Measuring housing underproduction: why estimates diverge and what a national number can say

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Abstract

Published estimates of U.S. national housing underproduction range from 2.0 million to 5.5 million homes. Each estimate compares the existing stock of homes with a target built from three components: the households that exist today, the missing households that would exist if housing cost less, and a normal vacancy rate. This paper shows that the choices made within each component move an estimate by millions of homes, in one case by more than the entire 3.5 million difference between the lowest and highest published estimates. Even the count of today's households differs by one to two million across surveys, and the other two components rest on assumptions, the most consequential of which is the period used to set the normal vacancy rate. The paper also provides a new estimate of missing households, the component that has to be modeled. Using a Kitagawa-Blinder-Oaxaca decomposition, it associates the rise in local rents between 2006 and 2024 with 2.5 to 3.0 million households that did not form. Finally, the paper shows why each component is harder to measure below the national level, where much housing policy is made. Local survey samples are too small to measure vacancy or missing households reliably. A national number therefore shows the scale of the shortage but should not be read as a construction target, and the evidence that policy most needs, on which homes are missing, for whom, and where, is the evidence that current methods are least able to provide.

Introduction

The share of renter households paying rent equal to more than 30% of income rose from about one in five in 1960 to nearly one in two in 2024, and nearly one in four now pay more than half (Ruggles et al., 2025). Many policymakers and researchers attribute these rising housing costs in part to a long-run shortage of homes, and policymakers are weighing how to close it (Jones and Weinstock, 2025). However, how much housing must be added, and where, depends on how large the shortage is. Published estimates range from 2.0 million to 5.5 million homes (deRitis et al., 2025; Freddie Mac Economic and Housing Research, 2024; Up for Growth and ECONorthwest, 2025; Jones and Hale, 2026; Zillow Economic Research, 2026; Patel et al., 2024; Rosen et al., 2021). Yet why the

estimates differ, and what a single national number can say about the homes, households, and places where housing is scarce, remain open questions.

This paper separates the published estimates into the three components: the stock of homes and households today, the missing households that would exist under other housing conditions, and the vacancy rate at which the housing market is in balance. The first component is measured, but by surveys that do not fully agree. The second must be estimated with a model of household formation, and the third rests on a judgment about when the market was last in balance. Estimates built on different assumptions therefore differ even when they use the same data. The paper shows that a single choice within one component can move an estimate by more than the entire difference between the lowest and highest published estimates.

To see how much these assumptions matter, the paper compares nine published estimates, which differ in what they measure as well as in the data and assumptions they use. Moody's Analytics, Freddie Mac, Up For Growth, Realtor.com, Zillow, Brookings, and the National Association of Realtors (NAR) estimate the gap between the stock and a target, a pace of construction, or a symptom of the gap, whereas the National Low Income Housing Coalition (NLIHC) and the Joint Center for Housing Studies (JCHS) address narrower questions about affordability and vacancy. It then examines each component in the order of the formula that the estimates share and asks whether each can be measured below the national level.

The comparison shows that methodological choices, namely the survey used, the model of missing households, and the vacancy benchmark, account for much of the divergence. The surveys that count the housing stock agree closely, whereas the surveys that count households differ by one to two million households or more. Most notably, the normal vacancy rate is a definition and not a measurement (Rosen and Smith, 1983), and the choice of benchmark period alone moves the target by about 3.7 million homes.

This paper also provides a new estimate of missing households, the component that has to be modeled, by asking how much of the change in household formation between 2006 and 2024 is associated with rising local rents. This approach updates a Kitagawa-Blinder-Oaxaca decomposition method used in earlier work by Freddie Mac and Brookings and contributes to the discussion of how many households are missing (Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024). The paper estimates that 2.5 to 3.0 million additional households would have formed by 2024 had these households faced 2006 housing prices. These are adults who live in another person's household instead of heading their own. The number of households therefore moves with housing costs, so an estimate of the shortage cannot take today's count of households as given.

The paper also shows why each component is harder to measure below the national level, where much housing policy is made and where supply conditions differ across markets (Glaeser and Gyourko, 2025; Molloy et al., 2020). The smallest geography that the American Community Survey microdata identify, the Public Use Microdata Area (PUMA), holds about 100,000 people, and the median PUMA's sample contains only about 500 household records. Samples this small strain the econometric methods used to estimate missing households, so estimates for a single local area are noisy. A national estimate also cannot be divided by type of home or income group. A national number therefore shows the scale of the shortage but should not be read as a construction target, because it cannot say which homes are missing, for whom, or where, and that is the evidence policy

most needs.

1 What a shortage is, and why housing is hard to measure

1.1 What a shortage means for most goods

For most goods, a shortage means that some people who want a good cannot get it. The market for N95 respirators in early 2020 provides a recent example. Demand rose far faster than manufacturers could expand output, and buyers who wanted masks could not find them. This situation can be seen in a familiar supply and demand graph (Figure 1A, left panel). After a demand surge, and before the price adjusts, the quantity demanded exceeds the quantity supplied, and the difference is the shortage.

Two features of this picture are especially relevant when comparing most goods with housing. First, the shortage is visible; it shows up as unfilled orders, rationing, and empty shelves. Second, it can be short-lived, because producers can expand output and the price can rise to ration what is available. In these cases the shortage can be measured directly, either as the quantity of the good that buyers want but cannot obtain or as the number of such buyers.

1.2 How households respond to a housing shortage

Housing differs from most goods on both counts, because a home is a durable good. Homes last for decades, so the stock is the accumulated result of past construction, and the homes built in a year add only a small share to it (Blank and Winnick, 1953; Glaeser and Gyourko, 2018). In the very short run, supply is therefore inelastic, and a surge in demand raises the price while the quantity of housing remains unchanged (Figure 1A, right panel). Over the medium and long run, supply becomes more elastic as builders add homes. How much it responds also differs across metropolitan areas, because the cost of building varies with land-use regulation and geography (Glaeser et al., 2005; Molloy et al., 2020; Glaeser and Gyourko, 2025). A surge in demand for housing therefore shows up first in prices and rents, not in unfilled orders.

In the market for housing, households that cannot obtain housing are only one possible outcome of a shortage. A shortage can show up along many margins of adjustment, with the most extreme being homelessness. A point-in-time count in January 2024 found more than 770,000 people experiencing homelessness, 33% more than at the start of the pandemic, with a more persistent increase among people living unsheltered or homeless for long periods concentrated in West Coast states where affordable housing is especially scarce (Joint Center for Housing Studies of Harvard University, 2026). Yet homelessness has many causes beyond the housing market.

Households also respond to a housing shortage by changing who lives together. Adults double up, live with parents or relatives, or delay forming a household of their own. Among adults ages 18 to 34, the share heading their own household rose from 30.3% in 2019 to 33.0% in 2022, but since 2024 these young adults have formed households more slowly, as rising costs have kept some

from setting up on their own and led them to share housing or remain with family (Joint Center for Housing Studies of Harvard University, 2026). Published estimates count the households that would exist under other housing conditions as missing households. Realtor.com estimates that 1.82 million households of younger adults (millennials and Gen Z) were missing in 2025, relative to the headship rates of 2010 to 2014 (Jones and Hale, 2026). Moody's Analytics and Freddie Mac make comparable estimates, which they call pent-up and latent households, of roughly 1.2 million and 1 million (deRitis et al., 2025; Freddie Mac Economic and Housing Research, 2024). Using data on U.S. metros between 1980 and 2016, Molloy et al. (2020, Table 5) find that where building is more tightly constrained, households contain more adults, a way of using less housing per person, although their estimated effects on housing consumption overall are modest. Like homelessness, these adjustments have other causes as well, including incomes, labor markets, and preferences.

Missing households cannot be observed and have to be estimated (Section 6 returns to this point). Even so, the concept is consistent with the number of households being an outcome of the housing market, not a fixed measure of how much housing is needed. Whether a household forms depends, among other things, on the cost of housing and on what type of housing is available. A shortage can therefore appear as a change in who lives with whom, rather than as the unmet demand visible in other markets. A housing shortage therefore cannot be measured directly and has to be estimated.

1.3 Defining a housing shortage

In this paper, shortage and underproduction both mean that the housing stock falls below the number of homes needed. Three features of housing complicate any definition of a shortage. Housing is durable, as described above, and new starts in 2025 added less than 1% of the roughly 148 million existing units. Housing is immobile, so a shortage is local. And housing is heterogeneous in type, size, and price, so one home is not necessarily a substitute for another. The last two features mean that a shortage is not a single national quantity. It varies by place, type of home, and price tier (Section 8).

These features lead to two related views of how to think about a shortage in the housing market. The stock view compares the number of homes with the number of households, plus the vacant homes a functioning market needs, which include units between occupants, seasonal units, and units held off the market (Section 7) (Freddie Mac Economic and Housing Research, 2024). The flow view compares each year's production with the homes needed as the population and the number of households grow and as existing homes are lost. The two views are not alternatives. Even a market in equilibrium needs continuing production to keep pace with growth, and the stock is the accumulated result of past flows.

2 Published estimates: national estimates range from 2.0 million to 5.5 million homes, and they ask different questions

The highest published estimate of the national housing shortage is more than double the lowest. Part of the difference comes from the questions the estimates ask.

2.1 The range of published estimates against the size of the stock

The United States had about 148 million housing units in 2025 (Figure 2A). Net additions to that stock averaged about 2.0 million a year in the 1980s and about 0.8 million a year in the 2010s, before recovering to about 1.4 million a year from 2020 to 2025. Against that stock, the published shortage estimates, which range from 2.0 million to 5.5 million homes (Figure 2B), amount to about 1.4% to 3.7% of all homes, or roughly 1.5 to 4 years of net additions at the average pace since 2000.

Figure 2B shows the latest headline from each of seven estimators, labeled with its reference period and key assumptions. The estimates are Moody's Analytics at 2.0 million (deRitis et al., 2025), Freddie Mac at 3.7 million (Freddie Mac Economic and Housing Research, 2024), Up For Growth at 3.78 million (Up for Growth and ECONorthwest, 2025), Realtor.com at 4.03 million (Jones and Hale, 2026), Zillow at 4.7 million (Zillow Economic Research, 2026), Brookings at 4.9 million (Patel et al., 2024), and the National Association of Realtors (NAR) at 5.5 million (Rosen et al., 2021). Two further estimates appear apart, from the National Low Income Housing Coalition (NLIHC) at 7.2 million and the Joint Center for Housing Studies (JCHS) at 0.6 million, because each answers a narrower question (National Low Income Housing Coalition, 2026; Joint Center for Housing Studies of Harvard University, 2026).

These values, however, are not strictly comparable. They are measured for periods that range from 2020 to 2025, and, as the next subsection shows, they answer different questions. A recent Congressional Research Service summary of several of these estimates describes a range of roughly 4 million to 5 million homes, and it notes that there is no universal agreement that an overall shortage exists (Jones and Weinstock, 2025).

2.2 The estimates answer different questions

As Figure 2B suggests, the estimates are not measurements of a single quantity. The upper panel shows aggregate estimates of the shortage of homes, which fall into three groups according to the question each addresses, and the colors distinguish the groups. The lower panel shows two estimates that answer narrower questions.

A first group of estimates asks how many more homes would bring supply and demand into balance. Freddie Mac, Up For Growth, Moody's Analytics, and Brookings each compare the existing stock with their own estimate of a "target" stock. The target stock is the number of homes that would house every household and also leave the vacant homes that a functioning market needs. It combines the households that exist today, an estimate of missing households, and the normal vacancy rate

(Jones and Weinstock, 2025). The shortage is the amount by which the target stock exceeds the stock that exists.

These estimates differ in how they treat the last two parts. One choice in defining the target stock is the year whose household formation is treated as unconstrained by housing costs, sometimes referred to as the baseline year. Freddie Mac and Up For Growth use 2000, and Brookings uses 2006 (Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024).[1] Moody's Analytics does not choose a baseline year. Instead, it extends the 2011 to 2019 trend in household formation, which averaged about 1.1 million new households a year, and treats the shortfall of actual households below that projection, measured through 2024, as pent-up households, 1.2 million in all (deRitis et al., 2025).

The other choice is the share of homes assumed to be vacant in a balanced market, sometimes referred to as the target vacancy rate. These assumptions differ in definition as well as in level. Freddie Mac and Brookings apply their vacancy rates to all vacant homes, including seasonal homes and homes held off the market, whereas Moody's Analytics counts only homes listed for sale or rent (Section 7) (Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024; deRitis et al., 2025).

A second group of estimates asks whether building has kept pace. NAR asks whether completions in 2001 to 2020 matched the pace of 1968 to 2000, and it finds a shortfall of 5.5 million homes, though its estimate has no demand side (Rosen et al., 2021). Realtor.com asks whether housing starts since 2012 have matched household formation, and it finds a shortfall of 2.21 million homes. It then adds 1.82 million pent-up households, measured against the headship rates of 2010 to 2014, which gives its estimate a demand side (Jones and Hale, 2026).

Zillow provides a third style of estimate, inferring the shortage from a symptom of it. The symptom is doubling up, in which families share housing with people outside the family. Zillow counts 8.2 million such families and subtracts the 3.4 million vacant homes on the market for rent or sale, which leaves a deficit of 4.7 million (Zillow Economic Research, 2026).

Finally, two additional estimates answer narrower questions than the aggregate shortage, so Figure 2B shows them in a separate panel. NLIHC counts how many rental homes extremely low-income renters can both afford and actually rent, and it finds 35 such homes for every 100 of these households, a shortage of 7.2 million (National Low Income Housing Coalition, 2026). This is an affordability gap and not a shortage of homes, because it describes price relative to income for one group of renters. JCHS asks how many more vacant homes the for-sale and rental markets would need for their vacancy rates to return to their 1990s averages of 1.6% and 7.7%, and it finds 0.6 million as of 2026Q1, made up of 0.4 million for sale and 0.2 million for rent (Joint Center for Housing Studies of Harvard University, 2026). This is a vacancy gap, which describes one indicator of market tightness and does not estimate missing households.

The estimates share a common structure. Each estimate rests on a count of the housing stock and of households, an estimate of missing households, and the normal vacancy rate. Each of these components involves a measurement or modeling choice. The surveys that count the stock and

[1] Up For Growth's baseline year is the one described in its 2022 technical memorandum, which its 2025 report does not restate (Wilkerson and Baron, 2022).

households give different answers, missing households must be inferred from a model, and the normal vacancy rate depends on how vacancy is defined and which period serves as the benchmark. Small differences in any of them matter at this scale, because one percent of the housing stock is about 1.5 million homes. These choices are what make a housing shortage hard to measure, and they help explain the spread in Figure 2B.

3 Trends consistent with growing underproduction

Because a housing shortage cannot be observed directly, the evidence for one is instead indirect. If too little housing had been built for decades, several signs would be expected. Fewer homes would be built per person. Prices and rents would rise relative to incomes. Households would adjust, with more young adults living with a parent. This section looks for these signs in the data over the past five decades, together with a fourth trend, the decline in household size, which raised the amount of housing needed per person. Each trend is consistent with growing underproduction. At the same time, each of these also has an explanation that does not involve the supply of housing, such as slower population growth, which alone would reduce construction per person, so they should be interpreted as signs of a shortage, not measurements of one.

3.1 Supply: fewer homes per person

The first sign of a shortage is in construction itself. Housing production per person has fallen over the last 60 years. Figure 3A shows housing starts per 1,000 people from 1959 to 2025, by type of structure, alongside the average for each decade. Starts averaged 8.2 per 1,000 people in the 1970s and were lower in every decade since. Between the 1970s and the 2000s the decline was almost entirely in multifamily construction, which fell from about 3 starts per 1,000 people to about 1, while single-family starts held near 4 (U.S. Bureau of Economic Analysis, 2026). After the 2007 to 2009 recession, single-family construction fell as well. Total starts dropped from 7.0 per 1,000 people in 2005 to 1.8 in 2009, the lowest in the series, and the highest year of the 2010s, 3.9 in 2019, was below the lowest year of any earlier decade, 4.0 in 1991. Production from 2020 to 2025 recovered part of the way, to an average of 4.3. Notably, this has also been a period in which housing affordability and the pace of construction have drawn renewed attention from researchers and policymakers.

Three caveats apply to this series. First, starts measure new construction, not net additions to the stock; at the same time, homes are also demolished, converted, and lost. Second, scaling by the total population pairs construction trends with population trends, but population and migration respond to housing costs, so the denominator is itself an outcome of the housing market. Third, a population needs new homes in proportion to its growth, not to its size, so starts per person should fall when growth slows even in a market with no shortage. The baby-boom cohorts reached the ages at which people form households in the 1970s, which raised the demand for new homes in that decade and explains part of its peak. Population growth then slowed, from 1.1% a year in the 1970s to 0.7% in the 2010s (U.S. Bureau of Economic Analysis, 2026). That alone would lower the starts needed

per person by about a third, and starts per person fell by more than half. Slower population growth alone would also lower starts per person, with no shortage.

3.2 Prices and rent burdens: housing costs rose relative to incomes

Prices are one sign of a shortage. In the market for most goods (Section 1), a shortage can be resolved when the price rises enough to ration what is available. Housing prices adjust as well, so if too little housing has been built, the place to look is what housing costs relative to what households earn. Figure 3B shows this for house prices and for rents.

House prices have risen relative to incomes. The left panel divides two measures of house prices by median household income, with 1987, the first full year of the Case-Shiller index, set to 100. Prices of existing houses rose faster than incomes in two waves, one peaking in 2006 and one in 2022, and in 2025 they stood about 50% higher relative to income than in 1987. Prices of new houses rose less, about 20% relative to income over the same period (S&P Dow Jones Indices LLC, 2026). The median sale price of new houses depends on which houses are sold, so changes in their size and mix (Section 8.1) may account for part of the difference.

Prices depend on more than the balance of supply and demand for housing. Lower interest rates and easier credit raise the price that a buyer with a given income can pay, so part of the rise before 2006 and after 2020 likely reflects the cost of borrowing rather than the scarcity of homes.

For renters, policymakers often focus on the share of income that is spent on rent as an indicator of the burden of housing costs. The right panel shows this share for renter households from the 1960 census through the 2024 ACS, using the common thresholds of 30% and 50% of income (Ruggles et al., 2025).[2] In 1960 one renter household in five paid more than 30% of its income in rent. By 2024 nearly one in two did, and nearly one in four paid more than half. Most of that increase came before 2010; the shares have changed little since.

Rent burdens also depend on renters' incomes and on who rents. A rent burden rises when incomes fall as well as when rents rise, and the renter population changes over time as households move between renting and owning. Higher prices and rents also change with whom people live.

3.3 Households adjust: more young adults live with a parent

As Section 1 described, households can respond to high housing costs by sharing housing rather than forming households of their own. If too little housing has been built, more adults should be living in households that someone else heads. The simplest case of this is young adults who live with a parent.[3]

[2]The long series uses contract rent and family income, the only definitions available in every census. The Census Bureau's own measure uses gross rent, which includes utilities, and household income, so its levels are not comparable; it begins in 2006 and shows the same pattern for those years, with about half of renters above the 30% threshold in every year.

[3]Adults also share housing with people who are not relatives, but that trend is mostly about couples. Since 1995, when the CPS began to separate unmarried partners from roommates, the share of households with an unmarried partner

More young adults are living with a parent than at any time since 1970, and the increase is largest among those aged 25 to 34. Figure 3C shows the share of adults who are a child of the householder, for ages 18 to 24 and 25 to 34, from the Current Population Survey (CPS) (Flood et al., 2025). Among adults 18 to 24, the share rose from about half in 1970 to 60% in 2026.[4] Among adults 25 to 34, an age at which many adults have transitioned to heading a household of their own, the share more than doubled, from 8% in 1970 to 18% in 2026, with most of the increase after 2005.

Later marriage, longer schooling, and weaker labor markets for young workers also keep young adults at home. Regardless of why, missing households are the demand side of the estimates that have one (Section 6).

3.4 Households, not people, demand housing, and households have become smaller

The three trends above are signs that housing may be scarce. The last trend is different, because it concerns how much housing a population needs rather than whether housing is scarce. Homes are occupied by households, so the number of homes a population needs depends on how many households it forms. Households have become smaller over time. Average household size fell from 3.3 people in 1960 to 2.5 in 2025 alongside a decline in fertility (Figure 3D).

Smaller households mean demand for more homes for the same number of people. A population of 100 people living in households with an average size of 3.3 forms about 30 households. The same 100 people living in households of size 2.5 form 40 households; this economy needs ten more homes. This arithmetic describes the United States since 1960. The number of households has grown two and a half times, while the population in households has not quite doubled, and the gap between the two is the extra demand for homes that comes from smaller households.

Smaller households can reflect a number of changes, including lower fertility, later marriage, and longer lives, each of which has causes outside the housing market. At the same time, each of these demographic changes can also, in part, be related to the housing market itself.

What the trends can and cannot show

The trends in this section are consistent with a U.S. housing market characterized by a shortage, and each enters the estimates in Section 2 through an assumption about its cause. Fewer homes per person may reflect underproduction or slower population growth; estimates that ask whether building has kept pace assume the former. More young adults living with a parent may reflect housing costs or later marriage and longer schooling; estimates that count missing households compare today's living arrangements with those of a baseline year and treat the difference as the effect of housing costs. Higher prices and rent burdens are consistent both with underproduction

rose from 2.8% to 6.5%, while the share with a roommate, boarder, or other nonrelative fell from 4.8% to 3.4% (Flood et al., 2025). An unmarried couple sharing a home is a household in the same sense as a married one.

[4]This group includes college students, whom the CPS counts as living at their parents' home, so its level is high and its movements are harder to read.

and with these alternatives. Smaller households are not a sign of a shortage, but they raise the count of households on which every estimate with a demand side rests. All together, the trends themselves cannot say which interpretation is correct. Knowing that requires knowledge of the counterfactual number of households and homes there would be had more housing been built. The next section sets out the components of an estimate.

4 The components of an underproduction estimate

The estimates in Section 2 that compare a target housing stock with the existing stock share a common formula. The number of homes needed equals the households that exist, plus the missing households, multiplied by one plus the normal vacancy rate. The shortage is the difference between the homes needed and the stock:

$$\text{needed} = (\text{households} + \text{missing households}) \times (1 + v), \tag{1}$$

$$\text{shortage} = \text{needed} - \text{stock}. \tag{2}$$

Here v is the number of vacant homes a functioning market is assumed to need for each occupied home.

Each term in Equations (1) and (2) is taken up in one of the next three sections. Section 5 covers the stock of houses and the count of existing households, which are both measured by surveys. Section 6 covers the missing households, which must be inferred based on a model. Section 7 covers the normal vacancy rate, which depends on how vacancy is defined and on the period used as the benchmark.

An estimate of the shortage has two sources of uncertainty. The first is measurement. The stock, the households, and the observed vacancy rate all come from surveys, which measure them with error that grows as the area becomes smaller. The second is assumption. Determining the number of missing households depends on the underlying demand model assumed, and the normal vacancy rate depends on a definition. In most cases, estimators choose a benchmark period in which the housing market is considered to be in equilibrium. Analysts disagree on each of these choices.

The national number is the easiest to produce, because each term can be measured in the aggregate with the data that exist. It is also the hardest to act on, because housing markets differ widely across the country. Both sources of uncertainty grow at smaller geographies, where surveys have fewer observations and the choices behind an estimate matter more. Section 8 shows which components of an estimate can be measured for which places and which homes and households a national number leaves out. Section 9 draws together what these components imply for measuring the shortage.

5 Counting the stock and the households

The formula in Equations (1) and (2) can be applied to any geography, from the nation to a single metropolitan area. Measuring each term is harder locally than nationally, and the available sources

differ greatly in the smallest geography they can describe. Local estimates are nonetheless needed, because housing is fixed, so a surplus of homes in one market does not relieve a shortage in another.

5.1 Sources for the stock and the households

Estimating a shortage requires counting both the homes and the households, and three Census Bureau surveys supply those counts. All three draw their samples from the Census Bureau's Master Address File, although not necessarily from the same version of it. Furthermore, each survey design samples housing units rather than people (McCue et al., 2015). The surveys serve different purposes, and as a result, they differ in what they count, in how far back they go, and in how local their estimates can be. Only the Housing Vacancy Survey (HVS) was designed primarily to measure housing. Each is described below, and Table 5A summarizes them.

The HVS is the Census Bureau's source of the published national housing stock.[5] This survey also produces national vacancy statistics, including detailed reasons for vacancies. The HVS is collected as a set of added questions for households already in the monthly Current Population Survey (CPS) sample, and the Census Bureau averages its monthly results to form annual figures. The HVS series for the housing stock begins in 1965 (McCue et al., 2015).

The second source is the American Community Survey (ACS). It was designed to give an annual picture of the population, including employment, education, and whether households own or rent, and the federal government uses its results to allocate funds. For counting homes and households, the ACS records housing units, the households that occupy them, and vacant units with their status. It can therefore produce the stock, the households, and vacancy for the same place in the same year. It has by far the largest sample of the Census Bureau's annual surveys that count households, which makes estimates for smaller subnational geographies feasible. Its published tables report housing information down to the census tract, a small area that typically holds between 1,200 and 8,000 residents. Its microdata identify the Public Use Microdata Area (PUMA), a geography that holds at least 100,000 residents (U.S. Census Bureau, 2026a,c).

The third source is the CPS Annual Social and Economic Supplement (CPS-ASEC), which is fielded each March, draws on the CPS sample as the HVS does, and asks different questions. The monthly CPS is best known as the basis for the unemployment rate and other labor market statistics, and the March supplement is the basis for the official national poverty rates and for much of the income data that analysts use (U.S. Census Bureau, 2026e). It counts households back to the 1960s, and its microdata describe the age, marital status, income, and living arrangements of each person, which supports the analysis of long-run demographic trends (Flood et al., 2025). Unlike the HVS, its questions do not measure the housing stock or vacancy. Because it is fielded only in March and draws a smaller sample, its estimates fluctuate more from year to year than those of the other two, which are collected all year (U.S. Census Bureau, 2026b; McCue et al., 2015). Its geography is limited to the nation and the states.

Published estimates draw on these surveys in different combinations: Freddie Mac, for example,

[5]Total housing inventory from the HVS is published only at the national and regional levels. Vacancy rates for rental and owner-occupied homes are also published for each state and for the 75 largest metropolitan areas (U.S. Census Bureau, 2021a, 2026d).

uses the CPS-ASEC to measure the share of adults who head a household, whereas Up For Growth builds its estimate from ACS microdata (Freddie Mac Economic and Housing Research, 2024; Wilkerson and Baron, 2022).

5.2 Why household counts differ across surveys

The three surveys draw on the same address file, yet they report different numbers of households. The difference comes from how each is scaled to national totals.

A survey interviews only a sample of households. Each response is multiplied by a weight that forces the sample to add up to an external, predetermined total. The HVS and the ACS fix that total at an independent estimate of the nation's housing units, produced by a separate part of the Census Bureau, the Population Estimates Program, so the stock in both surveys is set from outside the surveys. Their count of households is then that number of units multiplied by the share of units the survey finds occupied, so it is tied to the number of homes that exist.

The CPS-ASEC instead fixes the total at the Census Bureau's estimate of the population, and it counts as households the weighted number of adults who say they head one (McCue et al., 2015). Its household count is therefore not tied to the number of homes, and it can differ from the count that the stock and the occupancy rate imply. If the population and the share of adults who head a household imply more households than there are occupied homes in the HVS, the CPS reports more households. The HVS and the CPS draw on the same respondents, yet the Joint Center for Housing Studies (JCHS) finds that this choice of total has a larger effect on household counts than any other difference among the surveys (McCue et al., 2015).

Figure 5A shows that the HVS and CPS-ASEC household counts were close until the early 2000s and have differed since, and the timing points to the change in how the HVS is scaled as the cause. Through the 1990s the two series rise together. Between 2001 and 2002, both the HVS count of households and its count of housing units fall by about two million, while the CPS count continues to rise. By the mid-2000s the CPS count exceeds the HVS count by roughly four to six million households, depending on the vintage of the HVS series. JCHS reports that when the HVS began scaling to housing units in place of population in 2003, its household count fell by 3.8 million (McCue et al., 2015). The Census Bureau introduced new housing unit controls in the same year, so the figure cannot separate the two changes (McCue et al., 2015; U.S. Census Bureau, 2021b). The gap stays large through the 2010s and narrows after 2020, to under one million households in 2024, although the CPS count rises again in 2025.

5.3 What the surveys show from 2006

Comparing the surveys shows how much the choice of survey matters for an estimate of the shortage. Each of the three surveys has also been redesigned over time, which complicates comparisons across years. The ACS was substantially redesigned in 2005 and 2006, when its sample grew from about 800,000 to about 3 million addresses and it began to include people living in group housing such as dormitories and nursing homes (McCue et al., 2015). The comparison here therefore begins

in 2006, the first year in which the ACS has its current sample and coverage.[6]

Figure 5B compares the surveys from 2006. The CPS-ASEC does not produce a count of homes, so the comparison of the housing stock is between the HVS and the ACS, and the comparison of households includes all three surveys. The HVS and the ACS report nearly the same housing stock, as expected because both are scaled to the same external estimate of housing units. They are within about one percent of each other in every year, the largest gap is about 1.3 million homes in 2008, and since 2017 the two differ by less than 0.2 million.

The household counts differ by up to about six percent across the three surveys, compared with about one percent for the stock, and the CPS-ASEC accounts for most of the difference. Through 2023 the CPS-ASEC count exceeds the ACS count, by about three million households in 2006 and by more than seven million in 2016. The HVS and ACS counts stay within 1.7 million households of each other throughout, and they differ at all because each count is the stock less the vacant homes the survey finds, so a higher estimated vacancy rate leaves fewer households. The three counts come within about one million households of each other by 2024.

The HVS and the ACS therefore agree closely on how many homes there are, but the three surveys disagree on how many households live in them. The difference matters because of the size of the published estimates. Because the two surveys that measure the stock agree, a difference in the household count passes into the estimated shortage by at least that amount in Equations (1) and (2). Published estimates of the shortage range from 2.0 to 5.5 million homes. A difference of one to two million households, the typical gap between the HVS and the ACS, is therefore large in the context of that range.

Which of the three household counts is closest to the truth is not settled. The 2010 decennial census, taken as a benchmark, counted 116.7 million occupied homes (McCue et al., 2015). In the series shown in the figure, the CPS-ASEC count for 2010 is about 1.8 million above that figure, the ACS count is about 2.1 million below it, and the HVS count falls short of it by about 3.8 million. The CPS-ASEC count is therefore the closest to the census count, by a small margin over the ACS, and the HVS count is the furthest from it. The CPS-ASEC nonetheless has limits for this purpose. Its sample is small, which restricts local analysis, and it does not count homes, so an estimate has to combine it with another source.

In estimates of housing underproduction, the three surveys play different roles. The HVS is the national benchmark for the housing stock and vacancy, but it publishes the stock only for the nation and the census regions. The ACS is the only source that records homes, households, and vacancy for the same place, which makes it usable for smaller geographies. The CPS-ASEC is the long-run source for households, but it does not count homes and its sample is small.

[6]The ACS also modified its weighting in 2006 and 2007 to bring its household counts into line with its housing unit counts, which lowered the number of occupied units in those years, so 2006 and 2007 sit on the early side of that change (McCue et al., 2015).

6 Household formation: the demand side of every estimate

Missing households, which Equation (1) adds to the households that exist, cannot be observed directly. Missing households are the difference between the households that exist and the households that would exist under other conditions. They have to be estimated with a model of what affects household formation. This section reviews how published estimates handle them and then builds a count from the change in headship since 2006, to show how much the count depends on modeling choices.

6.1 How estimates treat missing households

The estimates described earlier, from Moody's Analytics, Freddie Mac, Up For Growth, Realtor.com, Zillow, Brookings, NAR, NLIHC, and JCHS, count missing households in different ways, and they fall into four approaches. Table 6A lists the benchmark, the ages covered, and the data for the six that count missing households.

The first approach, counterfactual headship, asks how many more households would exist if adults headed households at a higher rate, one that housing costs did not suppress. The headship rate is the share of adults who head a household, so a higher rate applied to today's adults gives more households, and any excess over actual households is the count of missing households. Each household has exactly one head, called the householder, so within a couple only one partner counts as heading the household (the survey definition is given with the data below). The estimates differ in how they choose the higher rate. Up For Growth and Realtor.com take the headship rate of an earlier baseline year, 2000 and 2010 to 2014 respectively, and attribute the whole change since then to the housing market (Wilkerson and Baron, 2022; Jones and Hale, 2026). Freddie Mac and Brookings instead use a statistical technique, the Kitagawa-Blinder-Oaxaca decomposition, to estimate how much of the change in headship is associated with housing costs, as distinct from other characteristics of adults, and they adjust for only that part that is associated with housing costs (Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024).

The remaining estimates take three other approaches. Moody's Analytics uses a trend extension, which carries the trend in household formation from 2011 to 2019 forward to 2024 and counts the shortfall of actual households below that trend as pent-up households (deRitis et al., 2025). Zillow uses a symptom. It treats every family that lives in another family's housing as a missing household, without adjusting for families that choose to share, and it does not otherwise model household formation (Zillow Economic Research, 2026). NAR, NLIHC, and JCHS count no missing households and take households as observed, and each answers a different question, about construction, about affordability for one income group, or about vacancy (Rosen et al., 2021; National Low Income Housing Coalition, 2026; Joint Center for Housing Studies of Harvard University, 2026).

6.2 Housing costs are one of several influences on household formation

Household formation depends on the age of adults as well as on housing costs. Headship rises steeply from the early twenties through the thirties and more gradually afterward, as Figure 6A shows. A change in the age mix of adults therefore changes the number of households even if no adult behaves differently.

Aging alone would have raised the headship rate. Since 2006 the age mix has shifted toward older adults, and the share of adults 65 or older rose from 16% to 23%. If each age group had kept its 2006 headship rate, the 2024 age mix would imply an overall headship rate of 52.4%.

Instead, headship fell within almost every age group. It was lower in 2024 than in 2006 in seven of the eight groups, so the actual headship rate in 2024 was 51.3%, the same as in 2006 and 1.1 percentage points below the rate implied by aging alone. The forces that offset aging may include housing costs, as well as changes in income, education, marital status, family circumstances, and preferences for living alone or with others. These forces operate at the same time, and the data show only their combined effect on the observed headship rate.

6.3 A decomposition of the change in headship since 2006

The estimates described earlier rest on assumptions about what would have happened to headship under other conditions, and the effect of those assumptions is easiest to see by building a count from the data. This subsection builds one from the ACS, using a decomposition of the change in headship between 2006 and 2024. The part of the change associated with local rents, multiplied by the number of adults, gives a number of missing households, and varying the choices behind it shows how far the number moves.

6.3.1 Data and sample

The data are the IPUMS USA microdata (Ruggles et al., 2025). The base year, 2006, is the first in which the ACS has its current sample and coverage, and it precedes the recession that began in 2007. The comparison year, 2024, is the latest available.

The sample starts with adults aged 18 and over. Residents of group quarters, such as dormitories, barracks, and institutions, are excluded, as are vacant units, which have no residents. Table 6B reports the sample in each year.

An adult is counted as heading a household if the adult is identified as the householder. In the ACS, the householder is a member of the household who owns or rents the home.[7]

The characteristics of each adult are age, sex, marital status, whether an own child lives in the

[7] Each household has exactly one householder, which in most cases is whichever of the people who own or rent the home is listed first on the questionnaire. When unrelated adults share a home, one is recorded as the householder and the others are classified as roommates, housemates, or unmarried partners, so only one adult in the household is counted as heading it (U.S. Census Bureau, 2025).

household, education, race and ethnicity, school enrollment, employment status, personal income, metropolitan status, and state of residence. Income is measured in 2024 dollars, converted from the dollars of each year with the Consumer Price Index for All Urban Consumers (CPI-U). Appendix Table A2 lists the categories of each characteristic. Race and ethnicity information is used to form four groups, Hispanic adults, non-Hispanic Black adults, non-Hispanic Asian or Pacific Islander adults, and all other non-Hispanic adults.[8]

The housing cost variable is the average rent in the adult's own local market. It is derived as follows. In each year, the contract rent of renter households is regressed on the number of bedrooms, the type of structure, and the year the building was built, with a fixed effect for each PUMA. The regression is used to predict the log rent of a standard two-bedroom unit in each PUMA in 2024 dollars.

The derived housing cost variable reflects the current price of housing in the adult's market, with the benefit that it does not depend on when an owner bought a home or on the interest rate at the time. The index for each year uses the PUMA boundaries defined for that year's survey, which follow the most recent decennial census. The index for the median PUMA is based on 121 sampled renter households, which represent about 16,000 renter households. Appendix Table A3 describes the rent index in more detail.

Householders and non-householders differ along the characteristics that the decomposition uses, and Table 6C describes the differences that the results below build on, for all adults and separately for adults ages 18 to 45 and 46 and over. In general, householders are older, more often hold a bachelor's degree, and have higher personal incomes. Notably, local rent is similar for the two groups on average, so its relationship with headship must be estimated while holding the other characteristics fixed. Between 2006 and 2024, adults in both groups became older and more educated, and men and women became about equally likely to be the householder, which may reflect a change in how the survey assigns the householder within couples and not a change in behavior. Appendix Table A4 reports the same comparison for 2006.

The results below are reported for all adults and separately for adults ages 18 to 45 and 46 and over. The younger group covers the prime ages for household formation, the years in which headship rises most steeply with age, and it matches the age range that Up For Growth uses for its headship comparison (Wilkerson and Baron, 2022). After 45, headship changes slowly with age, so the older group contains fewer adults who are still forming households. Among adults 18 to 45, about 58% are not householders, and they are more often never married, enrolled in school, and lower in income than householders of the same ages, which fits young adults who have not yet formed their own households. Among adults 46 and over, about 40% are not householders, and three quarters of them are married with a spouse present, which suggests that most live with a spouse who is the householder. Headship among adults 18 to 45 is therefore the closer measure of household formation, whereas among adults 46 and over it largely reflects whether a person lives with a partner.

[8] In 2020 the Census Bureau changed the race question and its coding, and the share of adults reported as two or more races rose from about 1% in 2006 to about 12% in 2024 as the share reported as white fell. The last group combines white, American Indian, other, and multiracial adults. The four groups used in this analysis do not shift with the change in the question.

6.3.2 Empirical strategy

The decomposition starts from a linear probability model of whether an adult is a householder. For each year g, with $g = A$ for 2024 and $g = B$ for 2006, the model is

$$Y_i = X_i' \beta_g + \varepsilon_i, \tag{3}$$

where Y_i equals one if adult i is a householder and zero otherwise, X_i contains a constant, the characteristics of the adult, and the log of real local rent, and β_g is the vector of coefficients for year g. Each year is estimated separately with the person weights, and Appendix Table A2 reports the coefficients for both years. A linear model keeps the decomposition exact, and it makes the conversion from a change in the headship rate to a number of households linear.

A regression with a constant fits the weighted mean of the outcome exactly, so the change in the headship rate between the two years is

$$R = E(Y_A) - E(Y_B) = E(X_A)' \beta_A - E(X_B)' \beta_B, \tag{4}$$

where $E(X_g)$ is the weighted mean of the characteristics in year g. The Kitagawa-Blinder-Oaxaca decomposition separates this change into a part explained by differences in the characteristics of adults and a part that is not, by applying a vector of reference coefficients β^* to the differences (Kitagawa, 1955; Blinder, 1973; Oaxaca, 1973; Jann, 2008).

$$\begin{aligned} R &= Q + U, \\ Q &= \{E(X_A) - E(X_B)\}' \beta^*, \\ U &= E(X_A)'(\beta_A - \beta^*) + E(X_B)'(\beta^* - \beta_B). \end{aligned} \tag{5}$$

The explained part Q is the change in characteristics multiplied by the reference coefficients. The unexplained part U collects the differences in coefficients and in the intercept, and it also absorbs any influence that the model omits.

The two regressions yield two sets of coefficients; the decomposition in Equation (5) requires a single set, β^*. The choice of β^* is a choice of reference period, and it determines how much of the change is attributed to characteristics and how much to coefficients (Oaxaca, 1973; Fortin et al., 2010). The lead specification uses the coefficients of 2024, so that the change in characteristics is weighted by the relationship between characteristics and headship in the comparison year. Two alternatives are reported, the coefficients of a regression that pools both years and includes a year indicator, and the coefficients of 2006. The three choices give a range for each result.

The explained part is a sum over characteristics, in which each term is the change in the mean of a characteristic multiplied by its reference coefficient. A characteristic that enters as a set of indicator variables, such as age groups, would otherwise receive contributions that depend on which category is omitted, so the sets are normalized, which makes the detailed contributions independent of the omitted category (Yun, 2005).

The housing cost term is the contribution of log rent to Q,

$$Q_r = \{E(r_A) - E(r_B)\} \beta_r^*, \tag{6}$$

where r is the log of real local rent and β_r^* is its reference coefficient. $\beta_r^* < 0$ implies that higher rents are associated with lower headship. Because the number of households equals the number of adults multiplied by the headship rate, the number of missing households is

$$M = -N_A Q_r, \tag{7}$$

where N_A is the weighted number of adults in 2024. In other words, M is the number of additional households that the adults of 2024 would form if mean real rent were at its 2006 level, with the rent slope given by the reference coefficient and every other characteristic left as it is. The 2024 coefficients are the lead estimate because they describe how the adults of 2024 respond to rent, which is the relationship that this question requires. The pooled and 2006 coefficients are reported as alternatives.

The rent term measures the association between rent and headship once the other characteristics are held fixed. It can be read as the effect of rent only if places with different rents do not differ in other ways that affect headship. The coefficient on rent comes from comparing adults in PUMAs with different rents within the same state. Adults in the same PUMA face the same rent, so their errors are likely to be correlated, and standard errors are clustered by PUMA. Appendix Table A1 reports robust and replicate-weight standard errors alongside the clustered ones.

6.3.3 Results

The headship rate was unchanged in aggregate, at 51.3% in both 2006 and 2024. This stability combines two offsetting effects. Changes in the characteristics of adults would have raised headship, and a decline within groups of similar adults lowered it. At the 2024 coefficients, the explained part raised headship by 1.1 percentage points and the unexplained part lowered it by 1.1 points (Figure 6B and Table 6D). The pooled and 2006 coefficients give smaller offsetting amounts, about 0.9 and 0.6 points, so the three models agree on the pattern and differ only in its size. The explained part includes the effect of rent, which is isolated below.

The rent term is about one percentage point of headship, or 2.5 to 3.0 million missing households. The rent term is 0.97 percentage points at the 2024 coefficients, 1.06 at the pooled coefficients, and 1.16 at the 2006 coefficients. It combines a 22% rise in mean real rent since 2006 with a negative relationship between rent and headship. Multiplied by the 258.9 million adults of 2024, the term at the 2024 coefficients corresponds to 2.5 million missing households, with a 95% interval of 2.0 to 3.0 million. The pooled and 2006 coefficients give 2.8 and 3.0 million. The three models apply the same rise in rent to different estimates of the relationship between rent and headship. A 10% higher rent was associated with a headship rate 0.6 percentage points lower in 2006 and 0.5 percentage points lower in 2024, and the pooled model falls between the two, so the 2024 coefficients give the smallest count and the 2006 coefficients the largest.

Aging, education, and income account for most of the increase from the other characteristics, which raised headship by 2.1 percentage points once rent is excluded. Aging contributed 1.1 percentage points, because older adults are more often householders and their share of adults has grown. Education contributed 0.7 points and income 0.3 points, because adults with more education and higher incomes are more often householders and have become more common. Marital status, own

children, and race and ethnicity each contributed less than 0.3 percentage points, with the first raising headship and the other two lowering it. All changes other than rent, including the unexplained part, would have added 2.5 million households at the 2024 coefficients, which nearly offsets the rent term and explains why the headship rate did not change.

6.3.4 Sensitivity and robustness

The count of missing households depends most on which adults are included, next on how rent is measured, and least on the estimator (Table 6E). Each row of the table changes one choice from the baseline and reports the count under the three reference coefficients.

Alternative measures of rent change the count by less than one million, and the baseline measure sits toward the low end of the range. Gross rent, which includes utilities, gives 2.3 million at the 2024 coefficients because it rose less over the period than contract rent. Deflating rent by the price index that excludes shelter gives 3.2 million, because the baseline index includes shelter and so understates the rise in real rent. Across the three reference coefficients and the three measures, the count ranges from 2.3 to 3.8 million.

The count is much smaller for adults 18 to 45, the prime ages for household formation. For these adults the rent term corresponds to 0.9 million missing households at the 2024 coefficients and 1.2 million at the 2006 coefficients, compared with 1.3 to 1.4 million for adults 46 and over. The relationship between rent and headship is flatter for the younger group, at -3.4 points per log point compared with -5.0, and adults 46 and over are 53% of adults, which is why they account for more than half of the baseline count. Because headship among adults 46 and over largely reflects living with a partner, the count for adults 18 to 45 is likely the closer measure of household formation that housing costs constrain.

Allowing the effect of rent to be more flexible changes the count by less than half a million. A flexible rent curve lets the effect of rent differ across the rent distribution, and it gives 2.75 million, with the fitted effect largest in the middle of the distribution and close to zero at the highest rents. Letting the effect of rent differ by age, marital status, education, income, sex, and children gives 2.2 million. Double machine learning, which controls flexibly for characteristics while estimating a single rent slope, also gives 2.2 million (Chernozhukov et al., 2024). These compare with 2.55 million for the linear model under the same counterfactual, in which each adult's rent is drawn from the 2006 rents of adults in the same state (Quintas-Martinez et al., 2024). The estimates stay between 2.2 and 2.8 million, so the linear specification does not drive the result.

Missing households enter every estimate through Equation (1). The count ranges from 0.9 to 3.8 million, depending on which adults are included, how rent is measured, which reference coefficients are used, and which estimator is applied. That spread of about 2.9 million is close to the 3.5 million between the lowest and highest aggregate shortage estimates. How missing households are counted could therefore account for much of the disagreement among published estimates. The count varies most with the ages of the adults included, so estimates that rely on only part of the age distribution are not directly comparable with estimates that use all adults (Table 6A).

7 The normal vacancy rate: it must be estimated, and the stock must match it

The last term in Equation (1), the normal vacancy rate, converts the households that exist and the missing households into the number of homes needed to house them. It is a judgment about how many empty homes a well-functioning market needs, and the stated targets range from 3.8% to 12% across the published estimates (deRitis et al., 2025; Wilkerson and Baron, 2022; Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024). These targets differ in level, and they also differ in which vacant homes they count and in the stock to which they are applied. A vacancy target is meaningful only when the stock it is applied to counts the same homes. This section explains why a market needs vacant homes, describes what the two main surveys count as vacant, and sets each published target beside its stock.

7.1 Why a housing market needs vacant homes

A housing market needs empty homes to function. A home is vacant when no household lives in it as a usual residence, and vacant homes include homes between occupants and homes that are listed while a buyer or renter is found. Without them, a household could move only after another household left, but another household may not leave if there are no units for them to move to.

The labor market offers a comparison. The natural rate of unemployment is the rate at which the labor market is in balance, and unemployment below that rate pushes inflation upward. Rosen and Smith apply the same reasoning to rental housing. They define the natural vacancy rate as the rate that results from frictions in the market, such as the cost of searching for a home and the cost of holding a vacant one. When the vacancy rate is below the natural rate, rents come under upward pressure, and when it is above, rents come under downward pressure (Phelps, 1967; Rosen and Smith, 1983). A target vacancy rate is therefore an estimate of this natural rate, the rate at which excess demand neither raises nor lowers rents.

Like the natural rate of unemployment, the natural vacancy rate cannot be observed, so any target rate requires a judgment about a period in which the housing market was in balance. Different periods give different targets, as the history of vacancy later in this section shows. The target also depends on which types of homes are counted as vacant. Some vacant homes are offered for rent or sale, while others, such as seasonal homes and homes that owners keep for occasional use, are not. The same market can show a low or a high vacancy rate depending on the definition. Comparing target vacancy rates across different underproduction estimates therefore requires knowing which homes each rate counts as vacant.

7.2 What the HVS counts and how vacancy has moved

The Housing Vacancy Survey (HVS) is the Census Bureau's official source of national vacancy statistics, and the way it classifies homes shows why vacancy can be measured in more than one way. A home is either occupied, by an owner or a renter, or vacant. Vacant homes are offered for

rent, offered for sale only, already rented or sold and awaiting a new occupant, held off the market (kept for occasional use, temporarily occupied by people whose usual residence is elsewhere, or held for other reasons), or seasonal. Gross vacancy, the broadest measure, divides all vacant homes by all housing units.

Gross vacancy has moved a great deal over the past six decades, and it has no stable level (Figure 7A). It was 10.5% of housing units in 1965, fell to 8.3% in 1978, rose to 14.5% in 2009, and was 10.4% in 2025.[9]

The vacancy rates that the Census Bureau publishes most widely count only the homes on the market, so they leave out most of gross vacancy. The rental vacancy rate divides the homes offered for rent by the rental inventory, and the homeowner vacancy rate divides the homes offered for sale only by the owner inventory. Each inventory also includes the occupied homes and the homes already rented or sold and awaiting a new occupant. A third measure, which the Census Bureau calls the available vacancy rate, relates the homes offered for rent or for sale together to the occupied homes and the homes on the market. The rental rate was 7.1% in 2025 and the homeowner rate 1.2%, and the rental rate has been the higher of the two in every year since 1965 (U.S. Census Bureau, 2025).

Most vacant homes, however, are not on the market at all. Seasonal homes and homes held off the market, which together are the homes not on the market, make up about 63% of vacant homes on average, and their share has ranged from 59% to 71%. They were 5.1% of all housing units in 1976, peaked at 9.0% in 2012, and were 6.7% in 2025. Homes on the market moved differently, from a low of 2.3% of units in 1978 to a peak of 4.9% in 2009, and were 3.1% in 2025. The two groups peaked three years apart.

The fall in gross vacancy has had different sources over time. Since 2009 gross vacancy has fallen by 4.1 percentage points, about half from homes on the market and half from homes not on the market. Since 2019 it has fallen by 1.7 percentage points, almost all of it from homes not on the market, while vacancy among homes on the market is about where it was.[10] The recent fall in gross vacancy therefore reflects fewer homes held off the market or used seasonally, rather than a smaller supply of homes that households can rent or buy.

How an estimate treats the homes not on the market depends on an assumption about whether they could ever house the households that are missing. Seasonal homes and homes kept for occasional use, which are the homes most likely to be second homes or part-year homes, were 3.7% of all housing units in 2025. Their number is likely to depend on the preferences and incomes of households as well as on the total number of homes.

An estimate of the shortage can treat these homes in two consistent ways. If it removes them from the stock and relies on the available vacancy rate, it assumes that they would never house the households that are missing. If it keeps them in the stock and relies on the gross vacancy rate, it assumes that some share of them stays empty as the number of households grows. Either way, the same homes must be treated the same way on both sides of the formula, and an estimate should

[9]The series joins the Census Bureau's historical inventory table for 1965 to 1999 with its revised table for 2000 to 2025.

[10]Part of the change between 2019 and 2020 coincides with pandemic changes in the collection of HVS data, which the Census Bureau cautions may have lowered the estimates of vacant homes (U.S. Census Bureau, 2021b).

state which choice it makes.

7.3 How vacancy appears in the ACS and in the HVS

A local estimate of the shortage needs a local measure of vacancy. Only the ACS reports vacant homes by status below the region, because the HVS publishes just the rental and homeowner rates, and only for states and the 75 largest metropolitan areas (U.S. Census Bureau, 2021a, 2026d). Whether the ACS can supply local vacancy therefore depends on how closely it agrees with the HVS, the national benchmark. However, the two surveys differ in how many homes they count as vacant, and the difference changes over time (Figure 7B). In 2008 the ACS counted 2.0 percentage points fewer vacant homes than the HVS. The difference narrowed to nearly zero by 2018. In 2020 the ACS count was higher by 1.1 percentage points, but by 2024 it was lower again, at 9.5% of housing units against 10.3% in the HVS.

Breaking the difference in totals down by the status of the vacant homes, such as for rent or seasonal, shows where the two surveys diverge. The ACS counts fewer seasonal and occasional-use homes than the HVS in every year from 2006 to 2024, by 1.7 percentage points of all housing units in 2008 and 0.8 in 2024.[11] Differences in homes for rent are smaller: 0.6 percentage points fewer in 2008 and 0.4 fewer in 2024. The remaining categories run slightly higher in the ACS and narrow the total difference. In the years when the ACS count is lower overall, seasonal and occasional-use homes account for most of the difference.

The vacancy rates for the rental and homeowner markets show that the differences here lie mainly in rentals (Figure 7C). The ACS homeowner rate is within 0.22 percentage points of the HVS rate in every year, whereas the ACS rental rate is lower in every year, by 2.1 percentage points in 2008, 1.0 in 2024, and 0.05 in 2020.

JCHS describes the reasons for the difference in vacancy between the two surveys as unclear, but the rule that each survey uses to decide who lives in a home offers one possible explanation for the difference in seasonal homes (McCue et al., 2015). The ACS treats a home as occupied by a resident household when the people there will stay more than two months. The HVS instead asks whether the occupants have a usual residence elsewhere. A household that spends part of the year in a second home could be counted as living there in the ACS and as living elsewhere in the HVS. The surveys also differ in other procedures for collecting and confirming vacancy. The reversal in 2020 coincides with the changes in HVS data collection noted above, and the HVS estimate fell from 12.0% in 2019 to 10.6% in 2020 (U.S. Census Bureau, 2025; McCue et al., 2015; U.S. Census Bureau, 2021b).

The ACS counts fewer vacant homes than the HVS in most years, likely because it counts fewer seasonal and occasional-use homes. The difference could be larger in places with many second homes, such as resort communities (Wilkerson and Baron, 2022). In light of this, a local estimate

[11]The two surveys do not use identical categories, so the comparison matches them as follows. The ACS category for seasonal, recreational, and occasional use is compared with the sum of the HVS categories for seasonal homes and for homes held off the market for occasional use. The ACS category for other vacant homes is compared with the sum of the HVS categories for homes held off the market for reasons other than occasional use and for homes whose occupants have a usual residence elsewhere.

that relies on ACS vacancy should base its target vacancy rate on the ACS as well.

7.4 Published targets differ in rate, period, and treatment of the stock

The published targets differ in the vacancy rate they use and in the period they draw it from (Table 7A). Freddie Mac and Brookings use the gross vacancy rate, Up For Growth uses a rate built from the rental and homeowner rates, and Moody's Analytics uses the available vacancy rate, which it calls the active vacancy rate (Freddie Mac Economic and Housing Research, 2024; Patel et al., 2024; Wilkerson and Baron, 2022; deRitis et al., 2025).

Each target is an average over a chosen period. For a gross rate, the period matters, because average gross vacancy was 10.7% for 1980 to 2000 and 13.2% for 2010 to 2019. That difference of 2.5 percentage points is about 3.7 million homes on the 2025 stock of 148 million, since one percentage point is about 1.5 million homes. This is larger than the 3.5 million homes difference between the lowest and the highest published estimates of the shortage and almost twice as large as the lowest estimate, 2.0 million. The choice of period alone could account for the whole range of published estimates.

What matters most is whether a target and the stock to which it is applied treat the same homes in the same way. Freddie Mac includes seasonal and held-off homes in its target and keeps them in the stock (Freddie Mac Economic and Housing Research, 2024), and Brookings does the same with its gross rate (Patel et al., 2024). Moody's Analytics removes seasonal and held-off homes from the stock, on the grounds that they are not available to people looking for a place to live, and it uses a rate that excludes them (deRitis et al., 2025). Up For Growth likewise takes homes used as second residences and for vacations out of the stock and uses rates for homes offered for rent or for sale (Wilkerson and Baron, 2022).

A gross rate with the full stock and the available rate with a reduced stock are therefore both consistent. The difference between them is an assumption about whether these homes could house the households that are missing, not a difference in measurement.

8 What a national number hides: type, person, and place

The underproduction estimates in Section 2 each produce one number, a single count of homes measured against households for the nation. A national number can draw attention to a housing shortage, but it does not speak to the level at which most housing policy acts. Policy instead often targets particular kinds of homes, particular households, and particular places. This section explains why measurement at these levels is of interest, who has attempted it and how, and why it is difficult given what the earlier sections established.

Equation (2) has three key ingredients: the stock of houses, a count of households, and the normal vacancy rate. Each of these becomes less straightforward to measure as the question narrows to a kind of home, an income group, or a place. This section focuses specifically on three common targets: type, person, and place. Type asks which kinds of homes are missing, person asks which

income groups are affected, and place asks where the shortage is. Place is treated at the greatest length because it involves all three terms of the formula and pushes against the limits of the available data.

8.1 Type: the national count does not say which homes

A frequent question in housing policy debates is whether the right mix of homes is being built, and in particular whether enough smaller, less expensive homes, often called starter homes, are available (Jones and Weinstock, 2025). Larger houses often cost more to build and to buy, so the size of new homes is likely to be one link between what is built and what households can afford. The aggregate estimates do not address this directly, because each compares all homes, regardless of size, with all households, regardless of ability to pay.

Census data show that new single-family homes have become much larger and that small new homes have become much less common (Figure 8A). The median new single-family house was about 1,500 square feet in 1973 and nearly 2,500 in 2015. Over the same period the share of new houses below 1,400 square feet fell from about a third to under a tenth, and the share of 2,400 square feet or more rose from about one in seven to more than half. New houses have become somewhat smaller since 2015, but they remain far larger than in 1980. These figures describe what was built, however, rather than speaking to how many such homes were needed. Freddie Mac identifies the decline in the construction of entry-level homes, which it defines as homes of up to 1,400 square feet, as a major cause of its aggregate shortfall, but it does not estimate the need by type of home (Khater et al., 2021).

A shortage by type would require applying the formula to each type of home, and the difficulty lies in the need side. The existing stock can be sorted by structure type and size, but the number of homes of each type that are needed depends on which type each household would choose, and that choice is not observed. The same is true of missing households (Section 6), which the data describe by characteristics such as age and income, not by the type of home they would occupy. Estimating both the preferences of prospective households and their choices under different conditions is much more demanding than the counterfactual estimation that a national underproduction estimate requires. A division of the national gap by type would therefore require a comprehensive model of housing choice, which goes beyond the national underproduction methods discussed here.

The decline in the production of small homes has explanations other than a shortage. On the one hand, it is consistent with a shortage of starter homes if buyers still want them. On the other hand, the size of a new house is also a choice that builders make in response to the cost of land, to regulation, and to what buyers demand and are willing to pay. Larger new homes are therefore consistent with rising incomes, costlier land, more demanding regulation, and changing preferences, even as average household size fell from 3.3 people in 1960 to 2.5 in 2025, so the trend is not necessarily evidence of a shortage by itself. The mix of what is built has clearly changed, but the national estimate is not designed to show how many homes of each type are needed.

8.2 Person: the national count does not say which income groups are affected

The aggregate estimates in Section 2 do not say which income groups are affected. Rising rent burdens have made that question more pressing because the share of renter households spending over 30% of income on rent rose from about one in five in 1960 to nearly one in two in 2024, and nearly one in four now pay more than half (Figure 3B). These trends raise questions about whether and how underproduction may be concentrated in the homes that lower-income households can afford.

Two organizations have addressed the question using different tools. NLIHC defines extremely low-income renters as those whose income does not exceed the higher of the federal poverty guideline and 30% of area median income. It counts a rental home as affordable to them if the rent does not exceed 30% of the income limit for that group, and as available if it is also vacant or occupied by a household in that income group. Higher-income households occupy 3.4 million of the affordable homes, which leaves 3.8 million available for a group of 11 million such households (National Low Income Housing Coalition, 2026). Moody's Analytics classifies census tracts by their income relative to the median income of the city and finds that rental homes are most scarce in middle-income tracts, in balance in the lowest-income tracts, and in surplus in the highest-income tracts (deRitis et al., 2025).

Both approaches show why dividing the shortage by income is difficult. The shortage in Equation (2) is the number of homes needed minus the stock, and neither the homes nor the households in that calculation take into account ability to pay or income. A household is housed, regardless of whether or not it can afford its home; an affordability gap can therefore exist alongside a national estimate that shows no underproduction at all (Section 2).

The meaning of a missing household is also not clear when the focus shifts to particular income groups. In Section 6, a missing household is one that would exist under other housing conditions, and the count changes when the effect of rent is allowed to differ by income (Section 6.3.4), whereas the NLIHC gap counts households that already exist and lack an affordable and available home. Both results also depend on how income is assigned, to a household relative to a 30% threshold in the NLIHC gap and to a tract in the Moody's Analytics classification, so neither says directly which households lack homes.

These difficulties do not make the underlying question any less important. Affordability will always be a concern, because housing is a consumption good, and in any market some households cannot afford some of what they would like to consume, including housing. Whether a market leaves some households without housing that they can afford is therefore a different question from whether the market has enough homes. This raises questions about the role of government in providing subsidized or free housing to some families in any market. A count of homes against households cannot, by itself, answer that question.

8.3 Place: the national count does not say where a shortage is

A national count combines every housing market in the country, so a shortage in one place and a surplus in another offset each other. Some observers argue that the shortage is not national but

specific to certain places and types of homes, among them homes priced for low-income renters (Jones and Weinstock, 2025). Where a shortage is located also matters for policy. The cost of building varies with land-use regulation and geography, so supply responds differently to demand across the country (Molloy et al., 2020; Glaeser and Gyourko, 2025).

Three organizations have estimated the shortage below the national level, and Table 8A lists what each produces, the geography it covers, its data, and the rule it uses to draw its areas. Up For Growth reports results for 309 metropolitan regions and 505 nonmetropolitan regions, and it counts a PUMA in a metropolitan region only if the PUMA lies entirely inside the metropolitan area (Wilkerson and Baron, 2022). Moody's Analytics reports results for census tracts in about 350 cities of more than 100,000 people, and it includes a tract if at least half of the tract lies inside the city (deRitis et al., 2025). NLIHC reports results for every state and for the 50 largest metropolitan areas, and it assigns a PUMA to a metropolitan area if at least half of the PUMA lies inside (National Low Income Housing Coalition, 2026). The three organizations draw their areas by different rules, and these three use no common rule, so the same metropolitan area can be made up of different PUMAs, each of which holds about 100,000 people, in different estimates.

Each component of Equation (2) becomes harder to measure as the geography gets smaller, and Table 8B shows what each Census Bureau source can report at each geography. The official source on vacancy, the Housing Vacancy Survey (HVS), publishes limited detail below the national level. Its tabulations report the housing stock only for the nation and the four regions, and they report vacant homes by status only at those levels. Below the region, the HVS reports rental and homeowner vacancy rates for states and for the 75 largest metropolitan areas, but without a matching count of homes, the rates cannot be converted into numbers of homes (U.S. Census Bureau, 2021a, 2026d).

The ACS provides data for smaller geographies, down to PUMAs in its microdata and to census tracts in its published tables, but the samples shrink as the geography does. Missing households must be estimated, which can be done using ACS microdata (Section 6.3) that identify where a household lives only down to the PUMA. In 2024, the median PUMA has 512 household records and the PUMA with the fewest has 142. Among adults aged 18 to 45, the median is 405 records and the smallest is 101, and Table 8C reports the full distribution. Vacancy records are fewer still, with a median of 24 vacant homes in a PUMA and 5 offered for rent, and 132 PUMAs have none offered for rent in the sample. With so few records, the coefficients that describe who heads a household are likely to be noisy at local geographies, making a decomposition of the kind in Section 6.3 difficult to apply to a single PUMA or a small metropolitan area.

Most important is that a national estimate nets across places, and local estimates do not. A national estimate counts each household once, wherever it is located, so a household that moves from an expensive Place A to a cheaper Place B changes neither the national count of households nor the national estimate. A local estimate for Place A may register the household as missing, potentially overstating the need in Place A. A local estimate for Place B counts the household as housed. But local estimates do not necessarily net the two, so the sum of local estimates need not equal the national estimate.

What the divisions show

Type, person, and place each ask a question that the national count does not answer. A national underproduction estimate cannot simply be applied to these questions, because each component becomes less well defined or less well measured for a subgroup. In the case of underproduction by type of housing, the need for each kind of home depends on both choices and stock characteristics that are not observed. In the case of affordable housing, the underlying problem is the price of a home relative to a household's income, which a count of homes against households does not capture, and the measures that exist rest on conventions such as a 30% threshold. Finally, estimates of local underproduction are limited by the available data and raise the question of how to combine estimates across places. A national estimate can say how large a shortage may be in total. Where it falls and whom it affects raise methodological questions that the available data cannot yet answer.

9 Conclusion

Estimates of housing underproduction differ largely because of the choices made in constructing them. The surveys that count households disagree, missing households have to be estimated with a model, and the normal vacancy rate depends on a period in which the market is judged to have been in balance. A single one of these choices can move an estimate by more than the entire difference between the lowest and highest published estimates. Even the number of households is not fixed. It adjusts to housing costs, so the demand that an estimate must meet has to be modeled rather than observed.

For those who use these estimates, a national number is best read as a measure of the scale of the shortage. It shows that the gap is several million homes, but it should not be read as a construction target. A national number also cannot say which homes are missing, which households lack them, or where they are needed, and these are the questions on which housing policy acts.

Those who produce estimates can make them more useful by stating each of these choices and showing how the result changes across reasonable alternatives. An estimate should name the survey used for the stock and households, the method used to estimate missing households, and the normal vacancy rate with its benchmark period, and it should apply that rate only to a stock that counts the same kinds of homes. Below the national level, an estimate should draw the stock, the households, and vacancy from one survey, which in practice means the American Community Survey, set the normal vacancy rate from that survey as well, report how precise the result is, and define the place in the same way as the estimates with which it is compared. Gaps for a type of home or an income group answer different questions from the aggregate shortage, so they should be reported separately and labeled as such.

Three directions for research would bring estimates closer to the questions that policy asks. First, a shortage by type of home requires a model of which homes households would choose, and none of the estimates reviewed here provides one. Second, local estimates need more precise inputs, and combining years of survey data or neighboring areas may provide them at some cost in detail about time or place. Third, a count of households that is tied to the housing stock and consistent across

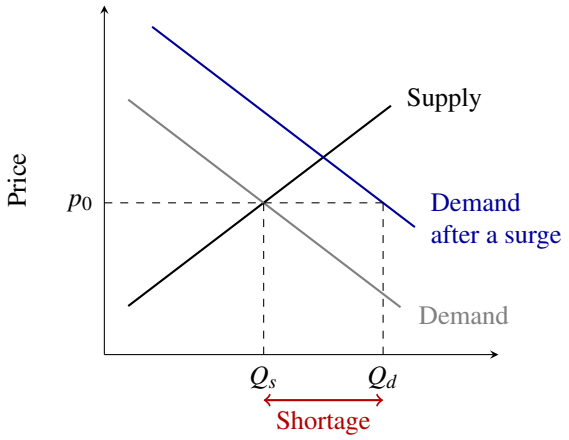
surveys would remove a source of disagreement that arises before any assumption is made.

A national number can show the scale of a housing problem, but housing policy acts on particular homes, households, and places. For each of them, the question is not how large the national shortage is but what the available data can say, and with what confidence.

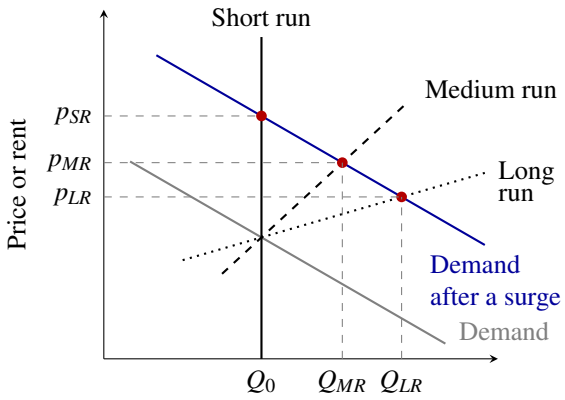
Tables and figures

Figure 1A. A demand surge, and how the supply of housing responds over time

A. Most goods: a shortage before the price adjusts

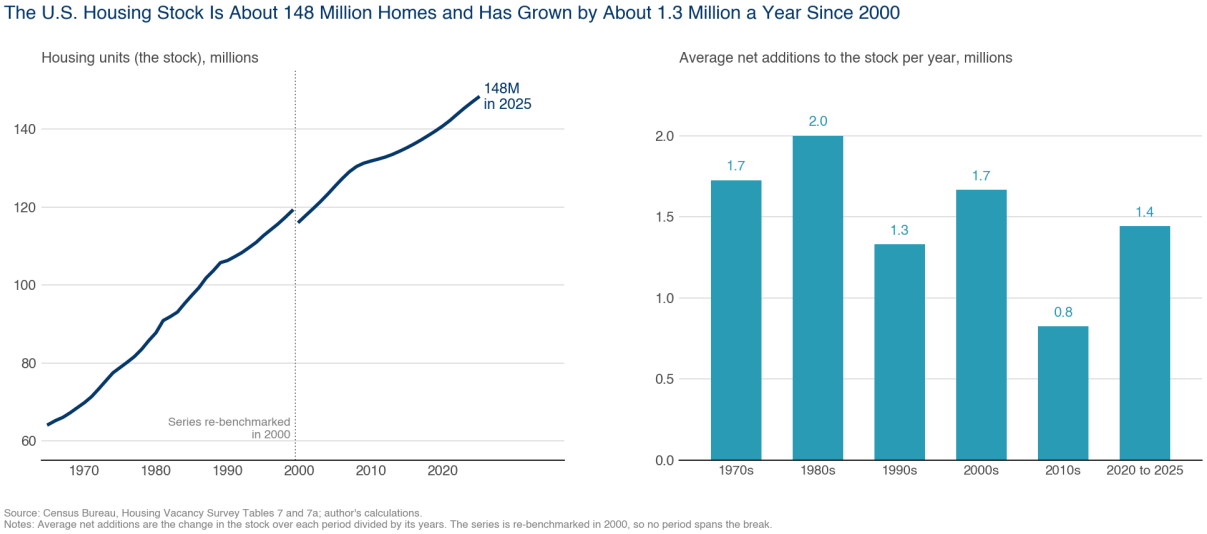


B. Housing: supply over three horizons



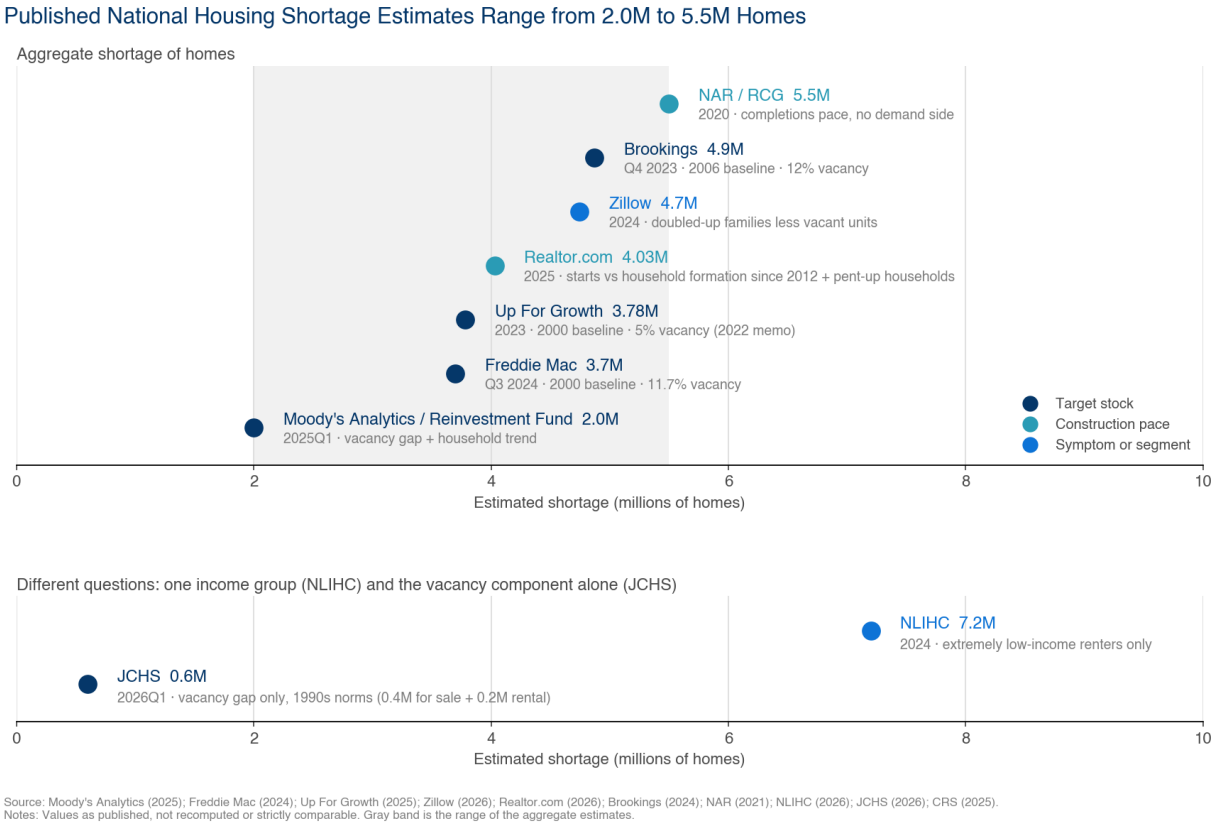
Notes: Left: at the unchanged price p_0, buyers want Q_d and sellers supply only Q_s; the gap closes as the price rises or supply expands. Right: supply is labeled by the horizon over which it responds. In the short run the stock is fixed at Q_0, so a demand surge raises the price to p_{SR} and leaves the quantity unchanged. As supply becomes more elastic, the price settles lower (p_{MR}, then p_{LR}) and the quantity rises (Q_{MR}, then Q_{LR}). Both panels are conceptual; no data.

Figure 2A. The U.S. housing stock and its average annual net additions, 1965 to 2025



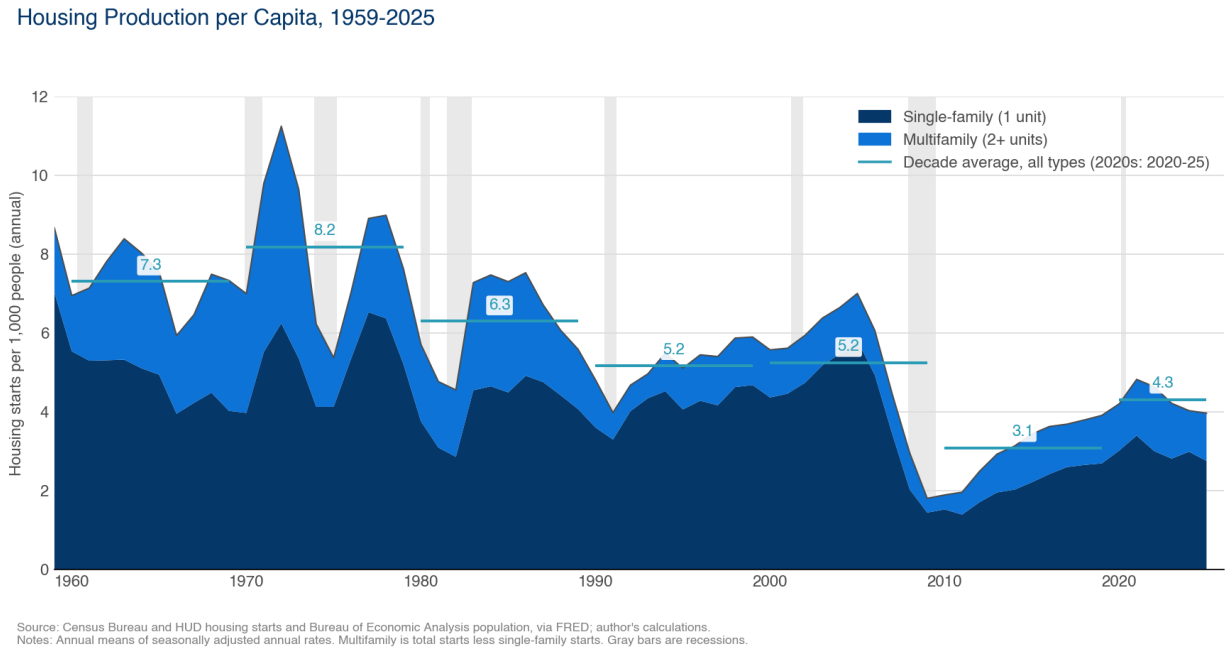
Source: Census Bureau, Housing Vacancy Survey (Tables 7 and 7a); author's calculations.

Figure 2B. Published national estimates of the housing shortage, latest vintage of each estimator



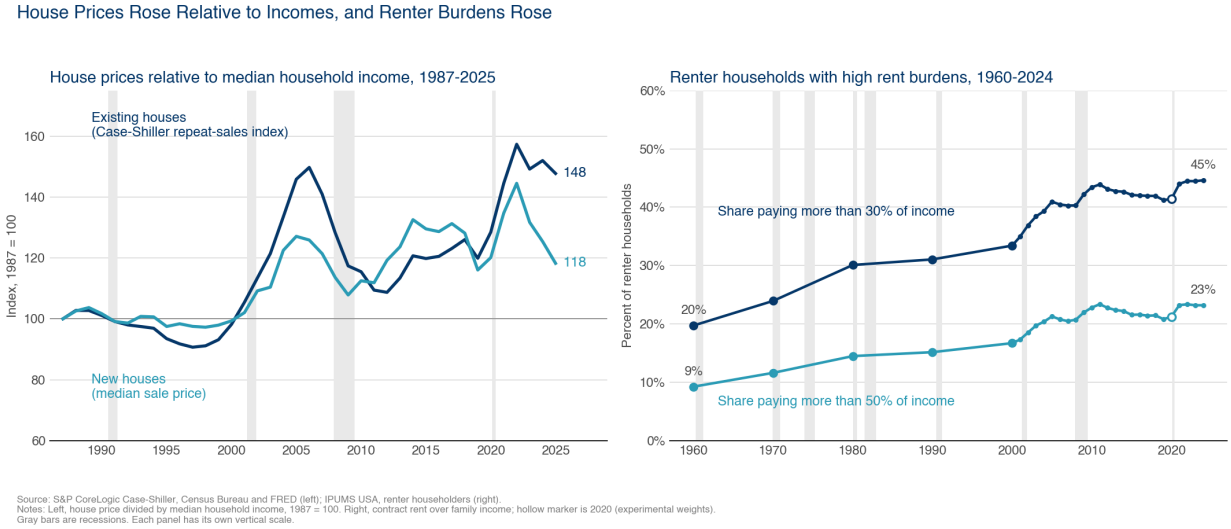
Notes: The upper panel shows aggregate estimates, colored by the question each addresses. The lower panel shows two estimates that answer narrower questions. **Source:** Moody's Analytics (2025); Freddie Mac (2024); Up For Growth (2025); Zillow (2026); Realtor.com (2026); Brookings (2024); National Association of Realtors (2021); National Low Income Housing Coalition (2026); Joint Center for Housing Studies (2026); Congressional Research Service (2025).

Figure 3A. Housing starts per 1,000 people, 1959 to 2025, by type of structure, with decade averages



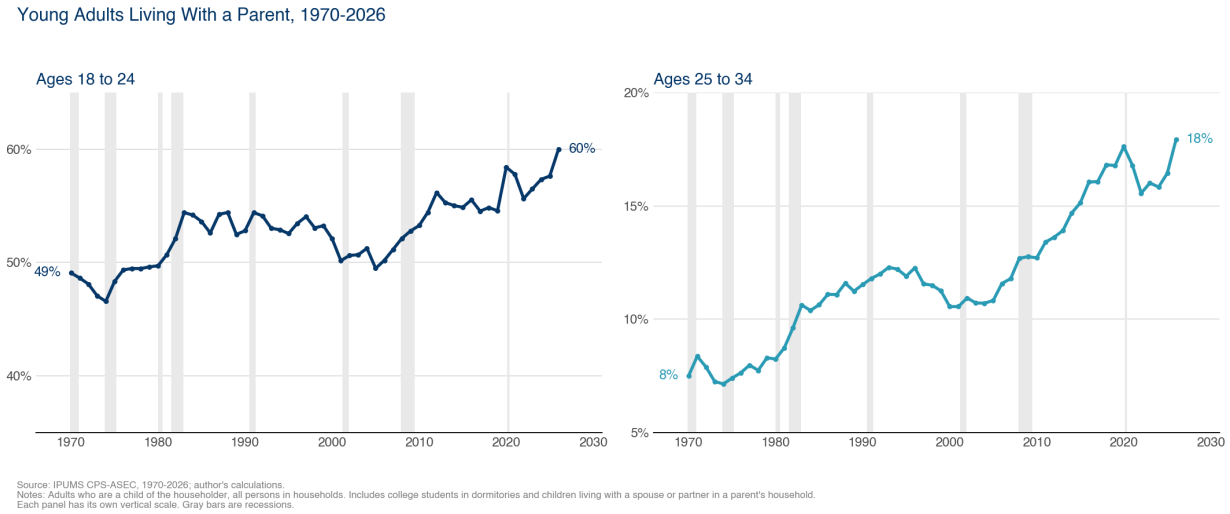
Source: Census Bureau and Department of Housing and Urban Development, housing starts; Bureau of Economic Analysis, population; both accessed through the Federal Reserve Bank of St. Louis FRED database; author's calculations.

Figure 3B. House prices relative to income and renter cost burdens



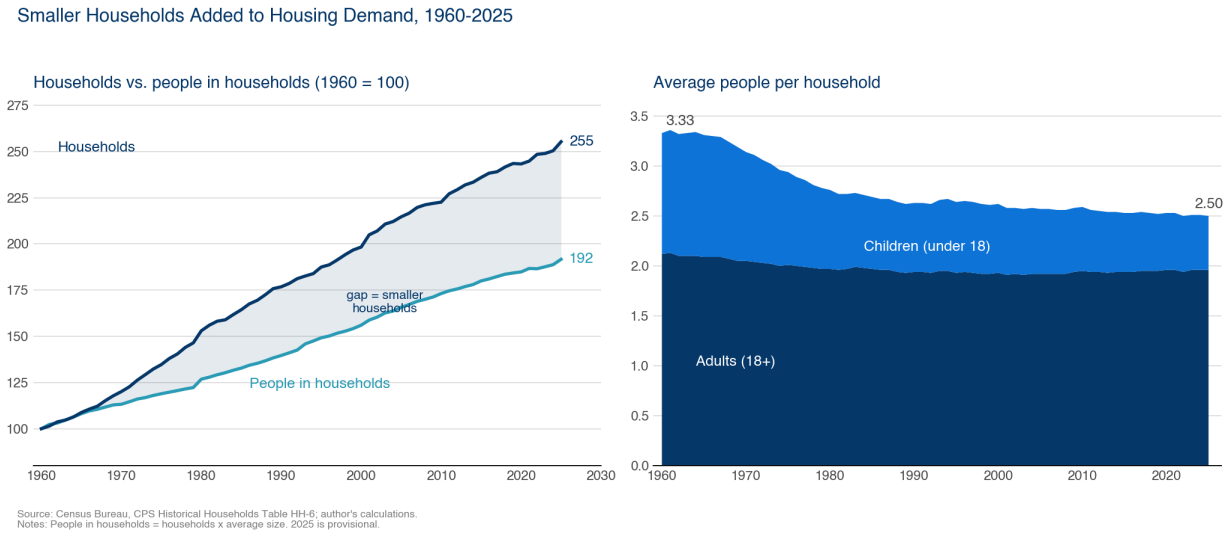
Notes: Left: house prices divided by median household income, 1987 = 100, for existing houses (Case-Shiller national index) and new houses (median sale price). Right: share of renter households paying more than 30% and more than 50% of family income in contract rent, from the censuses of 1960 to 2000 and the American Community Survey (ACS) for 2001 to 2024. Large markers are census years. **Source:** S&P CoreLogic Case-Shiller index, Census Bureau, and FRED (left); IPUMS USA, renter householders (right); author's calculations.

Figure 3C. Share of adults living with a parent, by age group, 1970 to 2026



Source: IPUMS CPS-ASEC, 1970 to 2026; author's calculations.

Figure 3D. Households and people in households, 1960 to 2025



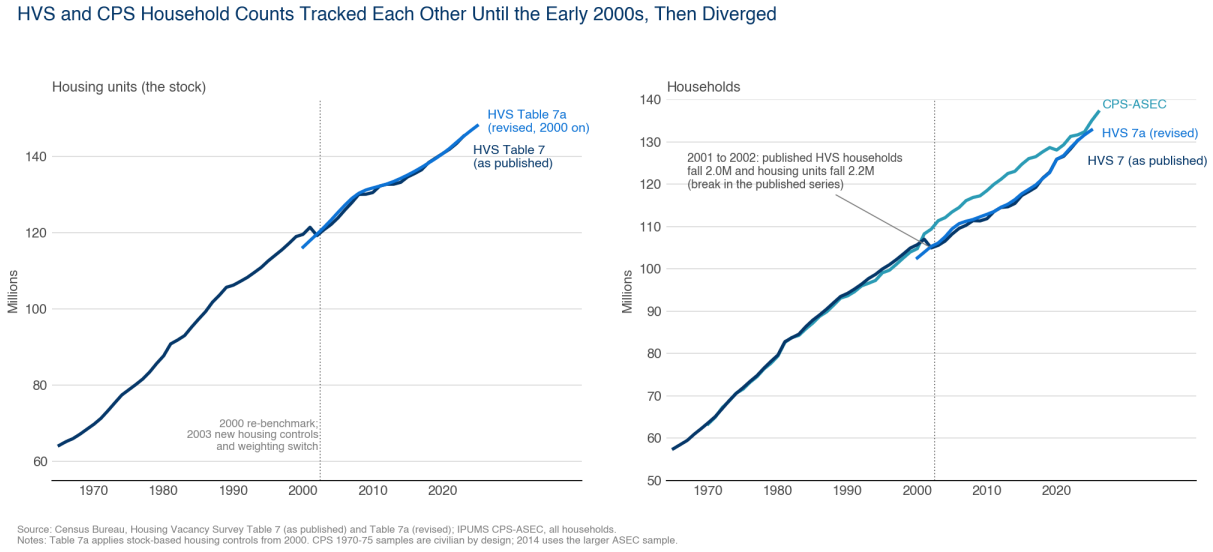
Notes: Left: both series indexed to 1960 = 100; the gap is the growth in households that reflects smaller households rather than more people. Right: average people per household, adults and children. **Source:** Census Bureau, Current Population Survey, Historical Households Table HH-6; author's calculations.

Table 5A. The three Census Bureau surveys that count the housing stock or households

	HVS	ACS	CPS-ASEC
Best suited for	National housing stock and vacancy	Households, vacancy, and microdata; the route to local estimates	Households over the long run; a cross-check
Scaled to	Census Bureau housing unit estimates	Census Bureau housing unit estimates	Census Bureau population estimates
Earliest year available	1965	2001	1962
Most local geography available			
Housing stock	Region	Census tract	None
Households	Region	Census tract (tables); PUMA (microdata)	State
Vacancy	States and the 75 largest metros (rental and homeowner rates only)	Census tract (tables); PUMA (microdata)	None

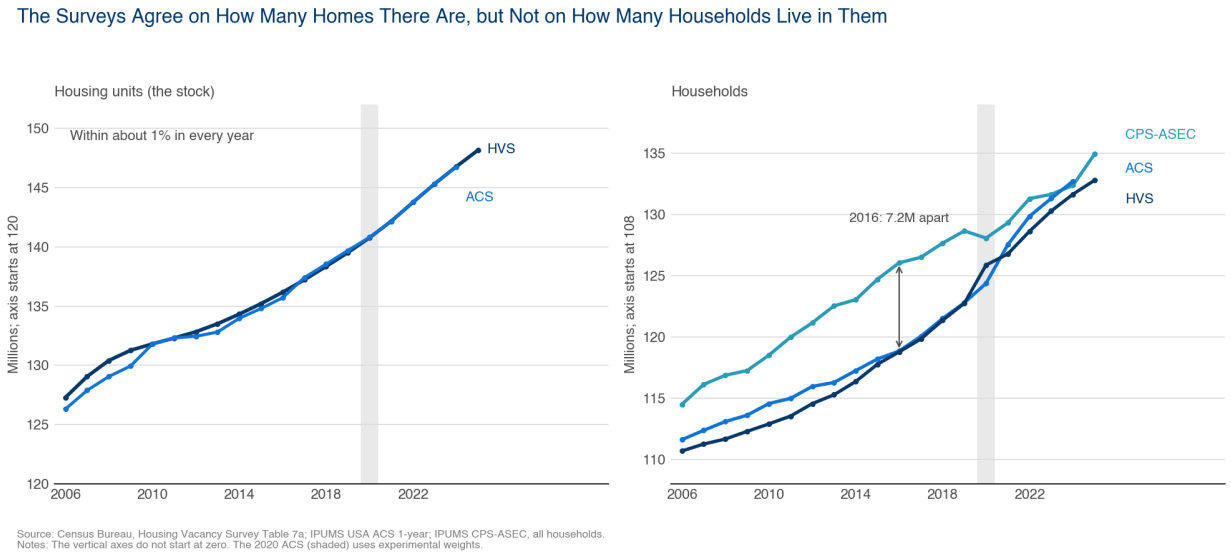
Source: McCue et al. (2015); U.S. Census Bureau (2021a, 2026d).

Figure 5A. Housing units and households in the HVS and households in the CPS-ASEC, 1965 to 2025



Notes: Left: housing units. Right: households. **Source:** Census Bureau, Housing Vacancy Survey (Table 7 as published and Table 7a revised); IPUMS CPS-ASEC; author's calculations.

Figure 5B. Housing units and households by survey, 2006 to 2025



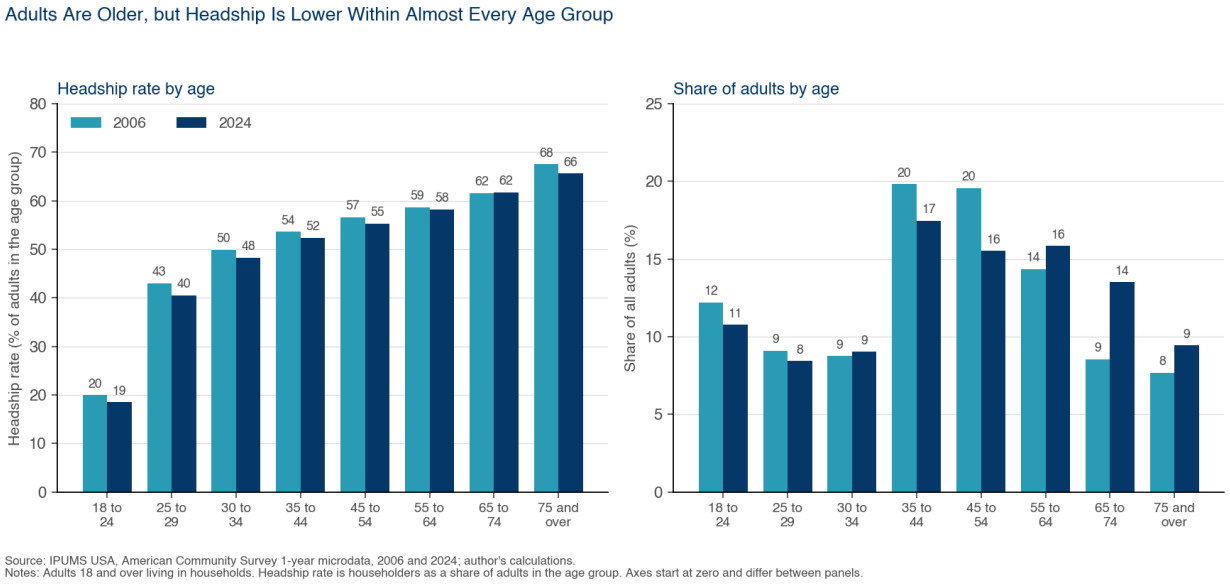
Notes: Left: housing units in the HVS and the ACS. Right: households in the HVS, the ACS, and the CPS-ASEC.
Source: Census Bureau, Housing Vacancy Survey (Table 7a); IPUMS USA, American Community Survey 1-year; IPUMS CPS-ASEC; author's calculations.

Table 6A. Benchmark, ages covered, and data for the six estimates that count missing households, grouped by approach

Estimate	Benchmark	Ages covered	Data	What is counted
Counterfactual headship, ordered by benchmark				
Freddie Mac	2000	15 and over	CPS-ASEC	Housing-cost part of the change
Up For Growth	2000	18 to 45	Census 2000 and ACS	Whole change
Brookings	2006	18 and over, and 16 to 18 not in school	ACS	Housing-cost part of the change
Realtor.com	2010 to 2014	18 to 44	CPS	Whole change
Trend extension				
Moody's Analytics	2011 to 2019 trend	All ages	Census Bureau	Shortfall below the trend
Symptom				
Zillow	None	All ages	ACS	Every family sharing housing

Source: Freddie Mac Economic and Housing Research (2024); Wilkerson and Baron (2022); Patel et al. (2024); Jones and Hale (2026); deRitis et al. (2025); Zillow Economic Research (2026).

Figure 6A. Headship rate and share of adults by age group, 2006 and 2024



Notes: Left: headship rate. Right: share of all adults. **Source:** IPUMS USA, American Community Survey 1-year microdata, 2006 and 2024; author's calculations.

Table 6B. Sample and weighted counts of adults and householders, 2006 and 2024

	2006		2024	
	Records	Weighted (millions)	Records	Weighted (millions)
Persons in households	2,888,839	291.3	3,238,311	331.6
Adults 18 and over (the sample)	2,187,467	217.8	2,610,952	258.9
Householders among adults	1,162,843	111.6	1,348,094	132.7
Headship rate (%)		51.27		51.25

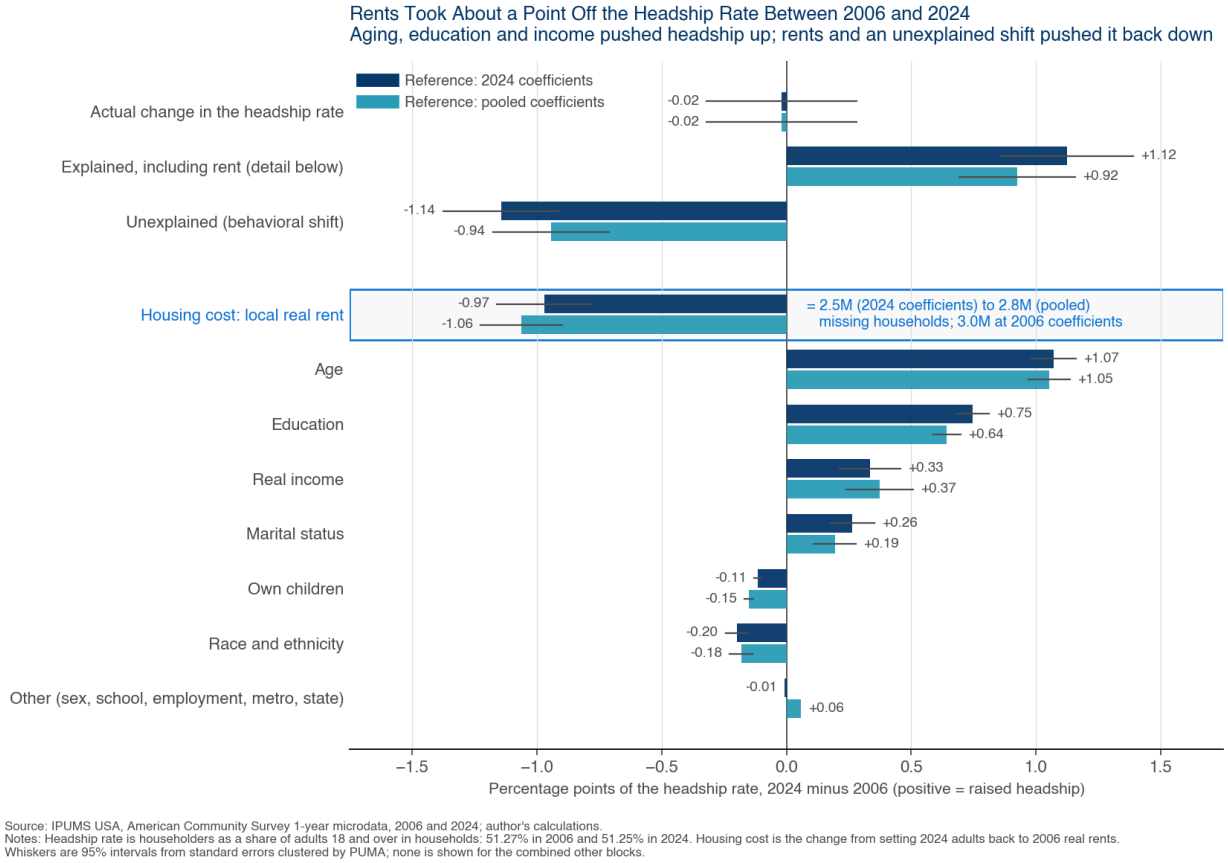
Notes: Weighted counts use the person weight. **Source:** Ruggles et al. (2025); author's calculations.

Table 6C. Characteristics of householders and non-householders among all adults and by age band, 2024

	All adults		Ages 18 to 45		Ages 46 and over	
Householder	Yes	No	Yes	No	Yes	No
Share of the group's adults	51	49	42	58	60	40
Percent of the group						
Age 18 to 34	19	38	49	67	—	—
Age 35 to 45	20	19	51	33	—	—
Age 46 to 64	33	26	—	—	54	60
Age 65 and over	28	17	—	—	46	40
Female	51	52	51	49	51	55
Married, spouse present	47	52	43	35	49	75
Never married	24	37	44	59	12	8
Any own child in the household	38	35	50	33	30	39
Bachelor's degree or more	40	30	45	29	36	31
Employed	65	63	87	73	51	49
Attending school	5	12	10	20	2	2
Median personal income (2024 dollars)	48,000	30,000	51,000	27,000	45,000	31,700
Mean local two-bedroom rent (2024 dollars)	1,186	1,213	1,205	1,219	1,174	1,206

Notes: Shares are weighted percentages of each group. **Source:** Ruggles et al. (2025); author's calculations.

Figure 6B. Contributions to the change in the headship rate from 2006 to 2024



Source: IPUMS USA, American Community Survey 1-year microdata, 2006 and 2024; author's calculations.
Notes: Headship rate is householders as a share of adults 18 and over in households: 51.27% in 2006 and 51.25% in 2024. Housing cost is the change from setting 2024 adults back to 2006 real rents.
Whiskers are 95% intervals from standard errors clustered by PUMA; none is shown for the combined other blocks.

Notes: In percentage points, under the 2024 coefficients and the pooled coefficients. **Source:** IPUMS USA, American Community Survey 1-year microdata, 2006 and 2024; author's calculations.

Table 6D. Decomposition of the change in the headship rate from 2006 to 2024 under three sets of reference coefficients

	2024 coefficients	Pooled coefficients	2006 coefficients
Percentage points of the headship rate			
Change in the headship rate	−0.02 (0.15)	−0.02 (0.15)	−0.02 (0.15)
Explained	1.12 (0.14)	0.92 (0.12)	0.63 (0.13)
Local rent	−0.97 (0.10)	−1.06 (0.08)	−1.16 (0.10)
Age	1.07 (0.05)	1.05 (0.04)	1.03 (0.04)
Education	0.75 (0.03)	0.64 (0.03)	0.49 (0.02)
Real income	0.33 (0.06)	0.37 (0.07)	0.42 (0.07)
Marital status	0.26 (0.05)	0.19 (0.04)	0.10 (0.04)
Own children	−0.11 (0.01)	−0.15 (0.01)	−0.19 (0.01)
Race and ethnicity	−0.20 (0.02)	−0.18 (0.02)	−0.17 (0.03)
Other characteristics	−0.01	0.06	0.11
Unexplained	−1.14 (0.12)	−0.94 (0.12)	−0.65 (0.14)
Missing households (millions)	2.51 (0.25)	2.75 (0.22)	3.00 (0.26)
Rest of the change (millions of households)	2.46	2.70	2.95

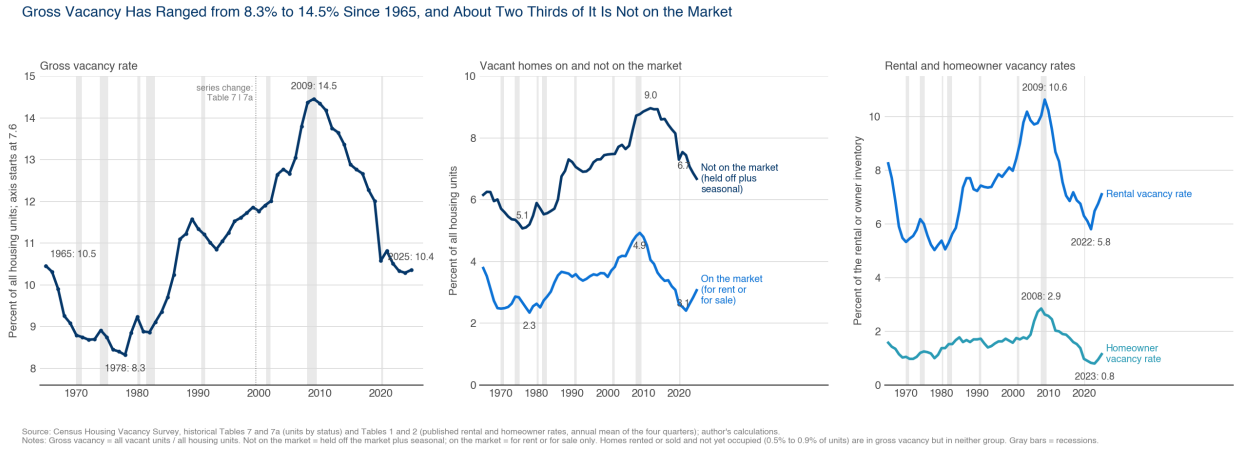
Notes: The explained part is the sum of the rows beneath it. Missing households are the adults of 2024 multiplied by minus the rent term, and the rest of the change is everything other than rent. Standard errors clustered by PUMA are in parentheses. **Source:** Ruggles et al. (2025); author's calculations.

Table 6E. Missing households from the rent term under alternative specifications, 2024

				Missing households (millions)		
	Adults	Slope	Rent change	2024	Pooled	2006
Panel A. Price measure						
Baseline: contract rent, CPI-U	258.9	−4.85	0.20	2.51	2.75	3.00
Gross rent	258.9	−5.52	0.16	2.32	2.65	2.95
Rent deflated by CPI-U less shelter	258.9	−4.85	0.25	3.18	3.48	3.79
Panel B. Sample						
Ages 18 to 45	122.5	−3.42	0.20	0.86	1.01	1.19
Ages 46 and over	136.4	−4.97	0.20	1.34	1.39	1.40
Panel C. Estimator (adults 18 and over; rent redrawn within state)						
Linear benchmark				2.55		
Flexible rent curve				2.75		
Rent slope varying by group				2.23		
Double machine learning				2.21		2.26

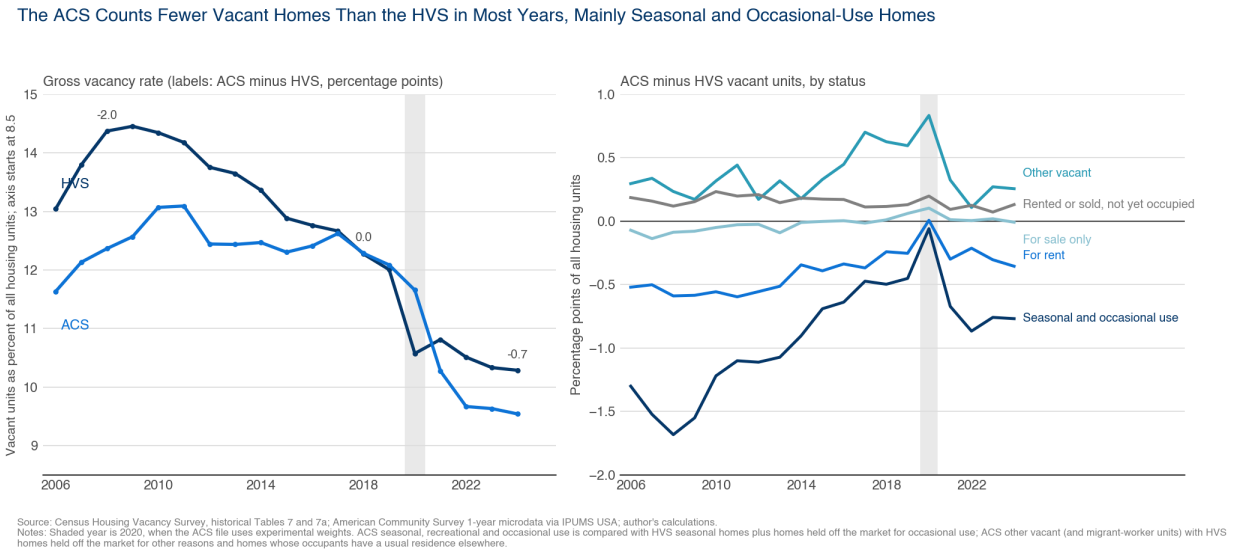
Notes: Adults are in millions. The slope is the 2024 coefficient on log rent in points of headship per log point, and the rent change is the rise in mean log rent from 2006 to 2024. The last three columns give the count at the 2024, pooled, and 2006 coefficients. Each row changes one choice from the baseline. The age groups are separate regressions of the adults in each group, so they do not sum to the baseline. Panel C reports the 2024-coefficient count and, for double machine learning, the count at the 2006 slope. Estimators that fit headship with regularized trees give counts of 1.3 to 1.5 million and are not shown, because the trees shrink the effect of a single place-level variable toward zero. **Source:** Ruggles et al. (2025); author's calculations.

Figure 7A. Gross vacancy, vacant homes on and not on the market, and rental and homeowner vacancy rates, 1965 to 2025



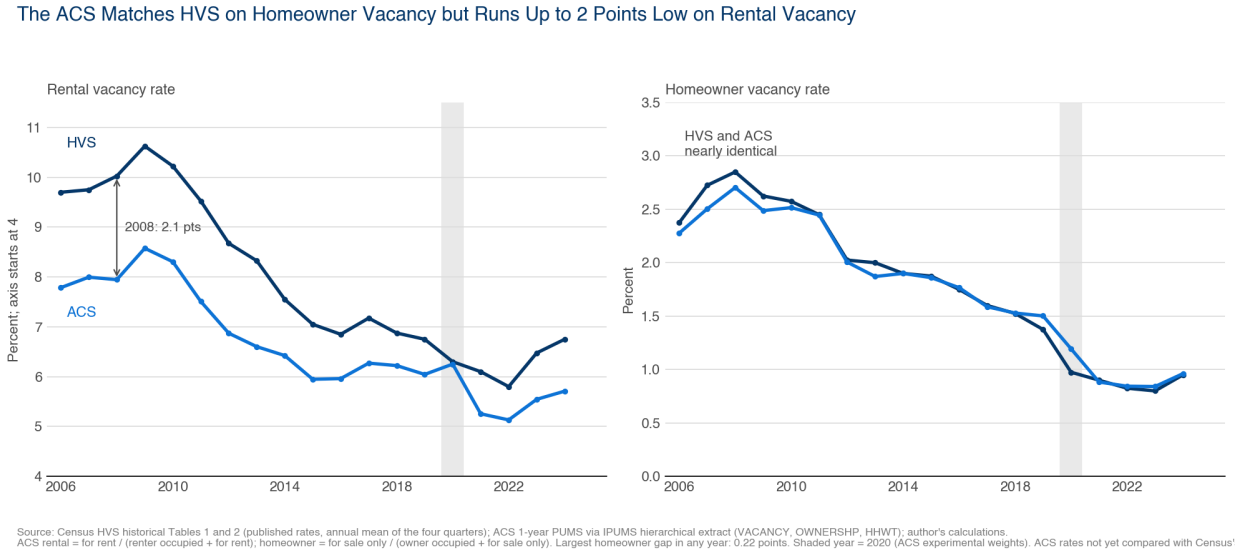
Notes: Left: vacant units as a percent of all housing units. Center: vacant homes on the market (for rent or for sale only) and not on the market (held off the market plus seasonal), as a percent of all housing units. Right: rental and homeowner vacancy rates, each the mean of the four published quarters of the year, as a percent of the rental or owner inventory. Homes rented or sold and not yet occupied are in gross vacancy but in neither group. Gray bars mark recessions. **Source:** Census Bureau, Housing Vacancy Survey (historical Tables 1, 2, 7, and 7a); author's calculations.

Figure 7B. Gross vacancy in the ACS and the HVS, 2006 to 2024, and the ACS minus HVS difference by status



Notes: Left: vacant units as a percent of all housing units, with the ACS minus HVS difference in percentage points. Right: the ACS minus HVS difference in each status, in percentage points of all housing units. The shaded year is 2020, when the ACS file uses experimental weights. **Source:** Census Bureau, Housing Vacancy Survey (Tables 7 and 7a); IPUMS USA, American Community Survey 1-year microdata; author's calculations.

Figure 7C. Rental and homeowner vacancy rates in the ACS and the HVS, 2006 to 2024



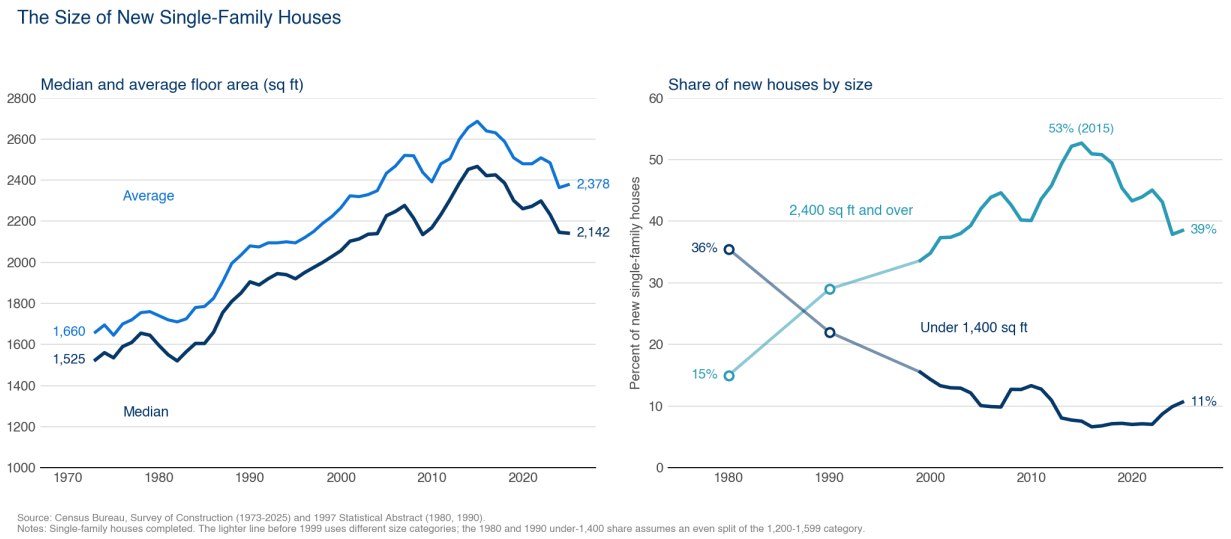
Notes: Left: rental vacancy rate. Right: homeowner vacancy rate. The HVS rates are the published rates, as the mean of the four quarters of each year. The ACS rates are calculated from vacant-unit records. The shaded year is 2020, when the ACS file uses experimental weights. **Source:** Census Bureau, Housing Vacancy Survey (historical Tables 1 and 2); IPUMS USA, American Community Survey 1-year microdata; author's calculations.

Table 7A. Vacancy rate and period used by published targets

Estimate	Vacancy rate used	Period
Freddie Mac	Gross vacancy, 11.7%	Average of 1994 to 2003
Brookings	Gross vacancy, 12%	Base year of 2006
Up For Growth	Rental and homeowner rates weighted by tenure, 5%	1980 to 2000, then validated by stakeholders
Moody's Analytics	Available (active) vacancy rate, 3.8%	Average of 1985 to 2000 (tracts: 2012 to 2018)

Notes: The available rate is the homes offered for rent or for sale as a share of the occupied homes, the homes on the market, and the homes already rented or sold and awaiting an occupant. **Source:** Freddie Mac Economic and Housing Research (2024); Patel et al. (2024); Wilkerson and Baron (2022); deRitis et al. (2025).

Figure 8A. Floor area of new single-family houses completed, 1973 to 2025



Notes: Left: median and average. Right: shares of new houses under 1,400 square feet and at or above 2,400 square feet. **Source:** Census Bureau, Survey of Construction (1973 to 2025); 1997 Statistical Abstract of the United States (1980 and 1990); author's calculations.

Table 8A. What each estimate below the national level produces, and how

Source	What it produces	Geography or group	Data	Rule or main assumption
NLIHC	Shortage of rental homes that are affordable and available to extremely low-income renters	Extremely low-income renters; nation, states, and 50 largest metropolitan areas	ACS PUMS	Rent at or below 30% of the group's income limit; available if vacant or not occupied by a higher-income household; a PUMA joins a metropolitan area if at least half is inside
Moody's Analytics	Shortfall of vacant homes in each tract, relative to the city's average vacancy rate in 2012 to 2018	Census tracts in about 350 cities of more than 100,000 people; tracts classified by income relative to the city median	ACS five-year tables	Vacancy gap only; a tract is included if at least half is inside the city
Up For Growth	Underproduction of housing, meaning homes needed minus homes that exist, for each region	309 metropolitan and 505 nonmetropolitan regions built from PUMAs	ACS PUMS	A PUMA joins a metropolitan region only if entirely inside; regions are not netted against one another

Notes: PUMA is Public Use Microdata Area, a geography that holds about 100,000 people, and PUMS is the Public Use Microdata Sample, the individual records of the ACS. **Source:** National Low Income Housing Coalition (2026); deRitis et al. (2025); Wilkerson and Baron (2022).

Table 8B. What each source can report at each geography

	Nation	Region	State	Metro	PUMA	Tract
HVS: housing stock	Yes	Yes	No	No	No	No
HVS: vacancy rates	Yes	Yes	Yes	Yes	No	No
HVS: vacant homes by status	Yes	Yes	No	No	No	No
ACS Public Use Microdata (PUMS)	Yes	Yes	Yes	Yes	Yes	No
ACS Published Tables	Yes	Yes	Yes	Yes	Yes	Yes

Notes: HVS is the Housing Vacancy Survey, ACS is the American Community Survey, and PUMS is the Public Use Microdata Sample. Yes means the source reports the measure at that geography. The HVS vacancy rates are for rental and owner-occupied homes, and at the metropolitan level cover only the 75 largest metropolitan areas. The ACS rows cover the housing stock, households, and vacancy by status; the PUMS are individual survey records, and the Published Tables are counts prepared by the Census Bureau, with tract tables from the five-year ACS. At the PUMA level the ACS rows rest on small samples (Table 8C). **Source:** Census Bureau, Housing Vacancy Survey (fact sheet and 2021 annual release); American Community Survey; author's assessment.

Table 8C. Sample records per PUMA, 2024

	Sample records				Weighted count
	Minimum	10th	Median	90th	Median
Households	142	349	512	786	51,608
Adults aged 18 to 45	101	281	405	592	47,388
Adults aged 46 and over	118	367	592	941	53,206
Vacant homes	1	8	24	87	4,134
Vacant homes offered for rent	1	2	5	14	902

Notes: Counts per PUMA across the 2,462 PUMAs in the 2024 one-year file. Sample records are unweighted, and the 10th and 90th are percentiles across PUMAs. The weighted count is the median number of households, adults, or homes that the sample records in a PUMA represent. Households and adults are in occupied housing units. The last row covers the 2,330 PUMAs with at least one such home; 132 PUMAs have none. Vacant homes offered for rent include homes offered for rent or sale. The age groups follow the decomposition in Section 6.3. **Source:** IPUMS USA, American Community Survey 1-year microdata, 2024; author's calculations.

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A Appendix

[APPENDIX: Appendix text to be drafted. The appendix tables follow in the next section.]

B Appendix tables and figures

Table A1. Standard errors of the decomposition of the change in the headship rate from 2006 to 2024, by reference coefficients

	Estimate	Robust SE	Clustered SE	Replicate SE
Percentage points of the headship rate unless noted				
2024 coefficients				
Change in the headship rate	−0.019	0.059	0.153	0.033
Explained	1.124	0.042	0.135	0.029
Local rent term	−0.971	0.033	0.097	0.019
Unexplained	−1.143	0.064	0.119	—
Missing households (millions)	2.514	0.086	0.251	0.050
Pooled coefficients				
Change in the headship rate	−0.019	0.059	0.153	0.033
Explained	0.925	0.034	0.119	0.025
Local rent term	−1.063	0.023	0.084	0.015
Unexplained	−0.944	0.060	0.119	0.039
Missing households (millions)	2.752	0.060	0.217	0.040
2006 coefficients				
Change in the headship rate	−0.019	0.059	0.153	0.033
Explained	0.629	0.043	0.127	—
Local rent term	−1.159	0.033	0.100	—
Unexplained	−0.648	0.065	0.145	0.045
Missing households (millions)	3.001	0.086	0.259	—

Notes: Robust standard errors use the person weight. Clustered standard errors cluster by PUMA. Replicate standard errors use the 80 successive-difference replicate weights of the ACS. A dash indicates a quantity that was not estimated with replicate weights. **Source:** Ruggles et al. (2025); author's calculations.

Table A2. Regressions of the householder indicator on the characteristics of adults and local rent, 2006 and 2024

	2006		2024	
	Coefficient (SE)	Mean	Coefficient (SE)	Mean
Log real rent of a two-bedroom unit in the PUMA (per log point)	−5.79 (0.17)	6.81	−4.85 (0.16)	7.01
Age				
18 to 24 (omitted)		12.2		10.8
25 to 29	15.22 (0.20)	9.1	15.10 (0.21)	8.4
30 to 34	20.08 (0.21)	8.8	22.32 (0.21)	9.0
35 to 44	21.93 (0.19)	19.8	25.76 (0.20)	17.5
45 to 54	24.30 (0.19)	19.6	28.24 (0.20)	15.5
55 to 64	27.84 (0.20)	14.4	32.18 (0.20)	15.8

	Coefficient (SE)	Mean	Coefficient (SE)	Mean
65 to 74	31.46 (0.22)	8.5	35.00 (0.21)	13.5
75 and over	33.94 (0.23)	7.7	36.12 (0.23)	9.4
Female	−12.13 (0.08)	51.7	−0.16 (0.08)	51.3
Marital status				
Married, spouse present (omitted)		52.9		49.4
Married spouse absent, separated, divorced, or widowed	26.58 (0.10)	21.8	25.09 (0.10)	20.3
Never married	9.90 (0.14)	25.3	12.71 (0.13)	30.3
Any own child in the household	5.37 (0.10)	40.1	3.20 (0.10)	36.5
Education				
High school or less (omitted)		52.7		43.4
Some college	4.87 (0.10)	22.0	6.92 (0.11)	21.6
Bachelor's degree or more	5.26 (0.10)	25.2	7.94 (0.10)	35.0
Race and ethnicity				
Other non-Hispanic (omitted)		71.2		63.9
Black non-Hispanic	3.67 (0.14)	11.1	2.06 (0.15)	11.3
Asian or Pacific Islander non-Hispanic	−5.14 (0.19)	4.7	−5.43 (0.17)	6.6
Hispanic	−1.59 (0.14)	13.1	−1.91 (0.12)	18.2
Attending school	−1.08 (0.15)	9.8	−1.63 (0.17)	8.2
Employment				
Employed (omitted)		63.8		63.6
Unemployed	0.95 (0.21)	4.0	0.90 (0.25)	2.9
Not in the labor force	4.66 (0.12)	32.2	3.16 (0.12)	33.5
Real personal income (2024 dollars)				
Zero or negative (omitted)		8.3		9.1
Up to 15,000	9.95 (0.16)	18.5	11.62 (0.17)	17.1
15,000 to 30,000	19.70 (0.18)	17.8	16.58 (0.18)	16.4
30,000 to 50,000	25.24 (0.19)	19.5	22.19 (0.19)	19.0
50,000 to 75,000	31.23 (0.20)	14.7	27.99 (0.20)	15.0
75,000 to 100,000	35.33 (0.22)	8.6	30.93 (0.22)	9.4
Over 100,000	40.22 (0.21)	12.6	35.32 (0.21)	14.1
Metro status (control, not interpreted)				
Not in a metro area (omitted)		16.0		7.6
Indeterminable	−0.41 (0.18)	7.0	−0.77 (0.17)	11.5
In a metro area	0.37 (0.14)	76.9	−0.57 (0.17)	80.9
Constant	37.28 (1.06)		24.31 (1.09)	

Notes: Coefficients are in percentage points of the headship rate, with robust standard errors in parentheses. Means are percentages of adults, except for local rent, which is the mean of the log of real rent. State effects for the 50 states and the District of Columbia are included and not shown. Local rent is the log of the real rent of a standard two-bedroom unit in the adult's PUMA, income is in 2024 dollars, and the metropolitan status coefficients are not interpreted.
Source: Ruggles et al. (2025); author's calculations.

Table A3. The local rent index, 2006 and 2024

	2006	2024
Panel A. The index across PUMAs		
PUMAs	2,069	2,462
Cash-renter household records	284,469	336,110
Records per PUMA, median (minimum)	121 (12)	121 (15)
Real rent, 10th percentile PUMA (2024 dollars)	521	635
Real rent, median PUMA	905	1,135
Real rent, 90th percentile PUMA	1,561	1,816
Standard deviation of the log index across PUMAs	0.41	0.40
Panel B. Difference in rent from the reference unit		
No bedroom	−28%	−25%
One bedroom	−20%	−20%
Three bedrooms	+12%	+11%
Four bedrooms	+23%	+22%
Five or more bedrooms	+21%	+23%
Mobile home or trailer	−18%	−25%
Boat, tent, van, or other	−28%	−37%
House, detached	+14%	+10%
House, attached	+7%	+7%
2-family building	+3%	−2%
3-4 family building	+1%	0%
10-19 family building	+3%	+3%
20-49 family building	+1%	+2%
50 or more family building	0%	+2%

Notes: The index is the rent that a regression of the log contract rent of cash-renter households on bedrooms, structure type, and year built, with a fixed effect for each PUMA, predicts for a two-bedroom unit in a building with 5 to 9 units built in 1980 to 1989. Panel B reports the percent difference in rent associated with each characteristic, relative to that unit. **Source:** Ruggles et al. (2025); author's calculations.

Table A4. Characteristics of householders and non-householders among all adults and by age band, 2006

	All adults		Ages 18 to 45		Ages 46 and over	
Householder	Yes	No	Yes	No	Yes	No
Share of the group's adults	51	49	43	57	60	40
Percent of the group						
Age 18 to 34	21	40	48	66	—	—
Age 35 to 45	23	21	52	34	—	—
Age 46 to 64	36	28	—	—	64	70
Age 65 and over	20	12	—	—	36	30
Female	45	59	46	53	44	68
Married, spouse present	50	56	49	43	51	77
Never married	19	32	32	49	8	6
Any own child in the household	41	39	58	41	28	36
Bachelor's degree or more	29	22	31	21	27	23
Employed	66	61	83	69	53	49
Attending school	6	14	11	22	2	2
Median personal income (2024 dollars)	46,700	23,300	46,700	22,600	45,400	26,400
Mean local two-bedroom rent (2024 dollars)	977	997	983	1,002	972	990

Notes: Shares are weighted percentages of each group. **Source:** Ruggles et al. (2025); author's calculations.