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The effect of housing supply regulation on housing affordability: A review☆

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The cost of housing has posed a growing weight on household budgets over the past half-century. As shown in Fig. 1, whereas only about one quarter of renter households spent more than 30 percent of their income on rent in 1960 and 1970, about half of households spent at least this much in 2016. Meanwhile, the fraction of owner-occupied households paying more than 30 percent of their income in housing costs has expanded from less than one fifth in 1980 to about one quarter in 2016.[1] Albouy et al. (2016) show that increases in housing-related expenditures are not because of changes in the quality or amount of housing consumed. Rather, the price of housing has risen substantially.

Increases in the price of housing would not occur if the supply of housing were perfectly elastic, so the rise in housing costs must indicate a limited supply. These limits could potentially stem from a range of sources including the availability of land, labor, or construction materials. Among these potential restrictions, one set of issues that has drawn much attention is regulatory constraints that limit the number of homes that can be built in a given area. These regulations take a wide variety of forms including zoning, minimum lot sizes, height restrictions, open space requirements, and growth controls. Other regulations, such as building codes and impact fees, also might restrict the supply of housing by raising the cost of construction.[2]

This paper reviews the literature on housing supply regulation and its effect on housing affordability. I start by discussing the effect of regulation on average prices and rents, which is the most active area of research related to the effects of housing supply regulation. However, this literature does not speak directly to housing affordability, as most policymakers and researchers who care about housing affordability generally want to know about the availability of lower-priced units out of a desire for all households to be able to afford at least some basic level of housing services. Assessing the availability of lower-priced units requires information on the *distributions* of house prices and rents, not just the averages. Therefore, I next discuss the effects of regulation on these distributions, splitting the discussion into effects on distributions across metropolitan areas and within metropolitan areas. Finally, I turn to the connection between regulation and direct measures of housing affordability, which requires information on household income as well as housing costs. I conclude by highlighting some important issues that should be addressed with further research.

Housing supply regulations are not the only regulations or policies that affect the supply of affordable housing. For example, rent control can affect the affordability of rental housing; see the survey by Turner and Malpezzi (2003) on this topic. And governments offer a variety of tax credits and other incentives to build affordable housing units; see the article by Eriksen and Lang in this volume. It is also worth pointing out that most of the empirical literature cited in this paper uses data from the United States. Although similar issues related to regulation and affordability likely apply in other countries as well, the political and economic environments are different in each location and I will not discuss differences across countries in this article.

1. Regulation and average housing costs

Simple theory predicts that regulation will raise the average price of housing by restricting supply and increasing the costs of construction. In the framework described by Glaeser and Gyorko (2003), regulation adds a fixed cost to construction that leads to higher average house prices. They argue that without household heterogeneity, regulations that limit the number of homes in an area, such as minimum lot sizes or growth controls, have the same effect as an additional fixed cost. Brueckner (2009) describes a series of simple models to illustrate how urban growth boundaries, height restrictions, and cost-increasing regulations each raise average house prices. Regulations also boost average house prices in more complex models such as that derived by Ortalo-Magne and Prat (2014), in which homeowners vote to restrict new construction because they benefit from higher house prices, or that derived by Helsley and Strange (1995), in which even developers have an incentive to support

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[1] The fraction of households spending large shares of their income on housing has come down a bit since 2010 as growth in household income has picked up and mortgage rates have declined. Nevertheless, housing-related expenditures remain a much larger share of the household budget than in previous decades.

[2] Restrictions on residential development can arise for many reasons. Metcalf (2018) discusses how institutional features in the US can lead to larger amounts of regulation. Two specific issues that he highlights are (1) jurisdictional fragmentation coupled with local taxation and (2) the political influence of incumbent homeowners who do not take the effects of local policy on the entire region into account.

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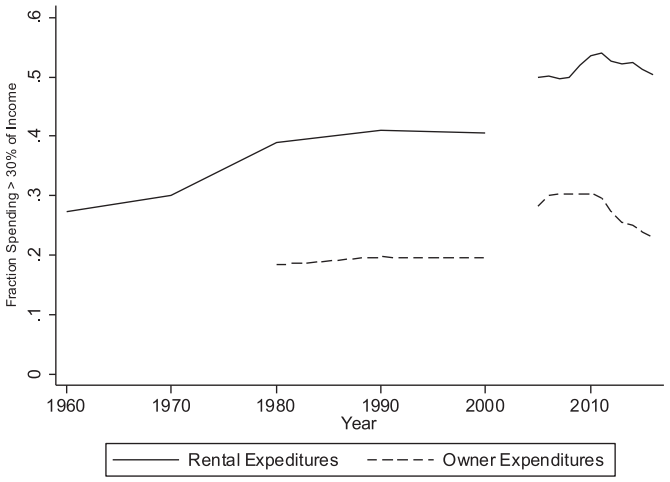

Fig. 1. Fraction of households with large housing expenditures relative to income.
Source. Author's calculations from the 1960–2000 Census and 2005–2016 American Community Survey, downloaded from IPUMS-USA (Ruggles et al., 2015). Each line shows the fraction of households with rent or owner costs greater than 30% of household income. Rent includes expenditures on utilities. Owner costs include mortgage payments, property taxes, insurance, condo fees and utilities.

regulation because it boosts their profits by raising prices.

Empirically, the costs imposed by housing supply regulations can be substantial. In a 2016 survey by the National Association of Home Builders, the average reported cost of complying with regulations amounted to $84,000 per house—24 percent of the sales price of a new home (Emrath, 2016). A large volume of empirical research documents a positive correlation between regulation and average or median house values. Quigley and Rosenthal (2005) survey this literature and cite 40 articles on this topic, most of which find a positive correlation. More recent research that obtains this result includes Zabel and Dalton (2011), Ihlanfeldt (2007) and Jackson (2018). However, it is important to keep in mind that most of this literature falls short of being able to identify a causal effect. Causal effects are extremely difficult to assess because regulations are endogenous to a host of local economic factors and amenities (Davidoff, 2016; Hilber and Robert-Nicoud, 2013; Saiz, 2010). In addition, the vast heterogeneity of different types of regulation and the fact that these regulations are correlated with one another makes estimating the effect of any single regulation quite complicated. Nevertheless, because a large positive correlation between regulation and house prices is generally found in a wide variety of situations, it seems reasonable to conclude that regulation probably does boost house prices.

If regulation raises house prices, then theory suggests that it should raise rents as well, since the flow of rental income generated by a property needs to be enough to offset the cost of buying and maintaining it (Hendershott and Slemrod, 1983; Poterba, 1984). Empirical research on the connection between regulation and rents is much sparser than that on regulation and house prices. The few papers that have looked at this relationship do tend to find that areas with more regulation have higher median rents, although this correlation tends to be a little smaller than the correlation with median house values (Malpezzi, 1996; Green, 1999; Xing et al., 2006).

Comparing the effects of regulation on rents versus prices is complicated by the fact that most rental units tend to be in large multifamily buildings while owner-occupied units tend to be single-family homes. Consequently, regulations that have different effects on multifamily and single-family structures may not have the same effects on prices and rents. Indeed, Shlay and Rossi (1981) and Pendall (2000) find that more regulated areas tend to have a larger share of single-family construction, suggesting that regulation restricts the supply of multifamily structures more than the supply of single-family structures. Also, Hilber et al. (2014) show that in metropolitan areas with more regulation, a positive shock to income results in a smaller shift in construction toward multifamily units. Their interpretation is that regulation prevents the construction of smaller homes that are more suitable to the migrants who would have otherwise moved into the area in response to the income shock.

The theoretical implications for regulation on land values are not as clear-cut as the effects on house prices and rents. Turner et al. (2014) develop a model to illustrate three ways that regulation affects land values. Regulation could decrease land values by reducing ownership rights. By contrast, regulation could raise land values by creating desirable amenities or by restricting the supply of buildable land. Empirically, they find evidence that the effect on ownership rights reduces land prices whereas the amenity effect is small and could be positive or negative. They also find that regulation reduces the supply of developed land, but they do not estimate the resulting effect on land prices. Glaeser and Gyourko (2003) show that the marginal price of land tends to be higher in areas where they estimate a larger contribution of regulation to house prices, which could be interpreted as either an amenity effect or a supply effect.

Thus far this discussion has focused on regulations that limit the supply of housing. Impact fees are a different type of regulation in that they directly impose additional costs on new construction. These costs are used to finance the infrastructure needed to support the new structures and the population growth that accompanies new construction. Been (2005) surveys the literature on impact fees and concludes that these fees do tend to be associated with higher prices of new and existing homes. She emphasizes the need for more research to determine whether these higher prices could reflect improved local amenities or a lower expected future property tax burden, in which case the fees would not imply higher prices after taking these benefits into account.

2. Regulation and the distribution of housing costs

Because regulation is much stricter in some metropolitan areas than others, these restrictions will alter the distributions of house values and rents across the US. Gyourko et al. (2013) document a substantial increase in the dispersion of house values across metropolitan areas—in 1950 house values in the most expensive cities were twice the national average, while by 2000 this gap had expanded to four times the national average. They relate this growing dispersion to an inelastic supply of housing combined with aggregate population growth. It would be reasonable to suspect that regulation could be a significant source of the supply constraints that drive their results, although they do not examine regulation directly. If regulation has altered the distribution of housing costs across metropolitan areas, then one would expect it to have affected migration flows across areas. Indeed, Saks (2008) and Zabel (2012) show that housing supply regulations alter migration patterns across metropolitan areas as migrants are deterred from moving to higher cost areas. And Hsieh and Moretti (2017) and Glaeser and Gyourko (2018) show that regulation can have a substantial impact on aggregate productivity by preventing workers from moving to the most productive areas of the country.

It is quite possible that regulation would affect the distributions of prices and rents even within the same metropolitan area or municipality. One way would be if regulation affects the quality of homes available. For example, regulation could give builders an incentive to construct higher quality homes if it causes lower-income households to be priced out of the market. Also, because regulation can make land assembly more difficult and increase minimum lot sizes, it may discourage large-scale housing developments. Homes built on a smaller scale by custom builders will not be able to take advantage of economies of scale, causing builders to focus on higher-end properties.

There is not much empirical research on the effects of regulation on housing unit quality. Malpezzi and Green (1996) find that the price of

low-quality homes relative to high-quality homes is higher in more regulated metropolitan areas, which suggests that regulation might reduce the supply of low quality units relative to the supply of high quality units. Building codes will also affect the quality of homes by enforcing some minimum standards. Research that has found a positive but small effect of building codes on house prices (although not directly on housing unit quality) includes Listokin and Hattis (2005), Noam (1983), and Dumm et al. (2011, 2012).

Regulation might also affect the quality of existing homes by changing the incentives for renovation. Filtering models as in Olsen (1969) and Arnott et al. (1983) describe the incentives for landlords to maintain and renovate homes, but the theoretical research in this area does not address the role of regulations. Empirically, Somerville and Mayer (2003) find that housing supply regulations make it more likely for affordable rental homes to filter up and become unaffordable. It is unclear whether they obtain this result because of a general increase in rents in the area or because regulation induces landlords to renovate lower-quality properties. Charles (2013) shows that teardowns, which replace a low-quality housing unit with a higher quality unit, are more likely to occur in neighborhoods with tighter housing supply regulations.

Another way that regulation might affect the distribution of housing costs within a metropolitan area is by pushing development into areas with higher-priced or lower-priced land. For example, if regulation binds more in high-demand areas where land prices are high, it might cause more development to occur in areas with lower land prices, which would increase the supply of homes at the lower end of the distribution. I am not aware of any research on how regulations affect the location of housing units within a metropolitan area. There has been some investigation into effects of regulation on the size of a metropolitan area; I will discuss this topic below.

3. Regulation and housing affordability

Researchers and policymakers who are interested in affordability generally focus on housing costs relative to some measure of household income because the amount that one can afford is strongly affected by one's income. For example, one common measure of affordability is the fraction of homes with rent that is less than 30 percent of some fraction of median income. Thirty percent is generally seen as a reasonable fraction of income to spend on housing, so this measure is designed to capture the fraction of rental housing stock that most households could easily afford. Another common measure is observed housing expenditures (either rent or ownership costs) relative to household income. As emphasized above, these measures require information on the distributions of housing costs, not just the mean or median costs. Researchers studying the effects of regulation on housing affordability must confront at least three important complications with using these standard affordability measures.

The first issue is that if regulations affect affordability differentially across locations—and indeed, regulations do vary substantially across space—they should also cause households to sort across locations. In particular, a regulation that raises housing costs may cause fewer poor households to move in and more poor households to move out. Thus, the regulation can alter the local distribution of income as well as the local distributions of house prices and rents. Gyourko et al. (2013) provide evidence that lower-income households tend to sort out of higher-price metropolitan areas. Ganong and Shoag (2017) develop a model to show how high house prices can deter migration of low-skilled migrants into high-cost areas, slowing income convergence across space.

To illustrate the effect of sorting on measuring housing affordability, Fig. 2 shows the correlations of housing supply regulation with rental affordability across metropolitan areas. Regulation is measured using the Wharton Residential Land Use Regulatory Index developed by Gyourko et al. (2008), and rental affordability is calculated as the fraction of rental units in the 2016 American Community Survey with rent less than 30 percent of the 25th percentile of household income. Panel A calculates the 25th percentile using the national distribution of income, while Panel B uses the distribution of income only for households in that metropolitan area. Whereas the correlation between regulation and affordability in Panel A is −0.56, the correlation in Panel B is only −0.16. This difference strongly suggests that household sorting can affect traditional measures of housing affordability if local incomes are used.[3]

A second issue that complicates the analysis of housing affordability is that observed housing expenditures are a function of preferences as well as income and housing costs. Specifically, the share of income devoted to housing is a function of the income elasticity of housing demand and preferences for housing relative to other goods. Therefore, a price increase might not necessarily result in a change in housing expenditures relative to income if it causes households to consume less housing. Indeed, Davis and Ortalo-Magne (2011) show that in a model with Cobb-Douglas preferences and free household mobility, households in areas with more regulation will not spend a larger fraction of their income on rent than households in areas with less regulation. Consistent with this prediction, they show that the median ratio of rental expenditures to income was roughly the same across the 50 largest metropolitan areas in the US from 1980 to 2000, despite substantial differences in rents across these locations. Of course, these results do not mean that regulation does not make housing less affordable; households simply consume less of it.

A third issue is that standard measures of affordability do not account for commuting costs.[4] If regulation pushes construction to areas that are farther from jobs, the total cost of living for the typical household will be higher because they face higher commuting costs. And commute times have increased markedly over the past several decades—the fraction of commuters with a commute longer than 30 minutes has expanded from 28 percent in 1980 to 38 percent in 2016.[5] Research has shown that density controls and height restrictions tend to increase urban sprawl, which would imply higher commuting costs (Bertaud and Brueckner, 2005; Mills, 2005). However, other regulations such as urban growth boundaries and maximum permit limits may reduce sprawl (Pasha, 1992; Song and Zenou, 2006; Geshkov and DeSalvo, 2012). Examining variation across local planning authorities in England, Cheshire et al. (2018) find that an increase in the refusal rate for major residential construction projects leads to an increase in average commuting distance.

Perhaps because of these empirical challenges, very few papers have explicitly assessed the empirical connection between regulation and direct measures of housing affordability, as opposed to average prices or rents. As mentioned above, Somerville and Mayer (2003) show that in more highly regulated locations, rental units are more likely to transition from the affordable stock to the unaffordable stock, where affordability is measured as less than 30 percent of 35 percent of median income in the metropolitan area. Pendall (2000) finds that the supply of affordable rental units—defined as rent less than 30 percent of 80 percent of median metropolitan area income—is lower in areas with permit moratoria, but is not materially lower in areas with permit caps, with ordinances that condition new development on the availability of adequate public facilities, or with urban growth boundaries. And counter-intuitively, he also finds that affordability is somewhat greater in areas with low-density zoning.

[3] Another interpretation could be that productivity, and hence income, is higher in more regulated metropolitan areas. However, the correlation of homeowner affordability (as opposed to rental affordability) with regulation is the same whether one uses the national or local distribution of income. Therefore, the difference highlighted in this picture is likely specific to rental markets, not related to factors like productivity that would affect the incomes of both renters and homeowners.

[4] Mortgage lenders also generally do not take commuting costs into account when determining the affordability of mortgage payments, even though they do consider other household costs such as other debt payments and property taxes.

[5] 2016 American Community Survey Table B08303 and 1980 Decennial Census Table 101.

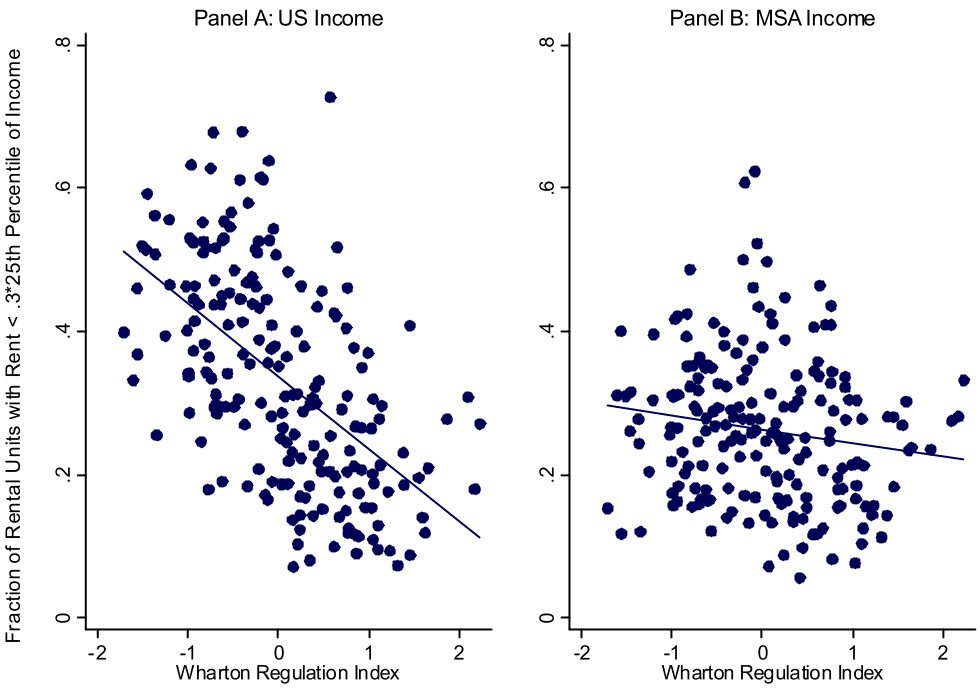

Fig. 2. Correlation of housing supply regulation and rental affordability across metropolitan areas.
Source. Author's calculations from the 2016 American Community Survey (Ruggles et al., 2015) and the Wharton Residential Land Use Regulatory Index (Gyourko et al., 2008). Each dot represents a metropolitan area. Panel A calculates the 25th percentile of income from the national distribution of household income. Panel B calculates the 25th percentile of household income from the metropolitan distribution of household income.

4. Directions for further research

Although there has been much research devoted to the effects of housing supply regulation on house prices, the implications for housing affordability deserve much more investigation. In this paper, I have emphasized that understanding these effects requires addressing a number of challenges including examining effects on the full distributions of housing costs and assessing effects on household location choices within and across metropolitan areas.

One substantial gap in the literature is the relationship between regulation and rents. Many households, especially those lower in the income distribution, are not homeowners and the effects on rents are more relevant for this group. And there are several reasons to expect effects on rents to differ from effects on house prices. Relatedly, a better understanding of the effects of regulation on the relative supply of owner-occupied versus rental housing and on the ability of households to transition from renting to owning would be helpful.

Another area that would benefit from further investigation is the effects on the quality of housing units and on housing unit location within the metro area. Both of these aspects of housing have considerable effects on the distributions of prices and rents within a metropolitan area, yet there has been little work on these effects, either theoretical or empirical. Also, a better understanding of the effect of regulation on household sorting is crucial in order to be able to translate effects on prices and rents into effects on affordability for the typical household. And it is important to learn whether different types of regulations affect sorting across areas differently. For example, regulations that impose large fixed costs might have different effects on the types of households that choose to live in an area than minimum lot sizes or open space requirements.

Finally, further research on the welfare implications of housing supply regulation is crucial. While this article has focused on effects on housing affordability, regulations could still improve welfare, on net, if the utility that they provide outweighs the higher cost of housing. For example, some building codes may provide a net welfare gain, as they ensure the safety and soundness of structures. Other regulations may improve welfare by preserving the environment and creating local amenities. Only a few papers have attempted to assess the net welfare effects of regulation, and they tend to find that the negative effects outweigh the benefits (Cheshire and Sheppard, 2002; Glaeser et al., 2005; Turner et al., 2014). But much more research should be done to understand whether the benefits created by these regulations outweigh the higher housing costs that they create.

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