

MORE CROWDING, FEWER BABIES: THE EFFECTS OF HOUSING DENSITY ON FERTILITY

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ABOUT THE AUTHOR

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Introduction

With fertility falling to record lows in the United States, it is increasingly important to understand what factors may be preventing Americans from having the families they want to have. One factor that many people immediately think of is housing, cities, and density. Because children require a degree of space, [people from a wide range of perspectives](#) argue that housing affordability, open space, and housing density could all matter for family formation.

But this debate takes a particularly sharp turn in relation to the modern [“YIMBY,” or “Yes In My Back Yard,” political movement](#) seeking to eliminate laws that restrict supply of new housing. Many YIMBY advocates believe that removing these laws will lead to housing becoming more affordable (which most people believe can boost fertility), even as it will also lead to Americans living in denser communities (which some people believe may reduce fertility). In this post, I won't settle the question over whether removing zoning laws would *actually* increase density (it really depends on what exact laws are changed). Rather, I'll focus on: What would happen to fertility *if density increased?*

What Is Density?

The basic problem in this debate is defining *density*. Some people define density at the county level, looking at people-per-square mile. Others define density at the neighborhood level: people per acre, or perhaps average lot size for a house. Still others define density at the building level: single-family houses are seen as “low density,” while multi-family apartment buildings are “high density.” Still, others define density at the *unit* level, meaning “people per bedroom in the house.”

Because how people define density varies so much, I'm going to try to cover all of them. The American Community Survey (ACS) from 2006 to 2022 has about 12 million women of reproductive age in its sample. They were asked numerous questions. For measuring density, the key measures are: bedrooms in the house (a proxy for house size), housing units in the building (a measure of building size), people in the house (a proxy for household crowding), and population density of the public-use microdata area the person lived in (PUMS are areas of about 150,000 people, so in rural areas cover several counties, but in urban areas cover fairly small areas corresponding to urban cores).

Cross-Sectional Evidence

I estimate a model predicting the probability that women report having had a birth in the last year, the ACS' best fertility-related variable. As control variables, I include a huge range of factors that could shape fertility: women's earned income, their unearned personal income, the income of other members of their family, whether or not they are enrolled in a school, their past educational attainment, their employment status, their citizenship status, their detailed ethnic ancestry, their race, whether they own the home they live in, whether

they live with their parents, their age, whether their lot has 10 acres or more, whether they live on a farm, and whether they have any cognitive or physical disabilities.

The resulting model gives us extremely granular estimates of how given density-related factors associate with fertility.

Area density does have some negative relationship to fertility. In the least dense parts of the U.S., fertility rates in 2006-2022 were 1.85-1.95 children per woman, after controlling for background traits for women. In the densest areas, fertility rates were 1.65-1.85. That’s an appreciable gap, suggesting that high local density may have a real negative effect on fertility.

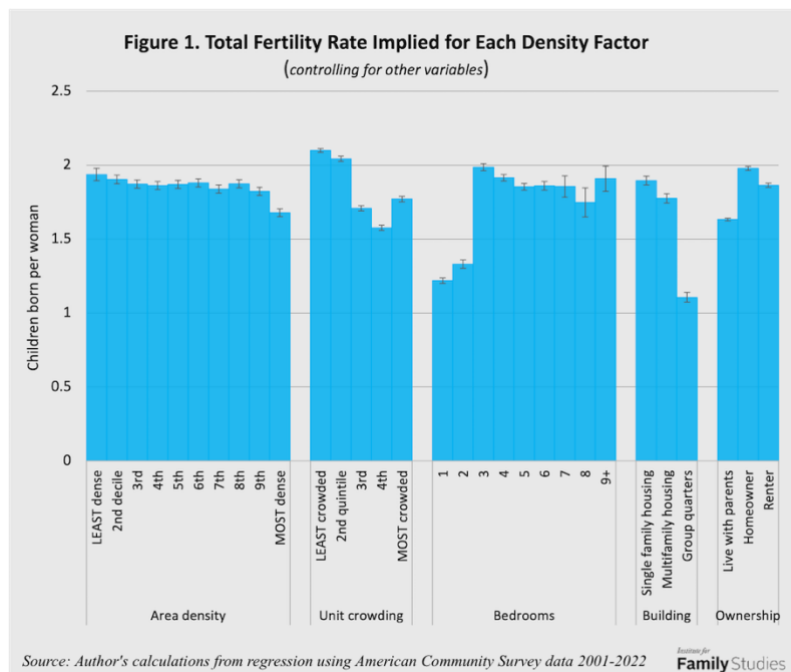
But other measures of density are even more important. Unit crowding, for example (that is: people per bedroom) is very important. Women in less-crowded units had TFRs of 2-2.1, but women in more crowded units have TFRs of 1.55-1.8. So, there’s a bigger difference in fertility between women in “crowded vs. not-crowded” units than between women in “more dense vs. less dense” areas.

Likewise, the number of bedrooms has a huge effect. Women in 1- or 2-bedroom housing units have a TFR of 1.2-1.35, levels somewhat similar to Japan or Italy. Women in 3-bedroom units average 1.9-2 children, near replacement rate, while women in even larger houses average 1.7 to 1.95 children. So, living in a very small house is associated with *far* lower fertility.

Turning to building characteristics, there isn’t a huge difference between people in single-family houses (TFR of 1.9) and people in multi-family apartment buildings (TFR of 1.8). But there’s a very large decline for women in group quarters (i.e. dorms, prisons, medical facilities, barracks, and other institutions): women in group quarters have a TFR of just 1.1 children per woman.

Finally, housing tenure matters. Women who live with their parents average just 1.6 children each, homeowners average 2, and renters average 1.85.

So what housing characteristics matter most? Well, in terms of the data in the ACS, the answer seems to be, first unit size; then group quarters; then unit

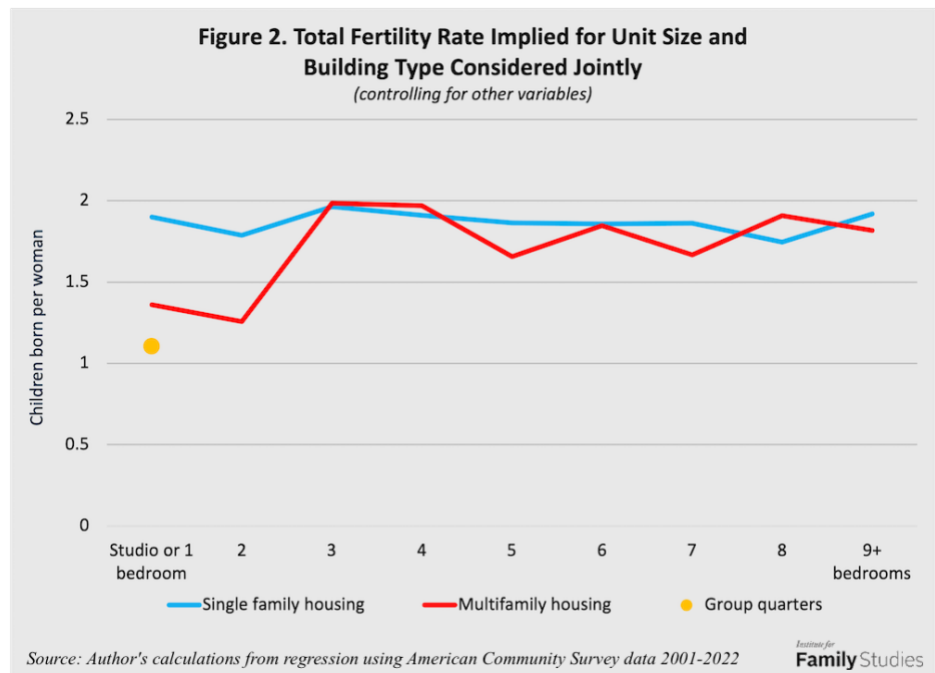


crowding; then coresiding with parents; then area density.

However, these results use only simple controls. A more sophisticated way to tackle the topic is to use interaction effects, that is, to ask if the number of bedrooms influences fertility *conditionally* on the person living with their parents, or being in multi-family housing, or being in a dense area, etc. So, for example, we can look at the combined effects of housing type and bedroom number:

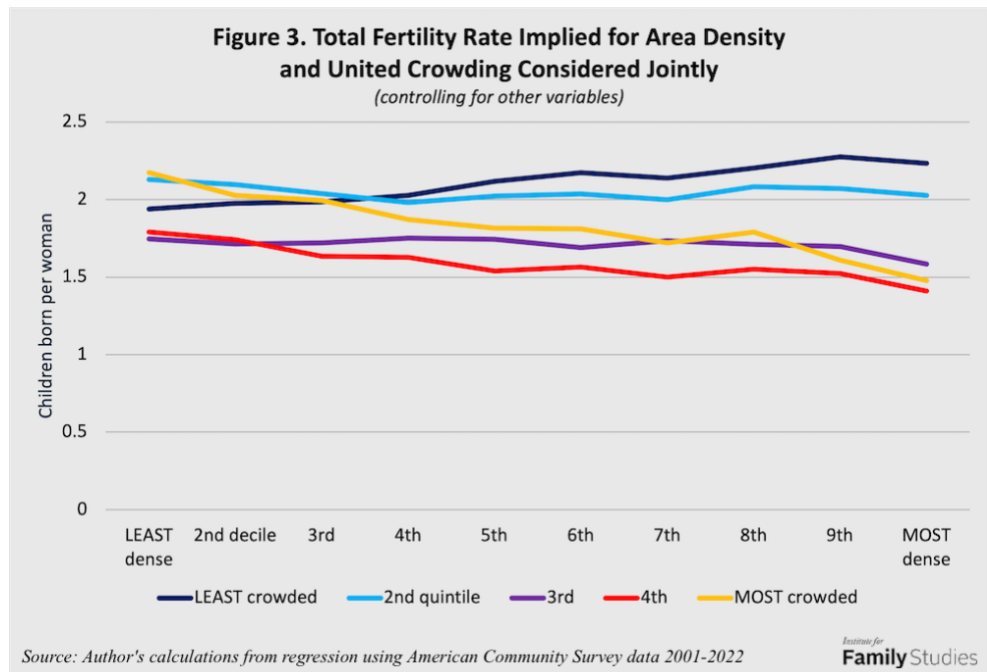
Women who live in apartments with 3+ bedrooms have basically the exact same fertility behaviors as women who live in single-family houses with 3+ bedrooms. But women who live in studio, 1-, or 2-bedroom apartments have *much* lower fertility than women who live in 1- or 2-bedroom single-family houses. The most likely reason is that a 2-bedroom house tends to be much bigger than a 2-bedroom apartment; the same probably goes for 1-bedroom houses being bigger than 1-bedroom apartments and studios.

Of course, it's worth noting that 27% of apartment-living women in this sample live in studio, 1-, or 2-bedroom apartments, whereas under 2% of single-family home-living women are in similarly sized houses. Thus, the negative effects on fertility of small apartments have a big effect on the overall fertility traits of apartment-living people.



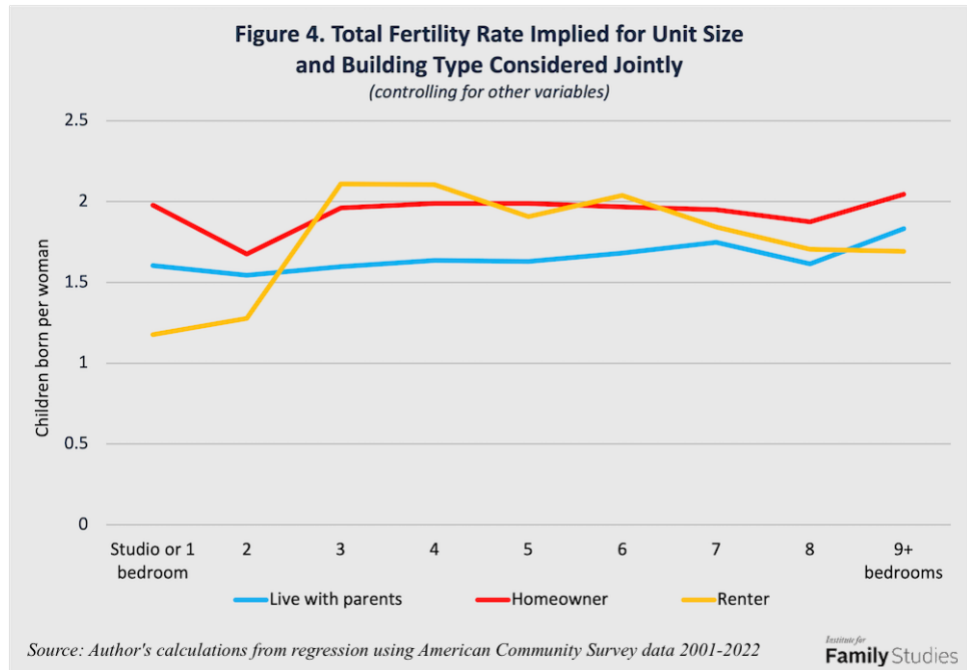
Instead of looking at architectural traits of buildings, we could look at population traits: people per bedroom in the house, and people per square mile in the area.

At low population densities, there isn't much correlation between "crowded housing unit" and lower fertility. But as area population density rises, the fertility rates of people in the least-crowded units rise, and the fertility rates of people in the most-crowded units falls. Put another way, crowding *within* the household and density *outside* the household work together to produce low fertility. In areas with low density, people in crowded houses may not have their family formation harmed because they have lots of other avenues in which to escape the crowded house. But in areas of high density, leaving the crowded household just leads to more crowds. And, perhaps importantly: household crowding is much more common in areas of high density. Throughout the bottom 70% of the area density distribution, the share of women living in high-crowding houses is less than 15%. But among the 10% of women living in the densest areas, 28% live in highly crowded houses, and essentially the reverse trend exists for the least-crowded houses. Thus, high population density may drive low fertility by suppressing the fertility of people in more-crowded-than-average households and by making crowded households more common.



Finally, we may wonder if the effect of living with your parents varies across house size. Maybe a bigger house affords more privacy. Figure 4 below provides some cautious support for this idea.

Women in 5- or 6-bedroom houses show about the same gap in fertility between women who live with their parents and women who do not, as women who live in 3- or 4-bedroom houses. For smaller houses, effects are more complicated: living alone in a small, *owned* unit may be better for fertility than living



with parents, but living alone in a small, *rented* unit might not be. In very large houses, however, like those with 7 or more rooms, the fertility gap between women who live with their parents and other women shrinks. These very large houses may be unique in other ways too: they may have more separate entrances, separate garages, separate heating and air, more bathrooms, and in some cases likely represent misclassified “accessory dwelling units.” Thus, in very large houses, the negative effect of living with parents is somewhat diminished.

Longitudinal Evidence

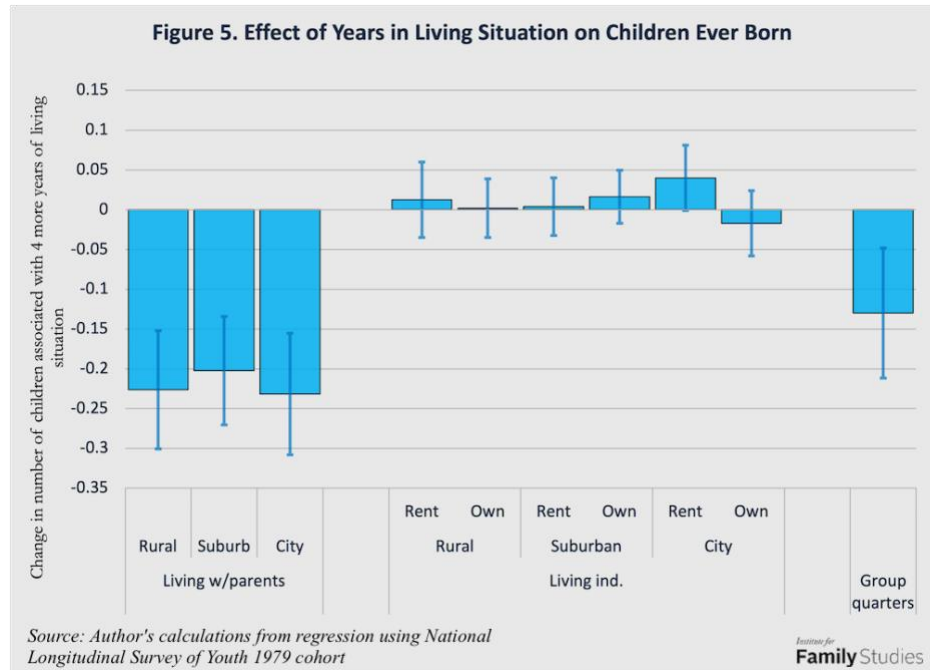
The problem with the ACS data, however, is that it is cross-sectional. Even though I control for age, income, and a host of other variables, it remains the case that people sort into different types of housing at different times, and the results shown above might reflect these life course factors rather than true causal relationships.

To control for that, I next turn to a sample of about 3,500 women in the National Longitudinal Survey of Youth 1979 cohort. For this cohort of women who were 14-22 in 1979, I control for standard demographic variables such as how many years women were married, their total lifetime earnings, their total lifetime income from spousal earnings, their total lifetime other household income, their educational attainment, and their race. But the NLSY also includes rich data on the kinds of early-life traits that might shape a person’s family and housing life trajectory in important ways: aptitude scores from the AFQT test, the number of children respondents reported desiring early in life, how many siblings they had growing up, and religiosity. If some people selectively end up in denser cities *because* they don’t want families, this approach should help address that issue. Likewise, if some

people end up married *because* they are higher achievers in general, this approach addresses that.

But whereas the NLSY can give us a better sense of these early life factors that may shape selection into various housing outcomes, the housing questions are not nearly as granular. Indeed, all we can really assess

in the NLSY is the role of living with parents, group quarters, homeownership, and then if the person lived in rural, suburban, or central city type areas. Figure 5 shows the estimated effect on completed fertility (in terms of children ever born) of living in a given housing arrangement for four additional years.



Regardless of area density, people who spent more years living with their parents had fewer children. Four extra years with parents implied about 0.15 to 0.3 fewer children, a quite considerable effect. Similarly, living in group quarters had a big effect, reducing fertility by 0.05 to 0.2 children per 4 years spent in group quarters.

But spending more years in various independent living arrangements, whether renting or owning and whether in city or rural areas, had basically no observable effect at all. Now, several factors could be in play here. First, the NLSY's geographic data are extremely crude. Actual densities vary widely within these categories. Second, as shown in the cross-sectional data earlier, there are important inter-relations between various measures of density, which relations the NLSY simply cannot capture. So these results do not *rule out* the possibility that various kinds of density might matter a great deal.

However, these longitudinal results should motivate a clearer awareness of what factors absolutely *do* matter for fertility. Most notably, extending the years that young people live with their parents has a huge negative effect in both cross-sectional and longitudinal data. If I use interaction terms, the huge negative effects of parental coresidence are not substantially diminished: for individuals with similar amounts of lifetime income (i.e. similar socioeconomic status), living with parents reduces fertility; for individuals with similar early-in-life test scores (i.e. a plausible guess at underlying ability), living with parents reduces fertility; for individuals with similar early-in-life family size desires, living with parents reduces fertility; for individuals with similar lifetime marital histories, living with

parents reduces fertility. Point blank, years spent living with parents likely *causes* a huge reduction in fertility.

If this effect really is causal, then it should show up in *lots* of datasets. And, lo and behold, it does. The figure below shows data from 271 different national censuses made available by IPUMS International stretching from 1702 to the 2010s and covering countries on every continent except Antarctica. Using that data, I estimate fertility rates for married women based on whether or not they have

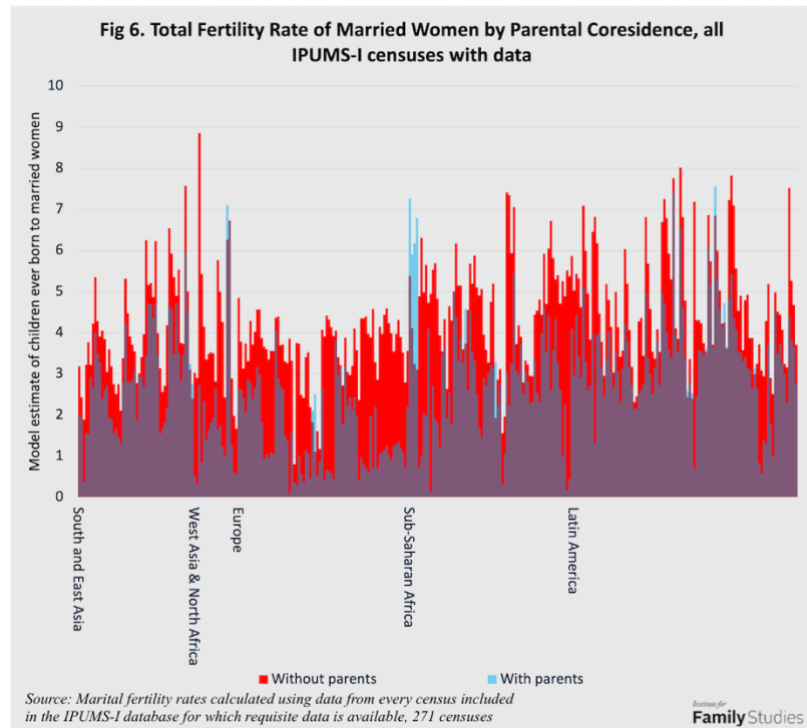
parents living in their house. Figure 6 below shows that in almost every society for which we have data, living with parents has a negative association with fertility.

Thus, it is nearly a cross-cultural universal that living with parents is associated with lower birth rates. On top of the hugely detailed sample in the ACS and the longitudinal data from the NLSY, this should be clear evidence that living with parents has a big negative effect on birth rates.

Conclusion

It's difficult to measure the exact effect of density on fertility, not least because it's difficult to even choose a consistent definition of density. Nonetheless, some important and plausible associations can be observed in cross-sectional data. When women live in smaller, more crowded houses, they have fewer children. This is *especially* true if those small, crowded houses happen to be in areas of high population density, where crowding within the household is echoed outside of the household. It is *not* generally the case that living in an apartment building reduces fertility: for housing units with 3 or more bedrooms, fertility is pretty much identical whether the unit is an apartment or a single-family home. Likewise, ownership status doesn't appear to be the biggest factor, with generally modestly-sized effects.

These dynamics help explain [what is happening with ultra-low fertility in East Asia](#), such as in Korea, Hong Kong, Shenzhen, or Macao, where fertility rates are all considerably below 1 child per woman. These megacities are a perfect storm of high population density areas full



of very small apartments with few bedrooms, and those few bedrooms are crammed with too many people. While those crowded units might not suppress fertility if they were in the countryside, endless cityscapes of giant towers of small units create a universal experience of crowdedness. It is not just *density* or *crowded houses* alone that drive low Asian fertility, but the joint effect of small apartments stacked into giant towers all crammed close together.

Another unique factor in Asia is the high rate at which young people live with their parents. In the U.S. today, about 45% of singles ages 18-34 live with their parents in the ACS data above. In Japan, [it is about 70%](#); in Singapore, [it is over 90%](#). This has multiple negative effects on fertility. First, as I've shown above in the ACS, NLSY, and 271 censuses around the world, living with parents has a huge negative effect on fertility. But living with parents might *also* influence household crowding. Where norms of parental coresidence prevail, there will tend to be more adults living in a house with a given number of bedrooms, and as such the average house will be much more crowded. Thus, Asian norms around parental coresidence not only directly suppress fertility, but they further feed into the dynamic of small, crowded houses in dense environments.

But even as these results help explain why fertility in east Asia is so extremely low, they give cause for hope that YIMBY-style reforms could boost fertility. The biggest housing factor shaping low fertility is just getting young people out of their parents' houses. Improving affordability can do that.

Likewise, current zoning rules often punish property developers who produce apartments with 3 or more bedrooms (such as by requiring a certain fixed amount of parking *per bedroom* instead of *per unit* or not at all). This means that a huge share of apartments are studios, 1-, or 2-bedrooms. Relaxing zoning rules for apartments might lead to more family-friendly apartments being built.

Moreover, relaxing zoning rules could allow more people to build extra bedrooms in accessory dwelling units, allowing them to move their live-in parents into an ADU instead of the main house, perhaps reducing the negative effect of parental coresidence and reducing household crowding.

Where YIMBY reforms may have some negative effects is if they are preoccupied with upzoning already dense urban neighborhoods. Building large numbers of small apartments in multi-family buildings in already rather dense neighborhoods does risk creating the kinds of perverse dynamics observed in east Asia. A better focus would be to target YIMBY efforts at reducing minimum lot sizes, reducing parking requirements, allowing ADUs or incremental single-story additions, or removing impediments to family-friendly apartments, and especially allowing dense-single-family with mixed-use zoning to be built on greenfield sites in exurban areas. These policies may be politically easier to accomplish than upzoning, and, since about 60% of Americans currently live in detached single-family homes, these policies would impact a larger share of people than simply zoning multi-family areas upwards.