees and the Editor (Ed Glaeser). In addition, Ingrid Ellen and participants in presentations at the 2019 NBER Summer Institute and at the Wharton School's Urban Lunch group provided valuable comments on previous drafts. We also benefitted from superb research assistance provided by Diane Ding, Anna Gao, Xinyu Ma, Sean McCulloch and Rachel Pomerantz. Finally, we appreciate the financial support of the Research Sponsors Program of the Zell/Lurie Real Estate Center at Wharton.

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[1] In 2019, the Trump Administration established the White House Council on Eliminating Regulatory Barriers to Affordable Housing. See https://www.presidency.ucsb.edu/documents/executive-order-13878-establishing-white-house-council-eliminating-regulatory-barriers for the text of the underlying executive order. The Biden campaign also outlined plans to eliminate some local regulations. See https://www.filesforprogress.org/memos/housing/Biden_DFP_memo.pdf or https://joebiden.com/housing// for more on their thinking on this issue.

[2] For example, California state bill (SB 827) would have limited the ability of localities to stop denser developments involving multifamily-type construction. For one of many analyses of this effort, which did not pass or even make it out of committee, see the Vox article at https://www.vox.com/cities-and-urbanism/2018/2/23/17011154/sb827-california-housing-crisis. See the July 5, 2017, article in *The Atlantic* for more on the new YIMBYism movement. Entitled "From 'Not in My Backyard' to 'Yes in My Backyard'", it may be accessed at https://www.theatlantic.com/business/archive/2017/07/yimby-groups-pro-development/532437/. The Oregon state legislature recently passed a bill to effectively ban single-family zoning in Oregon neighborhoods. See: https://www.oregonlive.com/politics/2019/06/bill-to-eliminate-single-family-zoning-in-oregon-neighborhoods-passes-final-legislative-hurdle.html. In late 2018, the Minneapolis City Council voted to eliminate single-family zoning, and in its stead, permit up to three housing units on each site. On this, see https://nytimes.com/2018/12/13/us/minneapolis-single-family-zoning.html.

[3] For example, see Albouy & Ehrlich (2018), Emrath, (2016), Been et al. (2016), Jackson (2016, 2018), Lin and Wachter (2019), and Turner, *et al.* (2014) for some recent efforts. Gyourko & Molloy (2015) provide the most recent scholarly literature review, with Glaeser & Gyourko (2018) describing how a restrictive supply side of housing markets appears to be affecting home prices in coastal markets especially.

https://doi.org/10.1016/j.jue.2021.103337
Received 4 June 2020; Received in revised form 12 February 2021
Available online 26 March 2021

There are many challenges to producing convincing analysis of the impact of the local regulatory environment, but such research always starts with measuring restrictiveness.[4] In this paper, we report results from a new survey of the residential land use regulatory environment in nearly 2,500 primarily suburban jurisdictions across a wide array of metropolitan areas throughout the country.[5] We construct a measure of regulatory restrictiveness called the Wharton Residential Land Use Regulatory Index (WRLURI), utilizing the same methodology as for the first Wharton regulatory index to facilitate comparison over time. To distinguish the new index from the first Wharton survey conducted over a decade ago, we refer to the new measure as WRLURI2018 and the previous index as WRLURI2006.

Our index methodology provides a convenient way to rank individual communities and markets in terms of their regulatory restrictiveness. The index is standardized so that it has a mean of zero and a standard deviation of one, where a higher value implies more regulation. However, the index does not reveal the actual regulatory policies and practices of different places. To provide a translation from index values to characteristics of regulatory environments on the ground, we group communities by their rank in the overall distribution of WRLURI2018 values. More specifically, we consider those in the bottom quartile of the WRLURI2018 distribution to be lightly regulated, those in the top quartile to be highly-regulated, and those in the interquartile range to have an average level of regulation.

Being relatively lightly regulated by our metric does not imply that the jurisdiction is unregulated or characterized by a near absence of residential land use controls. Among this subset of communities, two entities (usually a local planning commission and a local council) typically are required to approve any project that needs rezoning. Even for projects not requiring a variance to the zoning code, it is not uncommon for lightly-regulated communities to require the approval of two local entities in order for the development to proceed. Density restrictions are omnipresent, too. Ninety-four percent of the communities in the *bottom* quartile of the WRLURI2018 distribution have some type of minimum lot size requirement in at least one of their neighborhoods, with the typical minimum being less than one-half acre. It also takes a meaningful amount of time to get a proposal through the approval process in these relatively lightly-regulated communities. The average time span between submitting a project for approval and receiving a decision is 3.7 months, which amounts to 111 days assuming thirty days per month.

As was the case with the 2006 survey, the new data show that highly-regulated places tend to be more so on multiple dimensions. Thus, they are in the top quartile of the rankings not because they are extremely restrictive in only a few facets of regulation. These places tend to have at least three different entities that must approve (and, thus, can veto) a project. Density restrictions are more severe on average, as the modal community among this group reports a 2+ acre minimum lot size restriction in at least one of its neighborhoods. In addition, there is a more intense level of involvement in the regulatory process reported on the part of public and local officials in the places we rate as the most highly regulated. These jurisdictions are also more likely to have open space requirements and exaction fee programs imposed on builders. Project review delay times are more than double those found in the lightly-regulated areas, with the average being 8.4 months.

The average regulatory environment looks like the mean of the lightly- and highly-regulated ones. Hence, there is no place (on average) where residential development is simple and quick in the sense that projects are reviewed quickly by a single entity that has final approval rights.

A stricter regulatory regime at the jurisdiction level is associated with higher house values, higher incomes and a larger share of college graduates. In contrast, other local traits such as race and housing unit permitting intensity are not strongly correlated with our regulatory measure. These patterns appear to be robust over time, too, as lagged house values, incomes and level of educational achievement also predict current WRLURI2018 values, but neither lagged racial composition nor permitting intensity do so.[6] Thus, more restrictive residential land use regulation appears bundled together with high human capital, high incomes and expensive homes, both in the cross section and over time.

To the extent that metropolitan area-wide housing markets themselves differ along these lines, there should be spatial variation visible at that more aggregate level. This is documented using data from 44 metropolitan areas (technically, core-based statistical areas or CBSAs) in which there were at least ten communities responding to our survey. With 10 or more respondents, we felt comfortable creating market-wide regulatory index values, which reflect the simple means of the individual communities' WRLURI2018 values. The San Francisco and New York City CBSAs are the most highly regulated markets in the country, with each having a WRLURI2018 value that is more than one standard deviation above the national average.

In addition, there is a clear regional pattern to the CBSA-level results (see Fig. 1 and Table 4 below). Nine of the top 10 markets in terms of measured regulatory strictness are situated along either the northeast coast (from Boston down through Washington, D.C.) or the west coast of the country (Seattle, Portland (OR), San Francisco and Los Angeles). The most lightly-regulated among the group of larger metropolitan areas tend to be declining markets in the Rust Belt region (e.g., Cleveland, OH, Grand Rapids, MI, Cincinnati, OH, Detroit, MI, and St. Louis, MO). These markets tend to have WRLURI2018 values that are about one-quarter to one-third of a standard deviation below the national mean.[7] The interquartile range of this group contains a wide array of markets across the rest of the country. Markets around the national average (WRLURI2018 index values within one-tenth of a standard deviation from zero) include Houston, TX, Columbus, OH, San Antonio, TX, and Pittsburgh, PA. A simple fixed effects regression of jurisdiction-level WRLURI2018 values on CBSA dummies generates a R^2=0.45. A separate bivariate regression on census division dummies has much less explanatory power (R^2=0.09), so housing market-level effects are stronger. Even so, the bulk of the variation in regulatory index value is across places within a metropolitan area. On average, the locality itself clearly matters in determining its regulatory environment.

The 2018 survey allows us to paint a broad picture of the current regulatory environment. However, the cross section cannot tell us how the regulatory environment changed over time—either in aggregate or for certain markets or regions. To document changes, we exploit data from the 2006 Wharton survey (Gyourko et al. (2008)) and measure changes in communities' responses across the two sets of responses. In an online appendix, we detail changes from both the repeated cross-sections (all 2,720 respondent communities in 2006 versus all 2,825 in 2018) and the panel of 890 communities that responded to both survey waves.[8] We believe this is the first consistent nationwide data to docu-

[4] Prior efforts to measure the degree of regulatory restriction include Linneman, et al. (1990), Glickfield and Levine (1991), Pendall, Puentes and Martin (2006), and Gyourko, Saiz and Summers (2008). For other recent efforts on measuring restrictiveness, see the Terner Center's California Land Use data (http://californialanduse.org/index.html) and Brueckner and Singh (2020).

[5] Survey responses are always at the level of the individual political jurisdiction. A few are large central cities, but the vast majority are suburban communities surrounding the central city of an urban area, with a small number being rural jurisdictions outside of any core-based statistical area (CBSA). We use the terms jurisdiction, community and place interchangeably throughout the paper. The names of each jurisdiction are included in the downloadable data file discussed later in the paper.

[6] For example, the simple correlation of house value from the 2005-2009 *American Community Surveys* with a jurisdiction's WRLURI2018 value is 0.28. The analogous figures for income and college graduate share are 0.24 and 0.20, respectively.

[7] Given that the index is standardized with a mean of zero and standard deviation of 1, this implies that communities in many smaller markets make up the bulk of places with even lower WRLURI2018 index values.

[8] Depending upon the specific survey question, there typically are from 750-900 communities that answered it in both the 2006 and 2018 surveys. The number that answered

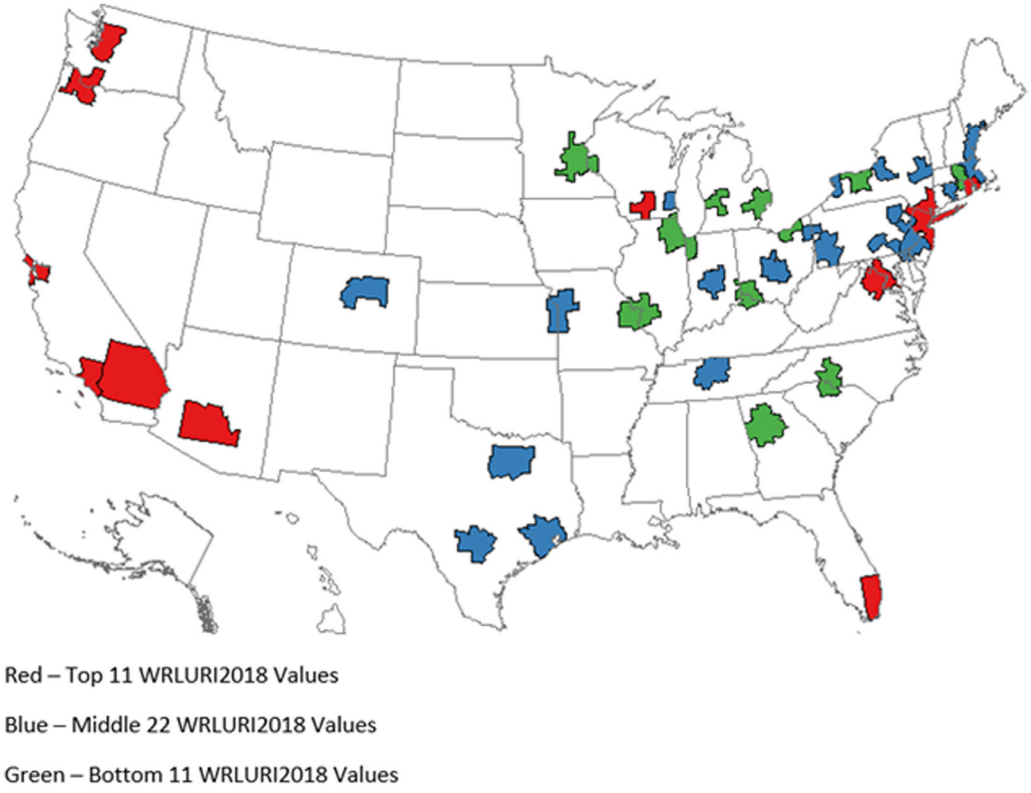

Fig. 1. Regional variation in land use regulation. Note: Figure shows only the 44 CBSAs with at least 10 observations.

ment changes in residential land use regulation at the local jurisdiction level.

In the text below, we focus on a small number of changes that we believe are especially relevant for future research. The first is not a change at all, but the absence of change. More specifically, restrictive local land use environments seem highly resistant to weakening. At the metropolitan area level, there is no case of a highly regulated market as of 2006 becoming substantially (or even modestly) less regulated over time. To the extent there is change, it is to strengthen the control regime. Now that we can measure change (or its absence) over time, a key question for future research is to pin down why.

This is not to imply that the nature of the local regulatory environment has been static since the mid-2000s. One trend involves the spread of density controls. Minimum lot size restrictions are not new, but they have become very popular and are now almost omnipresent across nearly every locality in every type of metropolitan area. Moreover, it is no longer uncommon to see a 1-acre+ minimum in the suburbs of virtually any housing market. This is not the case for other controls such as exaction fees (which declined in usage between the two surveys), open space requirements, or housing affordability requirements. Future research needs to use this variation to model and better understand why the local regulatory environment looks the way it does. A start on this issue would involve determining why the benefit-cost ratio of imposing higher minimum lot sizes seemed so much more favorable to many localities compared to the other regulations they could have imposed.

A third interesting stylized fact involves changes over time in the share of highly-regulated communities with a metropolitan area. Among CBSAs that we categorize as highly-regulated metropolitan housing markets, the share of highly-regulated jurisdictions within them rose over time. In contrast, among CBSAs that we categorize as lightly-regulated, it is nearly equally likely that the share of high-regulated communities within them fell (not rose) over time. As is documented below, this change is making it harder than it was only a decade ago for a prospective home buyer in the San Francisco Bay Area to find a lightly-regulated community. However, it remains easy, and became easier, to find such a community in more lightly-regulated regions such as Pittsburgh, Chicago and Atlanta. The change in the Bay Area (and other markets like it) has potentially vital implications for affordability conditions and the nature of the housing market itself when a middle class household cannot easily substitute away from a restrictive supply side environment almost anywhere within the local labor market area.

A fourth and final change that we think will help drive future research is the ongoing rise in the arduousness of navigating the regulatory environment from the homebuilder's perspective. This is best evinced by the increase over time in the number of regulatory bodies that must approve, and thus have veto rights, over any development project requiring a variance to the local zoning code. This change is widespread and is not confined to the most highly regulated markets in the 2018 survey. Why this is so and what it accomplishes for individual communities should be on the research agenda of those interested in understanding local government behavior.

Note that none of these changes directly involves how regulation affects housing prices, which has been the most studied issue in this area. That topic certainly will not go away and the ability to use differences in the regulatory environment over time will help make that research more credible. However, there clearly are new and different aspects of the political economy of local government and their housing markets that can be addressed with the new survey data complementing the old.

The plan of the paper is as follows. The next section describes how we construct the aggregate regulatory index for each place. Section III then reports results. This section describes the distribution across individual communities throughout the nation and then reports on market-wide variation. We also translate what the index numbers mean in terms

all questions in both surveys is just over 500. We also confirm that there are not strong selection effects in terms of which communities responded to both waves of the survey.

of actual regulations in place. Section IV describes how the regulatory environment has changed over time. Section V briefly concludes.

2. Defining the local regulatory environment: survey responses and index creation

A key reason it is so difficult to accurately measure the restrictiveness of the local regulatory environment is because there are many different ways that regulation can affect housing supply. The most direct mechanism is via a hard cap on permitting or building of new housing units. However, communities also can influence supply in indirect ways by enacting policies that raise costs or constrain potential builders, such as delaying evaluation of project proposals, imposing expensive design or density restrictions, etc. To help characterize such a complex regulatory environment, our survey asks a series of questions focused on the process of local regulation, as well as a few specific ways in which builders are constrained by rule or law. As with the 2006 survey, the questions fall into one of three categories. The first asks about the general nature or characteristics of the regulatory process. These include queries about who is involved in the process (e.g., local council, state legislature, local citizens, etc.) and how important these actors are. The second set of questions asks about the overarching rules of the process by which the housing market is regulated. These queries identify whether there are any explicit caps on permitting or construction, as well as the nature of density restrictions such as minimum lot size regulations. The survey also includes inquiries about other rules such as affordable housing requirements, impact fees and exactions. This section also asks about the typical time lag between when a project is proposed by a builder and when the local government provides a response to the application. The third and final set of questions asks about outcomes, such as changes in the cost of lot development, as well as the number of re-zoning permits applied for by developers. The 2018 survey instrument, as well as that from 2006, are reproduced in the first section of the online appendix which is available at http://real-faculty.wharton.upenn.edu/gyourko/land-use-survey//. Summary statistics on each question used in any index reported in this paper follow immediately thereafter in our online appendix.[9]

In order to translate the voluminous data generated from answers to our survey questions into a measure of regulatory strictness, we follow the strategy used in creating the first Wharton index. This begins by building a dozen subindexes that gage different components of the underlying regulatory environment. Simple factor analysis then is used to combine the information from the subindexes into a single aggregate measure of regulatory strictness. We do not argue that ours is the only sensible way to categorize the regulatory environment. However, many researchers already are familiar with the structure of the previous index, and it has been found to be a useful indicator of regulatory strictness in a variety of contexts.[10] Even more importantly for our purposes, this empirical strategy has the considerable benefit of facilitating comparison with that previous Wharton index. We exploit this below in Section IV's discussion of how the local residential land use regulatory environment has changed (or not) over time.

2.1. Subindex creation

Using individual community responses to various survey questions, we create a dozen separate indexes that capture different components of the local regulatory environment. Each subindex is described just below, with the second section of the online appendix providing a detailed mapping of each underlying question to the subindex in which it is used. Each subindex is created so that a higher value connotes 'more' or 'stricter' regulation.

1. Local Political Pressure Index (LPPI)

This subindex quantifies the degree to which various actors are involved in the local residential development process. The underlying data largely come from responses to Question 3 on our survey, which asks: "In your community, how involved are the following in affecting residential building activities and/or growth management procedures?" Respondents then rate the importance of various actors—such as a local council or managers, local community pressure or other listed entity–on a 1 to 5 scale, with 1 indicating the actors have no involvement and 5 indicating they are "Very Involved." To these scores, we add the number of land preservation and conservation-related ballot initiatives approved by the municipality between 2008 and August 2018. The ballot initiatives measure is based on the *Trust for Public Land Landvote* database.[11]

Scores are summed as follows:

$$LPPI = LocalCouncil + Community\,Pressure + Other + BallotInitiatives, \quad (1)$$

so that the range of answers is from a low of three (1 + 1 + 1 + 0, if the community responded that no local council was involved in the process, community pressure was not relevant, that there was no other group we did not list in Question 3, and there were no relevant ballot initiatives over the past decade) to 15 plus the number of ballot initiatives (5 + 5 + 5 + #BallotInitiatives).[12]

2. State Political Involvement Index (SPII)

The State Political Involvement Index (SPII) is based on the answer to a single question asking how involved is the state legislature in influencing residential building activities and/or growth management procedures. Thus,

$$SPII = StateLeg. \quad (2)$$

Because this is a component of Question 3 described above with respect to the LPPI, its answers also range from 1 (no involvement) to 5 (very involved).

3. Court Involvement Index (CII)

This is the final index regarding the actors involved in the local residential land use process. The CII is the sum of the reported local and state courts' involvement in affecting residential building activities and/or growth management (the sums of questions 3d and 3e, respectively). That is,

$$CII = LocalCourt + StateCourt. \quad (3)$$

The potential range of values is from 2 to 10, with a value of two indicating that both local and state courts are not at all involved in the regulatory process, and a score of ten indicating that they are heavily involved.

[9] All data from the 2018 and 2006 surveys also are available for download from this page.

[10] There are over 700 cites of the 2008 paper according to Google Scholar as of this writing, so there is widespread usage of the first index.

[11] To access the database, see: https://tpl.quickbase.com/db/bbqna2qct?a=dbpage&pageID=8.

[12] Conceptually, even though a higher degree of public and local official involvement could arise from a desire to lighten the regulatory burden, it almost certainly reflects a relatively high level of existing restrictiveness. This is confirmed by data reported in Table 3 below. This conclusion holds for the next two subindexes, too.

4. Local Project Approval Index (LPAI)

Question 4 of our survey asks for a different type of information on the process of regulatory control—namely, who must approve different types of projects before they can be built and whether approval requires a supermajority vote in favor. This subindex pertains to projects that do not require any variance to the current zoning code (i.e., they are 'by right' because they do not violate any current rule or law).

The question asks which of nine entities have to approve a project before any housing can be built. Eight specific entities listed include: the local planning commission; local zoning board; local council, managers, or commissioners; the county board of commissioners; the county zoning board; an environmental review board; a public health office; or a design review board; the ninth is 'Other' in case there is another group we did not list that is relevant.[13] Thus,

$$LPAI = LocalPlan + LocZone + LocCouncil + CountyComm + CountyZone + Environ + PubHealth + Design + Other. \quad (4)$$

Response values for each entity range from 0 to 2. A zero indicates the entity does not have to approve the project. A value of one indicates that the entity does have to approve, but may do so by a simple majority vote. A value of 2 indicates that the entity must not only formally approve the project, but must do so by a supermajority vote of its decision makers. Hence, the possible range of values for this index runs from 0 to 18. A value of zero indicates that there is no entity required to approve a 'by right' project, while a value of 18 would indicate that each of the eight listed entities, plus at least one other listed by the respondent, must approve with a supermajority in favor.

5. Local Zoning Approval Index (LZAI)

The LZAI is created exactly as described above for the LPAI, except it pertains specifically to projects that *do* require some type of variance or change to the local zoning code (see the second half of Question 4 from the survey). Thus,

$$LZAI = LocalPlan + LocZone + LocCouncil + CountyComm + CountyZone + Environ + PubHealth + Design + Other, \quad (5)$$

with the range of possible outcomes the same as for the LPAI subindex.

6. Local Assembly Index (LAI)

The LAI uses the final piece of data generated from Question 4. That question also asks whether a town meeting is required to approve any type of proposed residential project. Rather than include this information as a component of the LPAI and LZAI indexes just described, we use it to create a separate index to capture whether the local regulatory environment requires some type of direct democracy involvement of the local population. Thus,

$$LAI = TownMeet, \quad (6)$$

with the index values ranging from 0 to 2.[14]

7. Supply Restrictions Index (SRI)

The Supply Restrictions Index reflects the extent to which there are explicit annual caps on the supply of new housing. Question 8 of the survey asks whether (in a simple 'yes or no' sense) the respondent community places annual limits on the total allowable number of permitted units, total number units constructed, units per dwelling or the aggregate number of buildings constructed. More specifically, the question asks whether there are limits for the following: building permits for single family homes or multifamily units; the number of single family homes or multifamily units authorized for construction; the number of multifamily units buildings authorized for construction; and the number of units in multifamily dwellings. The SRI is the simple sum of the number of limits on building permits, construction, or number of dwellings and units and is constructed as follows:

$$SRI = SFPermits + MFPermits + SFConst + MFConst + MFBuild + MFUnitsDwell. \quad (7)$$

Hence, its value ranges from a low of zero to a high of six.

8. Density Restriction Index (DRI)

One way to constrain housing supply is to impose density restrictions. Question 7 of the survey asks whether the community has any minimum lot size requirement at all, and if so, the size of the largest minimum required in any neighborhood within the jurisdiction. Specifically, respondents were asked to indicate whether their largest minimum required that homes be built on less than one-half acre of land, from 0.5 to 1.0 acres, from 1 to 2 acres or from 2+ acres.

The DRI subindex takes on values ranging from 0 to 4 and is constructed as follows:

$$\begin{aligned} DRI &= 0 \text{ if there is no minimum lot size regulation anywhere in the jurisdiction} \\ &= 1 \text{ if there is a minimum, but it is no larger than } 0.5 \text{ acres} \\ &= 2 \text{ if there is a minimum, and the largest one is from } 0.5 - 1.0 \text{ acres} \\ &= 3 \text{ if there is a minimum, and the largest one is from } 1.0 - 2.0 \text{ acres} \\ &= 4 \text{ if there is aminimum, and the largest one is for more than } 2 \text{ acres}. \end{aligned} \quad (8)$$

9. OpenSpace Index (OSI)

Question 9 of the survey asks about different types of regulations that communities might impose on developers in return for the right to build. One is whether residential real estate developers are required to provide some type of space for the community to use (or pay a fee in lieu of providing such space). This could reflect an explicit open space requirement or some mandate that space be provided for a specific community use. For simplicity, we call this the Open Space Index, with OSI measured as 0–1 dummy where a value of one indicates that some type of dedicated space is required to be provided (or a financially equivalent fee paid). Thus,

$$OSI = 1 \text{ if some type of mandatory space provision is required}; = 0 \text{ otherwise}. \quad (9)$$

10. Exactions Index (EI)

Question 9 also asked whether the community required developers to pay any type of impact fee or the allocable share of the costs of infrastructure. The EI also is a 0–1 variable and is measured as follows:

$$EI = 1 \text{ if an impact fee exists}; \text{ and} = 0 \text{ otherwise}. \quad (10)$$

11. Affordable Housing Index (AHI)

The final component to Question 9 asks whether developers were required to "Include affordable housing, however defined, in their projects" in order to be able to build in the jurisdiction. We interpret an answer in the affirmative to indicate that there exists some affordable housing requirement in the municipality. This also is a 0–1 variable such that

$$AHI = 1 \text{ if an affordable housing program exists}; \text{ and} = 0 \text{ if not}. \quad (11)$$

[13] There were other relevant entities mentioned by respondents. For example, the California Coastal Commission often was listed by communities in the major coastal metropolitan areas of that state.

[14] We do not sum across the types of projects in the creation of this index. If any type of project approval requires some type of town meeting, the subindex takes on a value of 1 or 2 (if supermajority approval is required), and a value of 0 if no town meeting is required.

12. Approval Delay Index (ADI)

The final subindex used in creating our aggregate index is a measure of permit approval delay. The survey asks about project review time in several places (including questions 16, 17, 18, 20, and 22). The Approval Delay Index (ADI) combines the average review time for residential projects, rezoning requests involving multiple unit types and subdivision requests into a single metric. The ADI is calculated in several steps. First, we compute the simple averages of review time (reported in months) for:

(1) *by-right* single-family unit projects and by-right multifamily unit projects

((sfprojrev + mfprojrev)/2) from Questions 16a and 16b);

(2) *not by-right* single-family unit projects and not by-right multifamily unit projects

((nsfprojrev + nmfprojrev)/2) from Questions 17a and 17b);

(3) application for and issuance of a building permit for development of less than 50 single-family units, 50 or more single-family units, and multi-family units

((sfl50 + sfm50+ mf)/3) from Questions 20a, 20b, and 20c);

(4) application for subdivision approval and issuance of a building permit for development of less than 50 single-family units, 50 or more single-family units, and multi-family units ((subsfl50 + subsfm50 + submf)/3) from Questions 22a, 22b, and 22c).

We then take the average of these four numbers to arrive at the number of months involved in the Approval Delay Index (ADI). More specifically,

$$ADI = \{((sfprojrev + mfprojrev)/2) + ((nsfprojrev + nmfprojrev)/2) + ((sfl50 + sfm50 + mf)/3) + ((subsfl50 + subsfm50 + submf)/3)\}/4. \quad (12)$$

This average across such a wide range of potential projects is used because we believe it helps reduce potential measurement error in this variable.

2.2. Creating the aggregate index (WRLURI2018)

Simple factor analysis is employed to create the Wharton Residential Land Use Regulatory Index. Specifically, we select the first factor from each subindex to create an aggregate WRLURI2018 value for each jurisdiction.[15] As with the previous Wharton index, we employ this methodology to construct a single measure by which localities can be ranked based on the restrictiveness of their regulatory environments. We also standardize the WRLURI2018 measure such that the sample mean is 0 and its standard deviation is 1, with lower (higher) values of the index reflecting a less (more) restrictive regulatory regime in the community.

Table 1 shows the weights, or factor loadings, of each subindex in the aggregate index, as well as the correlation with the aggregate index.[16] Note that the Court Involvement Index, State Political Involvement Index, and Local Political Pressure Index have the highest factor loadings and almost the same strong correlation with the aggregate index, while the Density Restriction Index and Supply Restriction Index have the lowest factor loadings and weakest correlations with WRLURI2018. This indicates that there is relatively high variation across communities in the different political and court involvement indexes, but not as much in the supply and density restriction measures. That further implies the former set of subindexes are more influential in determining rankings of communities in terms of overall restrictiveness, but it does *not* mean they are the most influential in determining the absolute level of restrictiveness in a community.

3. Results

3.1. Inside versus outside metropolitan areas

Our full sample contains complete subindex and aggregate index data on 2,472 communities across the nation.[17] Information on the distribution of WRLURI2018 values for this sample are reported in the first column of Table 2. As noted above, the mean index value for the full sample is zero with a standard deviation of one by construction (see the first and second rows).[18] More detail on the full distribution is provided in the remaining rows of the column. The interquartile range runs from −0.68 to 0.62, so the middle fifty percent of communities have aggregate index values within seven-tenths of a standard deviation from the sample mean.

The second column reports index values for the 2,233 communities that lie within any core-based statistical area (CBSA) in the nation. Given that they represent 90 percent of the sample, their distribution looks much like that for the full sample. This is not the case for the 239 communities outside of CBSAs. Their mean WRLURI2018 value is 0.3 standard deviations below that for the metro area sample, and the median community outside a metropolitan area has an index value of −0.51, which puts it one-half of a standard deviation below the full sample mean. While the average community outside of any CBSA is much less regulated by our measure, this does not hold for its entire distribution. The top tail of the non-CBSA sample–from the 90th percentile and above–is nearly as highly regulated as the most regulated jurisdictions within metropolitan areas. While the stark differences in regulatory environments among local jurisdictions outside CBSAs are interesting, the remainder of this paper focuses on results for communities located within a CBSA.

3.2. What does it mean to be lightly, moderately and highly regulated in the U.S.?

Table 3 reports subindex and census information on communities within CBSAs. The first column reports this information for the 559 places in the bottom quartile of the WRLURI2018 distribution. These places have index values more than −0.64 standard deviations below the nationwide mean. For each subindex, we report mean values across individual places in the bottom quartile. The middle column of Table 3 reports analogous information for the 1116 places with WRLURI2018 values within the interquartile range of that index. The third column reports information on the 558 places in the top quartile of the WRLURI2018 distribution.

[15] Stata's PCA routine is used to extract the principal component from each subindex.

[16] The factor loadings are the weights applied when multiplying by each of the subindexes (which are themselves standardized in the principal component analysis) to generate the WRLURI2018 index as a linear combination of the twelve subindexes.

[17] This includes cases in which we allocated answers. This was done for Questions 3, 4, 8 and 9 as follows. For example, Question 3 asks about the intensity of involvement in the regulatory process by six possible actors. If all subparts of the question were left blank, we left the responses as missing. However, if the locality indicated some type of involvement for one or more (but not all) of the actors, we used those responses and imputed a response of "No Involvement" (i.e., =1) for the other actors listed. Thus, we never impute any positive involvement and only impute no involvement when a question is at least partially answered. Allocation flags for these cases are included in the publicly posted data so that researchers may see which observations were affected.

[18] All results in the main body of the paper are based on equal weighting of all relevant survey respondents. At the end of this section of the paper, we discuss in more detail how our key conclusions are robust to different assumptions about weighting.

Table 1
WRLURI2018 and its components (full sample: $n = 2472$).

	Factor Loadings	Correlation with WRLURI
Court Involvement Index (CII)	0.42	0.62
State Political Involvement Index (SPII)	0.41	0.59
Local Political Pressure Index (LPPI)	0.40	0.58
Exactions Index (EI)	0.28	0.41
Approval Delay Index (ADI)	0.28	0.41
Local Project Approval Index (LPAI)	0.29	0.42
Local Zoning Approval Index (LZAI)	0.27	0.39
Open Space Index (OSI)	0.24	0.35
Affordable Housing Index (AHI)	0.27	0.39
Local Assembly Index (LAI)	0.17	0.24
Supply Restrictions Index (SRI)	0.12	0.17
Density Restriction Index (DRI)	0.09	0.14

Table 2
WRLURI2018 summary statistics for communities inside and outside CBSAs.

WRLURI2018 Distribution	Full Sample	Metro Area Sample	Non-Metro Area Sample
Mean	0.00	0.03	−0.30
Standard Deviation	1.00	0.98	1.15
Minimum	−2.64	−2.64	−2.55
1st percentile	−2.04	−1.94	−2.26
10th percentile	−1.21	−1.17	−1.60
25th percentile	−0.68	−0.64	−1.09
50th percentile	−0.08	−0.03	−0.51
75th percentile	0.62	0.64	0.32
90th percentile	1.31	1.33	1.23
99th percentile	2.67	2.58	2.75
Maximum	4.86	3.94	4.86
Local Traits			
Median Family Income (2010)	62,259	64,429	41,801
Median House Value (2010)	217,140	227,206	122,236
Percent College Graduates (2010)	30.64%	31.89%	18.87%
Percent Poverty (2010)	13.04%	12.45%	18.64%
Percentage White (2010)	77.79%	77.55%	80.08%
Population (2010)	23,909	25,950	4748
Land Area in Square Miles (2010)	20.76	20.98	18.74
Population Density Per Square Mile (2010)	1792	1890	883
N	2472	2233	239

Table 3
Variation across the WRLURI2018 distribution (CBSA sample; $n = 2233$).

	Lightly-Regulated: Bottom Quartile WRLURI 2018 ≤ -0.64	Average Regulation: Interquartile Range $-0.642 <$ WRLURI 2018 < 0.637	Highly-Regulated: Top Quartile WRLURI 2018 ≥ 0.64
Subindex			
Local Political Pressure Index(LPPI)	6.85	8.61	9.83
State Political Involvement Index(SPII)	1.44	2.17	3.05
Court Involvement Index(CII)	2.30	3.11	4.48
Local Assembly Index(LAI)	0.33	0.44	0.60
Local Project Approval Index(LPAI)	1.67	2.24	3.22
Local Zoning Approval Index(LZAI)	2.28	2.79	3.69
Density Restriction Index(DRI)	1.92	2.13	2.48
Supply Restrictions Index(SRI)	0.04	0.11	0.36
Open Space Index(OSI)	0.32	0.64	0.76
Exactions Index(EI)	0.20	0.56	0.75
Affordable House Index(AHI)	0.02	0.10	0.36
Approval Delay Index(ADI–months)	3.7	5.0	8.4
Local Traits			
Median Family Income (2010)	55,817	63,790	74,235
Median House Value (2010)	172,576	215,782	304,262
Percent College Graduates (2010)	27.76%	31.78%	36.18%
Percent Poverty (2010)	14.55%	12.23%	10.80%
Percentage White (2010)	80.67%	77.24%	75.07%
Population (2010)	19,622	21,885	40,335
Land Area in Square Miles (2010)	21.43	18.77	24.96
Population Density Per Square Mile (2010)	1671	1883	2118
N	559	1116	558

Index values provide a convenient way to rank communities by their degree of regulatory restrictiveness, but they do not convey what it means in terms of actual policies and practices on the ground to have a low, average or high degree of regulation. Consequently, Appendix Table 1 describes the underlying regulatory environments for communities with index values representative of those reported in the different columns of Table 3. For example, the first row in the middle column of Table 3 indicates that the average LPPI value for communities with WRLURI2018 values within the interquartile range of the distribution equals 8.61. The top cell of the middle column of Appendix Table 1 then describes what those numbers mean in terms of the underlying political environment in which regulatory decisions are being made. An LPPI of 8.61 is consistent with the underlying community having what it reported as high involvement from its local political officers (on a local council or commission), moderate involvement in terms of community pressure, little to no other type of local political involvement and no special ballot initiatives regarding the regulatory or growth process.

A number of other interesting results and patterns can be gleaned from Table 3 and Appendix Table 1. First, being lightly-regulated (which we define as being in the bottom quartile of the WRLURI2018 CBSA-based distribution) does not mean these communities are unregulated or unrestricted. It is true that the underlying local and state political and legal environments are not ones in which there is intense involvement by politicians, judges or citizens. Thus, there is little evidence of pressure from the community to ratchet up regulation. Perhaps not surprisingly, these places typically do not have public meeting requirement either. The LAI value of 0.33 indicates that only one-third of them do.

However, this less intense degree of local political or community involvement does not mean the development approval process is simple or easy. Even for projects that do not require any rezoning, the mean LPAI of 1.67 indicates that many of these 'lightly-regulated' places have multiple entities that must approve the application. The modal response (at 32%) reports two such entities; 58% of this group of respondents note that a local planning commission must give its blessing, and 42% indicate that some other local council must do so. For projects that do require some type of zoning change, the LZAI value of 2.28 indicates that at least two entities are required for approval; 73% of these respondents note the local planning commission's approval is mandatory; 69% note the same for a local council, and 51% claim that a local zoning board approval is required; no other entity listed in survey question (#4) has more than a 6% share.

Having less than the average degree of regulation also is associated with a widespread presence of density controls. Density restrictions in the form of minimum lot size requirements exist in 94% of this group of communities. The most common size is for less than one-half acre per lot, although the mean subindex value of 1.92 implies that many of this (relatively) less-regulated group have larger minimum lot sizes in at least one neighborhood.

Density restrictions may be omnipresent, but formal limits or caps on permitting or developing any type of residential property are not. The SRI value of 0.04 is the mean across six different 0–1 answers for the presence of such rules, which indicates that virtually none of this group reported any formal supply restriction.

Being relatively lightly regulated also means that jurisdictions are not likely to have an open space requirement (OSI), mandatory exactions fees (EI), or an affordable housing program (AHI). Affordable housing programs are especially rare among this group, as its mean of 0.02 indicates that only 2% of, or 1-in-50, communities imposes any type of requirement pertaining to such housing. Open space requirements and exactions are more common, but only one-third report having the former and only one-fifth report the latter.

Finally, the typical time delay between submitting an application for a project and hearing a decision from the government is 3.7 months among this group of communities. That works out to 111 days presuming 30 days per month.

A second noteworthy pattern in the data is that to be more regulated implies stricter controls across the board, not just along one or two dimensions. This is illustrated by the fact that all subindex values rise as one moves from left to right across Table 3. Appendix Table 1 then explains that places in the top quartile of the WRLURI2018 distribution report a high level of involvement by local public officials; 90% indicated more than moderate levels of such involvement with over two-thirds claiming a 'very high' degree of involvement; 55% of this group also reports greater than moderate levels of community pressure; and 1-in-5 reported at least one other important player in the local regulatory process. On average, these communities report more involvement by their state legislatures and their court systems, too. Thus, the underlying political and legal environment in which the regulatory process is managed is more intense than in lightly regulated places (with 'average' places in between).

As noted just above, the same holds true for every other dimension by which we measure the degree of regulation. This is the only group for which the typical community has an open meeting requirement (LAI=0.60). Formal restrictions on supply still are quite rare even for this highly regulated group, but there are more entities that must approve (and thus, can veto) any given project. At least three entities must approve a project that does not require any zoning change (LPAI=3.22), while nearly four are typically required to approve anything that requires some type of variance (LZAI=3.69). On average, density controls are much more extreme for this group of communities, too. The modal community has a 2+ acre minimum lot size restriction somewhere within its jurisdiction; 66% of this group reports a minimum of over one-half acre. Three-quarters of the most highly-regulated places also have a formal open space requirement (OSI=0.76), and they typically impose exaction fee regimes on developers (EI=0.75). Less than half have an affordable housing program, but the slightly more than one-third that do (AHI=0.36) is more than triple the share in the interquartile range, and is 18 times greater than in the most lightly-regulated communities. Typical project review times of 8.4 months (252 days) are more than twice as long as those in the bottom quartile of most lightly-regulated jurisdictions.

What differentiates an average from a lightly-regulated community in the United States is a somewhat higher intensity of involvement at the local and state political level, modestly more entities required to approve any type of project, modestly more stringent density controls in the form of larger minimum lot sizes, the widespread presence of open space requirements and exaction fees, along with about 40 more days needed to get a decision on a project application. Thus, there is a fairly extensive regulatory framework in the places we rate as average in terms of overall strictness.

Finally, the data reported at the bottom of Table 3 show that the degree of regulation is increasing in local income, house value, and educational achievement of the population as noted in the Introduction. However, the more tightly-regulated places in our sample do not have a higher share of white residents; in fact, they are five percentage points lower in white resident share. Finally, they are larger in terms of population and land area, as well as in terms of population density, but no causal relation between regulation and any of these variables is implied.

3.3. Regulatory intensity across housing markets

Table 4 reports WRLURI2018 values for the 44 CBSAs with at least ten individual community responses to our survey. These are simple averages across each community within the relevant CBSA. These areas contain 150,827,922 people according to 2017 estimates from the *American Community Survey* (*ACS*). This is about 49% of the total population within CBSAs. This list also contains the 16 most populous metropolitan

Table 4
WRLURI2018 values for CBSAs with ten or more observations.

CBSA Name	WRLURI	# Obs	CBSA Name	WRLURI	# Obs
1. San Francisco-Oakland-Hayward, CA	1.18	18	23. Dallas-Fort Worth-Arlington, TX	0.17	49
2. New York-Newark-Jersey City, NY-NJ-PA	1.04	57	24. Hartford-West Hartford-East Hartford, CT	0.14	14
3. Providence-Warwick, RI-MA	0.93	14	25. Portland-South Portland, ME	0.13	16
4. Seattle-Tacoma-Bellevue, WA	0.73	22	26. Kansas City, MO-KS	0.13	17
5. Los Angeles-Long Beach-Anaheim, CA	0.73	48	27. San Antonio-New Braunfels, TX	0.10	10
6. Riverside-San Bernardino-Ontario, CA	0.68	18	28. Buffalo-Cheektowaga-Niagara Falls, NY	0.05	12
7. Washington-Arlington-Alexandria, DC-VA-MD-WV	0.66	16	29. Harrisburg-Carlisle, PA	0.01	15
8. Miami-Fort Lauderdale-West Palm Beach, FL	0.66	35	30. Lancaster, PA	−0.01	14
9. Phoenix-Mesa-Scottsdale, AZ	0.64	11	31. Columbus, OH	−0.01	17
10. Portland-Vancouver-Hillsboro, OR-WA	0.60	18	32. Houston-The Woodlands-Sugar Land, TX	−0.04	16
11. Madison, WI	0.60	13	33. Pittsburgh, PA	−0.06	56
12. Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	0.48	49	34. Minneapolis-St. Paul-Bloomington, MN-WI	−0.10	48
13. Albany-Schenectady-Troy, NY	0.47	10	35. Chicago-Naperville-Elgin, IL-IN-WI	−0.10	94
14. Denver-Aurora-Lakewood, CO	0.41	16	36. Atlanta-Sandy Springs-Roswell, GA	−0.12	27
15. Youngstown-Warren-Boardman, OH-PA	0.32	10	37. Worcester, MA-CT	−0.23	16
16. Boston-Cambridge-Newton, MA-NH	0.30	44	38. Cleveland-Elyria, OH	−0.28	19
17. Indianapolis-Carmel-Anderson, IN	0.30	14	39. Grand Rapids-Wyoming, MI	−0.31	24
18. Scranton–Wilkes-Barre–Hazleton, PA	0.30	10	40. Rochester, NY	−0.38	26
19. Syracuse, NY	0.25	11	41. Charlotte-Concord-Gastonia, NC-SC	−0.38	12
20. Milwaukee-Waukesha-West Allis, WI	0.24	22	42. Cincinnati, OH-KY-IN	−0.38	26
21. Allentown-Bethlehem-Easton, PA-NJ	0.22	14	43. Detroit-Warren-Dearborn, MI	−0.42	60
22. Nashville-Davidson–Murfreesboro–Franklin, TN	0.17	12	44. St. Louis, MO-IL	−0.51	37

Note: There are 1107 communities within these 44 CBSAs.

areas in the country, so the larger urban areas are well represented, but many less populated ones are not.[19]

The regional concentration along the coasts of the most highly-regulated housing markets is obvious from the first eight names. The San Francisco CBSA has the most regulated housing market in the country by our measure.[20] It and the New York City CBSA are the only ones that have index values more than one standard deviation above the sample mean. Others in the top quartile of the WRLURI2018 distribution include the Providence, Washington, DC, Seattle, Los Angeles, Riverside-San Bernardino, Miami (FL), and Phoenix markets. The Portland (OR) and Madison (WI) markets are also of note, as they have WRLURI2018 values within four-one hundredths of a standard deviation of the cutoff for the top quartile. Fig. 1 maps the strong regional pattern. The map presents three groups: the top 11 (in red), the middle 22 (in blue) and the bottom 11 (in green).[21]

One other noteworthy pattern in the market-level data is the high share of individual communities in coastal markets especially that are themselves very highly regulated by our measure (i.e., in the top quartile of the distribution of WRLURI2018 values). Table 5 reports these shares for the same 44 CBSAs. If a market is in the top quartile of this group, it is likely that at least 50% the responding communities within its metropolitan borders are themselves highly regulated. And, in the San Francisco and New York City CBSAs, the shares are three-quarters and two-thirds, respectively. Thus, the most intensely regulated CBSAs are not so because of a few ultra-restrictive outlier communities; rather there seems to be a high average level of regulation with a tight variance.

Among the markets in the interquartile range of this table, the share of highly-regulated communities averages from one-quarter to one-third. In the bottom quartile of these markets by WRLURI2018 values, the typical share is even lower—in the 10%–20% range. Thus, there always are some highly-regulated jurisdictions within any metropolitan housing market that is itself lightly-regulated on average. However, one of the differences between lightly- and highly-regulated CBSAs appears to be the ease with which a typical household could find a community that does not strictly regulate the supply side of the market within its own borders.

3.4. Sample representativeness and the impact of weighting on index values?

All results discussed thus far presume equal weighting of observations. This subsection investigates the representativeness of our survey sample and reports how different weighting schemes affect our index values and rankings. The International City Managers Association (ICMA) sent the 2018 survey instrument to 10,949 of its member municipalities and received 2,825 responses for a response rate of 25.8%.[22] The response rates by municipality population are listed in Appendix Table 3. The median (mean) population of the respondent communities is 8,100 (22,550), which is in line with the median ICMA-member city.

Because of sampling variability and the potential for differential non-response, we investigated three potential sets of weights that help tell us: (1) how representative the overall sample is compared to the universe of localities in the U.S.; (2) how representative is the sample of respondents in CBSAs to the set of all localities located in metropolitan areas; and (3) how representative is the sample of respondents in individual metropolitan areas to the universe of localities within each relevant area.

[19] The 17th and 18th ranked CBSAs are San Diego-Carlsbad (population 3,283,665; six of its communities responded to our survey) and Tampa-St. Petersburg-Clearwater (population 2,978,209; eight of its communities responded to our survey), respectively.

[20] The San Francisco CBSA does not include the San Jose-Sunnyvale-Santa Clara CBSA. There were only six communities from that latter market which responded to our survey. Their average WRLURI2018 value was 0.92, so this CBSA would rank 4th if included separately.

[21] Appendix Table 2 reproduces the rankings from our 2008 paper (WRLURI2006) for comparison purposes. A quick perusal shows broad persistence in relative rankings in the sense that if a market was in the top third or one-half of the sample in the first survey, it is very likely to be relatively highly ranked in the latest survey. However, there are some material moves individually, with the jump of various west coast markets towards the very top of the rankings.

[22] ICMA also sent the survey to 2,901 county equivalent governments and received 521 responses (18.0%). These 521 may be traditional county governments (that contain many independently-governed municipalities), consolidated municipality-county governments, or independent municipalities not within a larger county. The latter two categories are classed as county governments, but govern independently, do not contain other localities, and are themselves not part of a larger county. Therefore, we include the 23 consolidated municipality-county or independent municipalities in our sample. We do not include traditional county governments in our dataset because we wish to study the smallest level of local government with authority over local land use and the residential real estate planning/regulatory process.

Table 5
Share of places in top WRLURI2018 quartile for CBSAs with ten or more observations.

CBSA Name	Share in Top WRLURI Quartile	CBSA Name	Share in Top WRLURI Quartile
1. San Francisco	0.78	23. Dallas	0.31
2. New York	0.65	24. Hartford	0.29
3. Providence	0.57	25. Portland	0.31
4. Seattle	0.59	26. Kansas City	0.35
5. Los Angeles	0.46	27. San Antonio	0.20
6. Riverside	0.56	28. Buffalo	0.25
7. Washington DC	0.44	29. Harrisburg	0.27
8. Miami	0.51	30. Lancaster	0.21
9. Phoenix	0.55	31. Columbus	0.24
10. Portland	0.50	32. Houston	0.25
11. Madison	0.46	33. Pittsburgh	0.18
12. Philadelphia	0.41	34. Minneapolis	0.15
13. Albany	0.30	35. Chicago	0.17
14. Denver	0.44	36. Atlanta	0.07
15. Youngstown	0.30	37. Worcester	0.19
16. Boston	0.39	38. Cleveland	0.16
17. Indianapolis	0.14	39. Grand Rapids	0.08
18. Scranton	0.40	40. Rochester	0.15
19. Syracuse	0.36	41. Charlotte	0.08
20. Milwaukee	0.23	42. Cincinnati	0.08
21. Allentown	0.36	43. Detroit	0.13
22. Nashville	0.33	44. St. Louis	0.08

Note: There are 1107 communities within these 44 CBSAs.

To investigate the first issue, we began with a master list of all U.S. localities.[23] Using the 55,269 localities in our master file, we estimated a logit specification that regressed a 0–1 dichotomous indicator for whether the locality responded to the survey request on the host of demographic variables listed in Weighting Analysis Table 2 in the third section of the online appendix. That table also reports regression coefficients which indicate that more-populated localities, those with a higher share of people under 18, and places with a higher share of college graduates are more likely to be in our final sample. Conversely, places with higher rates of home ownership, a larger share of older residents, and a greater share of non-Hispanic whites are statistically significantly less likely to be in the sample. Interestingly, a locality's median household income and median house value are not predictive of response.

Consistent with standard practice, the probability of selection is computed for each responding locality using the coefficients from the logit estimation. The sample weight then is computed as the inverse probability of selection. In total, we create the three sets of weights discussed above: full sample weights, CBSA sample weights, and individual CBSA sample weights. The full sample weights are relevant for making inferences about the universe of the nation's cities and towns. CBSA sample weights are relevant for inferences about localities that are in metropolitan areas (i.e., CBSAs). The individual CBSA sample weights come from logit regressions run separately for each CBSA in the US for which there were at least ten responding communities.[24]

The first noteworthy conclusion is that weighting does not affect the distribution of overall (or CBSA-based) index values much at all. This is documented in Weighting Analysis Table 3 from the online appendix, which is the analogue to Table 2 in the main text. A quick perusal shows that the index values for different points along the distribution of index values never vary by as much as one-tenth of a standard deviation, and often by much less. Another way to look at how much weighting matters in this context is to compute the average change in index ranking for the typical community responding to the survey. We created unweighted and weighted percentile ranks for each community. Differencing showed that no place moved more than three percentiles (e.g., from the 11th to 14th percentile in terms of overall regulatory strictness), with the median observation moving only by a single percentile. Perhaps this is not so surprising given the large number of underlying observations. One randomly drawn sample in excess of 2,000 observations is likely to look similar to another.

Weighting also does not affect our conclusions about index values for groups of lightly, average, and highly rated communities either. Weighting Analysis Table 4 from the online appendix, which is the analogue to Table 3 in the main body of the paper, shows how little subindex values change when we use weights. For example, without weights, the average LPPI subindex value for communities in the interquartile range of WRLURI2018 was 8.61; this is very close to the 8.43 when weights are used (middle column of the top row of Weighting Analysis Table 4 in the online appendix. This further implies that our description of what it means to be lightly or highly regulated in the main body of the paper is not materially altered by whether weights are used.

Weighting should matter more at the market level, where the number of observations in any given CBSA is smaller. However, Weighting Analysis Table 5 from the online appendix, which is the analogue to Table 4 in the main text, shows that there is relatively little change in index values or ranks except in a few cases. The top five CBSAs are nearly same (with Los Angeles dropping out and Riverside, CA moving from 6th to 5th when we weight), and the index values are quite similar, too. The only notable changes across the weighted and unweighted rankings are for metropolitan areas for which observations are sparse. The Phoenix metro, for example, has only 11 observations in our data. It drops from ninth in the equally weighted rankings reported in the text to 17th in the weighted rankings below, and its value declines from 0.64 to 0.26. Youngstown, Ohio—which has exactly 10 observations—moves in the opposite direction, from 15th in the unweighted version to 6th in the weighted. Its index value rises to 0.74 from 0.32. As expected, the greater the number of observations, the less sensitive the CBSA's ranking is to survey weights. The simple correlation between number of observations within a CBSA and its (absolute value) ranking change is −0.27. By construction, the mean difference in rankings is zero; the mean absolute value ranking change is three.

In sum, index users well may want to weight when using the data in a different research context. However, weighting turns out not to materially influence any of our key conclusions about the nature of the local residential land use regulatory environment.

[23] These included Census Designated Places, County Subdivisions (but not Census County Divisions, as they are purely statistical units that have no legal or governmental function), consolidated municipality-county governments and independent municipalities

[24] Those results are too voluminous to show individually even in the online appendix.

4. Key changes in the regulatory environment over time

Because altering policy involves a formal legal process, we would not expect the regulatory environment to exhibit substantial high frequency change on a monthly or annual basis. Fortunately, the decade-plus span between the first and second Wharton surveys allows much more time to see whether there have been meaningful alterations in the local regulatory environment.[25]

We can measure change in the local regulatory environment by comparing answers to a variety of questions that are identical (or close to identical) across the two surveys. Moreover, we have the ability to see whether changes are due to selection effects from a different set of communities responding to each survey. In addition to the full sample of respondents who answered a given year's survey, we typically have from 750 to 900 communities that answered any given question in both surveys, with about 500 having answered all questions fully across both surveys.

To conserve space, we focus on four major changes in the nature of the local residential land use environment over the first and second decades of the 21st Century in the remainder of this section. Much more detail on changes in responses over time to numerous individual questions based on a comparison of the full cross sections from 2006 and 2018, as well as within the (smaller) panel of jurisdictions that responded to both surveys, is provided in our online appendix.

The first truly noteworthy feature apparent from comparing results across the two surveys is not a change at all, but the absence of change. More specifically, housing markets characterized as having highly restrictive local land use environments in 2006 seem highly resistant to weakening. At the metropolitan area level, there is no case of a highly regulated market as of 2006 becoming substantially less regulated over time.[26] Even though our indexes help us rank and thus convey relative (not absolute) restrictiveness of the land use control regime, perhaps the easiest way to see this is by comparing the ranking of CBSAs as of 2018 in Table 4 to the 2006 rankings in Appendix Table 2. There are no cases in which a market ranked in the top quartile in terms of supply side restrictiveness in 2006 changed to being relatively lightly regulated by our 2018 metric. This does not happen at the subindex or individual survey question level either. To the extent there is change, it is to strengthen the control regime.[27]

Why this is so should be a pressing question for research because the long-term nature of the restrictive regulatory environment has obvious implications for housing affordability in these markets and the debate over inequality more broadly. One reason for no movement would be no meaningful change in underlying economic or social conditions over time so that these parameters of a community's decision problem also did not change. That seems unlikely, especially in economic terms, as the Great Recession occurred between the surveys. This suggests future research should search elsewhere to understand this phenomenon. One hypothesis that could have explanatory power was posited by Glaeser (2020). To account for the winners and losers of urbanization around the globe, he suggested that private sector actors had much greater capacity to influence conditions than local governments did, many of which were quite weak. In his framework, the private actors were the insiders who could bend policy to serve their needs, with weak local officials unable to address the needs of less rich and less powerful citizens. Glaeser (2020) did not directly address our issue, but his framework seems likely to be relevant as existing landowners are the insiders who could control land use policy through their elected officials; the outsiders are current renters and those who live elsewhere (and, thus, cannot vote locally) but would like to live in the restrictive environment at a lower price. This well may not provide a complete answer, but given that we can now measure changes in regulatory strictness over time and the obvious relevance of this stylized fact to the housing affordability and inequality debates, understanding this stasis among highly regulated markets should be a top priority for urban and housing researchers.

One characteristic of the most regulated metropolitan areas is the spread of highly restrictive regulation across more individual jurisdictions within these markets. Among the top quartile of our CBSA sample in terms of regulatory strictness, the share of their communities that themselves are highly regulated (as defined by having index values in the top quartile of all jurisdictions throughout the nation for each survey year) increased in 9 of 10 areas.[28] This pattern is not evident at the other end of the distribution. In fact, among the bottom quartile that comprise our the least-regulated metropolitan areas, 8 of 10 markets experienced decreases (not increases) in the share of their communities that themselves are highly regulated per the definition above. Among the 20 markets in the interquartile range of regulatory strictness, half of them experienced increasing shares of highly regulated communities and half saw decreases in that share.

The potential implications of this phenomenon are very important for research. In the extreme, if households cannot find any locality whose supply side is not tightly regulated, then affordability conditions throughout a metropolitan area could deteriorate rapidly whenever demand surges. Pre-COVID conditions in the Bay Area mentioned in the Introduction beg the question of whether this explains what was happening in that market. Key aspects of housing markets that urban economists tend to take for granted, such as filtering, need to be reexamined. If there is little or no way for households to substitute away from restrictive to non-restrictive communities within the labor market area, land prices could become very high. Recent research finds very large impacts of restrictive supply side conditions on residential land prices throughout the entirety of major land markets on both coasts (Gyourko & Krimmel (2020)). In the Los Angeles, San Francisco and Seattle markets on the west coasts, they estimate land prices to be at least $100,000 higher for a standardized one quarter acre lot even if the parcel is more than 30 miles out from the metro urban core. Price impact is up to four times higher for better located close-in sites within 15 miles of the metro centroid. Land prices that get high enough could incent owners to upgrade virtually all housing, thereby interrupting the filtering process which many believe is essential to providing affordable housing to less well-off households in a market. Whether this is in fact happening is an important research issue for urban economics.

The usage of regulation itself changed in various ways that are discussed more fully in our online appendix. The most important is associated with the rise of density controls in the form of minimum lot size restrictions to nearly omnipresent status. Minimum lot size restrictions were widespread at the time of the first survey, with 84% of communities having them in at least one neighborhood. That share grew to 94%

[25] Most of the survey responses are from 12-14 years apart, as the first Wharton survey was sent out in late 2004, with the last round of responses received as late as 2006. The second survey was conducted entirely within calendar year 2018.

[26] This should not be interpreted as indicating that no individual jurisdiction in a metropolitan area that is highly regulated on average ever becomes less regulated. That does happen across all types of metropolitan areas, as is documented in the final section of our online appendix. What is implied is that it never is the case that a sufficiently large number of jurisdictions in a highly-regulated market become so much less regulated over time that the metropolitan area itself becomes meaningfully less regulated. Indeed, the trend is for more communities in those CBSAs to become more highly regulated than become lightly regulated.

[27] In our online appendix, we calculated the share of communities in regional groupings that showed a net increase in regulatory stringency based on their answers to a wide array of questions. CBSAs on the West Coast (which we defined as having at least one of its constituent counties touching the Pacific Ocean) had the highest share of individual communities within them which increased regulatory strictness (63%). This was closely followed by CBSAs from our East Coast region (which required at least one constituent county touching the Atlantic Ocean) at 59%. They also had the smallest shares of individual communities that decreased regulatory stringency over time, at 15% (West Coast) and 21% (East Coast). The interested reader should see the online appendix for more detail on how these figures were derived.

[28] We use only 40 of the 44 CBSAs from above in this calculation, as four markets had less than 10 communities respond to the 2006 survey.

according to the 2018 survey.[29] Perhaps more striking is the increase in the size of the largest minimum lot size regulation within a given jurisdiction. Information from figures in our online appendix shows that the share of communities experiencing an increase in their largest minimum lot size between surveys was double that which saw a decline (41% versus 20%, with the rest unchanged).[30] The modal minimum still is under one-half acre, but the share with a larger minimum increased from 39% in the 2006 survey to 52% in the 2018 survey.[31] While over half of communities now have a density control requiring at least one-half acre lot sizes somewhere in their jurisdictions, over one-third (35%) have a 1-acre+ minimum versus 25% in 2006.

The growing popularity of density controls in the form of increasingly stringent minimum lot size restrictions is in stark contrast to most other regulations asked about in our survey Data presented in our online appendix show no such increases in community usage or adoption of open space requirements, affordable housing programs, exactions, or hard caps on permitting or development. There also has been no material increase in project review times.[32] Regulations such as open space requirements, affordable housing requirements or explicit impact fees (exactions) directly raise costs to builders for whatever they want to supply. Density controls primarily restrict what a developer can build (to a more expensive product). They may be all that is truly essential for a community to control who lives in it. Research needs to understand why the benefit-cost ratio for more and higher minimum lot size restrictions appears to have become more favorable compared to other ways that localities can restrict land use or raise the cost of building.

The other major change in the regulatory environment is reflected in the increase in the number of entities that must approve a project requiring rezoning.[33] This is important because increasing the number of potential veto points raises the level of uncertainty faced by prospective builders. Researchers using the survey response data should take care in making this comparison because the 2018 survey asked about more entities that might have approval rights (9 in 2018 versus 6 in 2006). Hence, we standardized on the six entities asked about in both surveys.[34] The share of communities reporting that there was only one entity required to approve a project requiring rezoning in 2018 fell by about ten percentage points by 2018, with a similar fall for those claiming two entities were required. These 20 share points are shifted up the distribution in the 2018 survey responses, with the bulk of the change (from 16 to 19 points depending upon the sample—cross sections or panel of jurisdictions answering both surveys) observed on a sharply increased share of places saying that by 2018 three entities were required to approve any project requiring rezoning. Among the group that answered both surveys, in 2006 slightly more communities reported only one entity required for approval than reported three were needed; just over a decade later, the share reporting three was nearly four times that reporting only one. This is further reflected in the fact that 45% of communities that responded to both surveys increased the number of entities required for project approval versus only 15% that lowered the number.[35]

This change makes the approval process more arduous, especially for proposed projects of a type that are not already extant or allowed by rule in the jurisdiction. This begs the interesting research question of how much uncertainty is introduced by an additional required approver entity. Related is the question of how developers might price this change. Whatever the answer, the data across the two surveys tell us that local jurisdictions value the ability to control density directly via minimum lot size regulations and prefer the approval process to be more arduous and uncertain as opposed to directly making it more expensive via imposing impact fees or other building requirements.

5. Conclusion

We reported results from a new survey of residential land use regulation across nearly 2,500 individual jurisdictions across the nation and constructed an aggregate measure that allows us to rank communities by the degree of regulation. We also discussed how these results may be compared and contrasted with those from the first Wharton survey of 2006. We believe that the combination provides the first consistent national data with which to measure changes in residential land use regulation at the local jurisdiction level. Researchers are welcome to download the data for their own usage (at http://real-faculty.wharton.upenn.edu/gyourko/land-use-survey/).

Credit author statement

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jue.2021.103337.

Appendices

[29] These data are from Question 7a in 2018 and Question 6 in 2006.

[30] These data are from Question 7b in 2018 and Question 6 in 2006.

[31] This is for the small set of cities that answered both surveys. The increase is even greater using the changes based on the two cross sections. See our online appendix for more detail.

[32] This is not to imply that these other regulations are not in widespread use, only that they are not becoming more widespread (or more onerous in the case of review times). Open space requirements are reported to be in place by between 57%–59% of communities in both surveys. Exactions programs actually have declined by about one-quarter between survey years. Again, see the data presentation in our online appendix for more on how these programs either have not changed much or have declined in popularity.

[33] The data discussed in this paragraph are drawn from the answers to the first part of Question 4 from the 2018 survey and from Question 2 in the 2006 survey. The presentation in the online appendix provides added detail.

[34] These entities were the Local Planning Commission, Local Council, County Board, Environmental Review Board, Public Health Board, and Design Review Board.

[35] It is noteworthy that this increase did not occur for 'by right' projects (i.e., those not needing a variance to the zoning code). Those results are based on responses to the second part of Question 4 in 2018 and Question 6 from the 2006 survey. Hence, the increased hurdles and ultimate uncertainty of approval are only for projects not consistent with the extant zoning code in the typical community.

Appendix Table 1
What does it mean to be lightly, moderately or highly regulated?.

Lightly Regulated WRLURI 2018 ≤ −0.64	Moderately Regulated −0.642 < WRLURI 2018 < 0.637	Highly Regulated WRLURI 2018 ≥ 0.64
LPPI=6.85 Moderate levels of involvement by local political officials is common among this group of places; the modal response is for moderate involvement (34%); but 47% report higher than moderate involvement Community pressure is not high, as a modal 37% report somewhat less than moderate pressure, with another 21% reporting no meaningful pressure No other significant local political actor is involved; only 6% report any such actor.	LPPI=8.61 High involvement of local political officials—council, managers, commissioners; 80% of these communities report greater than moderate involvement Moderate level of community pressure; 43% report moderate involvement; only 27% report more than moderate involvement No other significant local political actor is involved in the regulatory process; only 11% report another such actor and only 2% report any type of ballot initiative	LPPI=9.83 High level of involvement by local public officials—90% report more than moderate levels of involvement, with over two-thirds reporting very high involvement Moderate level of community pressure; 34% report average involvement on a 1–5 scale; but 55% report greater than average involvement 1-in-5 highly regulated communities reports at least one other important player in the local regulatory process; this certainly is well under half, so it is not typical; however, it is double the level of the places in the interquartile range and 3+ times the level reported by lightly-regulated places
SPII=1.44 Nearly two-thirds (64%) of respondents report no meaningful involvement in the regulatory process by the state legislature; only 6% report moderate levels of involvement (or higher)	SPII=2.17 State legislature is only modestly involved in the regulatory process; almost one-quarter of respondents claimed no meaningful involvement at all	SPII=3.05 Moderate involvement of the state legislature is the mode of this group of places
CII=2.30 86% of respondents report no effective involvement by either the local or state court system.	CII=3.11 Neither state nor local courts are major players in the regulatory process; just over one-half of this group indicated no meaningful role for the court system	CII=4.48 Court involvement in the regulatory process is greater for this group, but it still is less than moderate on average; 70% of respondents report having less than moderate involvement for either court system
Lightly Regulated WRLURI 2018 ≤ −0.64	Moderately Regulated −0.642 < WRLURI 2018 < 0.637	Highly Regulated WRLURI 2018 ≥ 0.64
LAI=0.33 Only one-third of this group reported a town meeting option.	LAI=0.44 The typical town in this group does not have some type of open meeting requirement; that said, the actual share who does is 45%, so it is not uncommon	LAI=0.60 Only in the most highly-regulated places does the typical community have a public (or town) meeting requirement (60% do)
LPAI=1.67 The modal response (at 32%) reports two entities are required to approve a project that does not require any zoning changes; 58% note a local planning commission must be involved; the next highest share, at 42%, is for a local council.	LPAI=2.24 At least two distinct entities are required to approve projects that do not require any change in zoning—i.e., they are "by right"; (60% of respondents indicated a local planning commission was required to approve projects; 59% said a local council or commission was required; the next largest response rate was for the local zoning board at 33%, with 12% naming a design review board).	LPAI=3.22 At least three entities are required to approve a project that does not require rezoning among this highly-regulated group of places; local planning commissions and local councils are mentioned by well over half the respondents; 40% note that a local zoning board's approval is required, with all six other entities listed in the underlying question being mentioned by at least 10% of this group
LZAI=2.28 The mode here is also for two entities (43%); 73% of respondents note that local planning commission approval is required; 69% note the same for a local council, with 51% claiming local zoning board approval is required; no other entity listed has more than a 6% share	LZAI=2.79 For projects needing rezoning, 84% said the local planning commission had to give approval; 81% stated the local council had to do so; 53% noted a local zoning board had approval rights. A design review board was the next most cited body at 11%	LZAI=3.69 Nearly four entities are required to approve a project that requires rezoning; local planning commissions and local councils are involved in 80+% of respondents; the analogous number for local zoning boards is 54%; all six other entities are required in at least 10% of respondents, with design review boards being reported in over one-quarter
DRI=1.92 Density restrictions are wide spread even among the most lightly-regulated communities in the U.S.; 94% of this group reports having some type of minimum lot size requirement; the most common size is for less than one-half acre per lot	DRI=2.13 Density restrictions in the form of minimum lot sizes are omnipresent; 95% of places have a minimum in at least one neighborhood; it typically is less than 0.5 acres for a lot, but 55% of the group have a minimum greater than one-half acre.	DRI=2.48 All but 2% of these communities have some type of minimum lot size requirement; the modal community has at least one neighborhood with a 2+ acre minimum
Lightly Regulated WRLURI 2018 ≤ −0.64	Moderately Regulated −0.642 < WRLURI 2018 < 0.637	Highly Regulated WRLURI 2018 ≥ 0.64
SRI=0.04 Virtually none of this group reported any type of formal limit or cap on permits or building of single-family or multifamily housing	SRI=0.11 Formal limits or hard caps on permitting or building of any type are rare; only 1–3% of this group has any such requirement	SRI=0.36 Formal limits on permitting or construction are rare among this group, too; only 1-in-20 have any such limit.
OSI=0.32 The typical lightly-regulated community does not have an open space requirement (32% of this group does)	OSI=0.64 Open space requirements are the norm for this group of communities, with 64% reporting them	OSI=0.76 Three-fourths of these communities have open space requirements

(*continued on next page*)

Appendix Table 1 (*continued*)

Lightly Regulated WRLURI 2018 ≤ −0.64	Moderately Regulated −0.642 < WRLURI 2018 < 0.637	Highly Regulated WRLURI 2018 ≥ 0.64
EI=0.20 Exaction fees are imposed in only 20% of this group of communities	EI=0.56 Exaction fees are more common than not, with 56% of communities reporting them	EI=0.75 Three-fourths of these communities have exaction fee programs
AHI=0.02 Affordable housing requirements are quite rare, as only 1-in-50 of the more lightly-regulated places has such a program	AHI=0.10 Affordable housing requirements are rare, with only 10% of communities in this group reporting them	AHI=0.36 Affordable housing programs are relatively rare even among this group of highly regulated places; still, over one-third have some such program
ADI=3.7 This is a 3.7 month average delay between project application and receiving a decision from the government	ADI=5 There is an average 5 month lag between submitting a request for project approval and hearing back with a decision	ADI=8.4 Review times are longer here, averaging 8.4 months; there is a large 6.9 month standard deviation, so the communities in the upper tail of this distribution have 18–24 month delays

Appendix Table 2
WRLURI2006 results, major metropolitan areas (Table 11 from Gyourko et al. (2008)).

Table 11: Average WRLURI Values by Metropolitan Areas with Ten or More Observations

Metropolitan Area	WRLURI	Number of Observations	Metropolitan Area	WRLURI	Number of Observations
1. Providence-Fall River-Warwick, RI-MA	1.79	16	25. Milwaukee-Waukesha, WI	0.25	21
2. Boston, MA-NH	1.54	41	26. Akron, OH	0.15	11
3. Monmouth-Ocean, NJ	1.21	15	27. Detroit, MI	0.12	46
4. Philadelphia, PA	1.03	55	28. Allentown-Bethlehem-Easton, PA	0.10	14
5. Seattle-Bellevue-Everett, WA	1.01	21	29. Chicago, IL	0.06	95
6. San Francisco, CA	0.90	13	30. Pittsburgh, PA	0.06	44
7. Denver, CO	0.85	13	31. Atlanta, GA	0.04	26
8.. Nassau-Suffolk, NY	0.80	14	32. Scranton-Wilkes-Barre-Hazelton, PA	0.03	11
9. Bergen-Passaic, NJ	0.71	21	33. Salt Lake City-Ogden, UT	−0.10	19
10. Fort Lauderdale, FL	0.70	16	34. Grand Rapids-Muskegon-Holland, MI	−0.15	16
11. Phoenix-Mesa, AZ	0.70	18	35. Cleveland-Lorain-Elyria, OH	−0.16	31
12. New York, NY	0.63	19	36. Rochester, NY	−0.17	12
13. Riverside-San Bernardino, CA	0.61	20	37. Tampa-St. Petersburg-Clearwater, FL	−0.17	12
14. Newark, NJ	0.60	25	38. Houston, TX	−0.19	13
15. Springfield, MA	0.58	13	39. San Antonio, TX	−0.24	12
16. Harrisburg-Lebanon-Carlise, PA	0.55	15	40. Fort Worth-Arlington, TX	−0.27	15
17. Oakland, CA	0.52	12	41. Dallas, TX	−0.35	31
18. Los Angeles-Long Beach, CA	0.51	32	42. Oklahoma City, OK	−0.41	12
19. Hartford, CT	0.50	28	43. Dayton-Springfield, OH	−0.50	17
20. San Diego, CA	0.48	11	44. Cincinnati, OH-KY-IN	−0.56	27
21. Orange County, CA	0.39	14	45. St. Louis, MO-IL	−0.72	27
22. Minneapolis-St. Paul, MN-WI	0.34	48	46. Indianapolis, IN	−0.76	12
23. Washington, DC-MD-VA-WV	0.33	12	47. Kansas City, MO-KS	−0.80	29
24. Portland-Vancouver, OR-WA	0.29	20			

Notes: Metropolitan area definitions are based on 1999 boundaries. Consolidated Metropolitan Statistical Areas (CMSAs) are disaggregated into Primary Metropolitan Statistical Areas wherever relevant.

Appendix Table 3
Weighting analysis– survey response summary statistics.

Population	Number Surveyed	Number Responding	Response Rate
All	10,949	2825	25.8%
Over 1000,000	9	1	11.1%
500,000 - 1000,000	24	5	20.8%
250,000 - 499,999	44	17	38.6%
100,000 - 249,999	236	78	33.1%
50,000 - 99,999	546	183	33.5%
25,000 - 49,999	1027	311	30.3%
10,000 - 24,999	2327	655	28.1%
5000 - 9999	2750	670	24.4%
2500 - 4999	3983	905	22.7%
Under 2500	3	–	0.0%

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