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HOMELESSNESS AND HOUSING MARKET REGULATION

By

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Abstract

This chapter explores the potential importance of local housing market regulation in determining homelessness in the U.S. I begin with a theoretical discussion of the connection between the operation of local housing markets and the risk that a low income individual or family experiences homelessness. The chapter then turns to a discussion of local housing market regulation and the impacts of such practices on housing costs. I review the existing empirical literature documenting these connections and investigating differences between the operation of less and more regulated housing markets. I also present an empirical profile of more and less regulated housing markets in the U.S. This profile demonstrates that more regulated markets experience slower growth in housing, produce less higher quality housing, experience higher housing price appreciation, and experience much larger increases in the budget shares that renters (and particular, low income renters) devote to housing expenditures. Finally, using a new state-level regulatory index presented in Gyourko, Saiz, and Summers (2006) and the single-night homelessness count presented in the 2008 Annual Homelessness Assessment Report to Congress (AHAR), I explore the direct relationship between housing market regulation and homelessness. The data reveal a striking positive relationship between the degree of homelessness across states and the stringency of local housing market regulation.

1. Introduction

Local housing markets throughout the U.S. are subject to a host of regulations that tend to increase the cost of housing. Minimum lot size requirements, quality standards, density restrictions, and other such municipally-imposed regulation tend to limit the overall stock of available housing, increase average quality as well as minimum quality, and shift the overall distribution of housing prices towards higher levels. For the lowest income households, such factors will increase the proportion of household resources one would need to devote towards housing. For the poorest of the poor, excessive regulation may push the price of even the minimum quality units beyond the level of household income. To the extent that homelessness is in part driven by local housing affordability, local regulatory practices may be an important contributor to homelessness in the United States.

Of course, the importance of regulation will depend on the degree to which local regulatory stringency increases housing costs and the degree to which high housing costs impacts homelessness. While housing is definitely more expensive in more regulated local markets, it's not immediately obvious that regulation is the causal source of higher prices. Limited developable land and disproportionate economic growth may coincide with higher degrees of local regulation creating the impression of an impact of regulation on local housing markets. Thus, one needs to consider the specific mechanisms through which local regulation impacts housing costs as well as the available empirical evidence investigating this linkage.

In addition, there are clearly personal determinants of the individual risk of experiencing homelessness that lie outside of the realm of housing economics. The incidence of severe mental illness, substance abuse, as well as domestic abuse is relatively high among those who become homeless. Many might argue that these underlying personal issues are the more important

causes of homelessness in the United States, and that housing affordability plays only a secondary role. Thus, the importance of local regulation of housing market in determining homelessness depends on the relative importance of housing affordability.

In this chapter, I explore the potential importance of local housing market regulation in determining homelessness in the U.S. I begin with a theoretical discussion of the connection between the operation of local housing markets and the risk that a low income individual or family experiences homelessness. While the connection between low-income and homelessness is somewhat obvious, the potential importance of such factors as changes in income inequality and the supply of housing at higher quality levels on homelessness are less so. Thus I begin with a simple discussion of these linkages and the empirical evidence pertaining to the link between housing affordability and homelessness.

The chapter then turns to a discussion of local housing market regulation and the impacts of such practices on housing costs. Housing regulation impacts housing costs primarily through (1) an increase in construction costs, (2) restrictions on local housing supply, and (3) increases in demand for housing in a relatively regulated community. I review the existing empirical literature documenting these connections and investigating differences between the operation of less and more regulated housing markets. I also present an empirical profile of more and less regulated housing markets in the U.S. This profile demonstrates that more regulated markets experience slower growth in housing, produce less higher quality housing, experience higher housing price appreciation, and experience much larger increases in the budget shares that renters (and particular, low income renters) devote to housing expenditures.

Finally, using a new state-level regulatory index presented in Gyourko, Saiz, and Summers (2006) and the single-night homelessness count presented in the 2008 Annual

Homelessness Assessment Report to Congress (AHAR), I explore the direct relationship between housing market regulation and homelessness. While one must be cautious in interpreting these cross-sectional patterns as causal, the data reveal a striking positive relationship between the degree of homelessness across states and the stringency of local housing market regulation. I present a few simple back-of-the-envelope calculations intended to provide some sense of the potential importance of regulation in determining homelessness. These calculations suggest that the impact of regulation on homelessness, operating through an effect on the cost of housing, may be quite substantial.

2. Housing Affordability and Homelessness

Homelessness is an extremely complex social problem with root causes found in both the personal traits of those most likely at risk of a spell of homelessness as well as institutional factors that influence the housing options available to the poorest of the poor. The incidence of substance abuse, mental illness, extreme poverty, and income insecurity is certainly higher among those who experience homelessness than among those who do not. Moreover, since the mid 20th century, the total resources devoted to inpatient treatment of the severely mentally ill has declined dramatically, with the absolute numbers institutionalized in state or county mental hospitals declining from over half a million in the 1950s to less than 70,000 today (Raphael and Stoll 2008). Certainly, being mentally ill and a substance abuser elevates the risk of experiencing homelessness in the United States.

Nonetheless, there are many individuals and families among those who experience homelessness who are neither substance abusers nor severely mentally ill. These individuals tend to be extremely poor, are disproportionately minority, and generally have difficulty

affording the lowest quality housing units offered by their local housing markets. As we know from the seminal work of Culhane et. al (1999) and the 2008 Annual Homeless Assessment Report (AHAR) to Congress (2008), the proportion of the population experiencing homelessness over the course of a year is two to three times single the proportion homeless on any given night. This suggests that homelessness is a much broader, and perhaps more commonly experienced phenomenon than the lower one-night counts suggest. Moreover, point-in-time snap shots tend to disproportionately capture those who experience long spells; individuals who in turn are arguably more likely to be the chronically homeless with particular high incidence of mental illness and substance abuse problems. Hence, point-in-time empirical snapshots may lead us to overemphasize the primacy of personal problems in determining homelessness.

The potential theoretical connection between homelessness and housing prices is straightforward. To the extent that minimum quality housing is either priced such that it would consume an extremely high proportion of one's income or that minimum housing quality comes at a price that exceed one's income, an individual may become homeless. In the instance where one can afford the minimum quality housing unit but have little income left over for all else (such as food, clothing, etc.), one might rationally choose to forego conventional housing and try one's luck doubling up with relatives and friends or temporarily using a city's shelter system. In the latter case, where the price of the minimum quality unit exceeds income, homelessness is the only option. In either case, homelessness results from decision-making subject to extreme income constraints and perhaps minimum quality thresholds in the housing offered in private markets.

A key puzzle in understanding the causes of homelessness lies in understanding why homelessness increased so much during the 1980s and the apparent stability at the higher levels

that the country has experienced since the early 1990s. O'Flaherty (1995, 1996) offers a theoretical model of housing markets that, when combined with the increase in income inequality commencing in the early 1980s, provides insight into the changing incidence of homelessness. O'Flaherty's theoretical argument is built around a model of housing filtering. New housing construction occurs above a certain quality threshold, and housing units filter down through the quality hierarchy, and in turn, the rent distribution through depreciation. Below a minimum quality, rents do not justify maintenance costs, leading to abandonment by landlords or conversion of units to other uses. Most relevant to our discussion later on, the rate at which housing filters down through the quality distribution will depend on new construction rates at higher quality levels. With abundant new housing at higher levels, higher income households will be more likely to abandon older housing that then filters down to lower income households. Thus, the supply of lower cost affordable housing is linked dynamically to the supply of higher quality housing through filtering and depreciation.

Changes in the distribution of income affect the level of homelessness through the price of lowest-quality housing. An increase in income inequality around a stable mean (corresponding roughly to the course of incomes during the 1980s in the U.S.) reduces the demand for middle-quality housing and increases the demand for low-quality housing. Households whose incomes have declined reduce their demand for housing, enter the lower quality housing market, and bid up prices at the bottom of the market. Higher rents for the lowest quality housing imply a higher cutoff-income level below which homelessness is likely to result.

Empirically, point-in-time counts of the incidence of homelessness as well as period-prevalence counts are generally higher in regions of the country where housing is more

expensive (see for example, the number of studies cited in O'Flaherty (2004). Quigley, Raphael, and Smolensky (2001) demonstrate this positive association using several different data sets that count the homeless during the mid 1990s and earlier. Using data from the 1990 Census S-night enumeration, an earlier enumeration of metropolitan area homelessness by Martha Burt (1992), Continuum-of-Care counts for California counties pertaining to the mid 1990s, and longitudinal data on annual caseloads for the California Homeless Assistance program, the authors find consistent evidence of higher levels of homelessness in areas with high rents and low rental vacancy rates

This empirical relationship is also readily observable in more recent counts of the homeless population. Figures 1 and 2 present scatter plots of the proportion of a state's population homeless on a given night in January 2007 against two measures of housing affordability: median monthly contract rents and the ratio of rent-to-income for the median renter household in the respective state. In each figure, each data point marks the states homelessness level as well as the cost of housing. A positive relationship between these two variables would take the form of an upward sloping data cloud. The measure of housing Data on homelessness comes from the 2008 AHAR and is based on the figures provided in Continuum-of-Care applications. I tabulated median rents and rent-to-income ratios using data from the 2007 American Community Survey (ACS).

There is a clear positive association between the incidence of homelessness across states and variation in median rents and median rent-to-income ratios, as is evident in the general shape of the scatter plots as well as the displayed linear trend line that has been fit to the data. Inter-

state variation in rents explains roughly 40 percent of the variation in homelessness across states, while the comparable figure for rent-to-income ratios is approximately 29 percent.[1]

3. Regulation and Housing Costs

Thus, there are both theoretical arguments as well as empirical evidence that suggest that homelessness is in part a housing affordability problem. While this of course offers only a partial explanation for the rise and persistence of homelessness in the U.S., recent income trends as well as recent trends in housing prices suggest that the housing market itself may be a particularly important determinant of the incidence of homelessness. The extent to which local regulation of housing markets impacts homelessness will depend on the extent to which local regulation impacts the price of housing consumed by those likely to experience homelessness. Moreover, through filtering and competition between income groups in the housing market, the cost of such low quality housing will depend on the prices of housing further up the quality distribution as well as the determinants of housing supply at all quality levels, factors likely to be impacted by the local regulatory regime. In this section, we discuss this particular theoretically link in the chain; the impact of local regulation on housing supply and housing affordability.

The theoretical connections between regulation and housing costs

There are a number of avenues through which local regulation may impact the operation of local housing markets, and ultimately the price and minimum quality of the lowest quality units available. Minimum habitation standards generally preclude building new dwellings without basic amenities such as private kitchens, complete plumbing, and multiple exits. Such

[1] The outlier data point with a very high proportion homeless and high median rent is Washington D.C. Dropping this observation from the scatter plot does not appreciably alter the regression coefficients, although discarding this observation does increase the R^2 in each model.

regulations are most likely to directly impact the supply of housing that people at high risk of homelessness are likely to occupy.

Zoning regulation often restricts the amount of land within a municipality available for residential development and then regulates the nature of the housing that can be built in terms of density and quality. Growth controls, growth moratoria, exaction fees leveled on new development, and lengthy and complex project approval processes tend to discourage on the margin new housing construction and the nature of new housing ultimately supplied to the local market. While such regulation may not prohibit construction of minimum quality housing, such regulations constrain production processes and likely restrict supply.

These alternative forms of housing market regulation impacts housing costs by (1) increasing production costs, (2) restricting housing supply, and (3) increasing housing demand. All three factors will ultimately be reflected in an area's housing prices. Moreover, existing research indicates that the impacts of such regulation are greatest on the supply and price of housing for low and modest income families.

The impact of regulation on production costs operates directly through the added costs of winning approval for a project as well as indirectly by constraining the manner in which the developer must construct new units. The direct costs associated with winning approval include but are not limited too the time devoted to preparing permit applications, legal fees associated with application and in some instances appealing zoning board decisions, and the increased uncertainty associated with potential delays in the progress of a project. The indirect costs are more subtle and are perhaps best illustrated with an example. The common practice of large-lot zoning entails municipalities requiring minimum lot sizes per unit of single family housing. To the extent that a minimum lot size requirement constrains the building plans of housing

providers, then builders are being forced to use more land per unit than they otherwise would use in the absence of the constraint.

In a competitive housing market, builders provide housing using a mix of land, capital (e.g., building materials, machinery etc), and labor that minimizes the costs of providing a given quality and quantity of housing. Moreover, through competition in the housing market, such cost-conscious behavior is passed onto housing consumers in the form of lower prices. When producers are constrained to use a greater share of land per unit of housing, land preparation costs and/or land acquisitions costs per unit constructed will be higher. These increased costs will ultimately be passed on to the consumer in the form of higher housing prices.

Several regulatory practices also restrict and constrain the amount of land available to the housing sector, thus restricting the supply of new units. Practices such as large lot zoning artificially constrain the amount of housing that can be produced on a given amount of land. With a fixed amount of municipal land zoned for residential development, any requirement that increases the minimum lot size per housing unit arbitrarily reduces the number of units that can be constructed. Other common regulatory practices such as zoning disproportionate amounts of land for industrial use restricts the overall supply of land for housing construction, and by extension the supply of housing. As with all markets, artificially restricting supply in such a manner will drive up housing prices, all else held equal.

In addition to the effects of density regulation on production costs and housing supply, restricting density is also likely to increase demand for housing in the area. If consumers prefer low to high density, a regulatory environment that decreases the overall residential density of a community is likely to increase the attractiveness of the community to outsiders. This increased

attractiveness generates increased demand for housing located in the regulated community which in turn drives up housing prices.

What does the empirical research show?

There is ample empirical evidence finding that regulatory restrictions tend to increase the price of housing and in turn, tend to make communities less affordable for low and moderate income households. Since the mid 1970's, there have been a number of studies published in scholarly journals assessing whether local land use regulations impact housing supply and housing prices. The general finding in this line of research is that indeed, land use constraints are associated with higher housing prices. Fischel (1990) provides a review of early research on the effects of land use regulation and growth control measures in particular on housing and land markets. This extensive review of the extant literature as of 1990 concluded that growth and density controls have significant and substantial effects on land and housing markets. To be specific, Fischel concludes that housing market regulation increase home prices in the municipalities that impose such restrictions, have spillover effects on home prices in neighboring municipalities without such restrictions, and reduce the value of undeveloped land that has become subject to restrictive regulation.

A recent nationwide assessment of the effects of housing regulation on housing costs is provided by Glaeser and Gyourko (2003). The authors attempt to estimate the size of the "regulatory tax" imposed on the suppliers and consumers of housing in various metropolitan areas and assess whether the tax is larger in metropolitan areas were land markets are more heavily regulated. To measure the regulatory tax per housing unit, the authors note that in a competitive housing market the price of a house should be no greater than the cost of supplying the house anew. The costs of supplying a new unit of housing can be broken down into three

components: (1) land costs, (2) construction costs (labor, materials, equipment rental etc.), and (3) the costs associated with negotiating the regulatory process (in the language of the authors, the regulatory tax). For a number of metropolitan areas, the authors estimate land costs by comparing the price of otherwise similar homes that are situated on lots of different sizes, with the difference in price providing an estimate of how much consumers pay for slightly more land. Construction cost estimates are readily available from a number of sources. With the first two components and data on housing values from the American Housing Survey, the authors are able to estimate the regulatory tax by subtracting land costs and construction costs from housing values. The authors find quite large regulatory taxes embodied in the price of housing. They find that in most areas, land costs explain only one tenth of the difference between housing prices and construction costs, with the remaining nine-tenths explained by the price effects of land-use regulation.

Glaeser and Gyourko then use this estimate of the regulatory tax to first characterize the degree to which housing is overvalued in metropolitan areas, and then assess whether such overvaluation is greater in cities with more regulated land markets. Specifically, they measure the proportion of each metropolitan area's housing stock that is more than 40 percent overvalued by the regulatory housing tax. They then characterize the degree of local regulatory stringency using data from the Wharton Land Use Control Survey of sixty metropolitan areas. Indeed, the authors find that cities with the most regulated land markets have the greatest proportion of housing overvalued by their measure of the regulatory tax.

In a follow-up study, Glaeser, Gyourko and Saks (2005a, 2005b) document the overall increase in this regulatory tax nationwide and the fact that housing suppliers have become less responsive in terms of new supply to over-valued housing. The authors show that the ratio of

housing prices to construction costs has increased considerably since 1970. In addition, new construction rates have declined despite extreme price pressures in more regulated areas such as those on the east and west coasts. Finally, the authors demonstrate that in earlier decades, new construction tended to be higher in metropolitan areas with relatively high price/cost ratios while in later decades this relationship has disappeared.

In an analysis of California housing markets, Quigley and Raphael (2005) assess the importance of local land use regulation in explaining the evolution of housing prices and building in California cities between 1990 and 2000. The study uses a survey of California cities conducted during the early 1990s to gauge land use regulation and constructs an index of the regulatory environment based on 15 separate measures.[2] The study demonstrates three facts. First, housing is more expensive in California cities where land markets are more heavily regulated. Second, growth in the housing stock was slower over the 1990s in more regulated cities. Finally, housing supply is much less responsive to increases in price in cities that are more regulated. The latter finding is perhaps the most significant as it indicates that housing suppliers are less able to respond to increases in housing demand in more regulated cities. A further implication is that an increase in housing demand in a regulated city will result in a greater increase in housing prices and a smaller increase in housing supply relative to what we might otherwise observe in a less regulated environment.

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[2] The land use regulations considered include restriction on residential building permits issued in a given time frame, limits on population growth in a given time frame, adequate service levels required for residential development, adequate service levels required for non-residential development, rezoning of residential land to agricultural open space, reduction in density permitted by the general plan, voter approval required for residential upzoning, super majority council vote required for residential upzoning, restrictions on commercial building within a given time frame, restriction on industrial building within a given time frame, commercial industrial land rezoned to less intense uses, height restrictions on non-residential buildings, growth management elements in the general plan, and urban limit lines.

Further evidence of the effect of housing regulation on the responsiveness of housing supply to changes in demand is provided by Mayer and Somerville (2000). The authors measure the regulatory environment of over 40 metropolitan areas and characterize the regions based on the degree of regulatory stringency as pertaining to land use. They then assess whether the supply of housing is less responsive to increases in demand in more regulated metropolitan areas. They find evidence suggesting that this is the case.

Finally, Malpezzi and Green (1996) study how the degree of regulatory stringency impacts the price of rental housing at various points in the rental housing quality distribution – i.e., low, medium, and high quality rentals. To the extent that regulations have a differential impact on the supply of relatively low quality housing, one might expect larger impacts on low and moderate income households. Their results indicate that moving from a relatively unregulated to a heavily regulated metropolitan area increases rents among the lowest income renters by one-fifth and increases home values for the lowest quality single family homes by more than three fifths. The largest price effects of such regulations occur at the bottom of the housing quality distribution, and thus have disproportionately large effects on low to medium income households.

Thus, the existing research on the effects of land-use regulatory stringency on housing prices and supply consistently documents several findings. First, housing is more expensive in regulated markets, a fact that cannot be explained by higher land values. Second, the supply of housing is less responsive to changes in demand in more regulated markets, suggesting that demand pressures will result in greater price increases the more stringent the regulatory environment. Finally, the effect of land-use regulation on prices is greatest on the housing units that are most likely to be occupied by low and moderate income households.

Impacts of specific regulatory practices

The studies discussed thus far assess the effect of the overall regulatory environment on housing prices and supply. There are also a number of studies that investigate the effects of specific forms of density control and land-use regulation on housing outcomes. One of the most extensive analyses of the effects of specific types of land-use controls is provided by Pendall (2000). This study uses an original survey of local land-use practices to assess the effect of specific zoning and growth management regulations on housing market outcomes and the representation of racial and ethnic minorities among the localities' residential population. Pendall surveyed 1,510 cities, towns, and counties in the 25 largest metropolitan areas in the country, with a final response rate of 83 percent and observations on 1,169 jurisdictions. In the mailed questionnaire, municipal planning directors were asked whether the locality uses the following land use controls in their planning processes:

- **Low-density zoning only:** defined as gross residential density limits to no more than eight dwellings per acres;
- **Building permit caps:** controls that place annual limits on new building permits;
- **Building permit moratorium:** total stoppage of residential building permits in effect at least 2 years;
- **Adequate public facilities ordinances:** ordinances that require "levels of services" be set for more than two urban infrastructures or public service systems;
- **Urban growth boundaries:** restrictions that permanently or temporarily limit expansion on the urban edge;
- **Boxed-in status:** urban expansion precluded by political boundaries or water bodies.

The author extracted data from the 1980 and 1990 U.S. Censuses of Population and Housing on the housing stock of each municipality and the racial composition of the municipalities' residents in both years and matched these data to the survey data pertaining to land use practices. Regarding the operation of the housing market, the study reports that communities that employed

low-density-only zoning had lower growth in their housing stock between 1980 and 1990, and experienced a decline in the proportion of housing that was multifamily and an increase in the share that was single family. Such communities also experienced a decline in the proportion of the housing stock that was rental housing, all factors that tend to reduce rental affordability.

Low-density-only zoning is the only one of the six land use practices investigated that consistently impacts housing market outcomes. None of the other practices reduced growth in the housing stock, with one practice (boxed-in status) actually positively associated with growth. Similarly, none of the other practices restricted the share of multifamily dwellings, restricted the share of rental housing, or increased the share of single family housing. Several of the practices, however, did exert significant negative effects on the fraction of rentals that were affordable.

In a study of 39 municipalities in Waukesha Wisconsin in 1990, Green (1999) investigates the effect of various land use regulations that impact the minimum land or service requirements for new housing on the supply of affordable housing. The author makes use of a detailed regulation land use survey of the county's municipalities and estimates the effect of the measured provisions on housing prices, rents and the proportion of housing that would be affordable to a low to low-medium income household. The zoning requirements measures include required street width, minimum front set backs, minimum lot width, storm sewer and sanitation requirements, and water, curb, gutter, and sidewalk requirements. The author finds significant and substantial negative associations between more stringent requirements regarding minimum land requirements (--i.e., street width, front set back, and lot width) and the proportion of housing that is affordable.

Glaeser, Gyourko, and Saks (2005c) investigate the contribution of regulatory stringency to high housing prices in Manhattan. The study first assesses the degree to which the price per

square foot of residential housing in New York City exceeds the marginal construction costs for multi-floor buildings. In a competitive housing market, prices should be equal to the marginal costs of constructing housing, as housing suppliers would compete away any supra-normal profits in the process of competing for buyers. The extent to which prices exceed marginal construction costs therefore provide an indication of the extent to which regulatory barriers are increasing the costs of supplying housing. The authors demonstrate a steep increase in the ratio of housing prices to marginal construction costs. The authors also demonstrate that at the close of the 20th century, housing supply in New York was considerably less sensitive to increases in condo prices. The authors also show that despite the high demand and the unprecedented prices of housing in Manhattan, building heights on new projects began a steep decline beginning during the 1970s. The authors attribute part of the run up in NY housing prices to density restrictions that limit the size of buildings.

To summarize, while there are fewer studies that estimate the effects of specific forms of land-use regulations on housing market outcomes, the existing studies do suggest that policies that reduce density (minimum lot size as in Pendal, minimum lot width and setback requirements as in Green, or height restrictions as investigated in Glaeser, Gyourko and Saks) increase housing costs and diminish the supply of affordable housing. Combined with the consistent cross-sectional relationship between measures of housing costs and homelessness, the existing research on housing market regulation suggests that such regulation may be responsible in part for the rise of homelessness in the U.S.

4. Local Housing Markets in Relatively Regulated and Unregulated Markets

The preceding discussion suggests that housing is more expensive in more regulated markets, and that the quantity of housing supplied is less sensitive to shifts in housing demand. The discussion also suggests that housing supplies of various qualities are linked to one another via depreciation through the quality hierarchy and through competition for units between households of different income groups. In this section, I document the empirical associations between a measure of the degree of local regulation and various indicators of the evolution of housing supply, housing costs, and housing competition among households.

Gyourko, Saiz, and Summers (2006) present a new measure of the local regulatory environment in U.S. housing markets, presenting indices of regulatory stringency at the level of both metropolitan areas as well as states. The indices are based on responses to a survey of 2,600 communities across the country querying local planning directors about the use of various regulatory practices, typical approval times for residential projects, the influence of various pressure groups in approval and zoning decisions, and a number of other such practices. The indices also take into account state-level policy with regards to land use and the degree to which the state's judicial system defers to local land use decisions. Table 1 reproduces the Wharton Residential Land Use Regulation Index (WRLURI) tabulated at the state level. The indices are summary measures of the overall degree of regulatory stringency based on a number of sub-indices of regulatory practices and outcomes. The index values are standardized to have a mean of zero and a standard deviation of one.[3]

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[3] Based on the survey results and a legislative and case history analysis of each states, the authors construct the aggregate index from a factor analysis of the following sub-indices: an index measuring the degree of local political pressure in the development process, an index gauging the extent of state political involvement in local land use measures, an index measuring the degree of state court involvement, a local zoning approval index indicating the number of public bodies that must approve a given residential project, a local project approval index gauging the number of local organizations that must approve a project, a local assembly index indicative of the opportunity for community involvement in approval meetings, a supply restriction index, a density restriction index, an open space index, an exactions index, and finally an approval delay index.

In what follows, I stratify states into the five groups of ten listed in Table 1, rank-ordered from the most to least restrictive regulatory environments, and compare the evolution of state housing market outcomes between 1970 and 2007 across these groupings. To characterize state housing markets, I draw on data from the 1970 one percent Public Use Microdata Sample of the U.S. census and the 2007 American Community Survey. Unless otherwise noted, all of the comparisons pool the owner-occupied and rental housing stock.

To be sure, the simple comparisons presented here do not establish a causal relationship between more stringent regulations and the outcomes analyzed. It is entirely possible that the stringency of regulation may be determined by unobserved factors that also determine the housing outcomes that I analyze in this section. For example, high housing prices may beget growth controls in an attempt to limit changes to the character of a local housing market. Nonetheless, this empirical profile does reveal sharp contrasts between more and less regulated housing markets that, when combined with the studies discussed above, suggest a potentially important role for regulation in determining housing costs, and by extensions homelessness.

Regulation and the composition of a state's housing stock

Table 2 compares the distributions of the housing stock across the number of rooms, the number of bedrooms, and unit age for the five groups of states defined by the degree of regulatory stringency. For each group and for each outcome, the table presents the distribution in 1970, the distribution in 2007, and the changes occurring over this 37 year period. Across all three outcomes, there are notable differences that vary systematically with the degree of local regulatory stringency. In the most regulated states, the proportion of housing units with seven or more rooms increases from approximately 18 percent to 29 percent in the most regulated states, a change of approximately 11 percentage points. By contrast, the comparable figures for the least

regulated states are 15 percent in 1970 and 30 percent in 2007, an increase of 15 percentage points. Similarly, the proportion of housing units with three or more bedrooms increases by 11 percentage points in the most regulated states in contrast with the 15 percentage point change in the least.

To the extent that newer housing is larger with more bedrooms, these differential shifts suggest that new housing construction occurs at a slower rate in more regulated states relative to less regulated states. Indeed the patterns in Panel C indicate that this is the case. Interestingly, the distribution of the housing stock in the least regulated states is more skewed towards older units in 1970, with 52.65 percent of the units 21 years or older and nearly 39 percent of these units 30 years or older (the comparable figures for the most regulated states being 46.9 and 33.39 percent). Over the subsequent 37 years however, these patterns reverse. The proportion of the housing stock over 20 years old increases by over 22 percentage points in the most regulated states, in contrast with a 15 percentage point increase in the least regulated states.

Table 3 presents similar comparisons for the distribution of housing units across structure type. While the empirical relationships between these outcomes and regulatory stringency are less salient, there are nonetheless some interesting patterns across these groupings. First, the proportion of units accounted for by mobile homes increases by more in less regulated than in more regulated states, with the change in the percentage of units accounted for by this category increasing with near uniformity across the five state groups. Second, while the relationship between regulatory stringency and the change in the proportion of units that are in mutli-family structure is less pronounced, there does appear to be a weak relationship with this variable. For example, the proportion of the housing stock in multi-family structures declines by 3.45 percentage points in the most regulated states and by 2.81 percentage points in the second most.

For the least regulated states, this percentage declines by 2.81 percentage points, while the percentage multi family among the second least regulated states increases by 1.71 percentage points.

Thus, these simple comparisons suggest important differences in housing construction patterns between regulated and less regulated housing markets. The rate of new construction appears to be lower in regulated states, reflected in the lower quality housing and older housing stock at the end of the period studied. Moreover, the proportional importance of multi-family units and mobile homes diminishes by more in the most regulated states. Taken together, these patterns are consistent with a relative restricted housing supply in more regulated local markets.

Regulation, housing costs, and housing price inflation

Is there evidence that housing is more expensive in more regulated markets? Moreover, has housing appreciated at a slower rate in less regulated markets?

I begin to explore these questions by documenting the simple cross-sectional relationships between alternative measures of housing costs and the WRLURI regulation index. Figure 3 presents a scatter plot of median monthly contract rents against the regulation index values measured at the state level. Figure 4 presents a comparable scatter plot where the dependent variable is now the median rent-to-income ratio among the renter households for each state. Both figures measure the housing outcomes with data from the 2007 ACS. The data reveal a strong and statistically significant relationship between these two variables. The quality of the fits of the underlying trend lines are such that the regulatory stringency index explains 55 percent of the cross-state variation in median rents and nearly 68 percent of the cross-state variation in median rent-to-income ratios. Interestingly, Gyourko, Saiz and Summers (2006) document that population density is actually higher in the least regulated states, suggesting that

the positive association between housing prices and regulations observed in Figures 3 and 4 are likely to reflect in part a restriction on supply (rather than a demand-induced increase in regulatory stringency).

It is also the case that housing prices have climbed at a faster rate in more regulated states (on a quasi-quality adjusted basis). To demonstrate this pattern, I performed the following exercise. Using 1970 data for the nation as a whole, I calculated average housing prices for housing units defined by the interaction of the number of rooms, the number of bedrooms, and the unit structure types (categories used in Tables 2 and 3). I then use these average housing prices to allocate each housing type into one of five "quality" quintiles, where the lowest quality quintile is comprised of those housing units in the bottom fifth of the 1970 price distribution while the highest quality quintile are those units in the highest quintile of the 1970 price distribution.[4] Next, I calculated average housing prices within each of the quality quintiles defined with the 1970 price distribution but for 2007 (where the distribution of units across groups within quintile for 1970 is used to weight the price estimate).[5] Finally, I use these averages to gauge the overall growth in housing prices, the implied annual nominal appreciation rate and the implied annual real housing price appreciation rate.

Table 4 presents figures for the national housing stock. The first column present estimates of average nominal housing prices within quintile (in thousands of dollars) for 1970, the second column presents comparable estimates for similar quality housing in 2007, while the

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[4] These tabulations combined rental and owner-occupied housing. For the price of owner-occupied housing, I use the respondent's estimate of the value of the unit. For rental units, I convert monthly contract rents into housing values by multiplying by 12 and then dividing by the average mortgage interest rate on 30-year fixed rate fully amortizing loan. While this ignores the role of physical depreciation, anticipated price appreciation, and tax policy on housing valuation, several of these ignored factors offset one another. Thus, this imputation provides a rough proxy the value of rentals.

[5] Weighting in this manner eliminates any quality enhancements occurring via a shift in the distribution across the joint rooms-bedrooms-unit structure distribution that may have occurred within defined quality quintiles.

third column presents the ratio of average nominal prices in 2007 to the average nominal house price in 1970. Nationwide, the data indicate price appreciation which is biased towards lower quality housing (with average prices increasing nearly 13 fold among bottom quintile housing in contrast with 12 fold among top quintile housing). In nominal terms, the price appreciation observed over this 37 year period is consistent with a constant annual nominal appreciation rate of roughly 7 percent with a higher value for the lowest quality housing (7.2 percent) and a lower value for the highest quality housing (6.9 percent).[6] In real terms, average annual appreciation is roughly 2.5 percent for the lowest quality housing and 2.3 percent of the highest quality housing.

Repeating these tabulations for the five state groups defined by the WRLURI index (using constant quality definitions across all states) reveals stark differences in these pricing patterns. Table 5 presents the results from these more detailed tabulations. Over the 37 year period, housing price appreciation is considerably greater in more regulated states than in less regulated states. Among the most regulated states, housing prices increase 14 to 16 fold depending on the specific quality group. Among the least regulated states, housing prices increase approximately 8 to 10 fold. Among the most regulated states, the implied real annual price appreciation defined by the beginning and end year housing values are around 3 percent. In contract, annual real price appreciation for the least regulated states hovers around 1.1 percent, although the value is somewhat higher (1.7 percent) for the lowest quality quintile.

The impact of housing regulation on the affordability of housing most likely to be occupied by those who face the highest risk of homelessness is perhaps best illustrated by comparing the evolution of rent-to-income ratios in more and less regulated states (as lower income households are more likely to rent than to own). Table 6 compares select percentiles of

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[6] For a 37 year period, the constant annual nominal appreciation rate, a, consistent with an N-fold increase in nominal prices is given by the equation $a = N^{1/37}-1$.

the distribution of rent-to-income ratios in 1970 and 2007 for states grouped according to the stringency of local land use regulation. Renters in the most regulated states experience the largest increase in rent-to-income ratios at all points in this distribution. For example, the rent-to-income ratio at the 10^{th} percentile increases by 0.045 in the most regulated states but by 0.022 in the least regulated states. The comparable figures for the change in the median are 0.113 for the most regulated states and 0.074 for the least regulated states. The largest increases (as well as the largest disparities in growth) are observed in the highest percentiles of the rent-to-income distributions. Among renters in the most regulated states, the rent-to-income ratio at the 90^{th} percentile of the distributions increases by 0.383. The comparable increase among renters in the least regulated states is 0.264.

Of course, the homeless are most likely to be drawn from among the poorest of the population of renter households. Thus, we must also discuss the relationship between budget shares devoted to housing and regulation among particularly low-income renters. Figure 5 makes this comparison. The figure presents the median rent-to-income ratio among renter households in the bottom quartile of the national family income distribution in 1970 and 2007 for each of the five groups of states. Again, we see a striking empirical relationship with the degree of housing regulation that mirrors that presented in Table 6. However, the changes here are more pronounced. Among low-income renters in the most regulated states, the median ratio of rent to income increases 0.443 to 0.588, a 14.5 percentage point increase. The comparable figures for low-income renters in the least regulated states are 0.311 and 0.359, a 3.9 percentage point increase.

Thus, housing is more expensive in more regulated markets. In addition, housing prices have appreciated at much faster rates in regulated relative to unregulated housing markets.

Finally, these differences appear to particularly impact low-income households in the most regulated states, where the median rent-to-income ratio among this group now exceeds 0.5.

5. How Important is Regulation in Determining Homelessness?

Thus far, I have presented a series of indirect arguments that when taken together suggest that local regulation of housing markets may be in part responsible for the rise of homelessness during the past few decades. I have yet to directly link local regulatory stringency to the incidence of homelessness. More importantly, I have yet to address the relative culpability of land use regulation in explaining homelessness in the United States.

Of course, answering these questions convincingly is a quite difficult task. Assessing the importance of regulation requires properly measuring the impacts of regulation on housing costs and then the causal effects of housing affordability on homelessness. One encounters a number of measurement and methodological problems in trying to draw such inferences. First, data on homelessness and regulation are scarce and often afford researchers little variation beyond what we can observe in a cross section. The few efforts at measuring variation in regulatory stringency have been herculean tasks that generally only provide us with snapshots at a given point in time for small numbers of geographic areas. Moreover, one would strongly suspect that the impact of introducing such regulations on housing outcomes (both homelessness as well as affordability more generally) should occur with a lag. That is to say, new regulations should not impact the existing durable stock but the path of new construction. Unfortunately, most surveys of land use regulation policy measure current practices, with little information on the timing of new regulatory innovations. With regards to homelessness, methods for counting the homeless at a given point in time, as well as period-prevalence estimation methods, have improved greatly.

However, it will be a few years before current ongoing efforts yield data amenable to longitudinal analysis.[7]

A second important challenge concerns the ability to infer causality from the currently available cross sectional data sets. For example, in estimating the effects of regulation on housing costs with cross-sectional data, one might suspect that areas that experience rapid growth in housing demand endogenously enact more strict regulation in an attempt to control growth – i.e., high housing prices may reverse cause a more stringent regulatory environment. While there are certain empirical facts that suggest that this is not the case (in particular, the fact documented by Gyourko, Saiz, and Summmers (2006) that more regulated areas experience lower density than less regulated areas), one can never be certain in a non-experimental setting.

With these caveats in mind, here I present a series of simple regression models relating variation in the incidence of homelessness across states to variation in a single gauge of housing affordability, and in turn, housing affordability to the state-level WRURLI regulatory index variable. Specifically, I present a series of OLS models that regress single-night homeless rates for 2007 on state-level median rent-to-income ratios estimated from the 2007 ACS along with several other state-level covariates that may explain variation in homelessness. I then present a series of two-stage-least-squares models where rent-to-income ratios are instrumented with the WRURLI regulatory index. Using preferred estimates of these models, I then explore a few simple simulations where I reduce regulation in specific states and tabulate the effect on national homelessness implied by the model estimates.

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[7] Thankfully, future Annual Homelessness Assessment Reports will provide additional years of data from both Continuum-of-Care applications as well as Homelessness Management Information Systems that may facilitate longitudinal analysis of the determinants of homelessness.

Before presenting the model estimation results, I first document the reduced form relationship between homelessness and regulation. Figure 6 presents a scatter plot of the proportion of a state's population that is homeless on a single night in 2007 against the WRURLI regulation index. There is a clear positive and statistically significant relationship between these variables. In what follows, the 2SLS results permit decomposing this reduced form effect into the product of the effect of regulation on housing costs and the effect of housing costs on homelessness.

Table 7 and 8 present a series of regression models where the dependent variable is the proportion of the state's population homeless and the key explanatory variable is the median rent-to-income ratio in the state. The first three models present OLS results, while the next three models present 2SLS results where the WRURLI variable is used as an instrument for the rent-to-income ratio. Table 7 presents unweighted regression results while Table 8 presents estimation results where the models are weighted by state population in 2007. Beginning with the OLS results, there is a robust partial correlation between the rent-to-income ratio and homelessness. While I cannot control for an extensive set of covariates (as there are only fifty observations), controlling for the proportions black , Hispanic, poor, under 18 years of age, over 65 years of age, as well as the prisoner release rate in 2006 does not alter the coefficient on the housing affordability measure.[8] The OLS results are somewhat sensitive to inclusion of a measure of average temperature in January, although the coefficient on the regulatory index is still significant when this covariate is added to the specification. The instrumental variables models are generally consistent with the OLS estimates except for the model including January temperature, where the coefficient on regulation falls to zero. Note, the regulatory stringency

[8] With the exception of the prisoner release rate, I measure all of the explanatory variables with data from the 2007 ACS. The prisoner release rates at the state level come from the Bureau of Justice Statistics.

variable is a fairly strong instrument (in terms of statistical significance) in all models and always has the proper (that is to say, positive) sign in the first stage regressions.

The weighted regression results in Table 8 are similar, although the rent-to-income effects are somewhat larger than the corresponding OLS coefficients from the un-weighted models. In addition, the rent-to-income variable is significant in all three 2SLS specifications (at the one percent level in the first two specifications and at the ten percent level in the last).

I use these estimation results to assess the relative importance of regulation in determining current homelessness levels in the following manner. The instrumental variables models estimated in Tables 7 and 8 can be expressed by the equations

$$\begin{aligned} \text{hom}\,elessness_i &= \alpha + \beta\,\text{Re}\,nt/Income_i + \varepsilon_i \\ \text{Re}\,nt/Income_i &= \gamma + \delta\,\text{Re}\,gulation_i + \eta_i \end{aligned}$$

where the second stage dependent variable is the proportion of a state's population that is homeless, and where for simplicity I have ignored other covariates that may enter the model specification. As written, regulation impacts homelessness only indirectly through its impact on the rent-to-income ratio. In particular the change in the proportion homeless in a given state caused by a change in the degree of regulatory stringency would be given by the expression $dhomelessness_i = \beta\delta * dRegulation_i$. Thus, if we define the variable pop_i as the population of a given state, the predicted effect on the overall homelessness count for the nation for a given vector of state-level regulatory changes would be given by the equation

.

$$d\,\text{hom}\,less_{\cdot} = \beta\delta \sum_{i=1}^{50} pop_i\, d\,\text{Re}\,gulation_i$$

I simulate the effects of two alternative changes in the distribution of the WRURLI state level regulation index. First, I calculate the implied change in total single night homelessness that we would observe were we to reduce the degree of regulatory stringency in states with above median WRURLI index values to the median value, while holding all other state values (for those at or below the median) constant. Second, I calculate similar changes implied by reducing the WRURLI values of all states to the minimum value of this variable.

Table 9 presents the results from this exercise. For both simulations, I use the smallest of the 2SLS estimates of these parameters from the weighted regressions. Since the smallest estimates from the un-weighted models yields a structural coefficient of zero, these simulations should be thought of as upper-bound estimates of the impact of housing market regulation on homelessness.[9] Relative to a base homelessness count of 645,273 persons,[10] reducing regulatory stringency above the median to the median value would result in a decline in homelessness of 46,246, roughly 7.2 percent of total homelessness. Reducing all state level regulatory stringency values to the minimum value results in even larger declines (144,294 or 22 percent).

Of course, reducing the degree of regulatory stringency is unlikely to result in such large declines in homelessness. Regulated states have pursued development paths governed by their regulatory regimes, and housing patterns are, to a certain extent, locked in by the consequent land use patterns and the durability of the existing housing stock. Nonetheless, these simulations suggest that the regulatory environment in which many local housing markets have developed may indeed have contributed to homelessness via housing affordability.

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[9] The first-stage coefficient on the regulation variable does not change much from specification to specification, although the coefficients in the fullest specifications (the one that I use in each instance) are generally slightly smaller. The first stage results are available upon request.

[10] This total comes from applying the AHAR proportion estimates to non-institutionalized population totals estimated from the 2007 ACS.

6. Conclusion

Thus, this chapter has made several arguments and presented some basic stylized facts that hint at a potentially important role of local housing market regulation in determining homelessness. First, the theoretical link between regulation and housing affordability and in turn, affordability and homelessness is straightforward, with the latter link in this causal chain well established in non-experimental analysis relating homelessness to variation in housing costs. Second, there is a large and growing body of empirical literature demonstrating higher housing costs in more regulated local markets, with particularly large price disparities between more and less regulated markets for low-quality/low-income housing. Third, I presented empirical evidence of greater price appreciation and restricted housing growth in more relative to less restrictive markets. Finally, I demonstrated a direct positive correlation between one measure of regulatory stringency and a recent single-night enumeration of the homeless. The strength of this empirical relationship, as mediated through the effect of regulation on housing costs, suggests that regulation may be a substantial contributor to U.S. homelessness levels.

Of course, finding that local housing market regulation contributes to homelessness does not necessarily imply that combating homelessness requires that we first and foremost eliminate local control of land use planning. Given the historical deference to local land use decisions that characterizes most housing markets in the U.S., such a proposal is politically and practically infeasible. Presumably, incumbent residents (homeowners in particular) benefit from local land use control practices, both in terms of housing values as well as in terms of minimizing externalities through the close co-location of deemed incompatible land uses. Hence, it's hard to

imagine a feasible homelessness reduction policy agenda centered around limiting local government involvement in land use planning.

Nonetheless, the likely contribution of such policies to housing price appreciation and homelessness makes salient some of the extreme unintended distributional consequences of local housing market regulation. It also provides strong support for either income support efforts or housing cost subsidies that would render decent minimum quality housing affordable to extremely low-income individuals.

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Figure 1

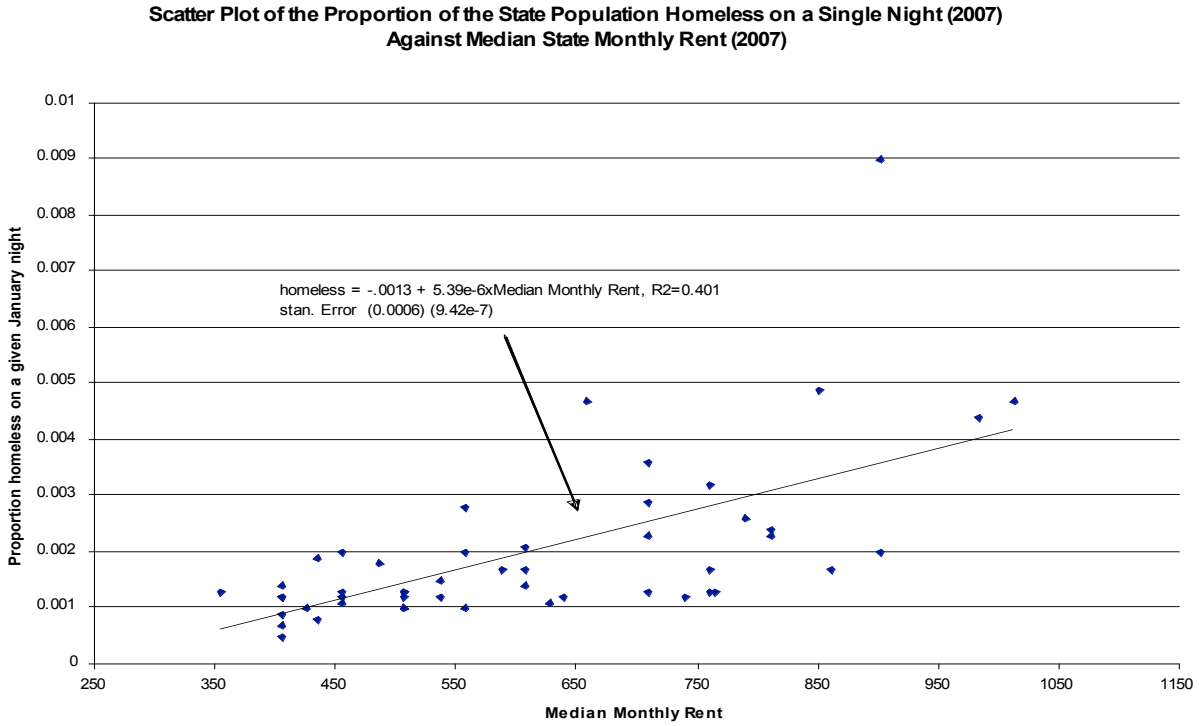

Figure 2

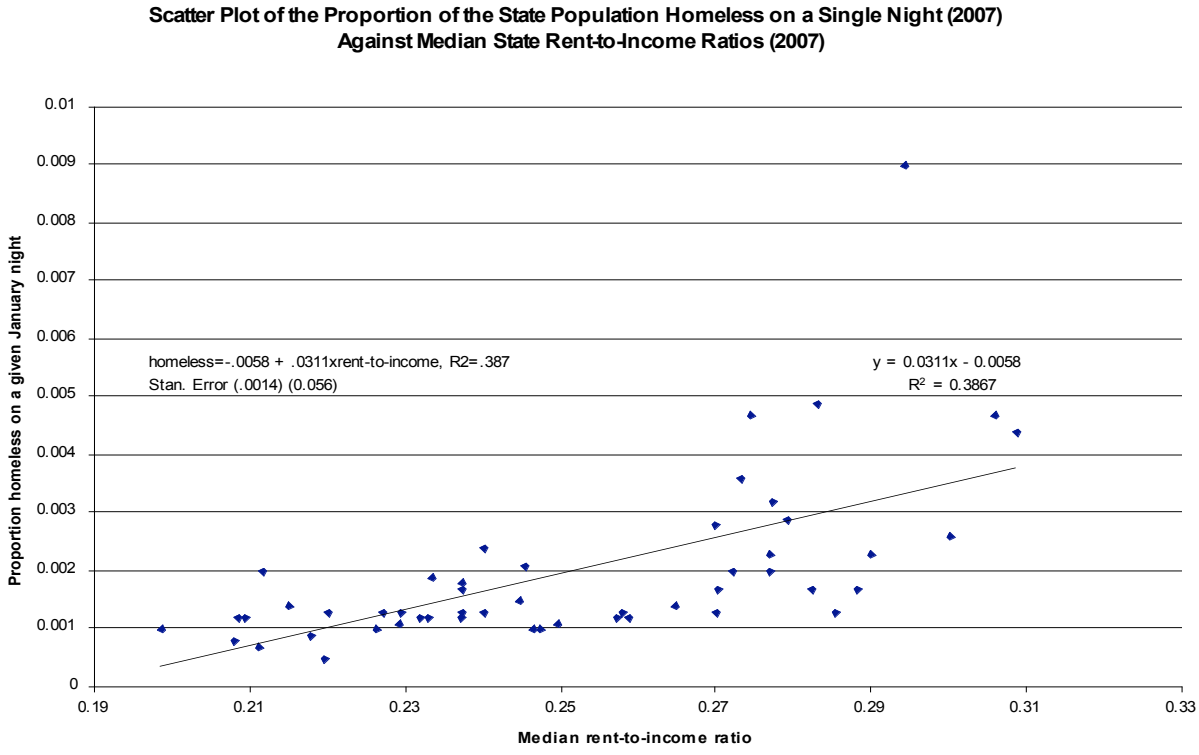

Figure 3

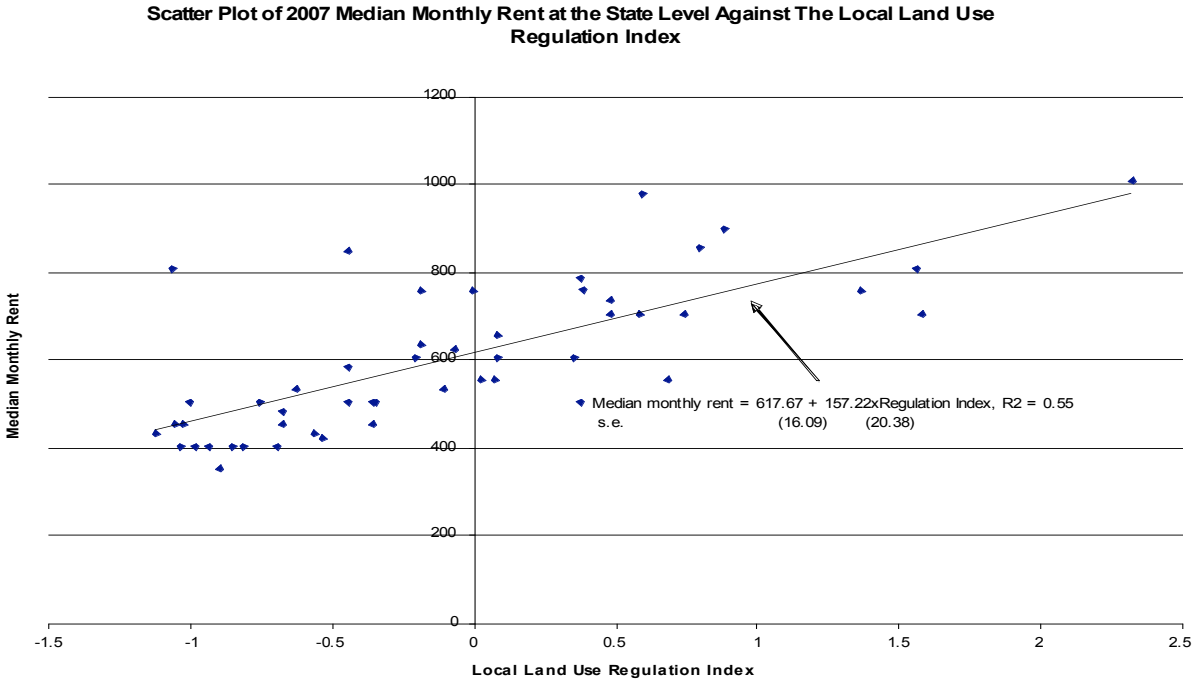

Figure 4

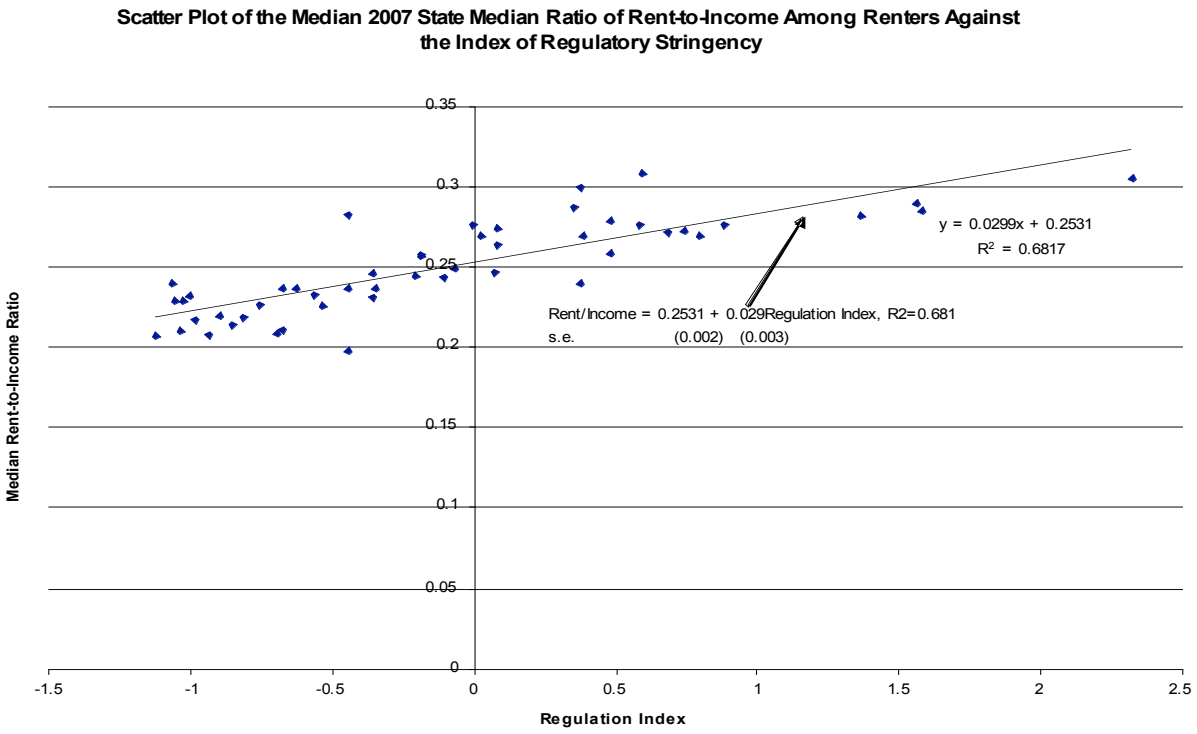

Figure 5

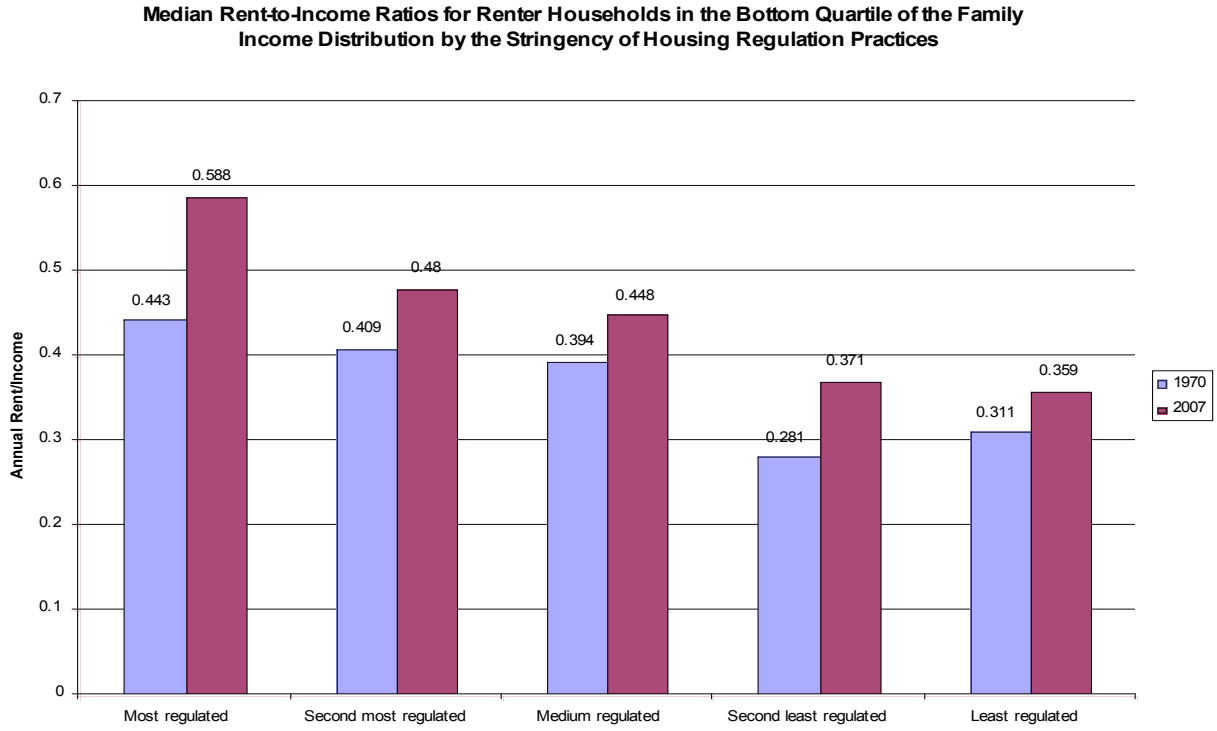

Figure 6

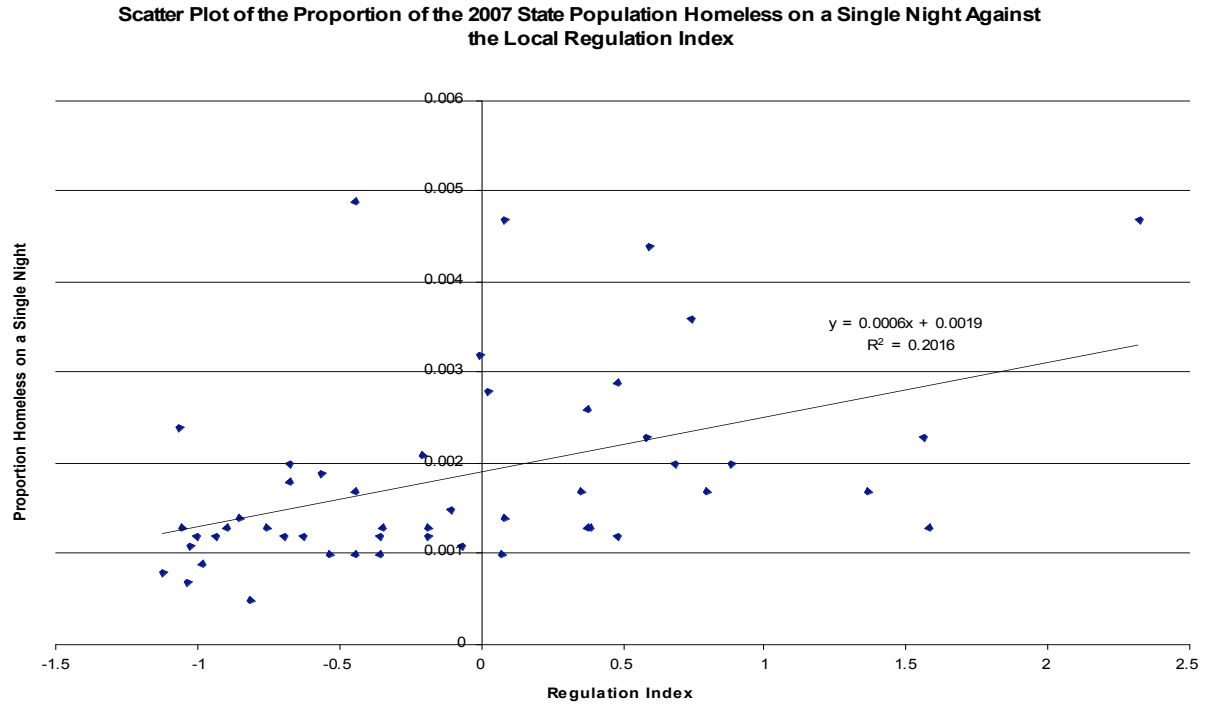

Table 1
Ranking of U.S. States by the WRURLI Land Use Regulation Index from Most to Least Regulated Local Housing Markets

Most Regulated		Second Most Regulated		Medium Regulation		Second Least Regulated		Least Regulated	
Hawaii	2.32.	Colorado	0.48	New York	-0.01	Nevada	-0.45	Arkansas	-0.86
Rhode Island	1.58	Delaware	0.48	Utah	-0.07	Wyoming	-0.45	West Virginia	-0.90
Massachusetts	1.56	Connecticut	0.38	New Mexico	-0.11	North Dakota	-0.54	Alabama	-0.94
New Hampshire	1.36	Pennsylvania	0.37	Illinois	-0.19	Kentucky	-0.57	Iowa	-0.99
New Jersey	0.88	Florida	0.37	Virginia	-0.19	Idaho	-0.63	Indiana	-1.01
Maryland	0.79	Vermont	0.35	Georgia	-0.21	Tennessee	-0.68	Missouri	-1.03
Washington	0.74	Minnesota	0.08	North Carolina	-0.35	Nebraska	-0.68	South Dakota	-1.04
Maine	0.68	Oregon	0.08	Montana	-0.36	Oklahoma	-0.70	Louisiana	-1.06
California	0.59	Wisconsin	0.07	Ohio	-0.36	South Carolina	-0.76	Alaska	-1.07
Arizona	0.58	Michigan	0.02	Texas	-0.45	Mississippi	-0.82	Kansas	-1.13

Source: Gyourko, Saiz, and Summers (2006).

Table 2
Comparison of the Distributions of Housing Units by Number of Rooms, Number of Bedrooms, and the Age of the Unit in 1970 and 2007 for States Grouped by the Stringency of Housing Regulation Practices

	Most Regulated			Second Most Regulated			Medium Regulation			Second Least Regulated			Least Regulated		
	1970	2007	Change	1970	2007	Change	1970	2007	Change	1970	2007	Change	1970	2007	Change
Panel A: Number of rooms															
1	2.05	1.32	**-0.73**	1.72	0.63	**-1.09**	1.83	0.84	**-0.99**	0.97	0.35	**-0.62**	1.14	0.40	**-0.74**
2	4.16	4.15	**-0.01**	3.03	2.57	**-0.46**	3.5	2.75	**-0.75**	2.50	1.93	**-0.57**	2.85	2.08	**-0.77**
3	12.34	10.44	**-1.90**	9.25	7.86	**-1.39**	12.1	8.91	**-3.19**	9.08	6.52	**-2.56**	10.04	6.90	**-3.14**
4	20.08	17.13	**-2.95**	18.15	15.79	**-2.36**	20.9	16.04	**-4.86**	22.93	16.49	**-6.44**	22.43	15.79	**-6.64**
5	23.85	20.03	**-3.82**	24.79	20.81	**-3.98**	24.51	21.47	**-3.04**	29.72	25.13	**-4.59**	29.17	24.22	**-4.59**
6	19.83	18.28	**-1.55**	23.03	20.33	**-2.70**	19.75	19.16	**-0.58**	20.23	20.72	**0.49**	19.47	20.56	**1.09**
7	9.59	12.46	**2.87**	10.68	13.86	**3.18**	9.31	12.73	**3.42**	8.60	13.02	**4.42**	8.63	13.29	**4.46**
8	4.84	8.15	**3.31**	5.63	9.05	**3.42**	4.88	8.63	**3.75**	3.52	7.83	**4.31**	3.94	8.32	**4.38**
9+	3.26	8.04	**4.78**	3.72	9.1	**5.38**	3.23	9.48	**6.25**	2.44	8.01	**5.57**	2.34	8.44	**6.10**
Panel B: Number of Bedrooms															
0	3.14	1.81	**-1.33**	2.21	0.82	**-1.39**	2.48	1.12	**-1.36**	1.24	0.51	**-0.74**	1.53	0.57	**-0.96**
1	17.79	13.16	**-4.81**	14.09	9.97	**-4.12**	17.21	11.51	**-5.70**	11.93	7.86	**-4.07**	13.86	8.59	**-5.27**
2	32.15	27.28	**-4.87**	31.59	27.21	**-4.39**	33.42	25.02	**-8.42**	39.18	25.54	**-13.64**	37.74	26.24	**-11.50**
3	33.78	35.77	**1.99**	38.48	41.82	**3.34**	35.16	41.15	**5.99**	38.54	47.26	**8.72**	36.93	45.77	**8.84**
4	10.65	17.49	**6.84**	10.99	16.42	**5.43**	9.57	16.81	**7.24**	7.69	15.32	**7.63**	8.29	15.44	**7.15**
5+	2.3	4.5	**2.21**	2.64	3.76	**1.12**	2.17	4.41	**2.23**	1.42	3.52	**2.1**	1.89	3.39	**1.51**
Panel C: Age of Housing Units in Years[a]															
0 -1	3.00	1.65	**-1.35**	3.41	2.01	**-1.40**	3.04	2.21	**-0.83**	4.46	2.93	**-1.53**	3.45	2.17	**-1.28**
2 -5	10.26	5.51	**-4.75**	10.23	7.18	**-3.05**	9.67	7.64	**-2.03**	12.68	10.78	**-1.91**	10.49	8.04	**-2.45**
6 -10	14.92	7.17	**-7.75**	11.41	7.48	**-3.93**	12.00	7.18	**-4.82**	14.64	9.10	**-5.54**	11.62	7.31	**-4.31**
11-20	24.91	16.42	**-8.49**	22.86	16.00	**-6.86**	22.05	15.27	**-6.78**	22.24	17.38	**-4.86**	21.79	14.70	**-7.09**
21-30	13.51	18.79	**5.29**	11.72	18.74	**7.02**	12.97	17.3	**4.33**	14.73	20.96	**6.23**	13.83	19.49	**5.66**
30+	33.39	50.46	**17.07**	40.36	48.59	**8.23**	40.26	50.4	**10.14**	31.25	38.85	**7.60**	38.82	48.29	**9.47**

Tabulated from the 1970 Public Use Microdata Sample of the U.S. Census and the 2007 American Community Survey. States are grouped into regulatory groups based on the survey analyzed in Gyourko et. al (2006).
a. For the age of the housing units, the end year is 2000 since this question was not asked in the 2007 ACS. To tabulated these figures we use data from the 1 percent Public Use Microdata from the 2000 census.

Table 3
Distribution of Housing Stock Across Structure Types, 1970 and 2007, by the Stringency of Housing Regulation Practices

Panel A: Most Regulated			
	1970	2007	Change
Mobile home	2.38	3.82	1.44
Single family-detached	60.05	58.45	-1.6
Single family-attached	3.89	7.51	3.62
2 to 4 units	15.36	9.87	-5.49
5 to 9 units	5.51	5.64	0.13
10+ units	12.81	14.71	1.91
Panel B: Second Most Regulated			
	1970	2007	Change
Mobile home	3.25	5.77	2.53
Single family-detached	64.12	62.78	-1.34
Single family-attached	6.71	8.34	1.63
2 to 4 units	13.89	7.32	-6.57
5 to 9 units	3.35	4.16	0.81
10+ units	8.69	11.64	2.95
Panel C: Medium Regulated			
	1970	2007	Change
Mobile home	2.37	5.93	3.56
Single family-detached	58.53	61.52	2.99
Single family-attached	1.82	4.63	2.81
2 to 4 units	15.65	9.03	-6.62
5 to 9 units	4.67	4.90	0.23
10+ units	19.96	14.00	-2.96
Panel D: Second Least Regulated			
	1970	2007	Change
Mobile home	4.91	10.79	5.88
Single family-detached	79.03	69.19	-9.84
Single family-attached	0.56	2.80	2.24
2 to 4 units	8.78	5.79	-2.99
5 to 9 units	2.15	4.62	2.47
10+ units	4.56	6.80	2.24
Panel E: Least Regulated			
	1970	2007	Change
Mobile home	3.95	8.62	4.67
Single family-detached	74.97	71.46	-3.51
Single family-attached	1.28	2.92	1.64
2 to 4 units	12.03	6.49	-5.54
5 to 9 units	2.92	3.90	0.98
10+ units	4.85	6.60	1.75

Tabulated from the 1970 Public Use Microdata Sample of the U.S. Census and the 2007 American Community Survey. States are grouped into regulatory groups based on the survey analyzed in Gyourko et. al (2006).

Table 4
Estimated Price Appreciation for Housing Units Between 1970 and 2007 by 1970 Quality Quintiles, All U.S. Housing Units

Panel A: All Housing Units

	1970 price (thousands $)	2007 price (thousands $)	P_{2007}/P_{1970}	Annual nominal price appreciation[a]	Annual real price appreciation[b]
Quintile 1	11.202	144.227	12.88	0.072	0.025
Quintile 2	14.405	177.488	12.32	0.070	0.024
Quintile 3	16.811	198.273	11.79	0.069	0.023
Quintile 4	19.329	214.519	11.10	0.067	0.021
Quintile 5	26.244	308.852	11.77	0.069	0.023

Figures tabulated from the 1970 Public Use Microdata Sample of the U.S. Census. 2007 figures are tabulated from the 2007 ACS. Housing quality quintiles are defined relative to the 1970 distribution of housing units across price groups defined by number of rooms, number of bedrooms, and structure type. Average prices in 2007 are weighted average within 1970 defined quality quintiles using the 1970 within group frequency distribution as weights.

a. Figures provide the annual nominal appreciation rate implied by the documented price levels.

b. Figures subtract the annual inflation rate implied by the starting and ending price levels for 1970 and 2007 (0.0463)from the annual nominal price appreciation rate.

Table 5
Estimated Price Appreciation for Housing Units Between 1970 and 2007 by 1970 Quality Quintiles, All U.S. Housing Units and by the Stringency of Housing Regulation Practices

	1970 price (thousands $)	2007 price (thousands $)	P_{2007}/P_{1970}	Annual nominal price appreciation[a]	Annual real price appreciation[b]
Panel A: Most Regulated					
Quintile 1	14.358	215.962	15.04	0.076	0.030
Quintile 2	17.590	271.520	15.44	0.077	0.030
Quintile 3	20.370	303.729	14.91	0.076	0.029
Quintile 4	23.594	334.348	14.17	0.074	0.028
Quintile 5	28.517	463.573	16.26	0.078	0.032
Panel B: Second Most Regulated					
Quintile 1	11.917	146.947	12.33	0.070	0.024
Quintile 2	14.595	161.611	11.07	0.067	0.021
Quintile 3	17.883	198.170	11.08	0.067	0.021
Quintile 4	19.320	240.920	12.47	0.071	0.024
Quintile 5	25.831	298.241	11.55	0.068	0.022
Panel C: Medium Regulated					
Quintile 1	12.137	124.725	10.28	0.065	0.019
Quintile 2	15.530	170.233	10.96	0.067	0.021
Quintile 3	17.459	157.205	9.00	0.061	0.015
Quintile 4	19.800	179.366	9.06	0.061	0.015
Quintile 5	27.909	281.259	10.08	0.064	0.018
Panel D: Second Least Regulated					
Quintile 1	7.405	95.834	12.94	0.072	0.025
Quintile 2	10.340	102.136	9.88	0.064	0.018
Quintile 3	13.446	125.251	9.32	0.062	0.016
Quintile 4	15.785	152.449	9.66	0.063	0.017
Quintile 5	22.384	204.876	9.15	0.062	0.015
Panel E: Least Regulated					
Quintile 1	8.962	88.206	9.84	0.064	0.017
Quintile 2	11.487	90.132	7.85	0.057	0.011
Quintile 3	14.407	112.938	7.84	0.057	0.011
Quintile 4	16.351	129.168	7.90	0.057	0.011
Quintile 5	22.835	186.518	8.17	0.058	0.012

Figures tabulated from the 1970 Public Use Microdata Sample of the U.S. Census. 2007 figures are tabulated from the 2007 ACS. Housing quality quintiles are defined relative to the 1970 distribution of housing units across price groups defined by number of rooms, number of bedrooms, and structure type. Average prices in 2007 are weighted average within 1970 defined quality quintiles using the 1970 within group frequency distribution as weights.

a. Figures provide the annual nominal appreciation rate implied by the documented price levels.

b. Figures subtract the annual inflation rate implied by the starting and ending price levels for 1970 and 2007 (0.0463) from the annual nominal price appreciation rate.

Table 6
Key Percentiles of the Distribution Rent-to-Income Ratios Among Renter Housing in 1970 and 2007 by the Stringency of Housing Regulation Practices

Panel A: Most Regulated					
	10th	25th	50th	75th	90th
1970	0.085	0.124	0.187	0.320	0.590
2007	0.130	0.200	0.300	0.514	0.973
Change	0.045	0.076	0.113	0.194	0.383
Panel B: Second Most Regulated					
	10th	25th	50th	75th	90th
1970	0.076	0.112	0.176	0.310	0.615
2007	0.119	0.179	0.277	0.461	0.960
Change	0.043	0.067	0.101	0.151	0.345
Panel C: Medium Regulated					
	10th	25th	50th	75th	90th
1970	0.074	0.108	0.168	0.286	0.546
2007	0.106	0.163	0.258	0.440	0.871
Change	0.032	0.055	0.090	0.154	0.325
Panel D: Second Least Regulated					
	10th	25th	50th	75th	90th
1970	0.063	0.097	0.153	0.262	0.506
2007	0.096	0.150	0.237	0.398	0.773
Change	0.033	0.053	0.084	0.136	0.267
Panel E: Least Regulated					
	10th	25th	50th	75th	90th
1970	0.070	0.099	0.157	0.270	0.536
2007	0.092	0.144	0.231	0.400	0.800
Change	0.022	0.045	0.074	0.130	0.264

Rent-to-income ratios are for renter households only. Percentiles are tabulated using data from the 1970 Census and the 2007 ACS.

Table 7
OLS Estimates of the Effects of Rent-to-Income Ratios on Homelessness and IV Estimates Using Regulatory Stringency as an Instrument for Rent-to-Income Ratio, Unweighted

	OLS Estimation, Dependent Variable = Proportion Homeless			IV Estimation, Dependent Variable = Proportion Homeless, Instrumental Variable= Regulatory Stringency		
Rent-to-Income	0.025	0.026	0.020	0.020	0.019	-0.001
	(0.004)	(0.005)	(0.006)	(0.005)	(0.007)	(0.011)
Prop. Black	-	-0.001	-0.004	-	-0.001	-0.004
		(0.001)	(0.001)		(0.001)	(0.002)
Prop. Hispanic	-	0.001	-0.000	-	0.002	0.003
		(0.001)	(0.002)		(0.002)	(0.002)
Prop. poor	-	0.006	0.007	-	0.003	-0.001
		(0.005)	(0.005)		(0.005)	(0.006)
Prison release rate	-	0.004	-0.059	-	-0.027	-0.091
		(0.134)	(0.128)		(0.137)	(0.148)
Prop. under 18	-	-	-0.016	-	-	-0.040
			(0.012)			(0.015)
Prop. Over 65	-	-	-0.031	-	-	-0.045
			(0.012)			(0.015)
Average January Temperature/1000	-	-	0.032	-	-	0.043
			(0.011)			(0.013)
R^2	0.452	0.503	0.613	0.435	0.481	0.487
N	50	50	50	50	50	50
First stage t	-	-	-	10.14	7.85	5.40
(p-value)				(0.000)	(0.000)	(0.000)

Standard errors are in parentheses.

Table 8
OLS Estimates of the Effects of Rent-to-Income Ratios on Homelessness and IV Estimates Using Regulatory Stringency as an Instrument for Rent-to-Income Ratio, Weighted by State Population

	OLS Estimation, Dependent Variable = Proportion Homeless			IV Estimation, Dependent Variable = Proportion Homeless, Instrumental Variable= Regulatory Stringency		
Rent-to-Income	0.032	0.037	0.035	0.027	0.031	0.019
	(0.003)	(0.005)	(0.005)	(0.004)	(0.007)	(0.010)
Prop. Black	-	-0.002	-0.004	-	-0.002	-0.004
		(0.001)	(0.001)		(0.001)	(0.002)
Prop. Hispanic	-	-0.000	-0.001	-	0.000	0.002
		(0.001)	(0.001)		(0.001)	(0.002)
Prop. poor	-	0.014	0.016	-	0.011	0.008
		(0.005)	(0.004)		(0.006)	(0.006)
Prison release rate	-	0.071	-0.018	-	0.062	0.001
		(0.119)	(0.116)		(0.121)	(0.132)
Prop. under 18	-	-	-0.020	-	-	-0.041
			(0.012)			(0.018)
Prop. Over 65	-	-	-0.031	-	-	-0.039
			(0.009)			(0.012)
Average January Temperature/1000	-	-	0.015	-	-	0.021
			(0.010)			(0.012)
R^2	0.652	0.750	0.804	0.635	0.743	0.757
N	50	50	50	50	50	50
First stage t	-	-	-	9.13	5.81	4.09
(p-value)				(0.000)	(0.000)	(0.000)

Standard errors are in parentheses.

Table 9
Simulated Effects of Reducing Regulatory Stringency to Specific Levels on the National Single-Night Homelessness Count

	Reducing Regulatory Stringency For States Above the Median Level to the Median Level	Reducing Regulatory Stringency in All States to the Level of the Least Regulated State
Base homeless count[a]	645,453	645,253
Simulated homeless count	599,005	500,960
Difference	46,246	144,294

Estimates based on the 2SLS estimates from the final specification of the weighted models presented in Table 8.
a. Total homeless count is tabulated by applying state-level homeless rates from AHAR to state-level population estimates from the American Community Survey.