



441 G St. N.W.
Washington, DC 20548

June 25, 2020

Congressional Requesters

HOUSING: Preliminary Analysis of Homeownership Trends for Nine Cities

Owning a home has been one of the primary ways Americans built wealth and financial security. This is one reason why the availability and price of housing is consequential to both households and policymakers. Since the 2007–2009 financial crisis, the national homeownership rate has stabilized; however, not all Americans have benefitted from the recovery. Even in housing markets that appear to be thriving, many still find themselves locked out of homeownership.

You asked us to conduct a comprehensive assessment of today’s housing market and whether it is meeting the needs of Americans. This report is one of several we plan to issue in response.¹ It presents historical homeownership trends at the national level and trends from 2010 through 2018 for nine cities: Chicago, Illinois; Cleveland, Ohio; Columbia, South Carolina; Denver, Colorado; Houston, Texas; Pittsburgh, Pennsylvania; San Francisco, California; Seattle, Washington; and Washington, D.C.² We selected our nine cities based on an existing classification of cities, geographic diversity, and congressional interest.³

To describe homeownership trends, including changes in units and prices, the outward expansion and densification of cities, and homeowner and recent borrower characteristics, we analyzed data from the following sources from 2010 through 2018, the most current data available at the time of our review: the Census Bureau’s American Community Survey, the Federal Housing Finance Agency’s (FHFA) House Price Index, and Home Mortgage Disclosure Act (HMDA) data. To assess the reliability of these data sources, we primarily reviewed related documentation. In some cases, we also interviewed agency officials and tested data for missing values and obvious errors. We determined these data sources were sufficiently reliable for the purposes of reporting homeownership data and trends. To further inform our work, we also interviewed selected researchers and agency officials and conducted a literature review.

¹We issued a report on rental housing in May 2020—see GAO, *Rental Housing: As More Households Rent, the Poorest Face Affordability and Housing Quality Challenges*, GAO-20-427 (Washington, D.C.: May 27, 2020).

²As described in more detail in enclosure 1, we included the following core-based statistical areas (“cities”) in our analysis: Chicago-Naperville-Elgin, IL-IN-WI; Cleveland-Elyria, OH; Columbia, SC; Denver-Aurora-Lakewood, CO; Houston-The Woodlands-Sugar Land, TX; Pittsburgh, PA; San Francisco-Oakland-Berkeley, CA; Seattle-Tacoma-Bellevue, WA; and Washington-Arlington-Alexandria, DC-VA-MD-WV.

³This report examines trends in the housing market prior to the Covid-19 pandemic and does not account for the profound effect it likely will have on homeowners. We have ongoing work that will examine implementation of foreclosure and eviction protections authorized in recent legislation.

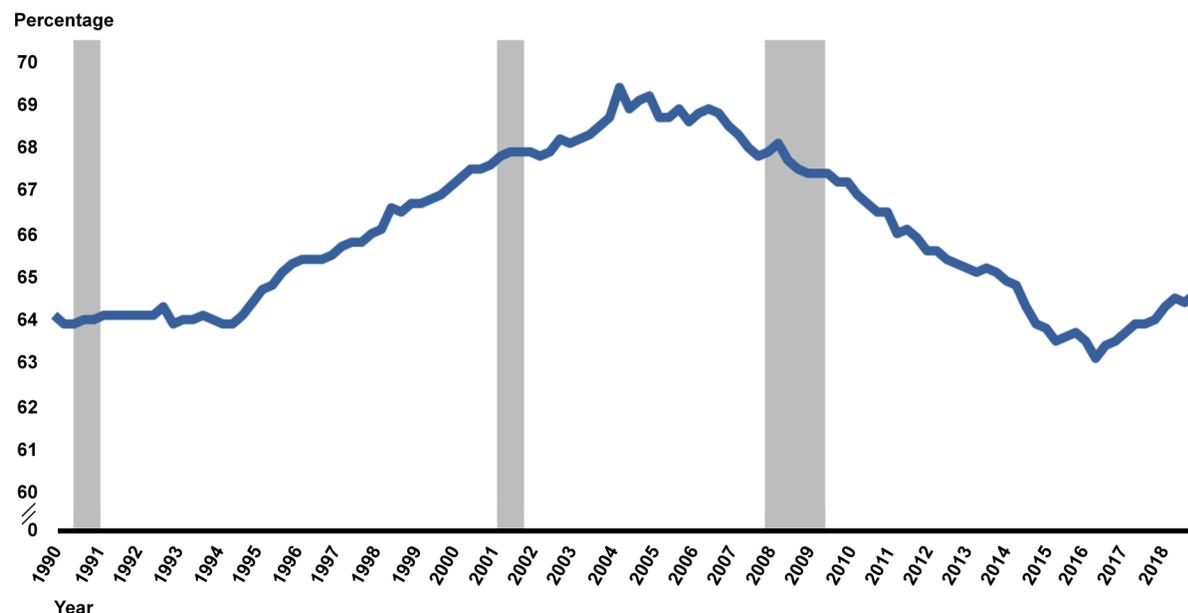
Enclosures are organized as follows: (1) Scope and Methodology and (2) Analysis of Homeownership Trends for Nine Cities.

We conducted this performance audit from October 2018 to June 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

National Homeownership Trends

Many factors affect who owns or can buy a home, including: housing stock characteristics, house prices, and household characteristics, such as income.⁴ As shown in figure 1, the national homeownership rate peaked at about 70 percent in the years before the financial crisis, then reached a 30-year low point (approximately 63 percent) in 2016. The rate began increasing again starting in 2016.

Figure 1: Homeownership Rate in the United States, 1990–2018



Source: Census Bureau Current Population Survey/Housing Vacancy Survey and National Bureau of Economic Research data. | GAO-20-544R

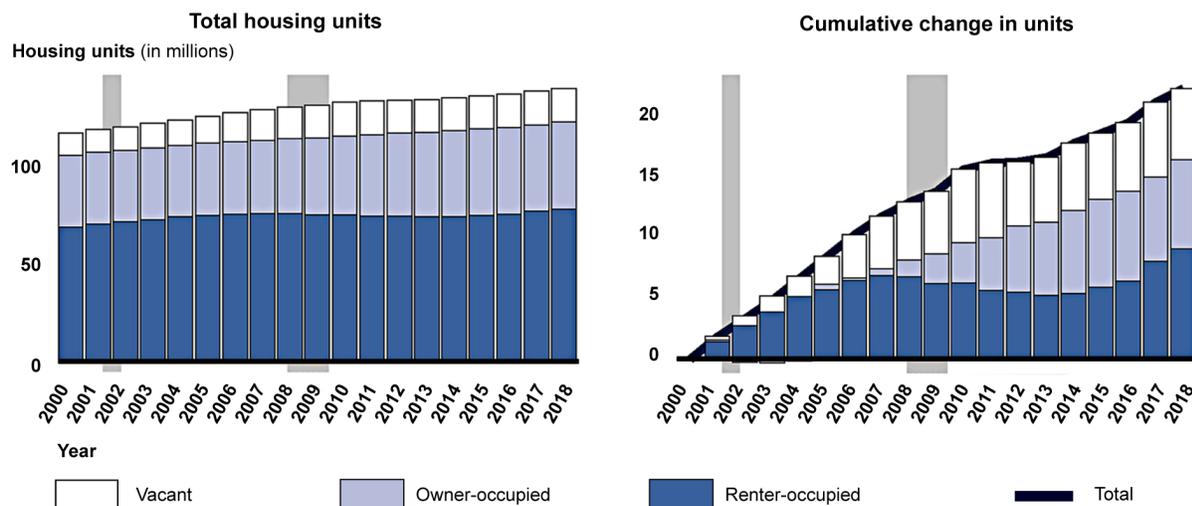
Notes: The homeownership rate is the percentage of total households (owner and renters) who own a home. The Census Bureau defines a household as one or more individuals who occupy a single housing unit. The data underlying this figure are from one of multiple census surveys that can be used to measure the homeownership rate. These surveys differ in sample size and frequency and therefore may result in different estimates. Shaded areas indicate U.S. recessions. Estimates in this figure have a margin of error of less than ± 1 percentage point at the 90 percent confidence level.

The continued decline in the homeownership rate through 2016 can be explained, in some part, by trends in housing stock. As shown in figure 2, for 2006–2013, the estimated number of owner-occupied housing units in the United States declined by roughly 1.2 million, while vacant

⁴Throughout this report, unless otherwise noted, “stock” includes owner-occupied housing units, renter-occupied housing units, and all categories of vacant units.

and renter-occupied units increased substantially. This change can be attributed to a sharp decline in the construction of new homes beginning in 2006 and “tenure conversions” (ownership units converted to rental units).⁵ Meanwhile, the number of households in the United States continued to grow, increasing by about 17 million (or 16 percent) during 2000–2018.

Figure 2: Estimated Housing Stock in the United States, 2000–2018



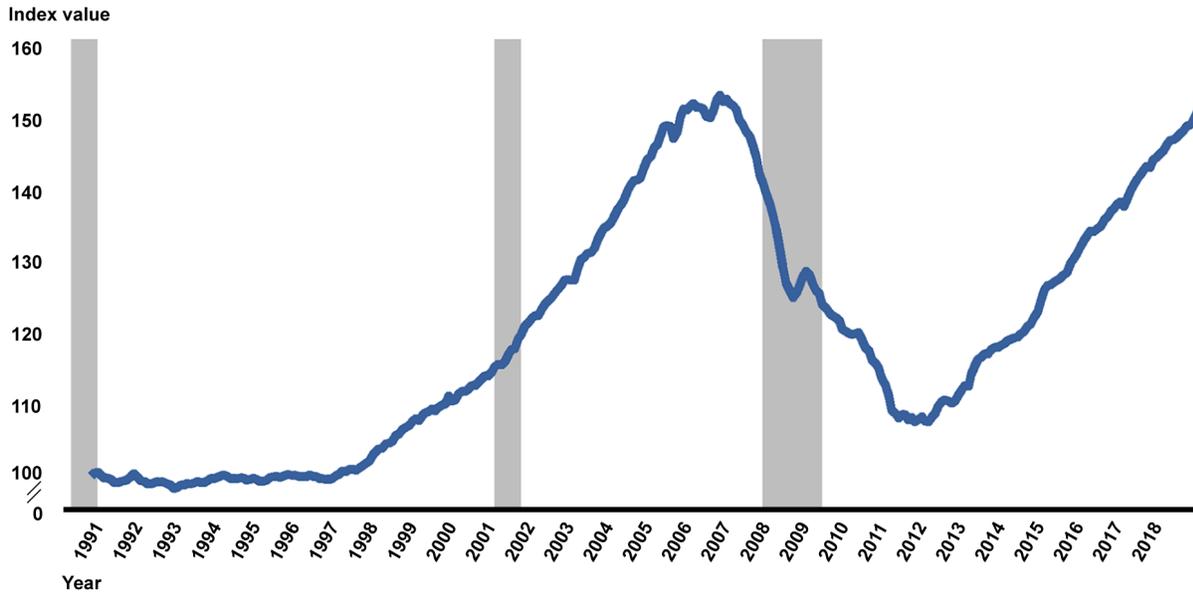
Source: GAO analysis of American Community Survey and National Bureau of Economic Research data. | GAO-20-544R

Notes: The “vacant” category includes units that were for rent; rented, but not occupied; for sale; sold, but not occupied; for seasonal, recreational, or occasional use; for migrant workers; and that were vacant for other reasons, such as being used for storage or foreclosed, as defined by Census Bureau. The data were available from 2000. Shaded areas indicate U.S. recessions. Estimates in this figure have a margin of error of ± 2 at the 95 percent confidence level.

The combination of growing potential demand for homeownership (as measured by growth in households) and the comparatively limited growth in ownership units contributed to steady average house-price increases at the national level since 2012, as shown in figure 3. Demographic characteristics—such as income—are key determinants in who historically has owned or been able to buy a home. For example, while national median household income has increased every year since 2013, growth in incomes at the national level has not kept pace with growth in house prices, potentially making homeownership difficult or out of reach for many Americans.

⁵The decline in owner-occupied units in 2007–2013 also could be a result of demolitions or disaster, badly damaged or condemned buildings, or other conversions, mergers, or change to nonresidential use. See Department of Housing and Urban Development, *Components of Inventory Change: 2011–2013* (Washington, D.C.: April 2016). Housing starts for privately-owned units (construction of new homes) plummeted from January 2006 through April 2009, from about 2.3 million in January 2006 to about 478,000 in April 2009. In general, starts increased annually from 2011, reaching an estimated 1.1 million in December 2018. See Census Bureau and Department of Housing and Urban Development, *Housing Starts: Total: New Privately Owned Housing Units Started [HOUST]*, retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/HOUST>, accessed March 8, 2020.

Figure 3: Inflation-Adjusted Average National House Price Changes, 1991–2018



Source: GAO analysis of Federal Housing Finance Agency, Bureau of Labor Statistics, and National Bureau of Economic Research data. | GAO-20-544R

Notes: January 1991 = 100. Index adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items Less Shelter in U.S. City Average. Shaded areas indicate U.S. recessions.

Local Homeownership Markets and Demographic Trends

Local markets are influenced by their own specific conditions and attributes, including population size, housing stock and availability, land area and geographic constraints, and employment conditions. As a result, local trends may look very different from national trends.⁶ To help illustrate the differences and similarities between local housing markets, we analyzed trends in units and prices, the outward expansion and densification of cities, and homeowner and recent borrower characteristics.⁷

In summary, among the nine cities we reviewed, we found:⁸

- **Total households grew in all cities.** Houston, Washington, D.C., and Seattle had the largest estimated increases in the number of total households (owners and renters) from 2010 through 2018, adding an estimated 337,000 (17 percent increase), 192,000 (9

⁶For example, see Edward Glaeser and Joseph Gyourko, “The Economic Implications of Housing Supply,” *Journal of Economic Perspectives*, vol. 32, no. 1 (2018), p. 3–30; and Albert Saiz, “The Geographic Determinants of Housing Supply,” *The Quarterly Journal of Economics*, 2010, p. 1,253–1,296; and Cecile Murray and Jenny Schuetz, *Housing in the U.S. is too expensive, too cheap, and just right. It depends on where you live*, accessed February 21, 2019, <https://www.brookings.edu/research/housing-in-the-u-s-is-too-expensive-too-cheap-and-just-right-it-depends-on-where-you-live/>.

⁷In this report, “outward expansion” refers to units added in areas that had fewer than 200 units per square mile in 2010 and that by 2018 had met or exceeded this threshold. Areas with fewer than 200 units per square mile in 2010 may have been nonresidential or light residential urban areas. “Densification” refers to additional units added in areas that were already considered developed in 2010.

⁸Enclosure 2 includes information on the statistical significance of all American Community Survey-derived estimates.

percent increase), and 172,000 (13 percent increase) households, respectively.⁹ In comparison, Cleveland and Pittsburgh added an estimated 25,000 (3 percent increase) and 35,000 (4 percent increase) households, respectively, from 2010 through 2018.

- **The homeowner vacancy rate dropped in all cities from 2010 through 2018, indicating growing constraints on the housing supply.**¹⁰ Most significantly, by 2018, the three cities with the largest house price increases—Denver, San Francisco, and Seattle—all had homeowner vacancy rates below 1 percent and the three lowest rental vacancy rates (less than 5 percent), indicating more severe constraints on supply.
- **Most cities further densified, and all expanded outward to some degree.** Cities such as Houston and Washington, D.C. both densified and expanded outward, while cities such as Seattle and Denver grew largely by further densifying in already high-density areas. Chicago, Cleveland, and Pittsburgh became less dense, as limited growth came largely through outward expansion.
- **Average home prices grew in all cities, but at considerably different rates.** In Denver, San Francisco, and Seattle, real house prices increased significantly from 2010 through 2018. Meanwhile, real prices increased steadily but comparatively modestly in Houston, Pittsburgh, and Washington, D.C. On the other end of the spectrum, relative to the other six cities, real prices in Chicago, Cleveland, and Columbia increased less.
- **The homeownership rate declined or was flat in all cities.** The homeownership rate significantly declined in Chicago, Cleveland, and Houston from 2010 through 2018, but remained statistically unchanged in all other cities. In Houston, the decline can be attributed, in part, to a large increase in the number of renter-occupied units relative to owner-occupied units through 2015. Chicago and Cleveland added relatively few total units over the period. In Washington, D.C., the homeownership rate declined through 2016 but subsequently returned to roughly the 2010 rate after owner-occupied units increased in 2017 and 2018.
- **Homeowners and recent borrowers were increasingly higher income.** All nine cities saw growth in the estimated number and percentage of households reporting annual incomes of \$150,000 or more (the highest income category reported by the Census Bureau). Similarly, with the exception of Columbia, real median incomes of borrowers increased in the selected cities from 2010 through 2018.
- **Homeowners and recent borrowers were increasingly older and more diverse.** Most cities saw growth in homeownership among households aged 60 and older, often with corresponding decreases among younger owners.¹¹ Additionally, our analysis of data on recent borrowers showed that while White borrowers continued to make up the

⁹As previously discussed, the Census Bureau measures the number of total households—one or more individuals occupying a single housing unit—that own or rent housing.

¹⁰The homeowner vacancy rate is the proportion of the homeowner inventory (owner-occupied, owned but not occupied, and vacant for sale) that is vacant for sale. For purposes of this discussion, vacant units include vacant for-sale and vacant for-rent units.

¹¹Until 2018, HMDA data on loan originations and borrowers did not include information on borrower age. As a result, our analysis on age is limited to owners measured in the American Community Survey.

greatest number of originations in eight of the nine selected cities, originations by minority borrowers increased in all cities from 2010 through 2018.

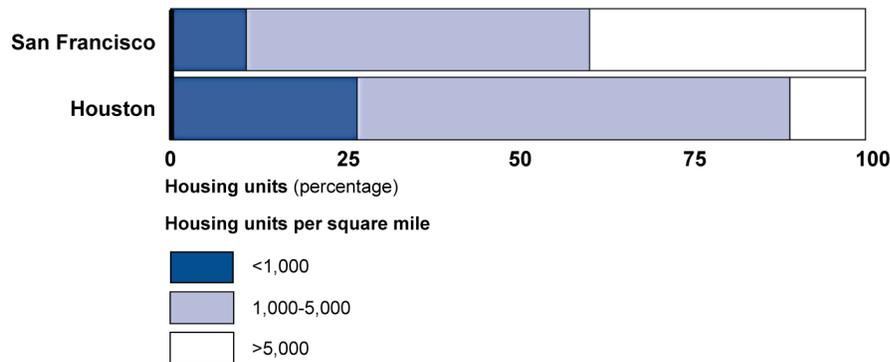
These data illustrate two main points: (1) Cities grow differently and accommodate growth to differing degrees, and (2) who owns and who can buy a home differs by location and type of buyer, sometimes substantially.

The contrasting stories of San Francisco and Houston can help illustrate these points.

San Francisco is a dense city, bounded by geographies (ocean and mountains) that limit its outward growth. Among the nine cities in our sample, San Francisco was by far the densest. As shown in figure 4, in 2018, about 40 percent of the city’s housing units were in high-density areas with more than 5,000 housing units per square mile), while only about 10 percent of units were in low-density areas (areas with fewer than 1,000 housing units per square mile).¹²

Conversely, Houston has the physical space to expand. In 2018, about 65 percent of housing units in Houston were in moderate-density areas (that is, areas with 1,000 to 5,000 housing units per square mile) and about 25 percent were in low-density areas. Only about 10 percent of units in Houston were in high-density areas.

Figure 4: Estimated Proportional Distribution of Housing Units by Density Category in Houston and San Francisco in 2018



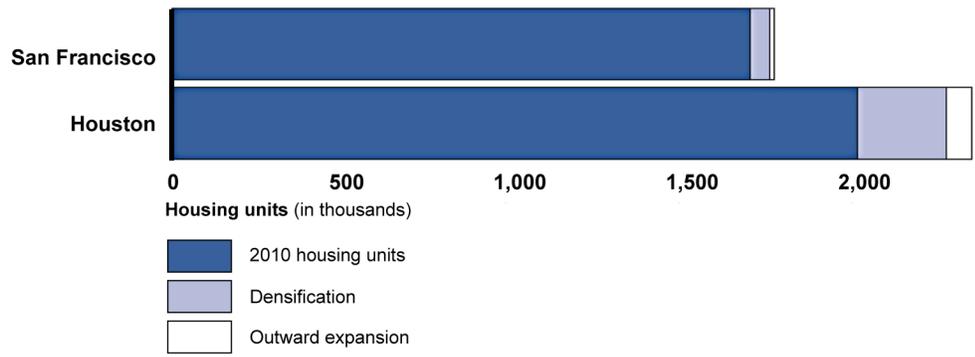
Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: Figure includes only areas with more than 200 housing units per square mile. Estimates in this figure have a margin of error of less than ± 1 percentage points at the 90 percent confidence level.

These geographic differences influenced how and the extent to which each city grew to accommodate household growth. As shown in figure 5, while both cities became denser (added units to already built-up areas), Houston expanded (grew outward), but San Francisco generally did not.

¹²We excluded areas with fewer than 200 housing units from our analysis. For ease of reporting, throughout this report, we refer to areas with 200–999 housing units per square mile as areas with fewer than 1,000 housing units per square mile.

Figure 5: Estimated Outward Expansion and Densification in Houston and San Francisco, 2010–2018



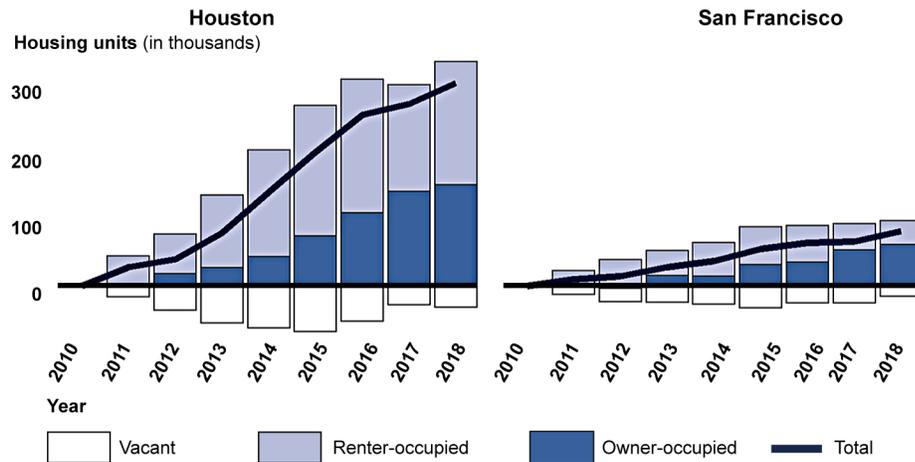
Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: Densification is the net change in units between 2010 and 2018 in areas meeting this threshold in 2010. Outward expansion is the net change in units in areas that had fewer than 200 units in 2010 but grew to more than 200 units by 2018. Areas with fewer than 200 units per square mile in both years are excluded. Estimates in this figure have a relative margin of error of ± 3 percent of the estimate at the 90 percent confidence level.

Furthermore, from 2010 through 2018, the number of households in San Francisco grew by about 97,000, but the city added only about 83,000 units, most of them ownership units. In comparison, Houston accommodated most of its growth with new units, adding an estimated 323,000 new units for an estimated 337,000 new households. Figure 6 illustrates the growth in housing units (excluding off-market vacant units) in both cities from 2010 through 2018.¹³

¹³Off-market vacant units include units rented or owned but not occupied, seasonal units, and “other vacant” units, which includes housing units in foreclosure, being used for storage, and in need of repair. These units accounted for about 1,000 additional units in San Francisco and 18,000 additional units in Houston not shown in the figure.

Figure 6: Estimated Cumulative Changes in Housing Stock by Occupancy Type in Houston and San Francisco, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: Total units include vacant for sale only, vacant for rent, owner occupied, and renter occupied. Vacant to own/rent includes units for sale only and for rent and estimates have a relative margin of error of from ± 6 percent to ± 16 percent at the 95 percent confidence level. All other estimates in this figure have a relative margin of error of ± 2 percent or less at the 95 confidence level.

How much housing is built in a city and where it is built can have tangible consequences on prices. This is evident when comparing house-price growth and median prices in the two cities: from 2010 through 2018, average prices in San Francisco increased rapidly and in December 2018, the reported median home value was \$1.4 million; in Houston average prices increased more modestly, and in December 2018 the reported median home value was \$183,000.¹⁴

Understandably, San Francisco has seen sharp growth in the estimated number of homeowners who earn \$150,000 or more annually (up about 69 percent since 2010), and substantial estimated decreases among all other income categories (households reporting annual incomes of \$0–\$149,999). While Houston also saw an increase in the estimated number of homeowners earning \$150,000 or more annually (up about 75 percent), it also saw growth in the estimated number of owners earning \$100,000–\$149,999 (up about 21 percent) and \$75,000–\$99,999 (up about 4 percent), and less dramatic estimated decreases among all other income categories compared to San Francisco.¹⁵

Not all cities are like San Francisco and Houston. For this reason, our analysis in enclosure 2 includes information on all nine cities, representing a variety of different housing markets. However, it is important to note that through a variety of means, local governments influence what, how much, and where new housing is built. Indirectly, these policies can have a substantial impact on who owns or can buy a home. And while the federal government supports

¹⁴We obtained median home price data from the Zillow Home Value Index, which is a smoothed, seasonally adjusted measure of typical home value and market changes across a given region and housing type. Research also has shown it is cheaper to add new housing at the periphery of a city than in the already-built environment. (For example, see Issi Romem, *Can U.S. Cities Compensate for Curbing Sprawl by Growing Denser?*, accessed May 25, 2020, <https://www.buildzoom.com/blog/can-cities-compensate-for-curbing-sprawl-by-growing-denser/>.)

¹⁵Additionally, estimated real median incomes of homeowners and recent borrowers rose significantly in San Francisco over the period of our analysis—by about \$22,600 and \$58,000, respectively. In Houston, real income growth was comparatively modest—estimated median incomes of homeowners grew by about \$4,800 and median incomes of borrowers grew by about \$3,000 from 2010 through 2018.

the homeownership market through policies and incentives that bolster demand (for example, by reducing borrowing and other costs associated with owning a home), it has limited influence over the local attributes and policies that drive supply. This report and our ongoing work in this area are designed to examine some of the particulars of local housing markets, so that policymakers might better understand what factors drive housing supply and demand and identify how the federal government might better support homeownership for Americans.

Agency Comments

We provided a draft of this report to the Department of Housing and Urban Development (HUD) for review and comment. HUD officials told us they had no comments on the draft report.

As agreed with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution until 30 days from the report date. At that time, we will send copies to the Director of FHFA, Secretary of the Department of Housing and Urban Development, and Secretary of the Treasury. In addition, the report will be available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-8678 or GarciaDiazD@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report include Cory Marzullo (Analyst in Charge), Emily Bond, Stephen Brown, Charlene Calhoun, John McGrail, Ed Nannenhorn, Matthew Rabe, Paul Schmidt, Jena Sinkfield, and Farrah Stone.

Sincerely yours,



Daniel Garcia-Diaz
Managing Director
Financial Markets and Community Investment

Enclosures – 2

List of Requesters

The Honorable Susan M. Collins
Chairwoman
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable Tim Scott
Chairman
Subcommittee on Financial Institutions and Consumer Protection
Committee on Banking, Housing, and Urban Affairs
United States Senate

The Honorable Michael F. Bennet
United States Senate

The Honorable Christopher A. Coons
United States Senate

The Honorable Lindsey O. Graham
United States Senate

Enclosure 1: Scope and Methodology

This report analyzes historical homeownership trends at the national level and trends from 2010 through 2018 for nine cities.

We selected nine core-based statistical areas (CBSA) as the focus of our analysis:

1. Chicago-Naperville- Elgin, IL-IN-WI Metro Area (Chicago);
2. Cleveland-Elyria, OH Metro Area (Cleveland);
3. Columbia, SC Metro Area (Columbia);
4. Denver-Aurora-Lakewood, CO Metro Area (Denver);
5. Houston-The Woodlands-Sugar Land, TX Metro Area (Houston);
6. Pittsburgh, PA Metro Area (Pittsburgh);
7. San Francisco-Oakland-Berkeley, CA Metro Area (San Francisco);
8. Seattle-Tacoma-Bellevue, WA Metro Area (Seattle); and
9. Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area (Washington, D.C.).¹⁶

We selected these cities based on Issi Romem’s classification of cities in *Has the Expansion of American Cities Slowed Down?*, geographic diversity, and congressional interest.¹⁷ In his article, Romem classified cities into three groups—expansive, expensive, and legacy—based on their geographic expansion (as measured by housing unit density, or housing units per square mile) and price appreciation from 1980 through 2010.¹⁸ As discussed in more detail later in this enclosure, our analysis in this preliminary report builds upon Romem’s analysis by providing an updated picture of stock and price changes from 2010 through 2018, further information on expansion and densification patterns, and information on the characteristics of owners and recent borrowers in the nine selected cities.

To inform our work, we reviewed literature and interviewed officials from the Department of Housing and Urban Development (HUD), the Department of the Treasury (Treasury), and the Federal Housing Finance Agency (FHFA). We also selected a judgmental sample of academics and researchers, industry groups, and research organizations, including:

- Various researchers working with the Board of Governors of the Federal Reserve System;

¹⁶CBSA refers collectively to metropolitan statistical areas and micropolitan statistical areas. A CBSA consists of the county or counties (or equivalent entities) associated with at least one core (urbanized area or urban cluster) of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties. Throughout the report and Enclosure 2, we refer to these CBSAs as “cities.”

¹⁷See <https://www.buildzoom.com/blog/cities-expansion-slowng>, accessed May 5, 2020.

¹⁸In 2010, San Francisco, Seattle, and Washington, D.C., were considered expensive cities in Romem’s classification; Denver and Houston were considered expansive cities; and Chicago, Cleveland, and Pittsburgh were considered legacy cities. Romem’s analysis did not classify Columbia.

- Lynn Fisher, formerly with the American Enterprise Institute;
- Edward Glaeser, Professor of Economics, Harvard University;
- Richard Green, Professor, Sol Price School of Public Policy, University of Southern California;
- Joint Center for Housing Studies of Harvard University;
- National Association of Home Builders;
- National Association of Realtors;
- Issi Romem, Fellow, Turner Center for Housing Innovation, University of California, Berkeley;
- Jenny Schuetz, Fellow, Metropolitan Policy Program, Brookings;
- Terwilliger Center for Housing;
- Susan Wachter, Professor of Real Estate, The Wharton School, University of Pennsylvania; and
- Urban Institute.

We selected these individuals and groups based on their work in the area of homeownership and mortgage finance, and recommendations from HUD, FHFA, and Treasury officials.

Data Used in Our Analysis

American Community Survey: The American Community Survey is an ongoing survey administered by the Census Bureau that collects and produces information on social, economic, housing, and demographic characteristics of Americans every year. The American Community Survey publishes 1-year and 5-year estimates. Because the American Community Survey is a survey of a sample of addresses, each estimate is subject to sampling error.

As described later in this enclosure, our analysis measured outward expansion and densification at the block-group level in the selected CBSAs from 2010 through 2018, the most current data available at the time of our review.¹⁹ To conduct this analysis, we used data from the 2010 release of the 2006–2010 American Community Survey 5-year estimate and 2018 release of the 2014–2018 5-year estimate. The 5-year estimates are based on larger sample sizes than the 1-year estimates, which increase their reliability and precision and allow for data to be collected and reported for smaller geographies (generally those with populations of less than 65,000).²⁰

¹⁹Blocks are formed by streets, roads, railroads, streams and other bodies of water, other visible physical and cultural features, and the legal boundaries shown on Census Bureau maps. Block groups are the next level above blocks in the Census Bureau's geographic hierarchy and consist of multiple blocks. Block groups are the smallest geography for which the Census Bureau tabulates American Community Survey data.

²⁰We used the 2010 decennial Census for purposes of establishing the land area for each block group in our analysis.

To describe (1) changes in the number of units (owner-occupied, renter-occupied, and vacant) and (2) the characteristics of homeowners in the selected CBSAs in 2010 through 2018, we used data from the American Community Survey 1-year estimates at the CBSA level for 2010–2018. The 1-year estimates reflect the most recent data and are more suitable for analyzing year-over-year changes in a population compared to the 5-year estimates, which are based on data from prior years. However, because the 1-year estimates rely on smaller sample sizes than the 5-year estimates, they are only available for geographies with populations of at least 65,000 (for example, 1-year estimates are available for CBSAs and certain counties, but generally not for tracts or block groups).

Two of our selected CBSAs—specifically Houston-The Woodlands-Sugar Land, TX (Houston) and Washington-Arlington-Alexandria, DC-VA-MD-WV (Washington, D.C.)—lost or gained counties from 2010 through 2018, thus changing the boundaries and populations of the CBSAs over the analysis period.²¹ One way to account for these changes in the American Community Survey data would be to aggregate county-level data to the CBSA level; however, at least 24 of the counties that made up the nine CBSAs in our sample did not have populations of at least 65,000 (and therefore did not have 1-year estimates). As a result, and to better understand changes to the size of the populations that were added to or subtracted from the associated CBSAs, we collected and analyzed data on these geographies from the 5-year estimates. Our analysis found that population changes were not substantial enough to influence reported characteristics.

To assess the reliability of the American Community Survey 5-year and 1-year estimates, we reviewed technical documentation from the Census Bureau’s website and calculated the margin of error and statistical significance for each estimate we produced.²² We determined the American Community Survey data were sufficiently reliable for the purposes of analyzing outward expansion and densification, changes in the number of units, and the characteristics of selected homeowners.

FHFA House Price Index: To describe housing price changes nationally from 1991 and in the selected CBSAs from 2010 through 2018, we used FHFA’s House Price Index.²³ The FHFA House Price Index is a weighted, repeat-sales index that measures average price changes in repeat sales on the same property. The information underlying the index is from repeat mortgage transactions on single-family properties with mortgages that have been purchased or securitized by Fannie Mae or Freddie Mac since January 1975. To assess the reliability of FHFA’s House Price Index, we reviewed technical documentation available on FHFA’s website and interviewed FHFA officials. We determined the index was sufficiently reliable for purposes of analyzing house price changes.

Home Mortgage Disclosure Act data: We used Home Mortgage Disclosure Act (HMDA) data to describe the characteristics of recent borrowers from the selected CBSAs from 2010 through 2018, the most current data available at the time of our review.²⁴ For each year, we compiled

²¹Specifically, Houston lost one county in 2013 and Washington, D.C. added two counties in 2013 and one county in 2018.

²²Because the American Community Survey is a survey of a sample of addresses, each estimate is subject to sampling error.

²³To be consistent with other analyses, we analyzed the index through the end of 2018.

²⁴HMDA requires financial institutions, including mortgage lenders, to maintain, report, and publicly disclose loan-level information about mortgages. HMDA was enacted by Congress in 1975 and is implemented by Regulation C. The

record-level data by each county within our nine selected CBSAs and then aggregated these county records to the CBSA-level based on the counties that composed each CBSA, as defined in the most recent CBSA delineations for that year. Because HMDA data were available at the record level, we were able to adjust for the county-level changes that occurred in Washington, D.C. and Houston over the period of our analysis, as previously discussed in this enclosure. To assess the reliability of HMDA data, we reviewed technical documentation available on the Consumer Financial Protection Bureau's and the Federal Financial Institutions Examination Council's websites and assessed the data for missing values and other anomalies. Based on this review, we identified outliers in the applicant income and loan amount fields in the 2017 and 2018 data. Before conducting our analysis, we removed outlier values—that is, all loan and income values below the 0.001 and above the 99.999 percentiles calculated within each CBSA and year. However, due to the high number of outliers in 2017 and 2018, we applied our 2016 thresholds for each CBSA to loan and income amounts for 2017 and 2018.²⁵ We discussed our method for addressing outliers with Consumer Financial Protection Bureau officials and they agreed with our approach. We determined the HMDA data were sufficiently reliable for purposes of analyzing the characteristics of recent borrowers.

Our Analysis

We performed each of the analyses discussed below for each of the selected CBSAs and at the national level as described.

Housing Units (Stock) and Homeowners

To describe trends in the housing units (stock), the homeownership rate, and the share and characteristics of households that own their homes, we reported data from the American Community Survey 1-year estimates.²⁶ We calculated totals and proportions annually for 2010–2018 and year-over-year changes in totals and proportions for each variable.

We reported stock trends and the homeownership rate nationally and for each CBSA.²⁷ We limited our analysis of homeowner demographics to the nine selected CBSAs and focused on household age, race and ethnicity, and income. For ease of analysis, we combined some Census Bureau categories as follows:

Consumer Financial Protection Bureau is responsible for implementing and— with Board of Governors of the Federal Reserve, Federal Deposit Insurance Corporation, Comptroller of the Currency, and National Credit Union Administration—overseeing compliance with Regulation C. For purposes of our analysis, we retrieved publicly available ultimate Loan Application Register files for 2010–2014 from the National Archives, Loan Application Register files for 2015 and 2016 from the Consumer Financial Protection Bureau, and dynamic (subject to revision) Loan Application Register files for 2017 and 2018 from the Federal Financial Institutions Examination Council (accessed March 25, 2020). Our analysis was limited to owner-occupied, 1–4 family, first-lien, site-built, home purchase loans.

²⁵This resulted in 239 loan amounts and 2,583 income amounts being omitted, mostly from the 2018 data.

²⁶Specifically, we used estimates from the Housing Characteristics table, which provide information on units, tenure (number of units that are owner- and renter-occupied), and household demographics (for example, tenure by age, race and ethnicity, and income). Throughout this report, unless otherwise noted, “stock” includes owner-occupied units, renter-occupied units, and all vacant units.

²⁷We used data from the Census Bureau's Current Population Survey/Housing Vacancy Survey to report the national homeownership rate from 1990 through 2018.

- We combined the 18–24 and 25–34 age categories to create and report on an 18–34 age category; we otherwise reported on the age categories defined by the Census Bureau.
- We created and reported on five race and ethnicity categories: White Alone, not Hispanic (referred to in our analysis as “White”); Black; Asian; Other (includes American Indian, Alaska Native, Native Hawaiian, Other Pacific Islander, two or more races, and some other race); and Hispanic.²⁸
- We combined the \$0–4,999, \$5,000–\$9,999, \$10,000–\$14,999, \$15,000–\$19,999, and \$20,000–\$24,999 income categories to create and report on a \$0–\$24,999 income category. We also combined the \$25,000–\$34,999 and \$35,000–\$49,999 income categories to create and report on a \$25,000–\$49,999 income category. We otherwise reported on the income categories defined by the Census Bureau.

Outward Expansion and Densification

To describe how our selected nine cities expanded and densified from 2010 through 2018, we used the 2010 release of the 2006–2010 American Community Survey 5-year estimates and 2018 release of the 2014–2018 5-year estimates at the block-group level. As previously discussed in this enclosure, block groups are one of the smallest geographical units for which the Census Bureau tabulates data. The use of block group-level data permits the description of how cities (in the case of our analysis, CBSAs) changed over time and relative to one another.

In our analysis, we divided block groups within each city into two groups: (1) block groups with 0-199 housing units per square mile (referred to throughout this report as “undeveloped” areas) and (2) block groups with 200 or more units per square mile (referred to throughout this report as “developed” areas).²⁹ In this report, “outward expansion” refers to units added in areas that had fewer than 200 units per square mile in 2010 and that by 2018 met or exceeded this threshold.³⁰ “Densification” refers to additional units added in areas that already were considered developed in 2010. Expanding upon Romem’s work, we further categorized “developed” block groups as follows: those with 200-999 housing units per square mile, those with 1,000-5,000 housing units per square mile, and those with more than 5,000 housing units per square mile.³¹ This further categorization allowed us to assess and illustrate how the cities

²⁸Census defines race as a person’s self-identification with one or more social groups. An individual can report as White, Black or African American, Asian, American Indian and Alaska Native, Native Hawaiian and Other Pacific Islander, or some other race. Survey respondents may report multiple races. Ethnicity identifies whether a person is of Hispanic origin or not and includes two categories, Hispanic or Latino or Not Hispanic or Latino. Hispanics may report as any race. The 1-year estimates include a category for White, which includes Whites who identify as Hispanic and those who do not, and White Alone, which includes only those Whites who identify as Not Hispanic. To avoid over-counting, we reported on the White Alone category. However, the Hispanic category includes and double counts individuals who identified as Black, Asian, and Other.

²⁹Issi Romem established this threshold in his article *Has the Expansion of American Cities Slowed Down?*, accessed May 5, 2020, <https://www.buildzoom.com/blog/cities-expansion-slowing>.

³⁰We excluded units in areas with fewer than 200 units per square mile in both years, which could lead to some overestimating of units in outward expansion areas. For example, if an area had 199 units in 2010 and added 1 unit by 2018, all 200 units would be counted as outward expansion. Areas with fewer than 200 units per square mile in 2010 may have been nonresidential or light residential urban areas.

³¹For ease of reporting, throughout this report, we refer to areas with 200-999 housing units per square mile as areas with fewer than 1,000 housing units per square mile. Additionally, if a block group had fewer than 200 units per

changed over the period of our analysis (that is, how and the extent to which they expanded and densified).³²

Prices

We used FHFA's House Price Index to describe house price changes nationally from 1991 and in the selected CBSAs for 2010–2018. Four of our nine CBSAs contained multiple metropolitan divisions (a smaller group of counties or equivalent entities defined within a metropolitan statistical area containing a single core with a population of at least 2.5 million). For these CBSAs, we analyzed and reported the House Price Index of each metropolitan division within the CBSA because house prices can vary widely by metropolitan division. Furthermore, FHFA reports its House Price Index at the metropolitan-division level, where applicable.

Recent Borrowers and Their Loans

To describe characteristics of recent borrowers and their loans in the nine selected CBSAs, we calculated summary statistics, including median values and distributions from HMDA data.³³ We focused our analysis on originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans. We also analyzed loan characteristics by borrower type and income.

Applicant race and ethnicity categories in HMDA data differs slightly from categories in American Community Survey data. Loan applications can include up to five fields to indicate an applicant's race (American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or other Pacific Islander, or White). For our analysis, we considered only the first race field in categorizing an applicant's race. We categorized applicants of any race that also identified as Hispanic or Latino as a separate category (Hispanic). Applicant race and ethnicity information was available for the large majority of, but not all, records in the HMDA data. Additionally, until 2018, HMDA data on loan originations and borrowers did not include information on borrower age. As a result, our analysis on age is limited to owners measured in the American Community Survey.

Unless otherwise noted, to account for inflation, we converted all prices, incomes, and other financial characteristics to 2018 dollars using the Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.

We conducted this performance audit from October 2018 to June 2020 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

square mile in 2010, we did not include any of these housing units, but if by 2018 the block group grew to more than 200 units per square mile, we reported all units in that block group as added units.

³²As previously discussed, another key difference between our work and Romem's work is that we assessed changes in housing units at the block-group level from 2010 through 2018, while Romem's work concludes in 2010 with the last decennial Census.

³³We did not collect or report on HMDA data at the national level.

Enclosure 2: Analysis of Homeownership Trends for Nine Cities

Our analysis focused on trends in household growth; unit growth; the outward expansion and densification of cities; house prices and loan origination amounts; homeownership rates and loan originations; and homeowner, recent borrower, and loan characteristics. Enclosure 1 provides detailed information on the data we used in our analysis, as well as our complete scope and methodology.

Although our analysis focused on these particular aspects of homeownership, homeownership considerations take place in the context of broader housing market conditions. In general terms, housing markets serve a variety of purposes. Individual households make decisions about the size and type of housing unit to live in, where to live, and whether to own or to rent. These decisions are influenced by many factors, such as educational opportunities, local community amenities, and the ease of commuting to work. Developers and builders make decisions about the quantity, type, and location of new housing supplied to the market, in response to current and expected future land prices, house prices, and rents. Local governments also play a role in regulating construction standards and approving new construction in light of the capacity of existing infrastructure and community preferences.

One important function of a housing market is to accommodate the current and expected future level of economic activity in an area. Many older cities had periods of significant growth in the past and, because housing is long-lived, the amount and type of housing in those areas reflect past decisions about the structure type and density of construction common to those eras. In the case of cities with current economic growth, the extent and characteristics of the existing housing stock and opportunities for outward expansion, among other factors, will influence the nature of the response of developers and builders to develop new housing.

As a result, our analysis in this enclosure provides information on nine cities, representing a variety of different housing markets. Specifically, we analyzed homeownership-related data for 2010–2018 for Chicago, Illinois; Cleveland, Ohio; Columbia, South Carolina; Denver, Colorado; Houston, Texas; Pittsburgh, Pennsylvania; San Francisco, California; Seattle, Washington; and Washington, D.C.³⁴ We selected our nine cities based on an existing classification of cities, geographic diversity, and congressional interest.³⁵

Household Growth

Total households grew in each of the nine selected cities from 2010 through 2018, as shown in table 1.³⁶ In particular:

- Houston, Seattle, and Washington, D.C. had the largest increases in the number of total households over the period of our analysis: Houston grew by approximately 337,000

³⁴Specifically, and as described in more detail in enclosure 1, we included the following core-based statistical areas (“cities”) in our analysis: Chicago-Naperville-Elgin, IL-IN-WI Metro Area; Cleveland-Elyria, OH Metro Area; Columbia, SC Metro Area; Denver-Aurora-Lakewood, CO Metro Area; Houston-The Woodlands-Sugar Land, TX Metro Area; Pittsburgh, PA Metro Area; San Francisco-Oakland-Berkeley, CA Metro Area; Seattle-Tacoma-Bellevue, WA Metro Area; and Washington-Arlington-Alexandria, DC-VA-MD-WV Metro Area.

³⁵See Issi Romem, *Has the Expansion of American Cities Slowed Down?*, accessed May 5, 2020, <https://www.buildzoom.com/blog/cities-expansion-slowing>.

³⁶The Census Bureau measures the number of households—one or more individuals occupying a single housing unit—that rent or own housing in the United States.

households; Seattle grew by approximately 172,000 households; and Washington, D.C. grew by approximately 129,000 households.

- Denver, Chicago, and San Francisco had comparatively moderate growth in total households, adding from about 97,000 households (San Francisco) to about 130,000 households (Denver).
- Cleveland, Columbia, and Pittsburgh added the fewest households among the nine selected cities.

Table 1: Estimated Growth in Total Households in Nine Cities, 2010–2018

Selected city	Total households in 2010	Total households in 2018	Change in total households 2010–2018	Percent change in total households 2010–2018
Chicago	3,415,317	3,538,101	122,784	4
Cleveland	840,929	866,039	25,110	3
Columbia	293,357	315,092	21,735	7
Denver	1,001,253	1,131,410	130,157	13
Houston	2,022,402	2,359,266	336,864	17
Pittsburgh	978,959	1,013,812	34,853	4
San Francisco	1,601,506	1,698,978	97,472	6
Seattle	1,353,765	1,526,210	172,445	13
Washington, D.C.	2,042,154	2,234,559	192,405	9

Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The Census Bureau measures the number of households—one or more individuals occupying a single housing unit—that rent or own housing in the United States. Growth in total households reflects the percent change in total households from 2010 through 2018. Estimates in this figure have a relative margin of error of ± 2 percent or less of the estimate at the 95 percent confidence level.

Also as shown in table 1, the nine cities grew at different rates.

- Houston, Denver, and Seattle had the greatest percentage increases in households, growing by about 17 percent (Houston) and 13 percent (Denver and Seattle) from 2010 through 2018.
- Columbia, San Francisco, and Washington, D.C. had more moderate percentage increases in households, growing by about 6–9 percent.
- Chicago, Cleveland, and Pittsburgh had the smallest percentage increases in households, growing about 3–4 percent.

Unit Growth

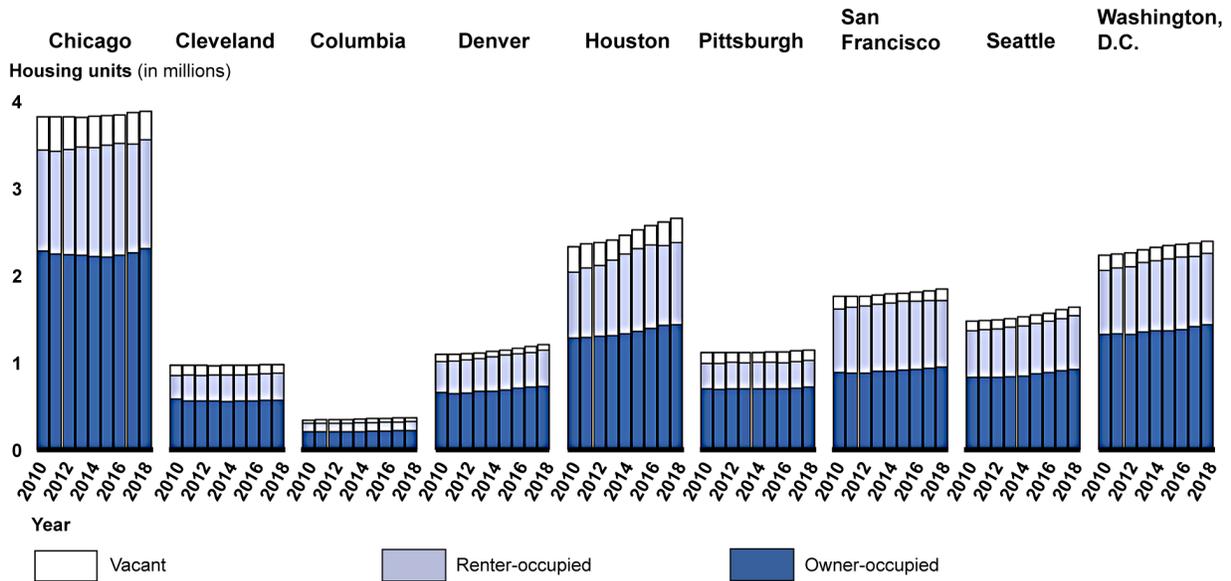
As shown in figure 7, each of the nine cities added housing stock (owner-occupied, renter-occupied, and all vacant units) from 2010 through 2018. Notably,

- Houston, Seattle, and Denver had the largest total and percentage increases in owner-occupied units over the period of our analysis: Houston added an estimated 152,000 units (about a 12 percent increase), Seattle added an estimated 91,000 units (about an

11 percent increase), and Denver added an estimated 65,000 units (about a 10 percent increase).³⁷

- Houston, Denver, and Seattle also had the largest total and percentage increases in renter-occupied stock over the period of our analysis: Houston added an estimated 185,000 units (about a 25 percent increase), Denver added an estimated 65,000 units (about an 18 percent increase), and Seattle added an estimated 81,000 units (about a 15 percent increase).³⁸
- Cleveland, Chicago, and Washington, D.C. had statistically significant decreases in the number of vacant units over the period of our analysis: Cleveland lost an estimated 17,000 vacant units (about a 15 percent decrease), Chicago lost an estimated 61,000 units (about a 16 percent decrease), and Washington, D.C. lost about 35,000 units (about a 20 percent decrease).³⁹

Figure 7: Estimated Housing Stock by Occupancy Type in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The vacant category includes units for rent; rented, not occupied; for sale only; sold, not occupied; units for seasonal, recreational, or occasional use; units for migrant workers; and “other” vacant units. Estimates in this figure have a relative margin of error of ± 13 percent or less of the estimate at the 95 percent confidence level.

³⁷Total and percentage changes in owner-occupied units in these cities were statistically significant at the 99 percent confidence level.

³⁸Total and percentage changes in renter-occupied units in these cities were statistically significant at the 99 percent confidence level.

³⁹Total and percentage changes in vacant units in these cities were statistically significant at the 90 percent or greater confidence level, except percentage change in Cleveland, which was not statistically significant. Others had a greater percentage decreases in vacant units over the period, but these changes were not statistically significant.

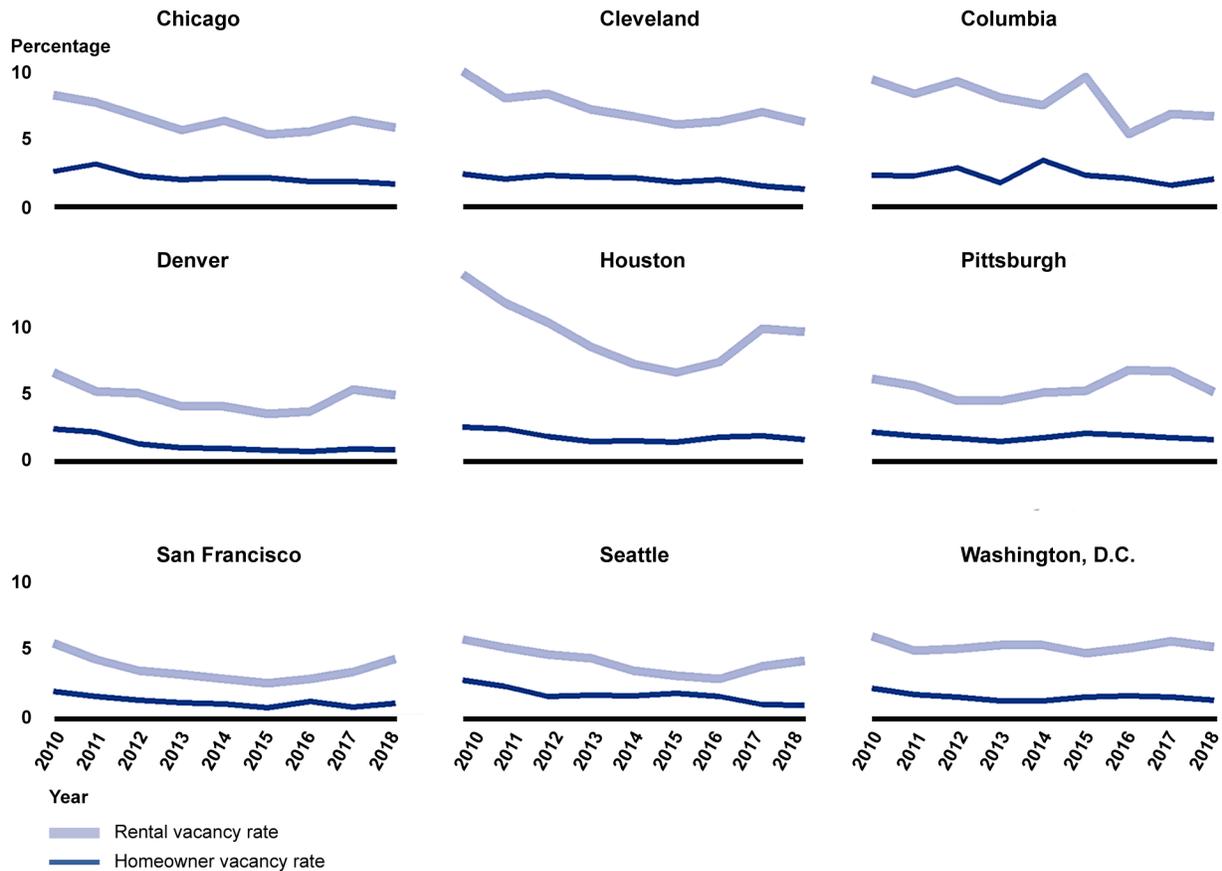
Housing vacancy rates can provide a measure of how and the extent to which a location is meeting demand for housing.⁴⁰ According to a recent study, homeowner vacancy rates (the proportion of the homeowner inventory that is vacant for sale) around 1 or 2 percent and rental vacancy rates (that is, the proportion of the rental inventory that is vacant for rent) around 7 or 8 percent represent stable markets, where housing is obtainable and affordable.⁴¹ As shown in figure 8, the homeowner vacancy rate in each of the nine cities was about 2–3 percent in 2010.⁴² However, by 2018, the rate had fallen below 2 percent in all nine cities, indicating growing constraints on the housing supply. Most significantly, by 2018, the three cities with the largest house price increases—Denver, San Francisco, and Seattle (see fig. 15 later in this enclosure)—all had homeowner vacancy rates below 1 percent and the three lowest rental vacancy rates (less than 5 percent), indicating more severe constraints on supply.

⁴⁰We did not measure housing starts (units under construction) in the nine selected localities; however, vacant for-sale and for-rent units in our analysis include completed new housing for sale or for rent.

⁴¹See Alan Mallach, *The Empty House Next Door: Understanding and Reducing Vacancy and Hypervacancy in the United States* (Lincoln Institute of Land Policy, Cambridge, Mass., 2018).

⁴²The homeowner vacancy rate in San Francisco in 2010 was 1.7 percent; all other cities had a homeowner vacancy rate of about 2–3 percent.

Figure 8: Estimated Vacancy Rate by Inventory Type in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The homeowner and rental vacancy rates are the proportion of respective inventories that are available to own or rent. Estimates in this figure have a margin of error of ± 2 percentage points or less at the 95 percent confidence level. Higher margins of error occurred in rental vacancy rates in cities with smaller sample sizes.

Finally, figure 9 shows the cumulative change in units by occupancy type from 2010 through 2018.⁴³ Overall,

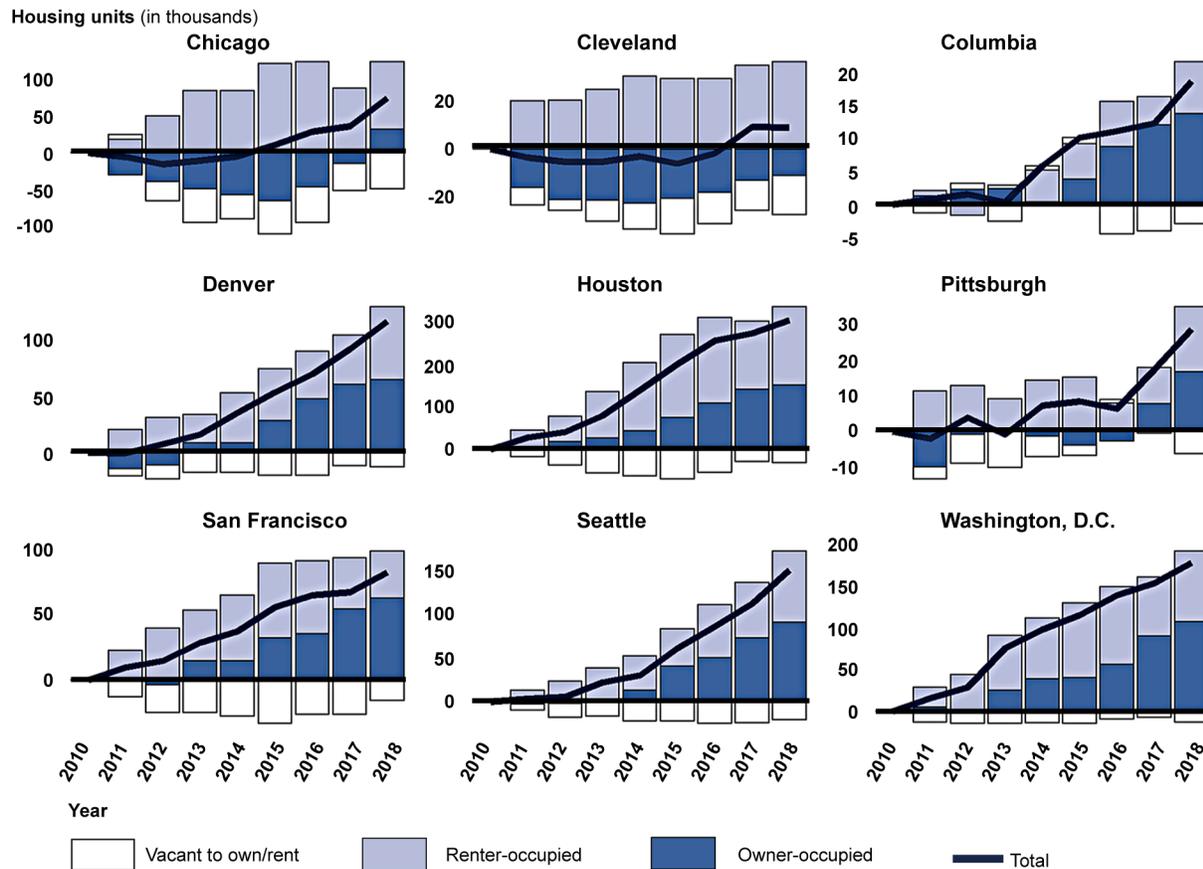
- Chicago and Cleveland had little growth in total units and generally replaced owner-occupied with renter-occupied units. Meanwhile, Denver, Seattle, and Washington, D.C., primarily added renter-occupied units through 2016 but by 2018 had added more owner-occupied units. Following the 2007 through 2009 financial crisis, many cities experienced increased demand for rental units among higher-income households.⁴⁴

⁴³For purposes of this discussion, changes in stock include only owner-occupied housing units, renter-occupied housing units, vacant for-sale housing units, and vacant for-rent housing units.

⁴⁴See GAO, *Rental Housing: As More Households Rent, the Poorest Face Affordability and Housing Quality Challenges*, GAO-20-427 (Washington, D.C.: May 27, 2020) and Joint Center for Housing Studies of Harvard University, *Across the Country, Most of the Growth in Renters Is High-Income Households*, <https://www.jchs.harvard.edu/across-country-most-growth-renters-high-income-households>, accessed June 8, 2020.

- Houston added new owner-occupied and renter-occupied units and San Francisco converted vacant units to owner- and renter-occupied units, reflecting in both cases broad demand for housing. That Houston added new units and San Francisco converted vacant units further reflected how each city grew over the period (through outward expansion or densification, as discussed later in this enclosure).
- Pittsburgh had a large drop in vacancies from 2011 through 2012 and later in 2017, and relatively substantial increases in owner- and renter-occupied units in 2017 and 2018, likely reflecting new or vacant stock being bought or rented.⁴⁵

Figure 9: Estimated Cumulative Changes in Housing Stock by Occupancy Type in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

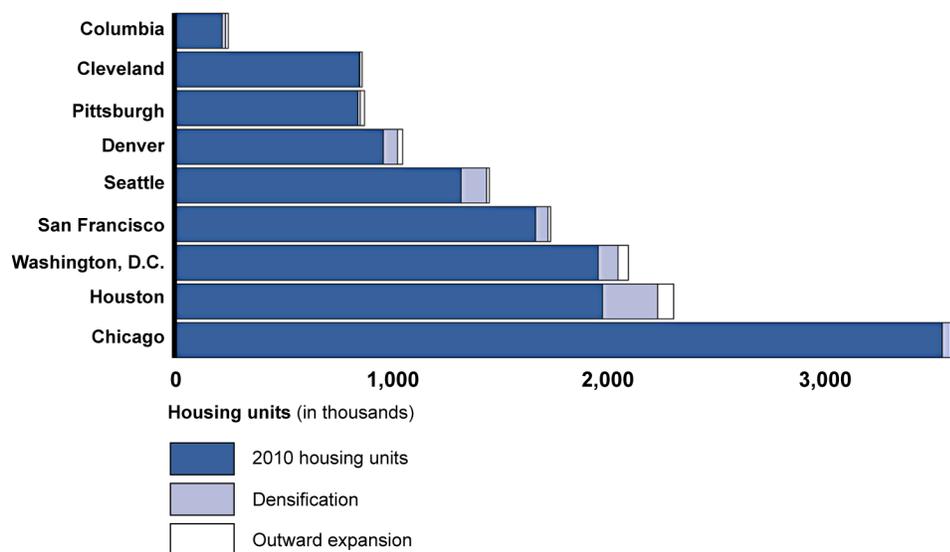
Note: Total units includes vacant for sale only, vacant for rent, owner occupied, and renter occupied. Vacant to own/rent includes units for sale only and for rent and have a relative margin of error of ± 5 percent to ± 25 percent of the estimate at the 95 percent confidence level. Higher relative margins of error occurred in cities with fewer vacant units during certain years. All other estimates in this figure have a relative margin of error of ± 6 percent of the estimate or less at the 95 confidence level.

⁴⁵For more information on housing stock trends in Pittsburgh, see Mullin and Lonergan Associates, Brean Associates, and Fourth Economy, Housing Needs Assessment, report prepared for the City of Pittsburgh Affordable Housing Task Force (May 2016).

Outward Expansion and Densification of Cities

We further examined how cities changed—became denser and expanded outward—which often reflected the types of changes seen in their housing stock. Figure 10 shows how each of the nine selected cities densified and expanded outward from 2010 through 2018.⁴⁶ Through our analysis, we determined whether each block group within a city during 2010–2018 (1) was already developed in 2010 and had an increase in the number of housing units (light blue in the figure), and (2) was previously undeveloped in 2010 but became developed by 2018 (white in the figure). As discussed above, cities like Chicago, Cleveland, and Pittsburgh experienced relatively little growth overall, while cities like Houston, Denver, and Seattle saw more notable growth in housing units, although they grew in different ways.

Figure 10: Estimated Outward Expansion and Densification in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: Outward expansion refers to units added in Census Bureau block groups that had less than 200 housing units per square mile in 2010 but more than 200 units per square mile by 2018. Densification refers to units added in block groups that had more than 200 units per square mile in both 2010 and 2018. Estimates in this figure have a relative margin of error of ± 4 percent of the estimate or less at the 90 percent confidence level.

⁴⁶For purposes of our analysis, we divided block groups within each city into two groups: (1) block groups with 0–199 housing units per square mile (referred to throughout this report as “undeveloped” areas) and (2) block groups with 200 or more units per square mile (referred to throughout this report as “developed” areas). A block group is a geographic measure defined by the Census Bureau (for more information, see enclosure 1). “Outward expansion” refers to units added in block groups that had fewer than 200 units per square mile in 2010 and that by 2018 met or exceeded this threshold. Areas with fewer than 200 units per square mile in 2010 may have been nonresidential or light residential urban areas. “Densification” refers to units added in block groups that had 200 or more units per square mile in 2010.

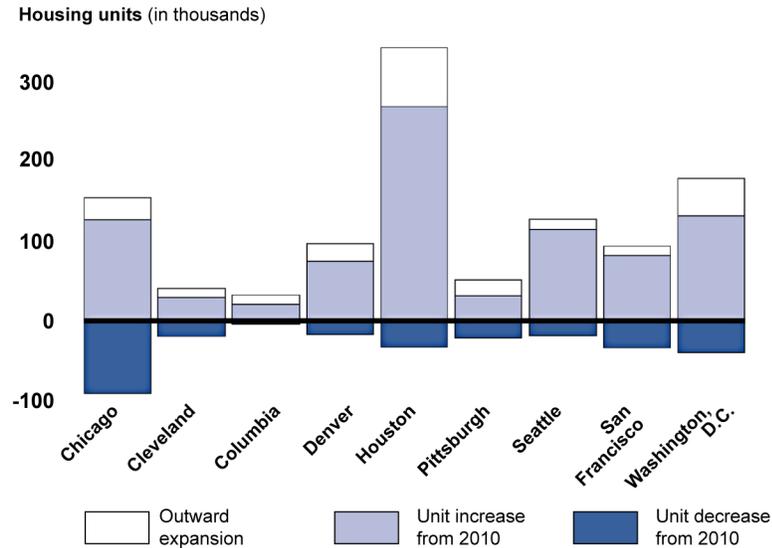
More specifically:

- Houston and Columbia grew the most, both through outward expansion and densification. From 2010 to 2018, Houston grew 13 percent through densification and 4 percent through outward expansion (17 percent overall), while Columbia grew 7 percent through densification and 6 percent through outward expansion (13 percent overall).
- Conversely, Chicago, Cleveland and Pittsburgh saw either no statistically significant change or 1 percent growth through densification and 1-2 percent growth through outward expansion.
- Seattle, Denver, and Washington, D.C. saw relatively moderate growth (7–10 percent overall). All three cities grew mostly through densification (5–9 percent) and less through outward expansion (1–2 percent). However, in terms of number of units, Washington, D.C. was second only to Houston in the number of units added through outward expansion.
- San Francisco saw some growth through densification (4 percent), but along with Chicago was the only city to see less than 1 percent growth through outward expansion.

Figure 11 further describes how the nine selected cities densified or expanded outward from 2010 through 2018. Above, we discussed outward expansion and net growth in developed areas since 2010 (densification), but several areas that were developed in 2010 saw a statistically significant decrease in the number of housing units (dark blue in figure 11).⁴⁷

⁴⁷A decline in units could be from demolitions or mergers (for example, multi-unit buildings to single-unit buildings). Densification in figure 10 depicts net densification, meaning it accounts for increases and decreases in housing units depicted in figure 11.

Figure 11: Estimated Change through Outward Expansion and Densification by Block Group in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: Outward expansion refers to units added in Census Bureau block groups that had less than 200 housing units per square mile in 2010 but more than 200 units per square mile by 2018. Unit increase from 2010 refers to units added in block groups that had more than 200 units per square mile in 2010 and had a statistically significant increase in units by 2018. Unit decrease from 2010 refers to the decline in the number of units in block groups that had more than 200 units per square mile in 2010 but had a statistically significant decrease in units by 2018. Across all cities, approximately 77 percent of housing units in developed block groups in 2010 were in block groups that did not see a statistically significant change in units at the individual block group level. Estimates in this figure have a relative margin of error of ± 4 percent or less and changes were statistically significant at the 90 percent confidence level.

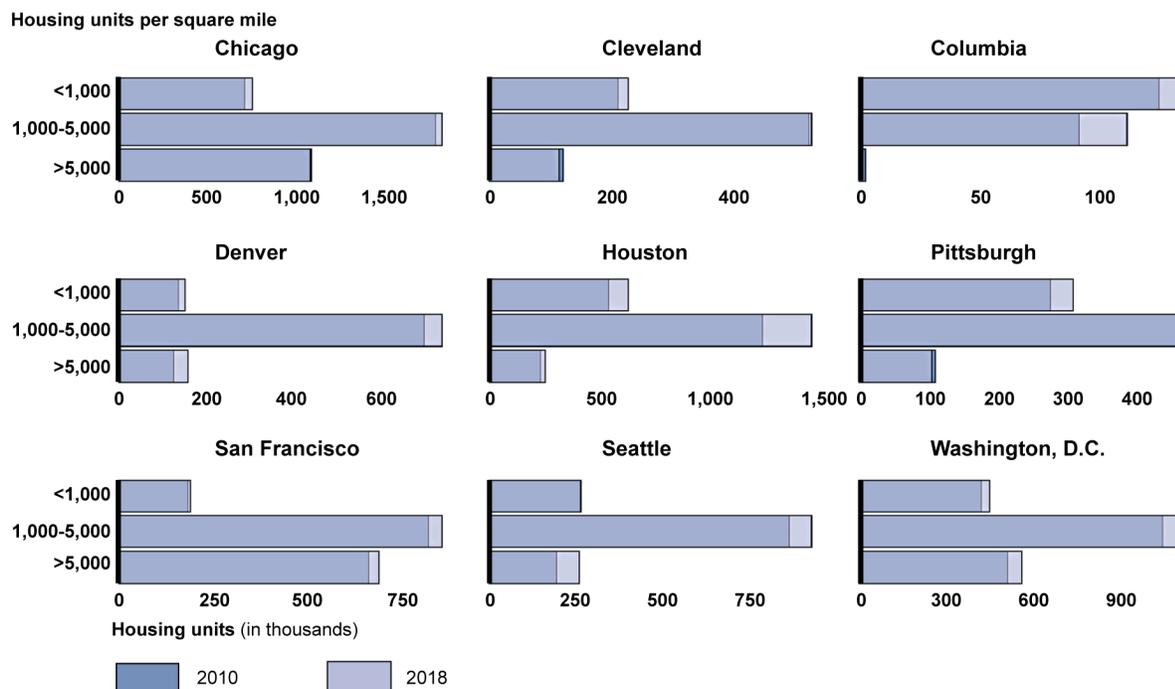
As shown in figure 11:

- In cities that saw little growth overall—specifically, Chicago, Cleveland, and Pittsburgh—the ratio of units lost to units added was about 75 percent, meaning that for every 100 units added in already developed areas, roughly 75 units were lost in other developed areas of the city. With the exception of Chicago, most of the limited net growth in these cities occurred in previously undeveloped areas (that is, through outward expansion).⁴⁸
- On the other end of the spectrum, the ratio of units lost to units added in Denver, Houston, and Seattle was 25 percent or less, as relatively few developed areas in these cities lost units, while other areas further densified.
- San Francisco, the densest city among the nine selected, lost approximately 44 units for every 100 it added in developed areas. Furthermore, about 82 percent of growth in San Francisco happened in already developed areas.

⁴⁸About 40 percent of the share of total net growth in housing units in Chicago occurred in previously undeveloped areas. This share was 65 percent in Pittsburgh and 82 percent in Cleveland.

Figure 12 shows the number of housing units by block group in each of the nine selected cities in 2010 and 2018 in three density categories: fewer than 1,000 units per square mile, 1,000-5,000 units per square mile, and more than 5,000 units per square mile.⁴⁹

Figure 12: Estimated Count of Housing Units by Block Group Density Category in Nine Cities, 2010 and 2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Note: Estimates in this figure have a relative margin of error of less than ± 2 percent of the estimate at the 90 percent confidence level, except for high-density areas in Columbia, which had a relative margin of error of ± 11 percent of the estimate due to the small number of observations.

More specifically, as shown in figure 12:

- San Francisco was the densest of the nine cities in both 2010 and 2018, with roughly 40 and 50 percent of units in high- and medium-density areas, respectively, during both years. Columbia was the least dense of the nine cities, with an estimated 1 percent or less of total units in high-density areas in 2010 and 2018. Unit growth in San Francisco occurred almost exclusively in high- and medium-density areas, while Columbia grew slightly more in medium-density areas than in low-density areas.
- Seattle and Denver, both largely medium-density in 2010, saw the largest percentage increases in units in high-density areas among the nine selected cities. From 2010 to 2018, the number of units in high-density areas grew by 34 percent in Seattle and 25 percent in Denver, resulting in the share of units in high-density areas increasing by 3 and 2 percentage points, respectively. In medium-density areas, Seattle grew 8 percent

⁴⁹We excluded areas with fewer than 200 housing units from our analysis. For ease of reporting, throughout this enclosure, we refer to areas with 200–999 housing units per square mile as areas with fewer than 1,000 housing units per square mile.

and Denver grew 6 percent, while outward expansion was minimal. This suggests that these cities may be starting to grow through densification rather than expansion.

- Other cities grew relatively equally across density categories. As discussed above, Houston grew more than any other city, and Washington, D.C. saw the second largest growth in terms of number of units. Both cities grew relatively evenly across density categories but at very different scales. In Washington, D.C., low- and medium-density areas both grew by 6 percent, while high-density areas grew by 10 percent. In Houston, low- and medium-density areas grew by 16 and 18 percent, respectively, while high-density areas grew by 10 percent.
- As discussed above, Chicago, Cleveland, and Pittsburgh grew almost exclusively in low-density areas, while housing units in medium- and high-density areas either remained relatively flat or declined. This suggests that these cities may be converting multifamily housing to single-family housing, or demolishing large multi-family structures, such as public housing.⁵⁰

House Prices and Loan Origination Amounts

How much and where a city builds housing influences house prices.⁵¹ For example, in general, the more housing available for purchase, the cheaper it will be. Additionally, housing built in a dense urban center can be more expensive than housing built on the periphery of a city.⁵² Accordingly, house prices in San Francisco—the densest of the nine selected cities and where growth in housing units was limited—were higher and grew at a faster rate than house prices in Houston or Columbia, the most expansive of the nine cities, also as shown in figure 11. House prices also saw large increases in Denver and Seattle, although these cities added more supply relative to San Francisco. While house prices in Washington, D.C. were relatively high in 2010, price increases were more moderate as the city both densified and expanded outward.

Figure 13 shows originated loan amounts (mortgages) in the nine cities from 2010 through 2018.⁵³

- In San Francisco, Denver, and Seattle, mortgages on home purchases increased significantly over the period of our analysis—the real median originated loan amount increased by about \$225,000 in San Francisco, \$111,000 in Denver, and \$95,000 in Seattle.

⁵⁰For example, see Mullin and Lonergan Associates, Brean Associates, and Fourth Economy, Housing Needs Assessment, report prepared for the City of Pittsburgh Affordable Housing Task Force (May 2016).

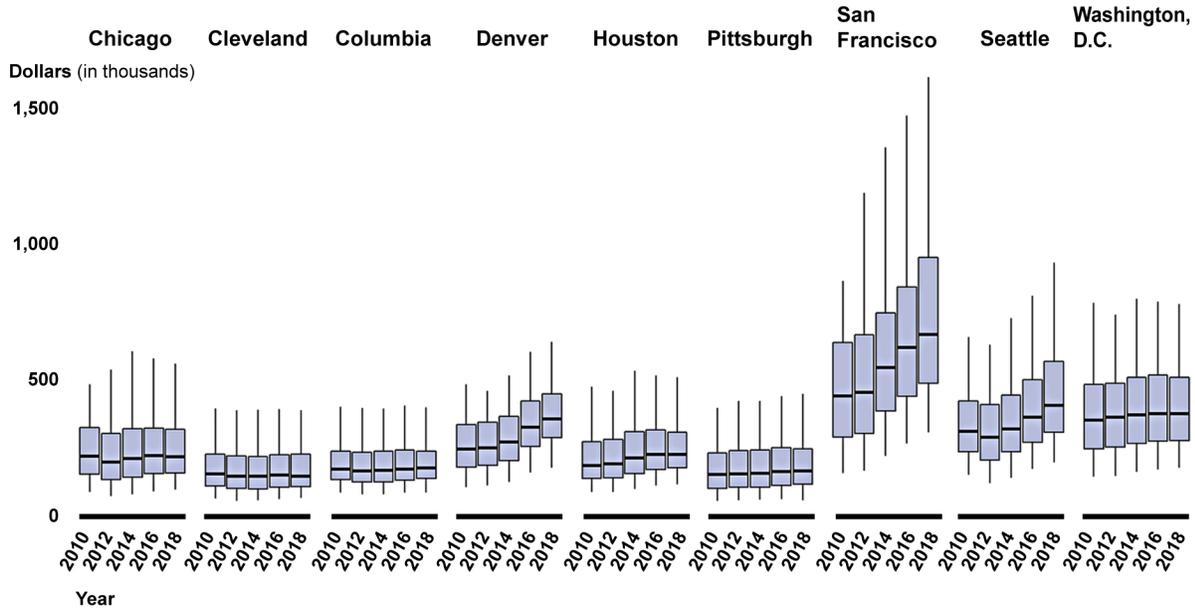
⁵¹As previously discussed, local economic conditions, community amenities, and other factors also may influence prices and price growth in a city.

⁵²For example, see Issi Romem, *Can U.S. Cities Compensate for Curbing Sprawl by Growing Denser?*, accessed May 25, 2020, <https://www.buildzoom.com/blog/can-cities-compensate-for-curbing-sprawl-by-growing-denser>.

⁵³The loan origination amount (or mortgage) is the principal amount of the loan, excluding additional costs, fees, and down payment.

- Houston and Washington, D.C. saw less dramatic increases—the real median originated loan amount increased by about \$41,000 in Houston and \$25,000 in Washington, D.C.
- Meanwhile, real median originated loan amounts in Chicago, Cleveland, and Columbia decreased or remained relatively flat.⁵⁴

Figure 13: Inflation-Adjusted Originated Loan Amounts for Nine Cities, 2010–2018



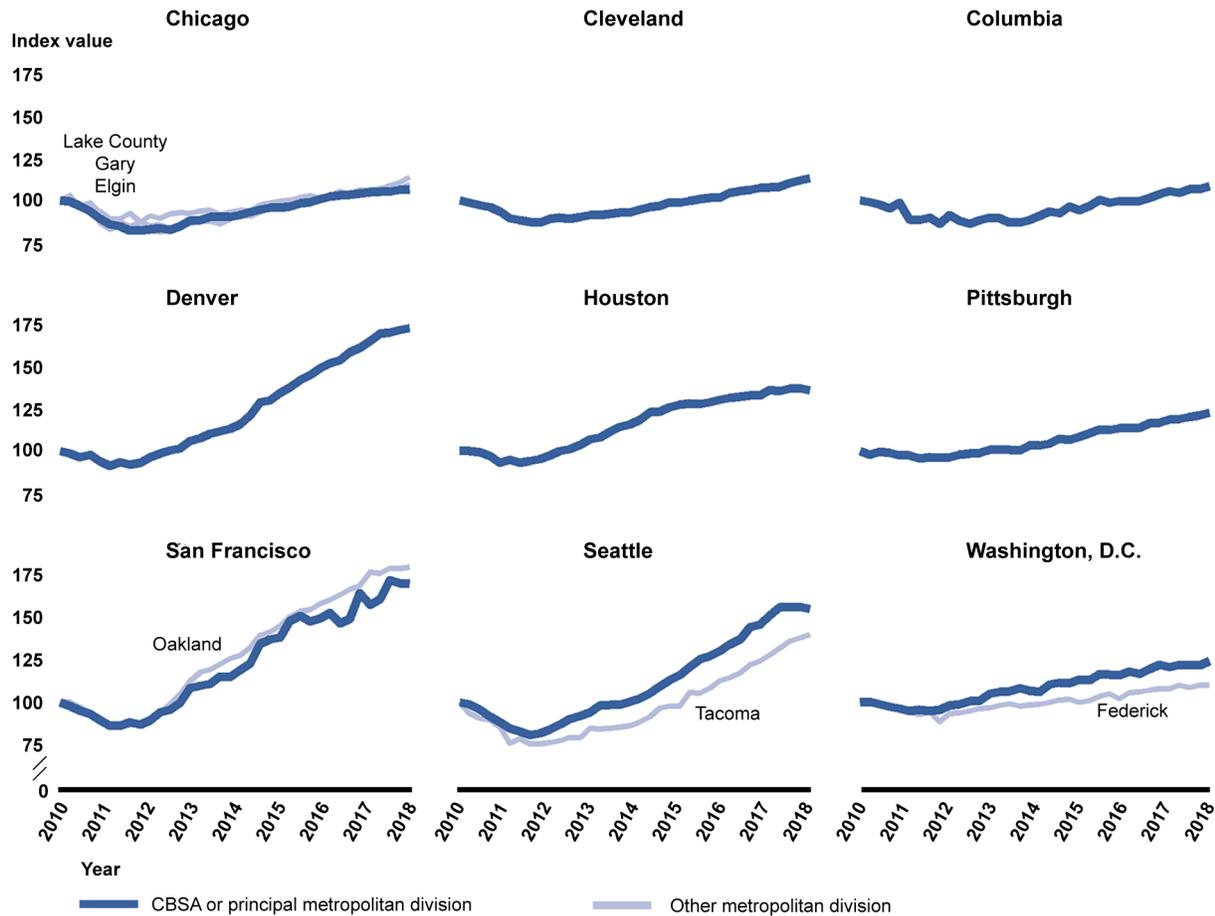
Source: GAO analysis of Home Mortgage Disclosure Act and Bureau of Labor Statistics data. | GAO-20-544R

Notes: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only. Dollar amounts were adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in U.S. City Average. Lines show 5th–25th and 75th–95th percentiles; boxes show 25th percentile, median, and 75th percentile based on real 2018 dollars within each city and year.

Figure 14 additionally illustrates real average house price trends in the nine selected cities from 2010 through 2018. In Chicago, Cleveland, and Columbia price appreciation was limited over the period. Conversely, price appreciation was moderate in Houston, Pittsburgh, and Washington, D.C., and rapid and significant in Denver, San Francisco, and Seattle.

⁵⁴From 2010 through 2018, the real median loan amount increased by roughly \$3,000 in Columbia and declined by \$4,000 and \$8,000, respectively, in Chicago and Cleveland.

Figure 14: Inflation-Adjusted Average House Price Trends in Nine Cities, 2010–2018



Source: GAO analysis of Federal Housing Finance Agency and Bureau of Labor Statistics data. | GAO-20-544R

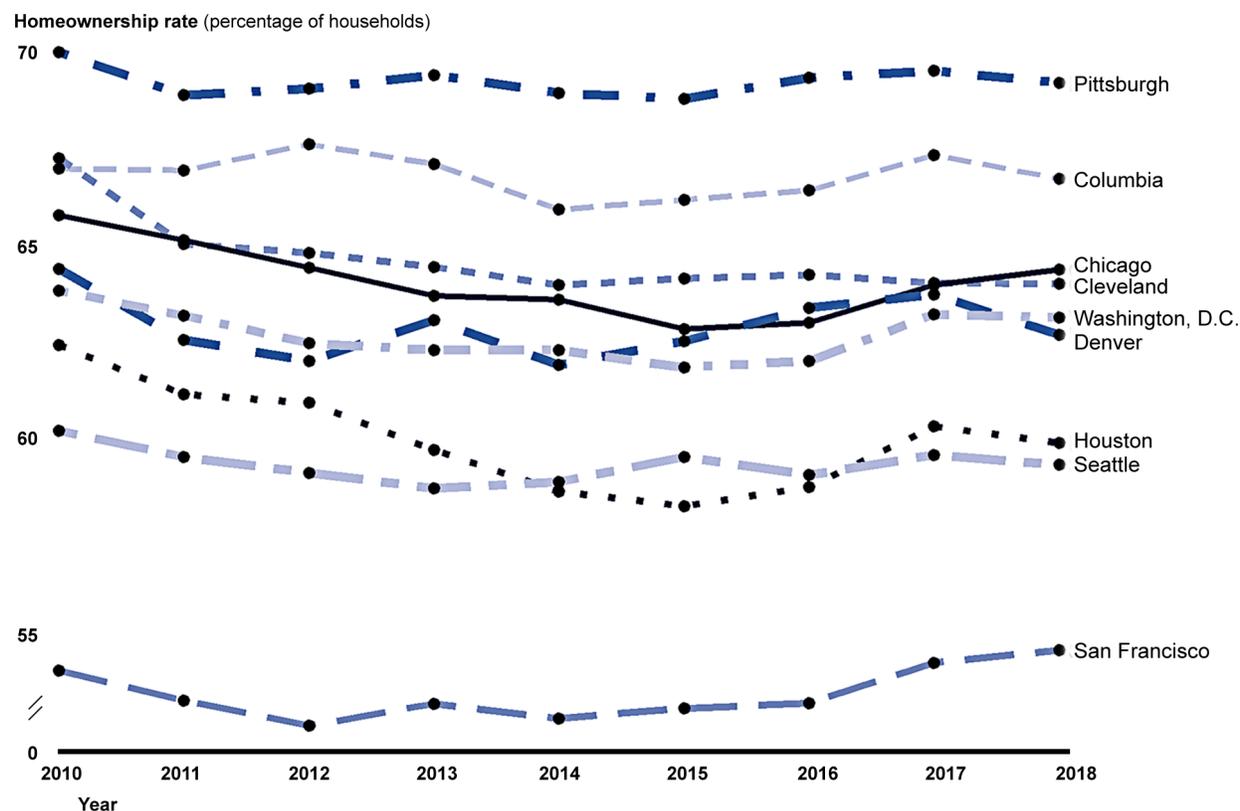
Notes: First quarter 2010 = 100. Index is seasonally adjusted and adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items Less Shelter in U.S. City Average. In core-based statistical areas (CBSA) with multiple metropolitan divisions, the largest metropolitan division (named above) is darker and wider. Other metropolitan divisions within the core-based statistical area are labeled separately. The index was not available for the San Rafael, California, metropolitan division. A metropolitan division is a smaller group of counties or equivalent entities defined within a metropolitan statistical area containing a single core with a population of at least 2.5 million.

Homeownership Rates and Originations

The trends in household growth, stock, development, and prices all ultimately affected the homeownership rate (who owned or was able to buy a home) in each of the nine cities. Figure 15 shows the homeownership rate in the nine cities from 2010 through 2018. When looking across the cities, San Francisco had the lowest homeownership rate (an estimated 55 percent in 2018), consistent with its high and rapidly appreciating house prices (see figs. 13 and 14). Conversely, the relatively high homeownership rates in Chicago, Cleveland, Columbia, and Pittsburgh (ranging from an estimated 64 percent in Cleveland to an estimated 70 percent in Pittsburgh in 2018) likely reflect a greater level of affordability. Additionally, Chicago, Cleveland,

and Houston were the only cities that had a statistically significant change (decrease) in the homeownership rate from 2010 to 2018.⁵⁵

Figure 15: Estimated Homeownership Rate in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The homeownership rate is the percentage of total households (owner and renters) who own a home. The Census Bureau defines a household as one or more individuals who occupy a single housing unit. The data underlying this figure are from the American Community Survey, which is one of multiple Census Bureau surveys that can be used to measure the homeownership rate. These surveys differ in both sample size and frequency and, as a result, may result in different estimates. Estimates in this figure have a margin of error of ± 2 percentage points or less at the 95 percent confidence level.

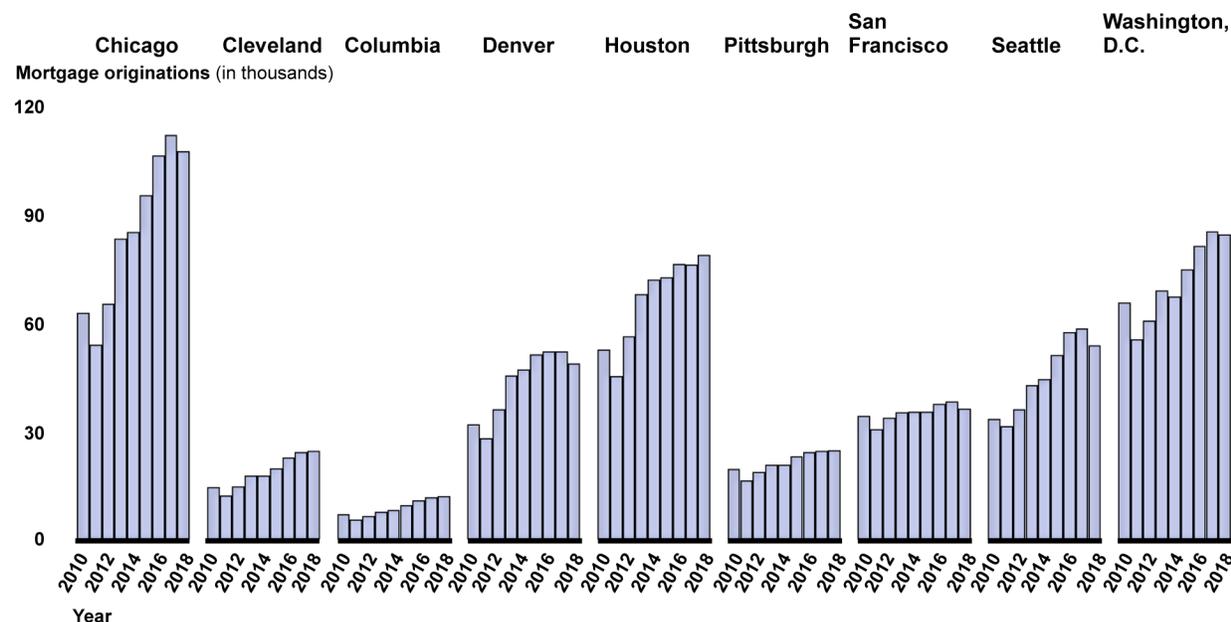
Another way to think about trends in homeownership is to examine data on loan originations (mortgages), or how many people bought a home in any given year. As previously discussed, all nine cities we looked at saw an increase in renter-occupied units (and the rentership rate) in the years following the 2007–2009 financial crisis (see figs. 7 and 9). In most cities, the increase in renter-occupied units either outpaced or was accompanied by a corresponding decrease in owner-occupied or vacant units. Accordingly, new loan originations were relatively low in all nine cities through roughly 2013, as shown in figure 16.

As the housing market began to recover after the 2007–2009 financial crisis and house prices stabilized, originations across the nine cities started to increase. However, due to the increase in rentership following the crisis, the increase in home purchases was only enough to bring the

⁵⁵Changes in the homeownership rate in these cities were statistically significant at the 90 percent or greater confidence level.

homeownership rate back to 2010 levels in most cities. New originations are also dependent on available homeownership housing stock (for example, new construction homes and vacant ownership units). For example, although cities like Chicago saw large and consistent increases in originations (a 72 percent increase during 2010–2018), overall the homeownership rate declined through 2015. Meanwhile, in San Francisco originations remained largely flat over the entire period of our analysis (increasing 6 percent in 2010–2018) possibly due to turnover of existing housing and additions to the stock.

Figure 16: Loan Originations in Nine Cities, 2010–2018



Source: GAO analysis of Home Mortgage Disclosure Act data. | GAO-20-544R

Note: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only.

Owner, Recent Borrower, and Loan Characteristics

We also examined who owned and bought a home from 2010 through 2018 in the nine selected cities. Our analysis of the characteristics of owners and recent borrowers showed that who owned and who was able to buy a home differed by location and type of owner or borrower, sometimes significantly. Notwithstanding this finding, we observed some consistent patterns across the cities—specifically, homeowners were increasingly older, more diverse, and higher-income.

Age

In general, and as shown in figure 17, the proportion of older homeowners (those aged 60–84, but particularly those aged 65–74) increased in all nine of the selected cities from 2010 through 2018. Specifically,

- The percentage of homeowners aged 65–74 increased by 4–5 percentage points in each of the nine cities.⁵⁶
- Chicago, Cleveland, and Houston saw a statistically significant increase in the percentage of homeowners aged 60–64, with increases ranging from about 1 to 2 percentage points.⁵⁷
- Chicago, Cleveland, Columbia, Houston, and Washington, D.C. also saw a significant increase in homeowners aged 75–84, with increases ranging from about 1 to 2 percentage points.⁵⁸

Additionally:

- Chicago, Cleveland, Houston, and Washington, D.C. had generally corresponding reductions in the proportion of younger homeowners (those aged 15–44).⁵⁹
- And, all cities saw a decline in the proportion of owners aged 45–54, with decreases ranging from about 3 to 6 percentage points over the period of our analysis.⁶⁰

⁵⁶These increases were statistically significant at the 99 percent confidence level.

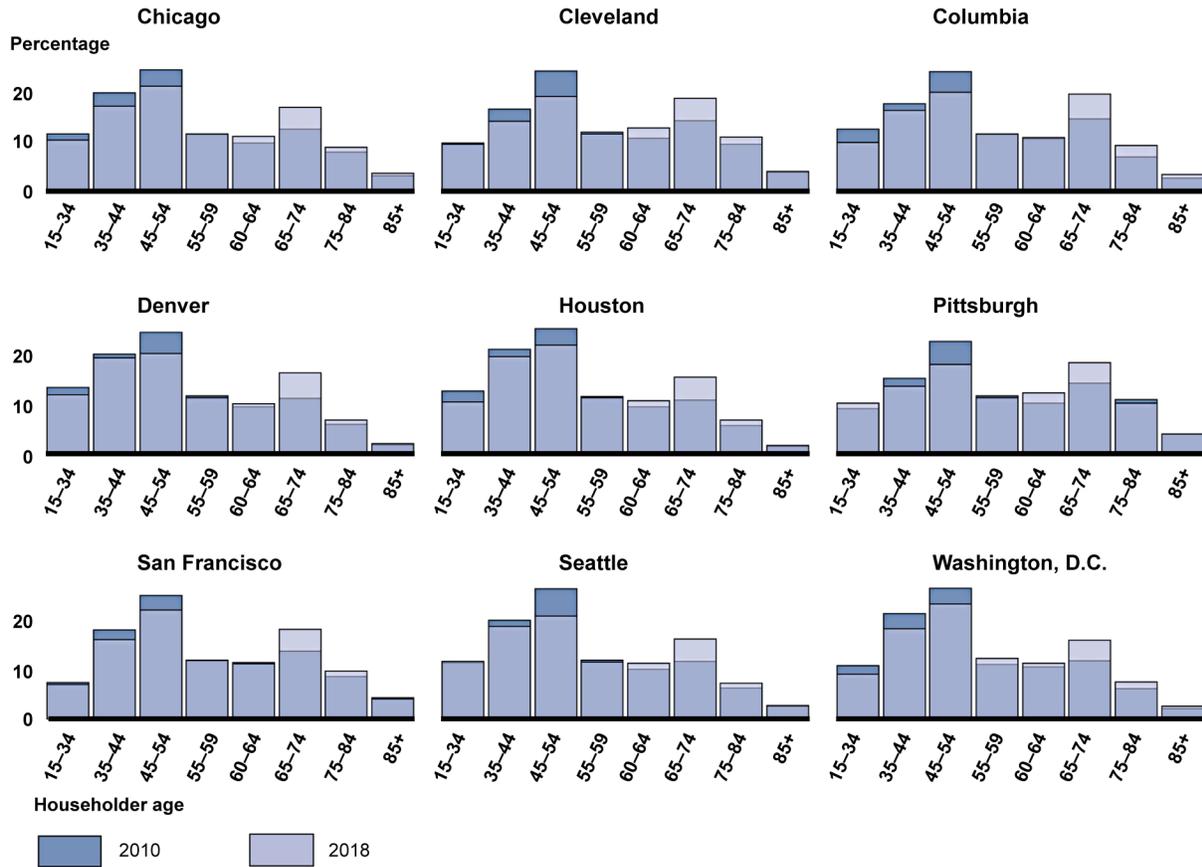
⁵⁷These increases were statistically significant at the 95 percent or higher confidence level.

⁵⁸These increases were statistically significant at the 90 percent or higher confidence level.

⁵⁹These decreases were statistically significant at the 95 percent or higher confidence level.

⁶⁰These decreases were statistically significant at the 90 percent of higher confidence level.

Figure 17: Estimated Changes in Homeowners by Age in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Note: Estimates in this figure have a margin of error of ± 2 percentage points or less at the 95 percent confidence level.

While these trends reflect an aging population in general, other factors likely contributed to increases in the number of older households and reductions in the number of younger households over the period of our analysis.⁶¹ For example, research has shown that many older homeowners are staying in their homes, primarily because they are “aging in place.” This lack of turnover in the existing housing stock has implications—most significantly, higher prices—for younger households looking to buy their first homes.⁶² By one estimate, as of 2018, about 1.6 million homes had been held off the market by generations born before 1960.⁶³ Additionally, some have suggested that delayed household formation (getting married and having children) and high amounts of debt have prevented or dissuaded younger generations from becoming

⁶¹Home Mortgage Disclosure Act data did not include data on borrower age until 2018. As a result, we were not able to report on loan originations by age, which might have provided additional details on emerging trends by age.

⁶²For example, see Bipartisan Policy Center, *America’s Growing Senior Population: Assessing the Dimensions of the Demographic Challenge* (Washington, D.C.: September 2015); Freddie Mac, *While Seniors Age in Place, Millennials Wait Longer and May Pay More for Their First Homes*, Economic & Housing Research Insight (McLean, Va.: February 2019) and Joint Center for Housing Studies of Harvard University, *Housing America’s Older Adults: Meeting the Needs of an Aging Population*, (Cambridge, Mass.: 2014).

⁶³See Freddie Mac, *While Seniors Age in Place, Millennials Wait Longer and May Pay More for Their First Homes*.

homeowners.⁶⁴ Finally, the reduction in younger and working-aged owners (generally those aged 15–54) in cities such as Chicago, Cleveland, Columbia, and Pittsburgh may be attributable, in part, to the lasting effects of the financial crisis—many homeowners who lost their homes through foreclosure have not returned or were slow to return to homeownership.⁶⁵

Race and Ethnicity

From 2010 through 2018, the percentage of minority homeowners increased in most cities. Additionally, and as shown in figure 18,

- Chicago, Houston, and Washington, D.C., had statistically significant increases in the number and percentage of Hispanic homeowners, with increases ranging from 2 to 3 percentage points over the period of our analysis.⁶⁶
- Chicago, Houston, San Francisco, Seattle, and Washington D.C., had statistically significant increases in the number and percentage of Asian homeowners, with increases over the period ranging from an estimated 1 percentage point in Chicago to an estimated 5 percentage points in San Francisco.⁶⁷
- However, White households still accounted for the largest number and percentage of homeowners in all cities from 2010 through 2018.
- No city saw a statistically significant increase in the percentage of Black homeowners over the over the period of our analysis.⁶⁸

⁶⁴For example, see Joint Center for Housing Studies of Harvard University, *Student Loan Debt and the Housing Decisions of Young Households*, (Cambridge, Mass.: November 2015); Jeff Larrimore, Jenny Schuetz, and Samuel Dodini, “What Are the Perceived Barriers to Homeownership for Young Adults?,” *Finance and Economics Discussion Series 2016-2021*, Board of Governors of the Federal Reserve System (Washington, D.C.: Mar. 8, 2016); Research Institute for Housing America, *Diverted Homeowners, the Rental Crisis and Foregone Household Formation* (Washington, D.C.: 2016); and Urban Institute, *Millennial Homeownership: Why Is It So Low, and How Can We Increase It?* (Washington, D.C.: July 2018).

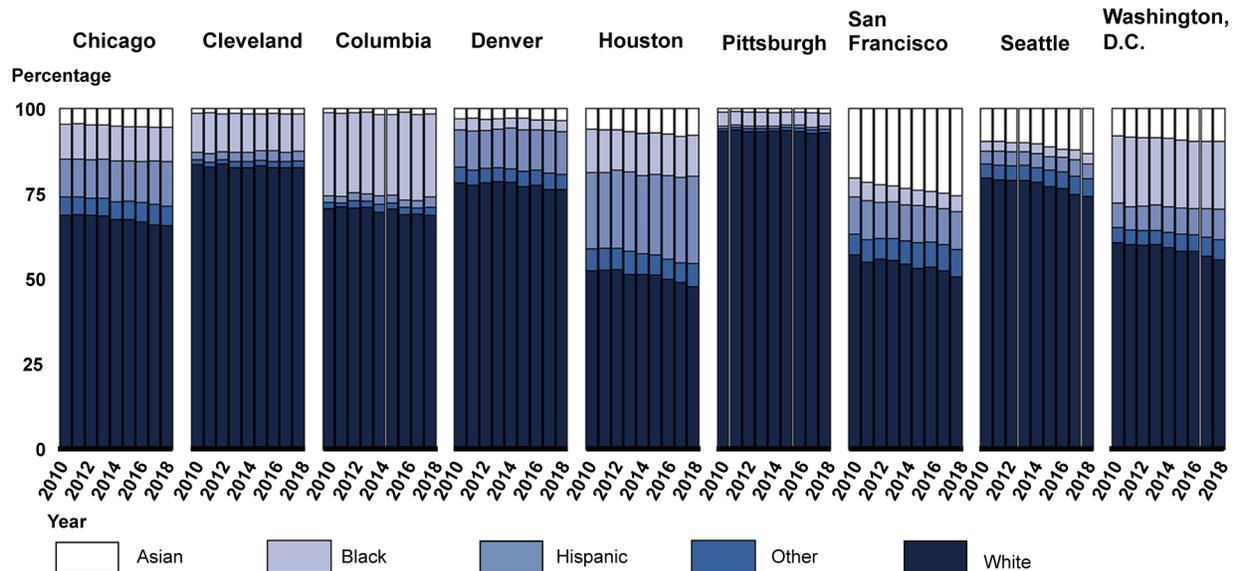
⁶⁵For example, see Ken Fears, “Return Buyers: Many Already Here, Many More to Come,” *Economists’ Outlook* (National Association of Realtors: Apr. 17, 2015); and Tomasz Piskorski and Amit Seru, *Debt Relief and Slow Recovery: A Decade After Lehman*, National Bureau of Economic Research Working Paper 25403 (Cambridge, Mass.: December 2018).

⁶⁶These changes were statistically significant at the 99 percent confidence level.

⁶⁷These increases were statistically significant at the 99 percent confidence level. In San Francisco, Seattle, and Washington, D.C., there also were statistically significant increases in the “Other” category, which includes respondents identifying as “two or more races” or “some other race.” These increases were statistically significant at the 95 percent or higher confidence level.

⁶⁸Washington, D.C. had a statistically significant increase in the number of Black homeowners (an increase of about 26,000, which was statistically significant at the 95 percent confidence level).

Figure 18: Estimated Percentage of Homeowners by Race and Ethnicity in Nine Cities, 2010–2018



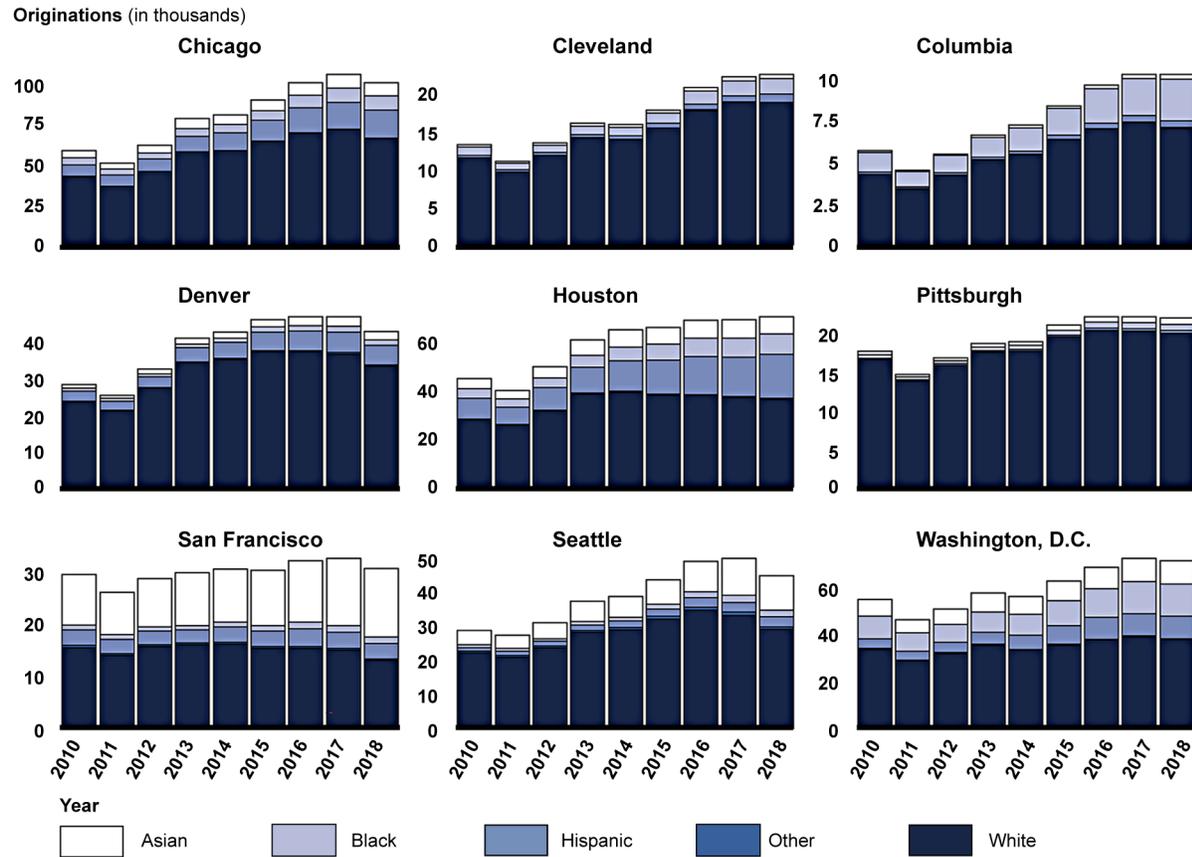
Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The “Other” category includes American Indian and Alaska Native, Native Hawaiian and other Pacific Islander, “two or more races,” and “some other race.” Estimates in this figure have a margin of error of ± 2 percentage points or less at the 95 percent confidence level. The 1-year American Community Survey estimates include a category for White, which includes Whites who identify as Hispanic and those who do not, and White Alone, which includes only those Whites who identify as Not Hispanic. To avoid over-counting, we reported on the White Alone category. However, the Hispanic category includes and double counts individuals who identified as Black, Asian, and Other. The range of these differences account for less than 0.1 percent (Pittsburgh) to 6 percent (Houston) of each total.

White borrowers also continued to make up the greatest number of originations in eight of the nine cities from 2010 through 2018, but originations by minority borrowers increased in all cities, as shown in figure 19. Originations by minority borrowers made up a greater percentage of total originations in all nine cities, notably in San Francisco, Houston, and Seattle, where minority borrowers as a percentage of total originations increased by 10, 11 and 12 percentage points, respectively.⁶⁹ In San Francisco and Seattle, the percentage of Asian borrowers increased by 10 and 8 percentage points, respectively, and there were slightly more Asian than White borrowers in San Francisco in 2018. Additionally, the percentage of Hispanic borrowers increased by 5–6 percentage points in Houston, Washington, D.C., and Chicago. In 2018, Pittsburgh, Cleveland, and Denver had the highest percentage of White borrowers, at 91, 83, and 78 percent, respectively. Columbia had the highest percentage of Black borrowers in 2018, at 25 percent.

⁶⁹These percentages exclude originations by mortgage applicants whose race was not reported.

Figure 19: Loan Originations by Race and Ethnicity in Nine Cities, 2010–2018



Source: GAO analysis of Home Mortgage Disclosure Act data. | GAO-20-544R

Note: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only. Mortgage applications with no race reported not shown.

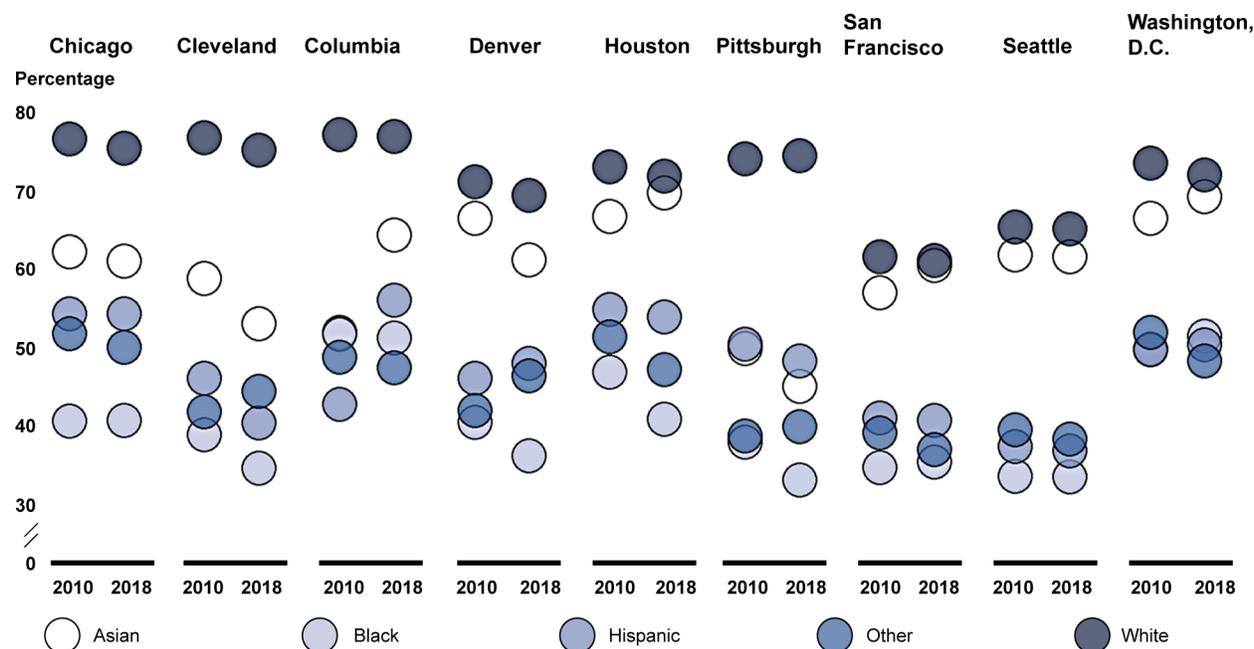
While the number and percentage of minority homeowners and borrowers increased in nearly all cities, there was little change in the homeownership rate (the percentage of total households that are owners, by race and ethnicity) among each of the racial and ethnic groups, as shown in figure 20.⁷⁰ These changes may be more indicative of broader diversification within these cities rather than changes in overall homeownership rates, as total households of nearly every race and ethnic group increased in all cities with some exceptions.⁷¹ As also shown in figure 20, there were large disparities in the homeownership rate between White and non-White households in most cities, although the homeownership rate among Asian households was only slightly lower in Houston, San Francisco, and Washington, D.C. (a difference ranging from

⁷⁰From 2010 through 2018, the only statistically significant change in the homeownership rate was a decline among Black heads of household in Houston (a decrease of about 6 percentage points). This change was statistically significant at the 95 percent confidence level.

⁷¹While total households increased in all cities, households by certain race and ethnic group saw no statistically significant changes in Chicago, Cleveland, Columbia, Denver, and Pittsburgh.

about 1 percentage point in San Francisco to 3 percentage points in Washington, D.C., in 2018).⁷²

Figure 20: Estimated Homeownership Rate by Race in Nine Cities, 2010 and 2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

Notes: The category “Other” includes American Indian and Alaska Native, Native Hawaiian and other Pacific Islander, “two or more races,” and “some other race.” Most estimates in this figure have a margin of error between ± 1 and 4 percentage points at the 95 percent confidence level. In some cities, races with estimates of 30,000 households or less have higher margins of error, up to ± 17.5 percentage points at the 95 percent confidence level.

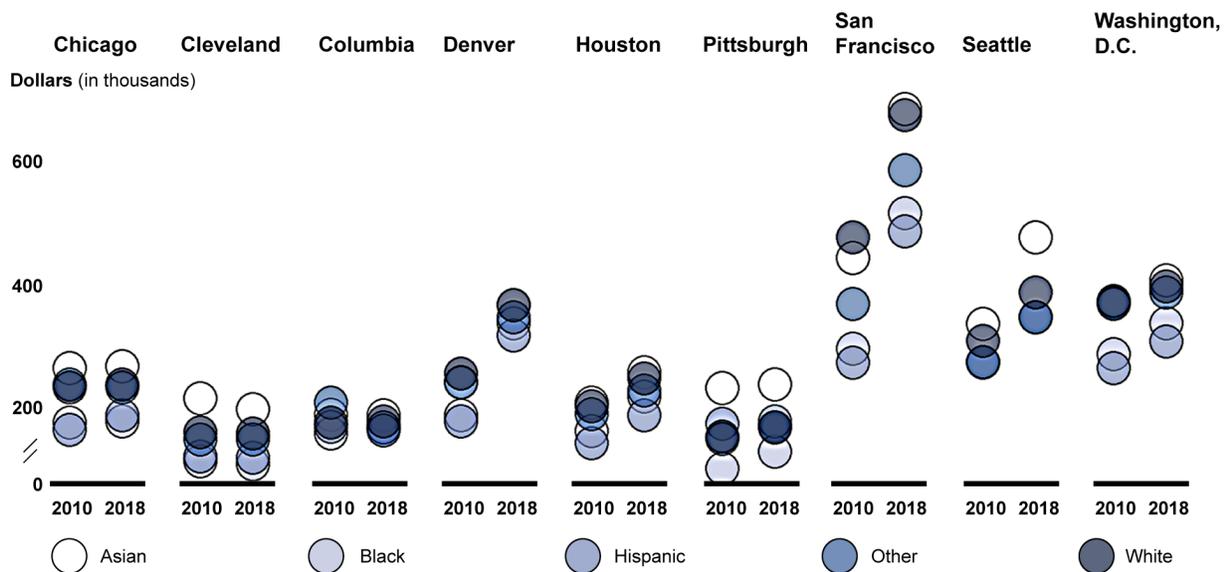
Similar disparities can be seen in originated loan amounts (mortgages) by race and ethnicity in each of the nine cities from 2010 through 2018, as shown in figure 21.

- On one end of the spectrum was Columbia, where there was little difference in loan amounts among racial and ethnic groups in and across years. In 2010, there was roughly a \$30,000 difference in median loan amount between Black and Asian borrowers, although by 2018 median loan amount for Black borrowers increased by roughly \$10,000 while for Asian borrowers it remained flat.
- On the other end of the spectrum was San Francisco, where there were clear disparities in both 2010 and 2018 among racial and ethnic groups in how much they borrowed to purchase a home. For example, in 2010, the median loan amounts for Black and Hispanic borrowers were \$294,000 and \$271,000, respectively, compared to \$442,000 and \$476,000 for Asian and White borrowers, respectively. By 2018, these amounts increased by about \$200,000, indicating a persisting disparity among races.

⁷²For example, see Arthur Acolin, Desen Lin, and Susan M. Wachter, “Endowments and Minority Homeownership,” *Cityscape: A Journal of Policy Development and Research*, vol. 21, no. 1 (2019), p.5–62 and Freddie Mac, *Will the Hispanic Homeownership Gap Persist?*, Economic & Housing Research Insight (McLean, Va.: June 2017).

- Seattle showed signs of growing disparities in loan amount by race and ethnicity, with Asians borrowing significantly more in 2018 than in 2010 and significantly more than Whites and Hispanics in both years. For both Black and Hispanic borrowers, median loan amount increased by about \$75,000, while median loan amounts for White borrowers increased by about \$80,000 and more than \$140,000 among Asian borrowers.
- Differences in the remaining cities were less stark. However, in general, Asians borrowed more than the other minority groups and often Whites, Blacks, and Hispanics consistently borrowed less than all other groups.

Figure 21: Inflation-Adjusted Median Originated Loan Amounts by Race and Ethnicity in Nine Cities, 2010 and 2018



Source: GAO analysis of Home Mortgage Disclosure Act and Bureau of Labor Statistics data. | GAO-20-544R

Notes: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only. Median loan amounts for Black, Hispanic, and Other borrowers in Seattle were all within \$1,000 of each other in 2010 and 2018. Dollar amounts were adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.

Our analysis of borrower incomes by race and ethnicity followed similar patterns to loan amounts by race and ethnicity in all nine cities. Similar to loan amounts, White and Asian borrowers consistently had among the highest real median incomes in 2010 and 2018, while Black and Hispanic borrowers consistently had lower median incomes than the other races and ethnicities.⁷³ Notwithstanding this finding, these gaps narrowed in most cities since 2010, and there was less variation in borrower incomes by race and ethnicity in Columbia, and to a lesser extent in Denver and Houston, than in the other selected cities in 2018.

⁷³For example, see Jung Hyun Choi, Alanna McCargo, Michael Neal, Laurie Goodman, and Caitlin Young, *Explaining the Black-White Homeownership Gap: A Closer Look at Disparities across Local Markets* (Washington, D.C.: Urban Institute Housing Finance Policy Center, revised November 2019).

Income

Figure 22 shows the percentage of homeowners by income group in the nine selected cities from 2010 through 2018.⁷⁴

- Homeowners reporting incomes of \$150,000 or more (the highest income category defined by the Census Bureau) increased in each of the nine cities over the period of our analysis.⁷⁵ In Denver and Seattle, the number of these households doubled from 2010 through 2018.
- With the exception of Columbia, all the cities had statistically significant decreases in the percentages of lower- and middle-income homeowners (those reporting incomes of \$0–\$74,999).⁷⁶ In Chicago, Denver, San Francisco, Seattle, and Washington, D.C., decreases in the share of homeowners reporting incomes of \$75,000–\$99,999 also were significant, decreasing by an estimated 2–4 percentage points.⁷⁷
- Among the nine cities, Columbia had little change in homeowner incomes—only the change in the percentage of households reporting incomes of \$150,000 or more was statistically significant, increasing by about 5 percentage points over the period of our analysis.

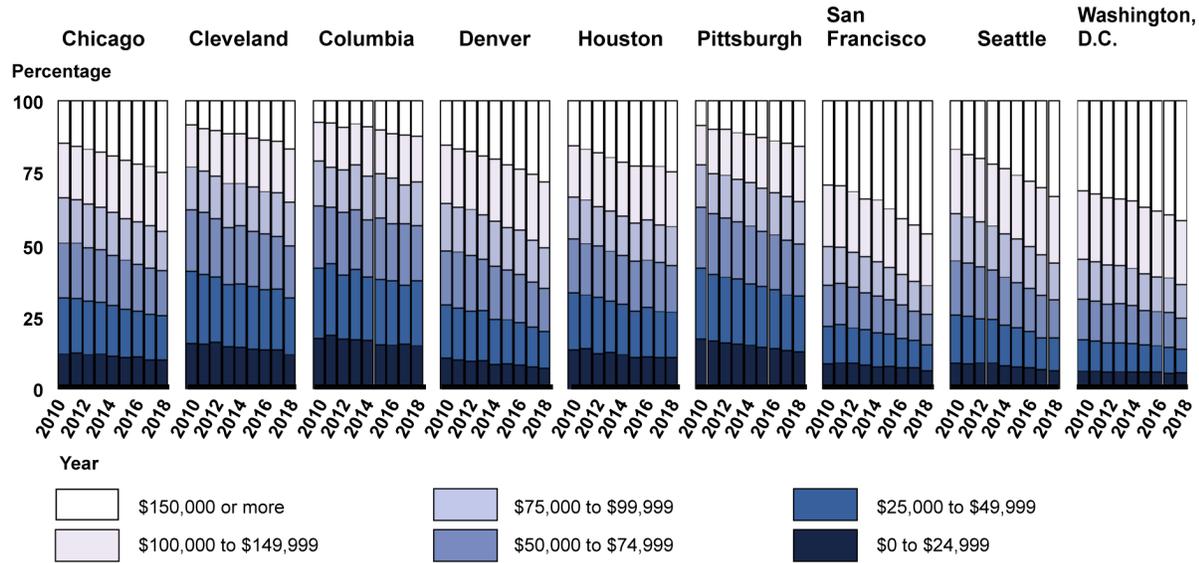
⁷⁴Because the American Community Survey reports income information in categories, we did not adjust for inflation. An increase in the percentage of homeowners reporting higher incomes simply could reflect a general increase in income due to inflation for existing residents. Or it also could reflect growth in incomes that exceeded inflation or an inflow of new homeowners who report higher incomes, among other things.

⁷⁵Changes in the percentage of homeowners in each of the nine cities reporting incomes of \$150,000 or more were statistically significant at the 99 percent confidence level.

⁷⁶Changes in percentages were statistically significant at the 95 percent or greater confidence level in all cities with one exception—the change in the percentage of homeowners reporting incomes of \$0–\$14,999 in Washington, D.C. was not statistically significant.

⁷⁷Changes in percentages were significant at the 90 percent or higher confidence level.

Figure 22: Estimated Percentage of Homeowners by Income Group in Nine Cities, 2010–2018



Source: GAO analysis of American Community Survey data. | GAO-20-544R

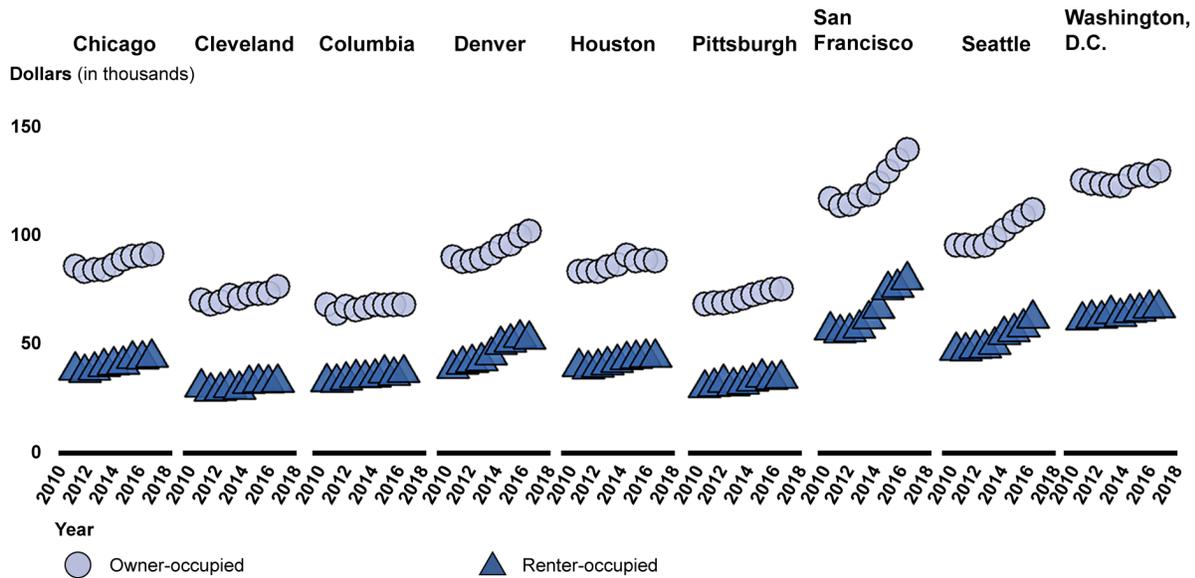
Notes: Because the American Community Survey reports income information in categories, we did not adjust for inflation. An increase in the percentage of homeowners reporting higher incomes could simply reflect a general increase in income due to inflation for existing residents. Or it also could reflect growth in incomes that exceeded inflation or an inflow of new homeowners who report higher incomes, among other things. Estimates in this figure have a margin of error of ± 2 percentage points or less at the 95 percent confidence level.

Figure 23 compares real median homeowner and renter incomes in the nine selected cities from 2010 through 2018. Across all cities and years, homeowners had higher incomes than renters. Additionally, changes in renter incomes generally tracked changes in homeowner incomes. For example, in Denver, San Francisco, and Seattle, real median renter incomes rose along with homeowner incomes, while in Cleveland and Columbia, real median renter and homeowner incomes remained relatively flat over the period of our analysis. Additionally:

- Real median incomes of homeowners in San Francisco increased dramatically from 2010 through 2018, from an estimated \$116,000 to an estimated \$139,000 (about a 20 percent increase).⁷⁸ Similarly, real median incomes increased by about 17 percent in Seattle and about 13 percent in Denver.
- In all other cities except Columbia, real median incomes of homeowners increased from about 4 percent in Washington, D.C., to about 10 percent in Pittsburgh.
- Real median incomes of homeowners in Columbia did not increase over the period of our analysis (about \$67,000 in both 2010 and 2018).

⁷⁸The total and percent changes in incomes were statistically significant at the 99 percent confidence level.

Figure 23: Estimated Inflation-Adjusted Median Incomes of Homeowners and Renters in Nine Cities, 2010–2018



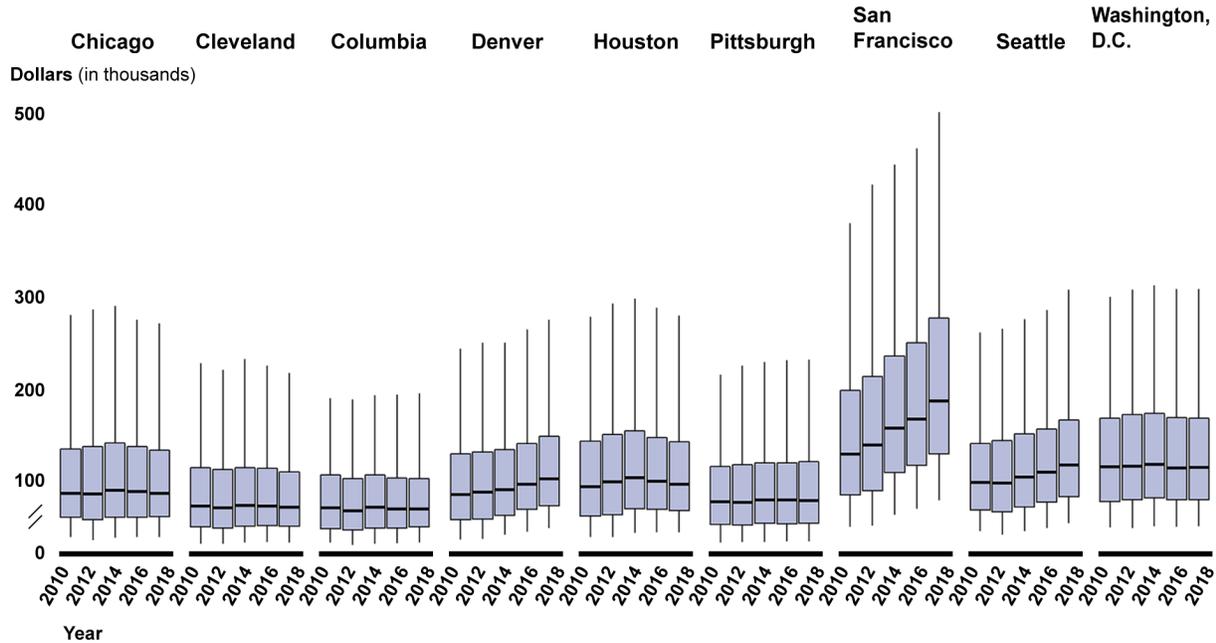
Source: GAO analysis of American Community Survey and Bureau of Labor Statistics data. | GAO-20-544R

Note: Estimates in this figure have a relative margin of error of ± 11 percent of the estimate or less at the 95 percent confidence level. Dollar amounts were adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.

Furthermore, as shown in figure 24, real incomes of recent borrowers increased in some of the nine cities from 2010 through 2018 but remained relatively flat in others. Specifically, real median incomes of borrowers increased by \$3,000 (3 percent) in Houston, \$17,000 (21 percent) in Denver, \$19,000 (20 percent) in Seattle, and \$58,000 (46 percent) in San Francisco. These increases may reflect increasing incomes in these cities in general (see fig. 23), but also rising house prices (particularly in Denver, San Francisco, and Seattle—see fig. 14). However, real median incomes remained largely unchanged in Chicago, Cleveland, Columbia, Pittsburgh, and Washington, D.C.⁷⁹

⁷⁹Real median incomes among borrowers increased by \$1,000 in Pittsburgh, did not change in Chicago, and declined by \$1,000 in Cleveland, Columbia, and Washington, D.C.

Figure 24: Range of Inflation-Adjusted Borrower Incomes in Nine Cities, 2010–2018



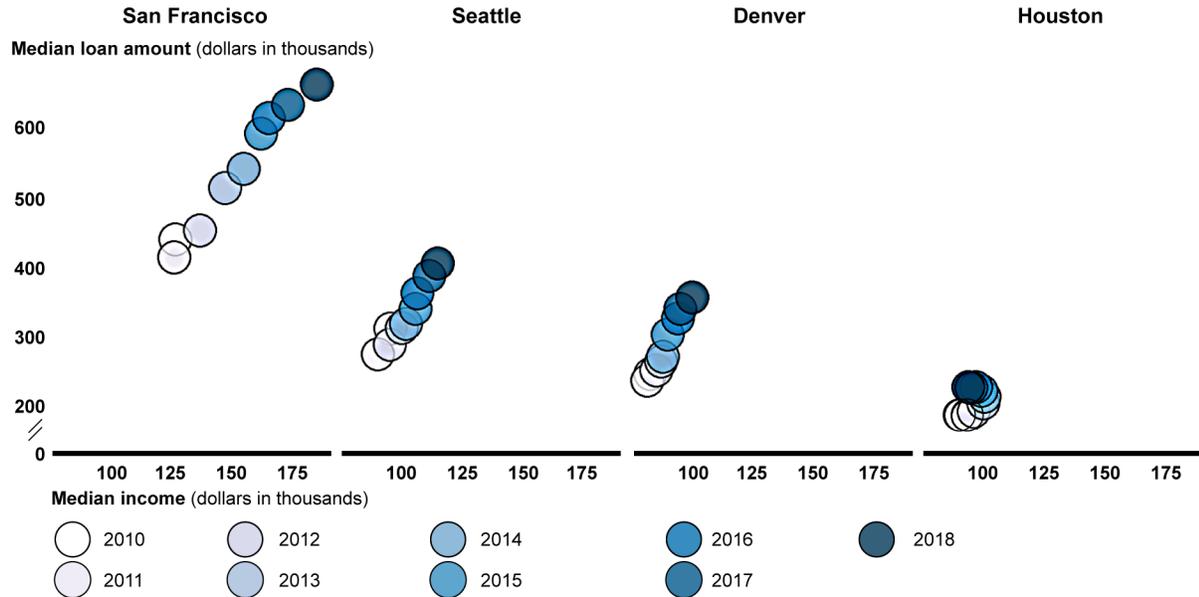
Source: GAO analysis of Home Mortgage Disclosure Act and Bureau of Labor Statistics data. | GAO-20-544R

Note: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only. Dollar amounts were adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.

Finally, as shown in figure 25, from 2010 through 2018 real median loan amounts rose commensurate with real median incomes in Denver, San Francisco, and Seattle (see fig. 24). In comparison, in Houston, loan amounts and median borrower incomes increased more modestly. This comparison suggests that increasing supply, particularly through outward expansion or in lower-density areas, can help moderate housing costs.⁸⁰

⁸⁰For example, see Edward Glaeser and Joseph Gyourko, “The Economic Implications of Housing Supply,” *Journal of Economic Perspectives*, vol. 32 no. 1 (2018), p. 3-30; Raven Molloy, *The Effect of Housing Supply Regulation on Housing Affordability: a Review* (Washington, D.C.: Mar. 31, 2017); and Vicki Been, Ingrid Gould Ellen, and Katherine O’Regan, “Supply Skepticism: Housing Supply and Affordability.” *Housing Policy Debate*, vol. 29 no.1, (2019) p. 25–40.

Figure 25: Inflation-Adjusted Median Loan Amount by Median Income for Recent Borrowers in Denver, Houston, San Francisco, and Seattle, 2010–2018



Source: GAO analysis of Home Mortgage Disclosure Act and Bureau of Labor Statistics data. | GAO-20-544R

Note: Includes originated, owner-occupied, 1–4 family, first-lien, site-built, home purchase loans only. Dollar amounts were adjusted for inflation using the Bureau of Labor Statistics Consumer Price Index for All Urban Consumers: All Items in U.S. City Average.

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