

Homeownership and the American Dream

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For decades, it was taken as a given that an increased homeownership rate was a desirable goal. In May 1995, President Bill Clinton released the National Homeownership Strategy (US Department of Housing and Urban Development 1995), an 87-page, 100-point plan with the goal that it would “boost homeownership in America to an all-time high by the end of the century.” President George W. Bush framed homeownership as a way to reduce racial inequality, and in 2003 signed the American Dream Downpayment Initiative to assist first-time homebuyers with obtaining a down payment (Bush 2003). But after the financial crises and Great Recession, in which roughly eight million homes were foreclosed on and about \$7 trillion in home equity was erased, economists and policymakers are re-evaluating the role of homeownership in the American Dream. Many question whether the American Dream should really include homeownership or instead focus more on other aspects of upward mobility, and most acknowledge that homeownership is not for everyone.

In this article, we take a detailed look at US homeownership from three different perspectives. We first take an international perspective comparing US homeownership rates with those of other nations. The data show that the US homeownership rate is at the middle to lower end of the range relative to other developed countries.

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Moreover, the US rate is about the same as it was in 1990, while the homeownership rate has increased substantially in most other developed countries.

We then take a demographic perspective and examine the correlation between changes in the US homeownership rate between 1985 and 2015 and factors like age, race/ethnicity, education, family status, and income. The homeownership rate increased more in 1995 and 2005 and fell more in 2015 than can be explained by demographics. Part of the run-up in homeownership is likely due to relaxed credit standards and new mortgage products that expanded the borrower base and lowered default rates. Subsequently, in the aftermath of the Great Recession, homeownership fell with tight credit conditions, problematic student loan debt, stagnant real incomes, and perhaps a subtle change in attitudes toward homeownership. Racial and ethnic disparities in home ownership remain pronounced. Homeownership rates for black households have fallen every decade for the last 30 years, both unconditionally and after controlling for income and demographics. Even in 2015, black households with a college education are less likely to own a home than white households whose head did not graduate from high school.

Finally, we turn to the financial benefits of homeownership. Using national data since 2002, the internal rate of return to homeownership is quite favorable compared to alternative investments, even during a period where home prices suffered the worst shock since the Great Depression. While this result does not depend only on favorable tax treatment, tax subsidies certainly help increase the financial benefits of homeownership. Of course, these results vary with the timing of the purchase, the holding period, and location. Returns to homeownership have been less favorable in locations such as Cleveland and Chicago relative to metropolitan areas like Los Angeles, Dallas, and New York. We then consider other risks and benefits to homeownership not taken into account in our basic model. Homeownership does not seem to impair mobility across metropolitan areas during recessions. As well, homeownership appears to help borrowers accumulate housing and nonhousing wealth in a variety of ways, with tax advantages, greater financial flexibility due to secured borrowing, built-in “default” savings with mortgage amortization and nominally fixed payments, and the potential to lower home maintenance costs through sweat equity. However, the ability to build wealth through homeownership is dependent on holding on to the home during downturns; lower-income and minority borrowers are less likely to maintain homeownership through the cycle, and thus benefit less from homeownership.

Our overall conclusion: homeownership is a valuable institution. On average, it allows families to build wealth and serves as a measure of financial security. Homeownership rates in a variety of countries peak for households in their 60s, suggesting that owning a home helps reduce financial risk in retirement. Moreover, the mortgage interest deduction is not the main source of these gains; even if it were removed, homeowners would continue to benefit from a lack of taxation of imputed rent and capital gains, which are tax benefits available in most countries around the world. There are very substantial variations in the homeownership experience, depending on factors like purchase timing, holding period, and location. But while two decades of policies in the 1990s and early 2000s may have put too

Table 1

Global Homeownership Rates by Country and Year, 1990–2015

| | <i>Homeownership rate (percent)</i> | | | | | <i>Change in homeownership rate</i> | | |
|----------------------|-------------------------------------|-------------|-------------|-------------|-------------|-------------------------------------|-------------|-------------|
| | 1990 | 2000 | 2005 | 2010 | 2015 | 1990–2005 | 2005–2015 | 1990–2015 |
| Bulgaria | 89.8 | 96.5 | 85.4 | 86.9 | 82.3 | –4.4 | –3.1 | –7.5 |
| Canada | 62.6 | 65.8 | 67.1 | 69.0 | 67.0 | 4.5 | –0.1 | 4.4 |
| Czech Republic | 38.4 | 47.0 | 73.5 | 78.7 | 78.0 | 35.1 | 4.5 | 39.6 |
| Denmark | 54.5 | 51.0 | 66.6 | 66.6 | 62.7 | 12.1 | –3.9 | 8.2 |
| Finland | 67.0 | 61.0 | 71.8 | 74.3 | 72.7 | 4.8 | 0.9 | 5.7 |
| France | 54.4 | 54.8 | 61.8 | 62.0 | 64.1 | 7.4 | 2.3 | 9.7 |
| Germany | 37.3 | 41.3 | 53.3 | 53.2 | 51.9 | 16.0 | –1.4 | 14.6 |
| Ireland | 80.0 | 78.9 | 78.2 | 73.3 | 70.0 | –1.8 | –8.2 | –10.0 |
| Italy | 64.2 | 69.0 | 72.8 | 72.6 | 72.9 | 8.6 | 0.1 | 8.7 |
| Japan | 63.2 | 64.9 | 63.1 | 62.4 | 64.9 | –0.1 | 1.8 | 1.6 |
| Mexico | 78.4 | 72.7 | 71.3 | 69.8 | 71.7 | –7.1 | 0.4 | –6.7 |
| Singapore | 87.5 | 92.0 | 91.1 | 87.2 | 90.8 | 3.6 | –0.3 | 3.3 |
| Slovenia | 68.0 | 82.3 | 83.2 | 78.1 | 76.2 | 15.2 | –7.0 | 8.2 |
| Spain | 77.8 | 82.0 | 86.3 | 79.8 | 78.2 | 8.5 | –8.1 | 0.4 |
| Sweden | 41.0 | 67.0 | 68.1 | 70.8 | 70.6 | 27.1 | 2.5 | 29.6 |
| Switzerland | 31.3 | 34.6 | 38.4 | 44.4 | 51.3 | 7.1 | 12.9 | 20.0 |
| United Kingdom | 65.8 | 69.1 | 69.2 | 65.7 | 63.5 | 3.4 | –5.7 | –2.3 |
| United States | 63.9 | 66.8 | 68.9 | 66.9 | 63.7 | 4.9 | –5.2 | –0.3 |
| Average | 62.5 | 66.5 | 70.6 | 70.1 | 69.6 | 8.1 | –1.0 | 7.1 |

Notes: Due to differing census and survey years, many figures in the table are from a year or two before or after the listed year, or the average between two nearby values. Sources for individual countries are listed in the Data Appendix.

much faith in the benefits of homeownership, the pendulum seems to have swung too far the other way, and many now may have too little faith in homeownership as part of the American Dream.

Homeownership around the World

The United States does not rank particularly high among other high-income countries when it comes to homeownership. Table 1 compares the homeownership rate from 1990 to 2015 across 18 countries where we have been able to obtain somewhat comparable data over the entire time period. The United States was ranked tenth in 1990, at the middle of the pack and close to the mean rate. By 2015, the United States was the fifth-lowest, its homeownership rate of 63.7 percent falling well below the 18-country average of 69.6 percent. Over the 1990–2015 period, 13 of the 18 countries increased their homeownership rates. The five countries with declines in homeownership were Bulgaria, Ireland, Mexico, the United Kingdom—and the United States.

In a broader sample of countries, many of which have missing data for some of the years in question, the United States homeownership rate in 1990 was slightly below the median and mean of the 26 countries reporting data. By 2015, the US

ranked 35 of 44 countries with reliable data, and was almost 10 percentage points below the mean homeownership rate of 73.9 percent. In the online appendix Table A1-1 (available with this paper at <http://e-jep.org>), we report results that include an additional 30 countries. We also give a couple of data sources.

By contrast, the age-pattern of homeownership in the United States is similar to that of other European countries. In most countries, homeownership rates peak at or near retirement, between ages 65 to 74. Other than Germany, Austria, and the Netherlands, the homeownership rate at this age peaks between 75 and 90 percent (it is 80 percent in the United States), well above the rate for younger households. Home equity for seniors in large European countries exceeds 8 trillion euros in 2013 (compared to over 5 trillion euros in the United States). This pattern suggests that home equity often plays an important role in retirement savings, although homeowners often don't access the equity directly except through the rent-free use of the property.¹

Looking at the reasons behind differences in homeownership across countries can be difficult. Each country has its own culture, demographics, policies, housing finance systems, and, in some cases, a past history of political instability that favors homeownership (Butrica and Mudrazija 2017). Badarinza, Cambell, and Ramadorai (2016) offer evidence on differences in household balance sheets for 13 countries and a discussion of various institutions such as the mortgage markets across these countries. The authors point to a linkage between mortgage finance, pensions, equity participation, and homeownership. While not definitive, countries like France, Germany, and the Netherlands have both lower-than-average homeownership rates and robust public pensions and private defined-contribution systems.

As well, government tax policy and regulations appear to play an important role in countries with below-average homeownership rates. For example, consider the evolution of homeownership in (the former) West Germany and the United Kingdom (Phillips 2014). Both countries pursued a similar policy of subsidizing postwar rental construction to rebuild their countries. However, in intervening years, German policies allowed landlords to raise rents to some extent and thus finance property maintenance while also providing "protections" for renters. In the United Kingdom, regulation strongly discouraged private rentals, whereas the quality of public (rental) housing declined with undermaintenance and obtained a negative stigma. As well, German banks remained quite conservative in mortgage lending. The result was that between 1950 and 1990, West German homeownership rates barely increased from 39 to 42 percent, whereas United Kingdom homeownership rates rose from 30 to 66 percent. Interestingly, anecdotes suggest that many German households rent their primary residence, but purchase a nearby home to rent for income (which requires a large down payment but receives generous depreciation benefits). This allows residents to hedge themselves against the potential of rent increases in a system that provides few tax subsidies to owning a home.²

¹For further detail, see Figure A1-2 in the online Appendix as well as Haurin and Moulton (2017).

²We thank Michael Lea, Deborah Lucas, and Mark Zandi for their helpful comments on the details of the German housing finance system.

Switzerland also has a low homeownership rate, and once again, tax regulations favor renting over owning. Bourassa and Hoesli (2010) conclude that income tax policy, especially the tax on imputed rents, as well as the high price of owning relative to renting are key determinants of why many more Swiss households are renters than in other countries. On the other side of the equation, the Netherlands, Switzerland, and the United States all have relatively generous mortgage interest deductions.

Patterns in US Homeownership Rates

The overall US homeownership rate rose from 63.5 percent in 1985 to 65.0 percent in 1995 and peaked at 68.8 percent in 2005. It then dropped to 62.7 percent by 2015, according to data from the American Housing Survey. We argue that neither the rise nor the fall of the homeownership rate can be explained by demographic changes alone, like the population becoming older or better educated. Rather, we argue, the vast expansion in credit contributed to the rise in the homeownership rate from 1985 to 2005, and the effects of the Great Recession, in combination with student loan debt, tight credit, and a subtle change in attitudes toward homeownership contributed to the fall in homeownership from 2005 to 2015. Homeownership rates for blacks have declined relative to whites and Asians, a fact that cannot be easily explained by household income or demographics.³

Demographic Factors Contributing to Homeownership

Table 2 shows the homeownership rate by race/ethnicity, age, education, and household composition. With a few exceptions, which we discuss below, the homeownership pattern across groups is the same: it increases from 1985 to 2005, then falls dramatically between 2005 and 2015.

Several demographic patterns in the table have implications for patterns of ownership over time. For example, the homeownership rate increases with age, peaking during retirement age after 65. After 1985, the homeownership rate for the 85+ group is consistently higher than for those who are 35 to 44. Over time, the US population has become older. For example, the share of households in which the head was 44 or younger fell from 49.2 percent in 1985 to 35.7 percent in 2015; conversely, the share of households in which the head was 65 or over rose from 21.5 percent in 1985 to 23.9 percent by 2015 (for details, see Table A-2.1 of the online Appendix). An aging population should contribute to a rising homeownership rate.

³The most commonly cited measure of homeownership comes from the Current Population Survey as reported by the US Census Bureau. However, for this current paper, we have chosen to use data from the American Housing Survey, which is a nationally representative longitudinal survey conducted every two years. The AHS data closely mirror the CPS data in overlapping years, but the AHS provides additional detail on households and housing units. The AHS has been conducted in a similar format since 1985, although in 2015 a new sample was selected and some reported variables changed. We were reluctant to estimate using the decennial census for the back data or gather more recent data since 2010 from another dataset like the American Community Survey, as the two series are not totally consistent.

Table 2

Homeownership Rates

| | 1985 | 1995 | 2005 | 2015 |
|--------------------------------------|-------|-------|-------|-------|
| Overall | 63.5% | 65.0% | 68.8% | 62.7% |
| Race | | | | |
| White | 68.3% | 71.4% | 75.8% | 70.8% |
| Black | 43.9% | 43.6% | 48.5% | 42.2% |
| Asian, Pacific Islander | 45.0% | 53.2% | 61.1% | 56.6% |
| Hispanic | 39.6% | 41.8% | 49.4% | 45.4% |
| Other | 44.1% | 43.1% | 53.8% | 49.0% |
| Age | | | | |
| 15–24 | 16.5% | 14.2% | 23.9% | 10.8% |
| 25–34 | 45.5% | 45.4% | 49.2% | 34.5% |
| 35–44 | 68.0% | 65.5% | 68.7% | 56.4% |
| 45–54 | 75.2% | 75.5% | 76.7% | 67.3% |
| 55–64 | 79.3% | 79.4% | 81.1% | 74.8% |
| 65–74 | 77.6% | 81.3% | 82.8% | 78.9% |
| 75–84 | 68.1% | 76.9% | 80.9% | 79.0% |
| 85 + | 60.8% | 66.1% | 68.9% | 70.7% |
| Education level | | | | |
| Less than high school | 61.0% | 58.2% | 57.1% | 48.6% |
| High school | 63.8% | 65.4% | 68.2% | 60.4% |
| Some post-secondary | 60.9% | 67.5% | 72.3% | 63.9% |
| College degree or higher | 68.1% | 71.8% | 76.7% | 71.4% |
| Household Composition | | | | |
| Living alone, male | 37.5% | 42.1% | 50.6% | 48.8% |
| Living alone, female | 51.5% | 54.5% | 59.4% | 54.1% |
| Married couple with kids | 73.7% | 76.0% | 79.1% | 70.8% |
| Married couple without kids | 81.5% | 84.0% | 87.2% | 82.5% |
| Male single householder, with kids | 48.4% | 53.0% | 52.6% | 45.6% |
| Male single householder, no kids | 41.8% | 45.1% | 49.5% | 46.2% |
| Female single householder, with kids | 34.3% | 38.5% | 42.5% | 32.8% |
| Female single householder, no kids | 53.6% | 57.7% | 59.5% | 52.6% |

Source: American Housing Survey, 1985, 1995, 2005, and 2015.

Broadly speaking, all age groups saw their homeownership rate peak in 2005, but households in the prime home-buying ages of 35–54 saw less than a 1.5 percentage point increase in homeownership over the 20 years prior to 2005. Instead, the largest increases in homeownership were for households whose heads were 65–84, which was predominantly driven by cohorts whose income and wealth substantially increased in their working years (Mayer 2017). Thus, much of the increase in homeownership between 1985 and 2005 was driven by a large cohort of retirees whose homeownership rate was much higher than the previous cohort of retirees, while homeownership rates of households in prime home-buying years were relatively flat until the last decade, when they fell sharply after the Great Recession. The younger the age group, the sharper the decline in homeownership by 2015.

Those with more education are more likely to be homeowners, as shown in Table 2. Educational levels have also risen over time: from 1985 to 2015, the share of household heads with a high school or less education fell from 61.3 to 44.6 percent,

while the share of household heads who are college graduates rose from 21.5 to 39.8 percent. This pattern should also increase the homeownership rate.

In 1985, homeownership rates were broadly similar for all education groups, with only 7.1 percentage points separating households whose head does not have a high school degree (61.0 percent) from those with a college degree (68.1 percent). This relatively egalitarian pattern has sharply changed. By 2015, there was about a 23-percentage point difference in the home ownership rates of the most (71.4 percent) and least (48.6 percent) educated households. The decline in homeownership for those with a high school education or less is an especially striking pattern. As has been repeatedly pointed out in academic research, the least-educated workers have faced flat or falling real incomes and lower labor force participation in recent decades (Cynamon and Fazzari 2014; Gordon 2012; Aaronson and Mazumder 2005).

Hispanics and non-whites have considerably lower homeownership rates than their non-Hispanic white counterparts (hereafter referred to as “white”), as shown in Table 2. Moreover, the changes over the 1985–2015 period have been uneven, with white homeownership increasing by 2.5 percent, Hispanic homeownership increasing by 5.8 percent, Asian homeownership increasing by 11.6 percent, and black homeownership declining by 1.7 percent. While some portion of the racial and ethnic differences in homeownership is driven by socioeconomic variables, regression analysis shows that a substantial gap remains. In fact, the homeownership rate in 2015 was higher for whites with less than a high school education (62.9 percent) than for blacks with a college education (57.4 percent). The United States is becoming more racially/ethnically diverse: in 1985, 81 percent of the population was white, this declined to 67.1 percent by 2015 (for details, see Table A-2.1 in the online appendix). All things being equal, the increase in household diversity should have put a drag on the homeownership rate over the 1985–2015 period. But other factors have not remained constant: for example, the differences in wealth by educational attainment have increased considerably (McKernan, Ratcliffe, Steuerle, and Zhang 2013; Urban Institute 2015).

Married couples are much more apt to be homeowners than either those living alone or single householders living with other relatives; the percentage of households consisting of married couples declined from 57.3 percent in 1985 to 49 percent in 2015. Married couples with at least one child under age 18 were the single largest household category in 1985, describing 28.8 percent of households. By 2015, however, only 19.7 percent of the households fit into this category. There are now considerably more married households without children than with children. Homeownership declined for all types of households with children between 1985 and 2015, whether or not headed by a married couple.⁴

Clearly, demographics have exerted various pushes and pulls over homeownership in recent decades. In the next section, we offer a descriptive regression of

⁴While an earlier literature suggested that homeownership benefitted the children of homeowners (Dietz and Haurin 2003), more recent papers have suggested that this effect was largely due to selection and finds few differences in outcomes for children regardless of the tenure choice of their parents (Barker and Miller 2009; Holupka and Newman 2012).

these factors. Of course, the goal of this analysis is not to determine causality, but rather to summarize patterns that can be compared to previous research and may be further explored in future analysis. Along with the demographic variables, we use year dummy variables, which allows us, in each survey year, to estimate the size of homeownership changes that cannot be explained by observed demographics.

A Regression Illustration

Our regression approach is similar to that of Schwartz, Bostic, Green, Reina, Davis, and Augustine (2016), who study patterns affecting rental housing using factors that have been established to be important in previous research (Herbert, Harin, Rosenthal, and Duda 2005; Haurin and Rosenthal 2007). We use American Housing Survey data from 1985, 1995, 2005, and 2015. Our approach is to use a series of dummy variables so that, in each broad category, the coefficient should be interpreted as relative to the left-out variable.

Table 3 shows the regression results. In general, the coefficients are as expected. The first group of dummy variables reflect race/ethnicity of head of household, and the coefficients should be interpreted as compared to the left-out category of “White.” Even controlling for income, education, age, and household type, homeownership rates vary substantially by race and ethnicity. Blacks, Hispanics, and Asians all had lower homeownership rates than their white counterparts. We experimented with some other control variables (described below), which reduce but do not eliminate this difference, suggesting that other factors beyond this analysis drive racial/ethnic differences in homeownership.

Previous research has consistently found that regressions do not explain black/white differences in owning a home. For example, Charles and Hurst (2002) points to smaller down-payment assistance from relatives and a higher likelihood of mortgage rejection as additional factors that contribute to lower homeownership rates for blacks, but still find a significant gap in the willingness of blacks to apply for a mortgage relative to whites. Haurin, Herbert, and Rosenthal (2007) suggest other additional factors may also play a role in the homeownership gap, including higher income volatility for blacks, lower family wealth, and differences in the neighborhoods where blacks are more likely to live. Bond and Eriksen (2017) find that 65 percent of the homeownership gap between blacks and whites can be explained by adding parents’ attributes like wealth and whether they were homeowners in addition to other typical demographic and income variables. Indeed, because household wealth is not accurately captured on a mortgage application, and family wealth is certainly not captured, these regression results will overstate racial differences.

Nonetheless, research does not yet fully explain why blacks have persistently lower homeownership rates, or why this gap (after adjusting for other factors) has increased. Racial discrimination in some form is a possible explanation for the persistent white/black gap in homeownership. However, given the large amount of resources that policymakers have placed into closing the gap in lending by race of borrower and neighborhood demographics, it seems unlikely that the larger white/black gap in homeownership is being driven by a rise in discrimination alone.

Table 3

**Results of a Regression Investigating the Relationship
between Various Demographic Factors and Homeownership**

| | | |
|----------------------------|-------------|------------|
| Intercept | 0.66628*** | (< 0.0001) |
| Non-Hispanic black | -0.15330*** | (< 0.0001) |
| Hispanic | -0.18876*** | (< 0.0001) |
| Asian/Pacific Islander | -0.15455*** | (< 0.0001) |
| Other race | -0.14127*** | (< 0.0001) |
| log of household income | 0.02976*** | (< 0.0001) |
| Aged 15–24 | -0.56348*** | (< 0.0001) |
| Aged 25–34 | -0.38944*** | (< 0.0001) |
| Aged 35–44 | -0.22215*** | (< 0.0001) |
| Aged 45–54 | -0.12445*** | (< 0.0001) |
| Aged 55–64 | -0.04940*** | (< 0.0001) |
| Aged 75–84 | 0.00685 | (0.149) |
| Aged 85 or more | -0.03263*** | (< 0.0001) |
| Less than high school | -0.10006*** | (< 0.0001) |
| High school graduate | -0.04492*** | (< 0.0001) |
| Some postsecondary | -0.01929*** | (< 0.0001) |
| 1995 | 0.02501*** | (< 0.0001) |
| 2005 | 0.05808*** | (< 0.0001) |
| 2015 | -0.01427*** | (< 0.0001) |
| Male living alone | -0.25886*** | (< 0.0001) |
| Female living alone | -0.23834*** | (< 0.0001) |
| Married, with kids | 0.06418*** | (< 0.0001) |
| Single male (kids/no kids) | -0.16952*** | (< 0.0001) |
| Single female, with kids | -0.20112*** | (< 0.0001) |
| Single female, no kids | -0.16962*** | (< 0.0001) |
| R^2 | 0.260 | |

Source: Authors using American Housing Survey data from 1985, 1995, 2005, and 2015.

Note: The table shows the results of a regression investigating the relationship between various demographic factors and homeownership. For each category of dummy variables, the coefficient should be interpreted as relative to the left-out variable. The first group reflects race/ethnicity of head of household, with the omitted category being “White.” For household head age groups, the omitted group is “Aged 65–74.” For education of the household head, the omitted variable is “College.” The omitted variable for household type, is “Married, no children.” Finally, the year 1985 is omitted for the year dummy variables. Standard errors are shown in parentheses. *, **, and *** indicate significance at the .1, .01, and .001 levels respectively.

Other control variables have the expected sign and significance. We include (log of) household income as a control variable, and it has a strong, positive correlation with homeownership. Age groups are also included, with the omitted group being “Aged 65–74.” With these control variables, the group with highest homeownership is aged 75–84, and the homeownership rate of the 85+ group is above that of the 55–64 age group. For education, the omitted variable is “College education.”

Adding control variables does not eliminate the impact of education on homeownership. Relative to those with a college education, households whose heads have a lower educational level are less likely to be homeowners.

The base household type, that is, the omitted variable for household type, is “Married, no children.” Not surprisingly, married households with children have the highest homeownership rate. All other (unmarried) household types have lower homeownership rates.

Finally, the year 1985 is omitted for the year dummy variables, and so the other coefficients show that even after adjusting for the other factors included here, the homeownership rate was 2.5 percent higher in 1995 than in 1985, 5.8 percent higher in 2005 than in 1985, and 1.4 percent lower in 2015 than in 1985. Thus, homeownership rates adjusted for the other demographic factors given here fell by a striking 7.3 percentage points from 2005 to 2015. Despite the reasonably large number of controls in these regressions, the size of the change in the year dummies is quite similar to the aggregate changes in homeownership rates, which suggests that most of the changes in homeownership are not being driven by the changes in the demographic variables. These are largely offsetting, with the rising age and education having a positive effect, and the increasingly non-white population and fewer families with children having a negative effect. Rather, the change in the homeownership rate is being driven by changes in the external environment, a point we will return to below.

Alternative Specifications

We experimented with a range of other specifications of the basic regressions, and the results are available in the online Appendix. While overall the results are qualitatively quite similar, we want to call attention to a few points.

In one specification, we used a more flexible indicator for income: specifically, using both a term for income and for income-squared. The greater flexibility for the income variable substantially reduces the magnitude and statistical significance of the education variables, which (not surprisingly) is consistent with the belief that the predominant impact of education on homeownership is via earnings.

In another specification, we ran four regressions, one for each quartile of income. While a household that is married with children generally has a higher homeownership rate (versus married without children), that is not the case in the lowest quartile, where the homeownership rate is unrelated to the presence of children in the household. Whatever the aspiration to become a homeowner, it is surely harder to save for a down payment when a household with low income must also support children. The coefficient of the income variable is also very different across quartiles. In the bottom quartile, the coefficient on income is quite small and negative, possibly suggesting the impact of homeownership programs that are targeted to the lowest income households. Again, this result is not surprising. The coefficient on income is quite high for the middle two quartiles, where incremental earnings may make a big difference in saving for a home and supporting a mortgage

payment. Income has a much smaller impact on homeownership for households in the top quartile.

What Factors Caused the Changes over Time?

Demographic factors underpredict the homeownership rate in 1995 and 2005, according to the year dummy variables, but overpredict it in 2015. Why is this? A number of factors seem to be at work.

The run-up in the homeownership rate from 1995 to 2005 can be partially explained by the emergence of nontraditional products and relaxation of credit standards, expanding the number of borrowers who could qualify. Mian and Sufi (2009, 2014) argue that the increase in mortgage credit was unrelated to fundamentals like income growth or lender expectations of house price appreciation, and indeed was not related to demand-side fundamentals, but instead to the supply of credit through the increase in securitization. For example, Mayer, Pence, and Sherlund (2009) calculate that 6.8 million subprime and Alt-A loans were originated between 2003 and 2005, and of those, about 2.8 million were purchase loans (as opposed to refinancing of existing mortgages). If half of those new purchase loans were for buyers who would not have been able to purchase without obtaining a nontraditional mortgage product, the homeownership rate would have risen about 1.6 percentage points, all else equal, or almost one-half of the 3.3 percent increase in the homeownership rate between 1995 and 2005 (see the coefficients for those years in Table 3).

Others have argued that demand for homeownership grew as household expectations that home prices would appreciate increased demand for owner-occupied properties. (Foote, Gerardi, and Willen 2012). In addition, the relatively rapid rise in home prices in many areas during the 1985–2005 period contributed to a low realized default rate, ensuring that even households facing financial challenges were able to maintain homeownership and lenders were more comfortable expanding credit (Gerardi, Lehnert, Sherlund, and Willen 2008).

To explain the decline in the homeownership rate between 2005 and 2015, there are at least four factors largely unrelated to demographic changes: the effects of the Great Recession, student loan debt, tight credit, and a shift in attitudes toward homeownership. Goodman, Pendall, and Zhu (2015) discuss these elements in greater detail and point out that they are difficult to separate empirically.

We can try to calculate the direct effect of the Great Recession on the homeownership rate. Hope Now (2017) (an organization including government, housing advocates, mortgage industry members, and investors) estimates there were, cumulatively, nearly eight million liquidations from the third quarter of 2007 to the end of 2015. We don't know how many of these were owner-occupied, as many investment property borrowers claimed to be owner-occupied. Assuming that six million of these were owner-occupied, and that under normal circumstances, two million owner occupied borrowers might have suffered a foreclosure over a similar time period, the incremental four million liquidations contributed to a roughly 3.3 percent drop in the home ownership rate (that is, 4 million additional owner-occupied foreclosures divided by 120 million households).

The amount of student loan debt has increased dramatically and likely contributed to a decline in the homeownership rate, especially for those who accumulated student debt but then did not graduate with a BA degree. From 2005 to 2015, the number of borrowers with student loan debt increased from 24.0 million to 43.3 million and the student loan debt balances grew from \$378 billion to \$1.19 trillion, according to the Federal Reserve Bank of New York's Consumer Credit panel. However, 41 percent of those starting college fail to complete their degree within 6 years (as reported at <https://nces.ed.gov/fastfacts/display.asp?id=40>). Gicheva and Thompson (2015) and Allison (2015) show that student loan debt is primarily an issue for those who do not receive their degree. For those who graduate, higher income offsets the impact of the debt and there is no net effect on homeownership.

Tight credit in the aftermath of the financial crises has also taken its toll on the homeownership rate. Li and Goodman (2014 with updates) look at the expected probability of default taken by the market in each origination quarter and show that the market in 2015 was taking less than half the expected credit risk it took in 2001. When comparing 2015 to 2001, new and existing home sales were down 4 percent but mortgage applications were down 32 percent. In 2001, 30 percent of borrowers had credit scores less than 660; in 2015, only 10 percent (Goodman, Zhu, and Bai 2016).

Commentators have debated whether there has been a change in attitudes with respect to homeownership. Homeownership clearly remains an aspiration for the vast majority of households. A National Association of Realtors (National Association of Realtors 2017) survey asked non-homeowners if they wanted to become a homeowner in the future: 86 percent said "yes," a percentage that has been roughly constant through the years. A Fannie Mae survey (2014) asked younger renters if they plan to buy, and 90 percent said they will, eventually. However, in such survey data, the questions do not put a timeframe on the purchase or take into account the difference between aspiration and ability. A recent Freddie Mac (2017) survey found that even though renters are more optimistic about their financial situation, 59 percent said their next home would be a rental, up from 55 percent six months earlier. Moreover, of the 80 percent of renters that said they would like to own a home at some point, only 29 percent said they could afford to purchase now, 38 percent said they cannot afford to purchase now, and 14 percent said while they would like to own, they do not think they would ever be able to afford it.

Perhaps the best documentation of a change in willingness to become a homeowner comes from a Fannie Mae study in which Simmons (2014), used American Community Survey data in the aftermath of the financial crisis. After controlling for race/ethnicity, they found a much lower homeownership rate for 30–32 year olds who were married with at least one child in the home and at least \$95,000 in income. That is, when looking at a sample of those who historically would have had a high desire along with the ability to purchase a home (and would not have been much affected by tight credit markets), there has been a marked decline in the percentage who actually purchased a home.

Notice that while we have looked only at national homeownership rates, there is a huge variation across the nation, with some states, particularly in the middle of the country, having much higher rates than others. There is also a difference

between metropolitan and nonmetropolitan areas, with non-metro areas generally having higher homeownership rates. Finally, certain expensive cities on the coasts have homeownership rates that are lower than both their state and other metro areas. Explaining this variation is a promising topic for future study.

Going forward, while some factors, like tight credit markets and borrowers who lost their homes in the aftermath of the Great Recession, may correct themselves, other challenges like higher student loan debts and labor market difficulties for low-income households are likely to persist. As a result, the relatively low homeownership rate in 2015 may stay low for an extended period of time.

Does Owning a Home Make Financial Sense?

A potential homeowner must consider a number of tradeoffs. We start by computing the financial returns, including tax benefits, associated with purchasing a home in 2003 relative to renting using estimates of sale prices and rents for the same homes. (Single-family homes for rent represent 13 percent of the housing stock, up from 9 percent a decade ago, as reported in Garrison 2015.) In the next section, we examine the nonfinancial costs and benefits.

Our results suggest that there remain very compelling reasons for most American households to aspire to become homeowners. Financially, the returns to purchasing a home in a “normal” market are strong, typically outperforming the stock market and an index of publicly traded apartment companies on an after-tax basis. Of course, many caveats are associated with this analysis, including variability in the timing and location of the home purchase, and other risks and tradeoffs associated with homeownership. There is little evidence of an alternative savings vehicle (other than a government-mandated program like Social Security) that would successfully encourage low-to-moderate income households to obtain substantial savings outside of owning a home. The fact that homeownership is prevalent in almost all countries, not just in the United States, and especially prevalent for people near retirement age, suggests that most households still view homeownership as a critical part of a life-cycle plan for savings and retirement.

Financial Returns to Buying a Home: The Framework

For a homeowner, a home is both a place to live and an investment. Under certain conditions, the net present value of the cash flows from owning a home, versus renting for a given holding period and investing the down payment, should be the same. These conditions include: no uncertainty about home prices and rents; a deterministic rate of inflation which affects both home prices and rents; no tax advantages to home ownership; known costs of home maintenance, property taxes, and insurance; no difference between home price appreciation, mortgage rates, and returns on other investments; a known holding period, and zero transactions costs to move between the purchase and rental decision. Of course, in the real world, with uncertainty, liquidity constraints, mobility costs, moral hazard, and many other factors, it is not surprising that people may prefer

ownership over rental, or vice-versa. Our approach will be to first compute returns to owning versus renting in a simple framework that ignores such factors affecting the household's decision to buy or rent a home. Then we discuss these factors in a following section.

Financial Returns to Buying a Home: Data

While the broad framework seems straightforward, comparing the financial returns of owning and renting requires quite a bit of data from different sources. One key challenge in this analysis is determining the market value of the *use* of the home for an owner-occupant, because no (readily available) data show rents and prices for the same properties. Given large quality differences in the typical rental apartment and owner-occupied home, just comparing apartment rents to single-family home prices may introduce appreciable errors. Instead, we rely on newly available Zillow data on median home prices and rents that are estimated for all the properties in its coverage universe. Zillow calculates an estimated home value ("Zestimate") and a separate estimated rent value at the property level using data on all rents and transactions in their database, and then takes the median. In theory, this approach should control for biases associated with differences between rental and owner-occupied homes and for variation in the types of properties selling over time. However, we do not have access to Zillow's proprietary model, and thus cannot examine the possibility of a changing value of attributes for rental versus owner-occupied properties or estimation errors that might be systematically biased.⁵ Zillow provides data at the metropolitan area and for the nation as a whole.

Information on annual costs for homeowners are obtained from the American Housing Survey, which asks detailed questions about costs for homeowners (and renters). We use this data for costs of maintenance and capital improvements, and for property taxes at the national level. Because the American Housing Survey (AHS) is conducted every other year at the national level, we interpolate values for the middle years. After 2013, the AHS no longer reports detailed costs, and so we index the most recent values using the Consumer Price Index (CPI). At the metropolitan area level, we use state property tax estimates from the Lincoln Land Institute and Minnesota Center for Fiscal Excellence starting in 2006; for years 2003–2005, we used an annual property tax survey conducted by the District of Columbia.

⁵Zillow data are used in many academic projects due to their easy availability and perceived accuracy. Zillow reports a median error rate of 4.3 percent as of August 2017, meaning that half of all homes sell for a price within 4.3 percent of the current Zestimates. For more information, see <https://www.zillow.com/zestimate/>. For more detail on the Zillow methodology, see <https://www.zillow.com/research/one-more-advance-in-creating-a-better-price-to-rent-ratio-2968/>. The rental data are based on asking rents and may overstate rents at times of excess vacancies when landlords offer concessions. Given the strong demand for rental properties over this time period, asking rents are likely to be a good proxy for effective rents. Because Zillow only started publishing rents on its universe of properties in 2010, they provided us rental data that were indexed back to 2006 using data from the American Community Survey (ACS) at the metropolitan level. For prior years, Zillow used state-level median reported rent growth from the decennial censuses. The sample includes all properties in the Zillow database including single-family homes, condominiums, and cooperatives.

We also wish to compute the financial returns to purchasing a home relative to the returns from comparable indexes of alternative investments. Our analysis assumes a purchase at the end of 2002, a time when home prices were close to a long-run normalized level and prior to the large run-up in home prices from 2003–2006 and the subsequent decline from 2007–2012. We compare returns for each year of ownership with potential sales from 2004–2016 using a representative (median) home in the United States and then for a selected set of metropolitan areas.

Results for a Homebuyer in 2002

Table 4 reports results from our computations for the financial returns from owning a median home purchased at the end of 2002. As shown in the first column, the home is purchased in this example at a price of \$134,200, with a down payment of 20 percent. The format is similar to the standard pro forma used in commercial real estate to assess the returns from an investment.

The analysis starts with the value of the use of the home as measured by the rent a homeowner would pay to live in a comparable property. This is similar to the concept of implicit rental income. Then we subtract the operating costs, including maintenance costs, property taxes, and homeowner's insurance, to obtain the equivalent of net operating income: the net financial benefit of living in a home before the impact of capital expenditures, taxes, and financing. This analysis ignores items like utility costs that would commonly be paid by residents whether they were owners or renters.

Next, we subtract annual capital expenditures and financing costs—in this case, yearly mortgage payments. This yields the imputed annual cash flow from living in the home. This annual imputed cash flow is negative for the first six years of ownership, which occurs in this example predominantly because the homeowner has chosen to use relatively high leverage of 80 percent, and the initial mortgage payment is 64 percent of the initial imputed rental cost. In this example, we assume the borrower refinances once, in 2012, reducing the mortgage interest rate by over 200 basis points, acknowledging that the refinance option is a contributor to the financial return on equity (Nothaft and Chang 2004). Of course, it is possible that many homeowners substituted “sweat equity” for cash capital expenditures during a time period when wage growth was low and thus our estimates of financial returns might not correctly incorporate the value of their labor (Bogdon 1996). Alternatively, homeowners might not have fully maintained their homes, leading to below-average appreciation rates over this time period for existing homes.

Finally, we estimate the value to an owner of taxes saved from deducting mortgage interest, property taxes, and some financing costs. Including tax savings, imputed cash flow is always positive. We report returns with and without the tax savings, because an estimated 40 percent of homeowners do not itemize deductions on their tax form (Lu and Toder 2016) and thus are not able to achieve this tax savings.

The next rows report financial cash flows for the purchase in December 2002, as well as the net sales proceeds for each year as if the owner sold the home between 2004 and 2016. This allows us to compute the internal rate of return (IRR) on a sale in any given year. The IRR is computed using the cash at purchase in 2002, the annual imputed cash flow for each year of ownership, and the cash at sale in

Table 4

Financial Returns from Owning a Home: National Data

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|--|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Imputed rental "income" (Zillow) | \$11,611 | \$12,031 | \$12,452 | \$12,872 | \$13,293 | \$13,737 | \$14,204 | \$14,724 | \$14,986 | \$15,015 | \$15,021 | \$15,360 | \$15,699 | \$16,470 | \$16,833 |
| less: Annual maintenance (AHS) | | \$444 | \$445 | \$446 | \$470 | \$495 | \$510 | \$524 | \$519 | \$513 | \$501 | \$489 | \$493 | \$496 | \$506 |
| less: Property taxes (AHS) | | \$1,564 | \$1,591 | \$1,619 | \$1,773 | \$1,928 | \$2,069 | \$2,210 | \$2,122 | \$2,034 | \$1,992 | \$1,950 | \$1,963 | \$1,976 | \$2,018 |
| less: Homeowners insurance (AHS) | | \$461 | \$478 | \$495 | \$532 | \$570 | \$581 | \$592 | \$580 | \$569 | \$566 | \$564 | \$568 | \$571 | \$583 |
| = Net operating income | \$9,563 | \$9,938 | \$9,988 | \$10,313 | \$10,516 | \$10,744 | \$11,134 | \$11,397 | \$11,765 | \$11,899 | \$11,961 | \$12,357 | \$12,675 | \$13,427 | \$13,726 |
| less: Capital improvements (AHS) | | \$2,543 | \$2,815 | \$3,087 | \$3,472 | \$3,856 | \$3,604 | \$3,353 | \$3,332 | \$3,311 | \$2,974 | \$2,637 | \$2,655 | \$2,672 | \$2,728 |
| less: Mortgage payments | | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$7,658 | \$5,171 | \$5,171 | \$5,171 | \$5,171 | \$5,171 |
| = Imputed cash flow (Net benefit) | -\$639 | -\$536 | -\$536 | -\$433 | -\$613 | -\$770 | -\$128 | \$386 | \$775 | \$930 | \$3,817 | \$4,549 | \$4,850 | \$5,583 | \$5,827 |
| plus: Value of tax deduction (if itemize) | | \$2,371 | \$2,175 | \$2,159 | \$2,177 | \$2,193 | \$2,204 | \$2,213 | \$2,156 | \$2,097 | \$1,513 | \$1,483 | \$1,468 | \$1,453 | \$1,444 |
| Imputed cash flow with tax benefit | \$1,732 | \$1,639 | \$1,726 | \$1,563 | \$1,563 | \$1,423 | \$2,075 | \$2,599 | \$2,931 | \$3,028 | \$5,330 | \$6,032 | \$6,318 | \$7,036 | \$7,271 |
| Financial cash flows | | | | | | | | | | | | | | | |
| Value of home | \$134,200 | \$141,900 | \$153,200 | \$169,500 | \$188,200 | \$195,600 | \$191,700 | \$177,900 | \$166,900 | \$157,900 | \$151,600 | \$155,400 | \$165,200 | \$172,200 | \$181,600 |
| Cash to purchase | -\$28,987 | | | | | | | | | | | | | | |
| Net sale proceeds (each year) | | \$26,006 | \$37,996 | \$54,722 | \$73,771 | \$82,408 | \$80,639 | \$69,771 | | | | | | | |
| Annualized financial return on equity | | | | | | | | | | | | | | | |
| Internal rate of return on equity | | 19.6% | 22.0% | 22.0% | 24.9% | 21.9% | 17.3% | 12.3% | 9.1% | 6.9% | 5.8% | 7.0% | 8.4% | 9.2% | 10.0% |
| Internal rate of return with tax benefits | | 20.0% | 28.4% | 28.4% | 30.6% | 27.2% | 22.6% | 17.8% | 14.7% | 12.7% | 11.5% | 12.3% | 13.3% | 13.8% | 14.3% |
| <i>Apartment Index after-tax returns</i> | | 23.1% | 18.8% | 21.5% | 21.5% | 11.5% | 5.7% | 7.5% | 10.1% | 10.1% | 9.5% | 8.1% | 9.5% | 9.6% | 9.0% |
| <i>S&P 500 Index after-tax returns</i> | | 14.1% | 10.1% | 10.5% | 10.5% | 9.0% | 0.4% | 2.8% | 3.8% | 3.3% | 4.1% | 5.9% | 6.3% | 5.7% | 5.9% |
| <i>Bond Index after-tax returns</i> | | 5.2% | 3.9% | 3.6% | 4.2% | 4.0% | 4.0% | 3.7% | 3.7% | 3.8% | 3.6% | 3.2% | 3.2% | 2.9% | 2.8% |
| Apartment index returns | | 30.0% | 24.7% | 28.3% | 15.1% | 15.1% | 7.2% | 10.2% | 14.3% | 14.3% | 13.6% | 11.6% | 13.7% | 13.9% | 13.1% |
| S&P 500 returns | | 17.4% | 12.4% | 12.7% | 12.7% | 10.8% | 0.4% | 3.4% | 4.6% | 4.0% | 4.9% | 7.0% | 7.3% | 6.7% | 6.9% |
| Bond index returns | | 6.9% | 5.3% | 5.0% | 5.0% | 5.9% | 5.7% | 5.3% | 5.4% | 5.7% | 5.5% | 4.8% | 4.9% | 4.6% | 4.4% |

Notes: It is assumed the home buyer pays a 28 percent marginal tax rate on ordinary income and 20 percent on capital gains. Mortgage rates and costs are based on average annual data from Freddie Mac; initial mortgage is an 80 percent loan-to-value 30-year fixed rate in 2002 (5.83 percent plus 0.6 percent in points and 1.4 percent in other closing costs); and mortgage balance is refinanced in 2012 with a 3.6 percent 30-year fixed rate loan (with 0.7 percent in points and 1.3 percent in other closing costs). "Value of tax deduction" is marginal tax rate multiplied by sum of mortgage interest, property taxes, and points paid on mortgage. "Imputed rental 'income'" and "Value of home" are reported by Zillow for the median home in the United States. "Value of home" is as of December in each year. Rental income is the sum of rents over the course of the year when the data is measured. "Cash to purchase" is the cost of the home minus the mortgage amount plus points and closing costs on the mortgage. Sale proceeds are the sale price of the home, less 7 percent expense (for broker and other sale costs) and payoff amount on the mortgage. All amounts are compounded annually. After-tax returns for apartments are computed by using annual dividends from Real Estate Investment Trusts (REITs), estimating the taxable portion of the dividend, and paying the tax using the 28 percent marginal tax rate on ordinary income in the year the dividend was paid. Remaining earnings were taxed at the capital gains tax rate of 28 percent in the year of sale. Apartment REITs are companies that own and operate apartments and generally receive similar tax treatment as an individual investor would for an equivalent investment in apartment buildings. The S&P 500 returns were assumed to be entirely capital gains and taxed in the year of sale, whereas the returns on bond fund were taxed annually using a blended rate with capital gains and ordinary income.

the year the property is sold. All cash flows in these rows are undiscounted and measured at the end of each year. We compute the internal rate of return on home equity for the homebuyer assuming a sale in each year, with and without the tax benefit from itemized deductions.

Of course, any judgments about financial returns must take opportunity cost into account: that is, what a household might expect to earn on an investment of comparable risk if it decided to rent instead of purchase a home. Here we provide three possible benchmarks: an index of publicly traded apartment real estate investment trusts (REITs), the S&P 500, and a representative bond fund. In the last rows of Table 4, we report before- and after-tax returns for the comparable investments.

A note about after-tax returns: While most political debate about tax benefits of homeownership focuses on the tax deductions for mortgage interest and property taxes, even more important for many homeowners is the “hidden” benefit from not having to pay taxes on the imputed rent and capital gains on the home. Conversely, returns from investments in stocks and bonds are taxable, and we need to subtract household taxes for an apples-to-apples comparison of the financial return from owning a home. When it comes to investing in an apartment index, owners of rental properties are taxed on income from properties (including rents and fees) after deducting property expenses, including repairs and maintenance, depreciation, interest payments, and residential property taxes. When a rental home is sold, the owner pays capital gains taxes. In contrast, owner-occupants do not pay taxes on a capital gain up to \$500,000 (\$250,000 for singles) from the sale of their home under most circumstances.

The largest takeaway from the calculations in the table is that owning a home appears to be generally financially advantageous relative to renting, regardless of whether a homebuyer itemizes deductions. A homebuyer in 2002 would have earned a higher rate of return on home equity than on bonds regardless of the holding period, and a higher return than on the S&P 500 with a three-year holding period or more, once taxes on the alternative investment are considered. Including the value of deductions, the homebuyer would have outperformed all the alternative investments in all years. By contrast, that same buyer who did not itemize would have underperformed the publicly traded apartment real estate investment trust index for a two-year holding period and for holding periods ending in 2010–2015, a time period when demand for rental units was very high.

There are also important caveats. This analysis has focused exclusively on the returns for a representative national property over a single time period and thus doesn’t incorporate what individual homeowners might have received on a specific property or in other time periods. It measures realized, not expected, returns. Moreover, new tax legislation may change the value of the tax benefits. As is often noted in investment prospectuses, past performance is not a guarantee of future returns.

What is driving these results? The last 15 years may have been a tough time period to invest in equities relative to real estate, as falling real interest long-term rates had a positive impact on returns for long-lived assets like housing. The strong

tax advantages associated with housing investments also play a role.⁶ Another factor benefitting returns to homeowners is use of leverage to purchase a home. We assume a buyer uses a 20 percent down payment, which was the median at the beginning of 2003 according to Goodman et al. (2017), although first-time homebuyers put down less (and the median down payment in 2017 has declined to 12 percent).

The assumed mortgage embeds much higher leverage than is utilized by the typical apartment real estate investment trust, which might have 50 percent debt, or the leverage of a typical S&P 500 company. However, homeowners are able to take advantage of low borrowing costs associated with mortgages that typically have an implicit or explicit government guarantee, which is less-expensive debt than is available to corporate borrowers. It should be noted that high corporate leverage (or purchasing stocks using a margin account) is in many ways riskier than buying a home with high leverage. Individual investors and companies face potentially severe financial consequences of operating with high debt, including margin calls and debt downgrades and covenants that severely affect the ability of a company to function when leverage rises on a market-to-market basis. By contrast, facing large costs of foreclosure and the loss of credit, many underwater homeowners were able to continue to make mortgage payments and wait for the housing market to recover. Indeed, as long as mortgage payments and other costs of owning a home are below the cost of renting an equivalent unit, an underwater homeowner has little financial incentive to default on a mortgage unless that homeowner would otherwise choose to downsize substantially.

Returns to Homeownership for Selected Metropolitan Areas

In Table 5, we calculate returns for owning in a few selected metropolitan areas. One limitation we face is that our analysis requires data from the American Home Survey in 2002–2004, which does not cover interesting housing markets such as Boston, Las Vegas, Miami, and San Francisco. Nonetheless, we are able to include data on Chicago, Cleveland, Dallas, Denver, Los Angeles, New York, and Phoenix. The analysis of the returns for these individual markets mostly mirrors the national data, with a few exceptions.

First, the average metropolitan area in these examples had higher average home prices and rates of home price appreciation than the United States as a whole, but lower average returns. In part, this finding suggests that a key component in understanding returns for purchasing a home comes from the rent/price ratio, which can be viewed as the initial cash yield on investment. Eisfeldt and Demers (2015) show that higher-priced homes have a lower cash yield on investment. Our analysis demonstrates that investing in a market with a high expected rate of appreciation may not have a strong financial return if the initial rental yield is sufficiently low. Also, commercial real estate investors in fast-growing markets often perceive these markets as having lower risk than the average market, as evidenced by low capitalization rates in so-called “gateway” (coastal) markets.

⁶Some individuals might choose to invest in tax-preferred vehicles like IRA or 401k. In this case, earnings are still taxed when the investor sells in retirement, but the effective tax rate would be lower than we estimate in this paper.

Table 5

Financial Returns from Owning a Home: Various Cities and National Data

| Year | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Annual % Δ 2003–16 |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------------|
| Dallas | | | | | | | | | | | | | | | | |
| Value of home | \$122,800 | \$127,200 | \$129,600 | \$139,000 | \$142,500 | \$146,400 | \$149,400 | \$138,200 | \$134,700 | \$137,400 | \$135,000 | \$139,300 | \$149,400 | \$159,100 | \$180,700 | 2.8% |
| IRR on equity with tax benefit | | | -3.3% | 9.8% | 11.1% | 12.0% | 12.2% | 8.2% | 7.4% | 8.2% | 7.7% | 8.8% | 10.2% | 11.2% | 12.5% | |
| Los Angeles | | | | | | | | | | | | | | | | |
| Value of home | \$271,900 | \$326,000 | \$393,500 | \$500,200 | \$587,400 | \$599,000 | \$552,800 | \$445,300 | \$420,100 | \$417,600 | \$388,700 | \$418,200 | \$491,500 | \$522,700 | \$557,600 | 5.3% |
| IRR on equity with tax benefit | | | 60.7% | 62.4% | 54.3% | 42.6% | 31.8% | 20.6% | 16.8% | 15.2% | 12.6% | 13.4% | 15.1% | 15.1% | 15.1% | |
| Phoenix | | | | | | | | | | | | | | | | |
| Value of home | \$139,900 | \$148,400 | \$157,300 | \$187,300 | \$269,300 | \$266,200 | \$241,900 | \$196,100 | \$161,400 | \$139,800 | \$131,100 | \$161,300 | \$191,200 | \$198,600 | \$215,600 | 3.1% |
| IRR on equity with tax benefit | | | 12.5% | 31.3% | 48.7% | 37.3% | 27.4% | 16.9% | 9.2% | 4.1% | 2.3% | 8.4% | 11.3% | 11.5% | 12.1% | |
| Cleveland | | | | | | | | | | | | | | | | |
| Value of home | \$128,100 | \$131,400 | \$137,700 | \$141,700 | \$144,800 | \$142,500 | \$135,600 | \$129,200 | \$125,500 | \$119,400 | \$113,700 | \$115,300 | \$117,700 | \$120,500 | \$124,800 | -0.2% |
| IRR on equity with tax benefit | | | -4.6% | 1.6% | 4.0% | 2.7% | -0.3% | -2.3% | -2.7% | -4.1% | -5.5% | -3.1% | -1.0% | 0.6% | 2.1% | |
| Denver | | | | | | | | | | | | | | | | |
| Value of home | \$214,200 | \$220,700 | \$223,500 | \$228,800 | \$234,900 | \$234,900 | \$230,900 | \$220,600 | \$217,400 | \$218,600 | \$214,600 | \$232,400 | \$253,500 | \$282,900 | \$324,200 | 3.0% |
| IRR on equity with tax benefit | | | -11.8% | -4.0% | 0.1% | 0.2% | -0.7% | -2.9% | -2.9% | -1.6% | -1.7% | 2.1% | 4.7% | 7.1% | 9.0% | |
| New York | | | | | | | | | | | | | | | | |
| Value of home | \$261,800 | \$292,100 | \$338,700 | \$386,700 | \$432,500 | \$443,700 | \$429,800 | \$393,200 | \$370,000 | \$357,300 | \$341,400 | \$341,700 | \$357,300 | \$364,900 | \$379,300 | 2.7% |
| IRR on equity with tax benefit | | | 41.3% | 42.3% | 39.2% | 32.5% | 26.1% | 20.0% | 16.5% | 14.5% | 12.8% | 12.5% | 12.9% | 12.9% | 13.1% | |
| Chicago | | | | | | | | | | | | | | | | |
| Value of home | \$181,500 | \$195,700 | \$213,900 | \$224,700 | \$238,500 | \$246,400 | \$240,900 | \$228,500 | \$204,300 | \$186,500 | \$168,300 | \$166,600 | \$179,100 | \$186,900 | \$194,300 | 0.5% |
| IRR on equity with tax benefit | | | 17.2% | 17.9% | 18.6% | 17.1% | 13.6% | 10.1% | 5.7% | 2.9% | 0.3% | 1.8% | 4.7% | 6.2% | 7.3% | |
| United States | | | | | | | | | | | | | | | | |
| Value of home | \$134,200 | \$141,900 | \$153,200 | \$169,500 | \$188,200 | \$195,600 | \$191,700 | \$177,900 | \$166,900 | \$157,900 | \$151,600 | \$155,400 | \$165,200 | \$172,200 | \$181,600 | 1.9% |
| IRR on equity with tax benefit | | | 20.0% | 28.4% | 30.6% | 27.2% | 22.6% | 17.8% | 14.7% | 12.7% | 11.5% | 12.3% | 13.3% | 13.8% | 14.3% | |

Notes: Data for individual cities as described in the text and calculated in Figure 4. IRR is internal rate of return. Value of home is reported by Zillow for the median home in the metropolitan area specified for the United States. All amounts are compounded annually. Marginal tax rates are assumed to be 28 percent in all Metropolitan areas, although they are likely higher in more coastal markets like New York and Los Angeles, and lower in Midwestern and Southern markets.

Returns to owning also depend critically on how much home price appreciation actually occurs. The slowest-growing markets like Cleveland and Chicago also had the lowest rate returns to owning a home, although only in Cleveland did the returns fall below the returns of the S&P 500. Of course, while the eventual realized relative returns were negative, it is unlikely that purchasers knew in advance which markets would rise or fall.

Finally, in all these markets, had a homeowner purchased in 2007, the returns would have been much lower than comparable stock market returns. Unless homebuyers can time the market (and choose the “right” city) with some foresight, purchasing a home is certainly not a guarantee of higher returns than renting. Academic papers such as Case and Shiller (1989) and Cochrane (2011) suggest there is a predictable component for returns to housing, although to some extent this predictability might be explained by time-varying risk preferences.

What Additional Risk and Benefits are Missing from These Financial Computations?

Along with the financial outcome, buying a home poses a range of other risks and benefits. Here, we discuss a number of issues associated with owning a home not included in the basic financial analysis: financial risks due to the concentration of wealth in a single asset; lock-in and decreased mobility effects; and homeownership as a method for disciplined savings and wealth accumulation. In fact, home equity is the principal source of savings for most American households, especially households in the bottom part of the income distribution, and ownership can serve to protect households from the financial risk of rising rents.

Of course, other factors might contribute to a high homeownership rate, but are missing from our discussion. For example, moral hazard concerns favor homeownership, because renters are unlikely to maintain a property as well as its owner would. Similarly, we cannot measure the many types of uncertainty that might affect owning a home in specific markets or explicitly compute whether the measured return provides sufficient excess return to compensate for perceived and actual risks. As well, in the past, a renter likely could not find a home of comparable quality to what was available to buy. But in the last decade, with the growth in institutional ownership of rental properties, there has been a renewed focus on providing rental homes that families desire in suburban locations with higher-quality school districts. There may also be cultural benefits from owning, and homeowners may develop an emotional attachment to their property that seems less likely in a rental property.

Financial Risks

Homeowners face potentially large financial risks associated with owning a single, undiversified, indivisible, sometimes illiquid asset that often represents the

vast majority of their wealth.⁷ Piazzesi and Schneider (2016) offer an exhaustive summary of the many risks (and benefits) associated with homeownership. Households lack the ability to hedge either individual or aggregate movements in home prices. They face high transaction costs associated with moving, buying and selling homes, and foreclosures. Thus, households need a way to manage the risk of homeownership. Having the financial ability to weather the storms of volatility in home prices can be viewed as a method of effectively hedging volatility over time. In fact, few homeowners seem to feel the need to hedge price fluctuations. There have been a number of attempts to launch home price futures contracts, most recently the S&P/CaseShiller Home price contracts traded on the Chicago Mercantile exchange at the national level and for 10 cities, but these contracts have never gained much liquidity. More recently, a number of companies have been formed to sell home price insurance or a portion of home price appreciation, with little evidence of success. One potentially more promising market innovation is the attempt to embed home price and unemployment insurance explicitly into mortgages.

Sinai and Souleles (2005) point out an essential tradeoff between owning and renting: while owning exposes a household to home price risk, renting creates exposure to changes in rents. They show that the longer the expected time in a home, the lower the risk of owning relative to renting. In fact, some German renters purchase homes in a nearby neighborhood to take advantage of tax subsidies that favor owning rental property, which suggests that hedging rent risk is an important consideration for some middle-class renters. In a similar vein, Li and Yao (2007) discuss how house price changes can have differential effects depending on the age of the household.

Households also face risk related to mortgage financing and interest rates. Campbell and Cocco (2003) suggest that homeowners are often better-off taking out adjustable-rate instead of fixed-rate mortgages, although this choice is relatively uncommon. The fact that homeowners have not chosen to hedge risks that many economists estimate to be material, at least so far, suggests that this area is ripe for future research.

Lock-in and Decreased Mobility

One potential negative result of homeownership is impaired labor market mobility, especially in a downturn (Oswald 1996). The evidence on this possibility is mixed, at best.

One strand of this research has looked at correlations between homeownership and various labor market outcomes. Results appear at most to be small, and it has been hard to establish definitive results, which is perhaps not unexpected given the difficulties of disentangling cause and effect between homeownership and expected mobility. For example, some research has found some limited evidence (after adjusting for endogeneity issues) that homeownership is correlated with unemployment (Green and Hendershot 2001; Coulson and Fisher 2002, 2009;

⁷Innovations like Airbnb that allow a homeowner to rent a portion of the home provide new options for mitigating the financial risk of owning.

Van Leuvensteijn and Koning 2004; Munch, Roshholm, and Sarver 2006, 2008). More recently, Blanchflower and Oswald (2013) use state-level data with a fixed-effects model, finding that increases in the homeownership rate are followed by higher unemployment at the state level, although with long lags (up to five years). They also show that areas with high homeownership rates had lower labor mobility, longer commute times, and lower rates of business formation. Green and Wang (2015) present more complex findings, demonstrating that although homeownership may be slightly correlated with higher unemployment, it is also associated with longer employment spells, greater interstate mobility, and a lower likelihood of being unemployed. The inconsistent findings at the individual level at a minimum suggest a complex relationship that economic models have not fully captured.

A perhaps more promising strand of this literature examines whether specific circumstances such as negative equity, property tax benefits from staying, loss aversion, or low mortgage rates impair mobility. For example, Ferreira, Gyourko, and Tracy (2010) find that negative equity reduced mobility by 30 percent, and that each \$1,000 of additional mortgage or property tax costs reduces household mobility by 10 to 16 percent (for earlier evidence, see also Genesove and Mayer 1997). However, using the same data but a different methodology, Schulhofer-Wohl (2011) argues that negative equity does not reduce mobility. Donovan and Schnure (2011) also find evidence of a lock-in effect, but argue that this effect is almost entirely driven by a decline in within-county moves, which are less likely to relate to moves that involve taking a new job. In contrast, out-of-state moves are higher in counties with greater home price declines, suggesting that falling home prices may even boost labor market mobility. Aaronson and Davis (2011) examine the post-recession timeframe from 2008 to mid-2010, a period of rising negative equity, and find no effect on interstate mobility. Consistent with Aaronson and Davis (2011), Sinai and Souleles (2013) show that households move between cities with highly correlated home prices, suggesting the lock-in is less likely to be an impediment to moving between metropolitan areas. Loss aversion also leads to a lower likelihood of selling a home when home prices fall (Engelhardt 2003; Genesove and Mayer 2001).

An overall reading of the existing evidence suggests that while specific factors related to falling home prices can impair mobility, these factors do not appear to meaningfully impede job-initiated moves. Moreover, given the expanded rental market for single-family homes, a homeowner now has an improved option to rent out the old home, find a rental property in the new location, and to postpone a decision to sell.

Homeownership and Wealth Accumulation

Homeownership has historically served as an effective vehicle for accumulating wealth for many reasons. Homes have generally appreciated in price over time. Owners typically pay down mortgage principal each month with nominally fixed payments that decline in real terms, can earn “sweat equity” by making improvements in their home, and benefit from favorable tax treatment (Herbert and Belsky 2008). Numerous studies show that homeowners have more wealth and accumulate wealth

faster than non-homeowners, although these effects are less pronounced for minority borrowers. Of course, it is quite difficult to disentangle correlation from causality.

Home equity is the largest component of net worth (excluding pensions and Social Security) and is particularly important for minority borrowers (Poterba, Venti, and Wise 2011, 2012). Median wealth of all homeowners in 2013 was \$195,500, including \$80,000 of home equity (Joint Center for Housing Studies 2015). Median home equity for white families was \$90,000, 40 percent of median wealth for this group of \$231,100. For black and Hispanic families, median wealth is much lower (\$79,900 and \$90,250, respectively) and home equity is even more important, representing more than half of that total (\$47,000 and \$48,000, respectively). Renters have relatively little net worth (\$5,400). Pre-crisis studies showed that while homeownership carries significant risks, homeownership in the long term has been associated with strong wealth accumulation (Belsky and Duda 2002; Haurin and Rosenthal 2004; Herbert and Belsky 2008), particularly for those borrowers who have the willingness and ability to maintain homeownership during market fluctuations.

Of course, it is not clear how or whether homeownership contributes causally to wealth accumulation. After all, a number of studies done before the housing crisis in 2008 found that purchasing a home does not guarantee increases in wealth. The exit rate from homeownership was large for first-time, low-income borrowers—40 to 50 percent were unable to sustain homeownership for five years, with divorce being a major factor (Reid 2004; Haurin and Rosenthal 2005). Even controlling for observable characteristics that predict default like credit scores, loan purpose, loan-to-value ratio, debt-to-income ratio, and property characteristics (Haughwout, Peach, and Tracy 2008; Mayer, Pence, and Sherlund 2009), minority borrowers have been more likely to become delinquent on their mortgage loans with negative effects (Van Order and Zorn 2002; Deng and Gabriel 2006; Firestone, Van Order, and Zorn 2007; Fout, Li, and Palim 2017). In addition, home prices at the lower end of the market are more volatile than homes with higher prices (Piazzessi and Schneider 2016), exacerbating the size of wealth effects (positive and negative) for lower-income and minority borrowers who have higher-than-average loan-to-value ratios. Suburban locations with a high minority share of residents may also have lower appreciation rates than locations with a higher share of non-Hispanic white residents (Anacker 2010).

Post-2008 studies reaffirm the generally positive association between homeownership and wealth accumulation. Grinstein-Weiss, Key, Guo, Yeo, and Holub (2013) and Freeman and Ratcliffe (2012) study the Community Advantage Program, a program for low- and moderate-income borrowers, and find that after adjusting for outliers, the net worth of the new homeowners had increased more from 2005–2008 and fell less through 2010 than a matched group of renters. Herbert, McCue, and Sanchez-Moyano (2014, 2016) compare owners and renters using data from the Panel Study of Income Dynamics between 1999 and 2013. They find that homeownership was associated with significant gains in household wealth, although the magnitude of the gain was much smaller after the recession than before. They also find that a higher share of Hispanic and low-income households failed to sustain homeownership, while black households had smaller gains in wealth than other groups, after controlling for income, demographics, and household composition.

Turner and Smith (2009) also provide evidence that minority and low-income households are less likely to sustain homeownership, using data from the Panel Study of Income Dynamics from 1970 to 2005.

Attempts to disentangle correlation and causality between homeownership and household wealth are difficult. Sodini, Van Nieuwerburgh, Vestman, and von Lilienfeld-Toal (2016) address this endogeneity using a quasi-experiment from Sweden in which some residents are able to purchase their apartments at below-market prices. The paper shows that these homeowners become wealthier by saving more, have a relatively low marginal propensity to consume out of their newfound housing wealth, and invest more in equities. The paper attributes these effects predominantly to homeownership, although wealth effects also play a role.

Conclusion

Policymakers have traditionally viewed an expansion of homeownership as an important public policy goal, and they implemented policies during the 1990s and early 2000s to encourage homeownership. To the extent that anyone believed that all households should be homeowners, the financial crisis provided a strong counterexample illustrating the risks associated with homeownership when millions lost their homes to foreclosure. However, we have argued that homeownership remains very beneficial for most families, offering both financial gains and a chance to build wealth, especially for those who expect to own their homes for a long enough period of time to overcome transaction costs and near-term cyclical volatility. Today, it can be more difficult for households to become homeowners, reflecting difficulties in obtaining a mortgage, incomes that have not kept pace with the increases in home prices, as well as a lack of entry-level inventory in most housing markets. The restricted inventory of housing—due in large part to zoning restrictions, building codes and other issues—adds significantly to the costs of building a home. The public policy challenge in the United States should be to break down barriers that limit those who would benefit from homeownership from accessing it, while not pushing people to become homeowners for whom it doesn't make sense or providing subsidies where not appropriate.

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References

- Aaronson, Daniel, and Jonathan Davis. 2011. "How Much Has House Lock Affected Labor Mobility and the Unemployment Rate?" Chicago Fed Letter 290, September.
- Aaronson, Daniel, and Bhashkar Mazumder. 2005. "Intergenerational Economic Mobility in the U.S., 1940 to 2000." FRB Chicago Working Paper no. 2005-12, December.
- Allison, Melissa. 2015. "Student Loan Debt Has a Minor Impact on Homeownership ... As Long as You Get at Least a Four-Year Degree." *Zillow Porchlight*, September 16. <https://www.zillow.com/blog/student-debt-effect-homeownership-182547/> February.
- Anacker, Katrin B. 2010. "Still Paying the Race Tax? Analyzing Property Values in Homogeneous and Mixed-Race Suburbs." *Journal of Urban Affairs* 32(1): 55–77.
- Badarizna, Cristian, John Y. Campbell, and Tarun Ramadorai. 2016. "International Comparative Household Finance." NBER Working Paper 22066. (And forthcoming in *Annual Review of Economics*.)
- Barker, David, and Eric Miller. 2009. "Homeownership and Child Welfare." *Real Estate Economics* 37(2): 279–303.
- Bond, Shaun A., and Michael D. Erikson. 2017. "The Role of Parents on the Home Ownership Experience of Their Children: Evidence from the Health and Retirement Study." University of Cincinnati Lindner College of Business Research Paper no. 2017-001. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3044708.
- Belsky, Eric S., and Mark Duda. 2002. "Asset Appreciation, Time of Purchase and Sale, and the Return to Low-Income Homeowners." Chap. 7 in *Low-Income Homeownership: Examining the Unexamined Goal*, edited by Nicolas P. Retsinas and Eric S. Belsky. Washington, DC: Brookings Institution Press.
- Blanchflower, David G., and Andrew J. Oswald. 2013. "Does High Home-Ownership Impair the Labor Market?" NBER Working Paper 19079, May.
- Bogdon, Amy S. 1996. "Homeowner Renovation and Repair: The Decision to Hire Someone Else to Do the Project." *Journal of Housing Economics* 5(4): 323–50.
- Bourassa, Steven C., and Martin Hoesli. 2010. "Why Do the Swiss Rent?" *Journal of Real Estate Finance and Economics* 40(3): 286–309.
- Bush, George W. 2003. "President Bush Signs American Dream Downpayment Act of 2003." Remarks by the President at Signing of the American Dream Downpayment Act. Press Release, December 16, 2003. Department of Housing and Urban Development, Washington, DC.
- Butrica, Barbara A., and Stipica Mudrazija. 2017. "Homeownership, Social Insurance, and Old-Age Security in the United States and Europe." Prepared for the 19th, Annual Joint Meeting of the Retirement Research Consortium, August 3–4, 2017. <http://crr.bc.edu/wp-content/uploads/2017/08/5a-Stipica-Mudrazija.pdf>.
- Campbell, John, and João F. Cocco. 2003. "Household Risk Management and Optimal Mortgage Choice." *Quarterly Journal of Economics* 118(4): 1449–94.
- Case, Karl E., and Robert J. Shiller. 1989. "The Efficiency of the Market for Single-Family Homes." *American Economic Review* 79(1): 125–37.
- Charles, Kerwin Kofi, and Erik Hurst. 2002. "The Transition to Home Ownership and the Black–White Wealth Gap." *Review of Economics and Statistics* 84(2): 281–97.
- Cochrane, John H. 2011. "Presidential Address: Discount Rates." *Journal of Finance* 66(4): 1047–1108.
- Coulson, N. Edward, and Lynn M. Fisher. 2002. "Tenure Choice and Labour Market Outcomes." *Housing Studies* 17(1): 35–49.
- Coulson, N. Edward, and Lynn M. Fisher. 2009. "Housing Tenure and Labor Market Impacts: The Search Goes On." *Journal of Urban Economics* 65(3): 252–64.
- Cynamon, Barry Z., and Steven M. Fazzari. 2014. "Inequality, the Great Recession, and Slow Recovery." Institute for New Economic Thinking Working Paper 9, October 1, 2014. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2638030.
- Deng, Yongheng, and Stuart A. Gabriel. 2006. "Risk-Based Pricing and the Enhancement of Mortgage Credit Availability among Underserved and Higher Credit-Risk Populations." *Journal of Money, Credit, and Banking* 38(6): 1431–60.
- Dietz, Robert D., and Donald R. Haurin. 2003. "The Social and Private Micro-level Consequences of Homeownership." *Journal of Urban Economics* 54(3): 401–450.
- Donovan, Coleen, and Calvin Schnure. 2011. "Locked in the House: Do Underwater Mortgages Reduce Labor Market Mobility?" Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1856073.
- Eisfeldt, Andrea, and Andrew Demers. 2015. "Rental Yields and HPA: The Returns to Single Family Rentals." NBER Working Paper 21804.
- Englehardt, Gary V. 2003. "Nominal Loss Aver- sion, Housing Equity Constraints, and Household Mobility: Evidence from the United States." *Journal of Urban Economics* 53(1): 171–95.
- Fannie Mae. 2014. "Fannie Mae National Housing Survey: What Younger Renters Want and

the Constraints They See." Slide presentation, May. <http://www.fanniemae.com/resources/file-research/housingsurvey/pdf/nhsmay2014presentation.pdf>.

Ferreira, Fernando, Joseph Gyourko, and Joseph Tracy. 2010. "Housing Busts and Household Mobility." *Journal of Urban Economics* 68(1): 34–45.

Firestone, Simon, Robert Van Order, and Peter Zorn. 2007. "The Performance of Low-Income and Minority Mortgages." *Real Estate Economics* 35(4): 479–504.

Foote, Christopher L., Kristopher S. Gerardi, and Paul S. Willen. 2012. "Why Did So Many People Make So Many Bad Ex Post Decisions? The Causes of the Foreclosure Crises." NBER Working Paper 18082.

Fout, Hamilton, Grace Li, and Mark Palim. 2017. "Credit Risk of Low Income Mortgages." Economic and Strategic Research, Fannie Mae, May.

Freddie Mac. 2017. "Profile of Today's Renter." Multifamily Rental Research, March. http://www.freddiemac.com/multifamily/pdf/consumer_omnibus_results.pdf.

Freeman, Allison, and Janneke Ratcliffe. 2012. "Setting the Record Straight on Affordable Homeownership." Center for Community Capital Working Paper, May.

Garrison, Trey. 2015. "Moody's Analytics: Single-Family Rental Growth Will Accelerate: Biggest Growth in Western, Southern Markets." *HousingWire*, July 1, <https://www.housingwire.com/articles/34369-moodys-analytics-single-family-rental-growth-will-accelerate>.

Genesove, David, and Christopher Mayer. 1997. "Equity and Time to Sale in the Real Estate Market." *American Economic Review* 87(3): 255–69.

Genesove, David, and Christopher Mayer. 2001. "Loss Aversion and Seller Behavior: Evidence from the Housing Market." *Quarterly Journal of Economics* 116(4): 1233–60.

Gerardi, Kristopher, Andreas Lihnert, Shane M. Sherlund, and Paul Willen. 2008. "Making Sense of the Subprime Crisis." Brookings Papers on Economic Activity, Fall, 69–159.

Gicheva, Dora, and Jeffrey Thompson. 2015. "The Effects of Student Loans on Long-Term Household Financial Stability." In *Student Loans and the Dynamics of Debt*, edited by Brad Hershbein and Kevin M. Hollenbeck, 287–316. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.

Goodman, Laurie, Alanna McCargo, Ellen Seidman, Jim Parrott, Sheryl Pardo, Todd M. Hill, Jun Zhu, Bing Bai, Karan Kaul, Maia Woluchem, Bhargavi Ganesh, and Alison Ricon. 2017. "Housing Finance at a Glance: A Monthly Chartbook, May 2017." Research Report, Urban Institute, May 24. [http://edit.urban.org/research/publication/housing-finance-glance-monthly-](http://edit.urban.org/research/publication/housing-finance-glance-monthly-chartbook-may-2017)

[chartbook-may-2017](http://edit.urban.org/research/publication/housing-finance-glance-monthly-chartbook-may-2017).

Goodman, Laurie S., Rolf Pendall, and Jun Zhu. 2015. *Headship and Homeownership: What Does the Future Hold?* Urban Institute, June. <http://www.urban.org/sites/default/files/publication/53671/2000257-Headship-and-Homeownership-What-Does-the-Future-Hold.pdf>.

Goodman, Laurie S., Jun Zhu, and Bing Bai. 2016. "Overly Tight Credit Killed 1.1 Mortgages in 2015." *Urban Wire*, Urban Institute, November 21. <http://www.urban.org/urban-wire/overly-tight-credit-killed-11-million-mortgages-2015>.

Gordon, Robert J. 2012. "Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds." NBER Working Paper 18315, August.

Government of the District of Columbia, Office of the Chief Financial Officer, Office of Research and Analysis. 2003–2016. Annual reports titled "Tax Rates and Tax Burdens in The District of Columbia: A Nationwide Comparison" for the years 2002 to 2015. (We used 2003–2005.) Available at <https://cfo.dc.gov/page/tax-burdens-comparison>.

Grinstein-Weiss, Michal, Clinton Key, Shenyang Guo, Yeong Hun Yeo, and Krista Holub. 2013. "Homeownership and Wealth among Low- and Moderate-Income Households." *Housing Policy Debate* 23(2): 259–79.

Green, Richard K., and Hendershot Patrick. 2001. "Home-Ownership and Unemployment in the U.S." *Urban Studies* 38(9): 1509–20.

Green, Richard K., and Bingbing Wang. 2015. "Housing Tenure and Unemployment." June 1, 2015. Available at SSRN: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2628242.

Haughwout, Andrew, Richard Peach, and Joseph Tracy. 2008. "Juvenile Delinquent Mortgages: Bad Credit or Bad Economy?" *Journal of Urban Economics* 64(2): 246–57.

Haurin, Donald R., Christopher E. Herbert, and Stuart S. Rosenthal. 2007. "Homeownership Gaps among Low-Income and Minority Borrowers." *Cityscape* 9(2): 5–51.

Haurin, Donald R., and Stephanie Moulton. 2017. "International Perspectives on Homeownership and Home Equity Extraction by Senior Households," June 5. Available at: <https://ssrn.com/abstract=2985917>.

Haurin, Donald R., and Stuart S. Rosenthal. 2004. "The Impact of House Price Appreciation on Portfolio Composition and Savings." Washington, DC: US Department of Housing and Urban Development, Office of Policy Development and Research.

Haurin, Donald R., and Stuart S. Rosenthal. 2005. *The Sustainability of Homeownership: Factors Affecting the Duration of Homeownership and Rental Spells*. Washington, DC: US Department of

Housing and Urban Development, Office of Policy Development and Research.

Haurin, Donald R., and Stuart S. Rosenthal. 2007. "The Influence of Household Formation on Homeownership Rates across Time and Race." *Real Estate Economics* 35 (4): 411–50.

Herbert, Christopher E., and Eric S. Belsky. 2008. "The Homeownership Experience of Low-Income and Minority Households: A Review and Synthesis of the Literature." *Cityscape* 10 (2): 5–60.

Herbert, Christopher E., Donald R. Haurin, Stuart S. Rosenthal, and Mark Duda. 2005. *Homeownership Gaps among Low-Income and Minority Borrowers and Neighborhoods*. Washington, DC: US Department of Housing and Urban Development, Office of Policy Development and Research.

Herbert, Christopher, Daniel McCue, and Rocio Sanchez-Moyano. 2014. "Is Homeownership Still an Effective Means of Building Wealth for Low-Income and Minority Households?" In *Homeownership Built to Last: Balancing Access, Affordability and Risk after the Housing Crisis*, edited by Eric S. Belsky, Christopher E. Herbert, and Jennifer H. Molinsky. Cambridge, MA: Brookings Institution Press with the Joint Center for Housing Studies.

Herbert, Christopher E., Daniel T. McCue, and Rocio Sanchez-Moyano. 2016. "Update on Homeownership Wealth Trajectories through the Housing Boom and Bust." Joint Center for Housing Studies Working Paper, Harvard University, February 18.

Holupka, Scott, and Sandra J. Newman. 2012. "The Effects of Homeownership on Children's Outcomes: Real Effects of Self Selection?" *Real Estate Economics* 40 (3): 566–602.

Hope Now. 2017 and back issues. Hope Now industry data reports. Most recent: [http://www.hopenow.com/industry-data/HopeNow.FullReport.Updated\(August2017\).pdf](http://www.hopenow.com/industry-data/HopeNow.FullReport.Updated(August2017).pdf).

Joint Center for Housing Studies. 2015. Appendix to *State of the Nation's Housing*. Table W-2: "Median Household Net Worth, Home Equity, and Non-Housing Wealth for Owners and Renters by Age and Race: 2013." Available at: <http://www.jchs.harvard.edu/research/publications/state-nations-housing-2015>.

Li, Wei, and Laurie Goodman. 2014. "Measuring Mortgage Credit Availability Using Ex-Ante Probability of Default." Research Report, Urban Institute, November 18.

Li, Wenli, and Rui Yao. 2007. "The Life-Cycle Effects of House Price Changes." *Journal of Money, Credit and Banking* 39 (6): 1375–1409.

Lincoln Institute of Land Policy and the Minnesota Center for Fiscal Excellence. 2010–2014. *50-State Property Tax Comparison Study* for the years 2009–2013. Available at: <http://datatoolkits.lincolnst.edu/subcenters/significant-features-property-tax/resources.aspx>.

Lincoln Institute of Land Policy and the Minnesota Center for Fiscal Excellence. 2015–2017. *50-State Property Tax Comparison Study* for the years 2014 to 2016. Available at: http://www.lincolnst.edu/search/site/50-State%2520Property%2520Tax%2520Comparison%2520Study?f%5B0%5D=mediatype_levelone%3A5.

Lu, Chenxi, and Eric Toder. 2016. "Effects of Reforms on the Home Mortgage Interest Deduction by Income Group and State." Tax Policy Center, Urban Institute and Brookings Institute, December 6. http://www.taxpolicycenter.org/sites/default/files/publication/136906/2001015-effects-of-reforms-of-the-home-mortgage-interest-deduction-by-income-group-and-by-state_0.pdf.

Mayer, Christopher. 2017. "Housing, Mortgages, and Retirement." Chap. 9. in *Evidence and Innovation in Housing Law and Policy*, edited by Lee Anne Fennell and Benjamin J. Keys. Cambridge University Press.

Mayer, Christopher, Karen Pence, and Shane M. Sherlund. 2009. "The Rise in Mortgage Defaults." *Journal of Economic Perspectives* 23 (1): 27–50.

McKernan, Signe-Mary, Caroline Ratcliffe, C. Eugene Steuerle, and Sisi Zhang. 2013. "Less than Equal: Racial Disparities in Wealth Accumulation." Urban Institute, April. <http://www.urban.org/sites/default/files/publication/23536/412802-less-than-equal-racial-disparities-in-wealth-accumulation.pdf>.

Mian, Atif, and Amir Sufi. 2009. "The Consequences of Mortgage Credit Expansion: Evidence from the US Mortgage Default Crisis." *Quarterly Journal of Economics* 124 (4): 1449–96.

Mian, Atif, and Amir Sufi. 2014. *House of Debt: How They (and You) Caused the Great Recession, and How We Can Prevent It from Happening Again*. University of Chicago Press.

Minnesota Center for Fiscal Excellence. 2007–2009. *50-State Property Tax Comparison Study* for years 2006–2008. Available at: <https://www.fiscalexcellence.org/our-studies.html?sessionid=60B56CA25AECEDA80F7AB396CD2A585A?page=3>.

Munch, Jakob Roland, Michael Roshholm, and Michael Svarer. 2006. "Are Homeowners Really More Unemployed?" *Economic Journal* 116 (514): 991–1013.

Munch, Jakob Roland, Michael Roshholm, and Michael Svarer. 2008. "Home Ownership, Job Duration, and Wages." *Journal of Urban Economics* 63 (1): 130–145.

National Association of Realtors Research Department. 2017. "Aspiring Home Buyers Profile." February. <https://www.nar.realtor/reports/aspiring-home-buyers-profile>.

National Association of Real Estate Investment Trusts (Nareit). 2017. *Monthly Property Index Values & Returns, Apartments*. Available from: <https://www.reit.com/data-research/reit-indexes/>

monthly-property-index-values-returns.

Nothhaft, Frank E., and Yan Chang. 2004. "Refinance and the Accumulation of Home Equity Wealth." Freddie Mac Working Paper no. 04-02, February.

Oswald, Andrew J. 1996. "A Conjecture on the Explanation for High Unemployment in the Industrialized Nations: Part I." Warwick Economic Research Papers 475, University of Warwick.

Phillips, Matt. 2014. "Most Germans Don't Buy Their Homes, They Rent. Here's Why." *Quartz*, January 23. <https://qz.com/167887/germany-has-one-of-the-worlds-lowest-homeownership-rates/>.

Piazzesi, Monika, and Martin Schneider. 2016. "Housing and Macroeconomics." Stanford University Working paper, July. <http://web.stanford.edu/~piazzesi/housingandmacro-economics.pdf>. (And forthcoming in *Handbook of Macroeconomics*.)

Poterba, James, Steven Venti, and David Wise. 2011. "The Composition and Drawdown of Wealth in Retirement." *Journal of Economic Perspectives* 25(4): 95–118.

Poterba, James M., Steven F. Venti, and David A. Wise. 2012. "Were They Prepared for Retirement? Financial Status at Advanced Ages in the HRS and AHEAD Cohorts." In *Investigations in the Economics of Aging*, edited by David A. Wise, p. 21–69. University of Chicago Press.

Reid, Carolina. 2004. "Achieving the American Dream? A Longitudinal Analysis of the Homeownership Experiences of Low-Income Households." CSDE Working Paper no. 04-04, University of Washington, Seattle.

Schulhofer-Wohl, Sam. 2011. "Negative Equity Does Not Reduce Homeowners Mobility." NBER Working Paper 16701, January.

Schwartz, Heather L., Raphael W. Bostic, Richard K. Green, Vincent J. Reina, Lois M. Davis, Catherine H. Augustine. 2016. "Preservation of Affordable Rental Housing: Evaluation of the McArthur Foundation's Window of Opportunity Initiative." RAND.

Sinai, Todd, and Nicholas Souleles. 2005. "Owner-Occupied Housing as a Hedge Against Rent Risk." *Quarterly Journal of Economics* 120(2): 763–89.

Sinai, Todd, and Nicholas Souleles. 2013. "Can Owning a Home Hedge the Risk of Moving?" *American Economic Journal: Economic Policy* 5(2): 282–312.

Simmons, Patrick. 2014. "Upper-Income, Educated, Married with Children, and Still Not Buying: Declining Homeownership among

'Prime' First-Time Home Buying Candidates." Fannie Mae Housing Insights Brief. *Fannie Mae Economic and Strategic Research* 4(4), August 18, 2014. <http://www.fanniemae.com/resources/file/research/datanotes/pdf/housing-insights-081814.pdf>.

Sodini, Paolo, Stijn Van Nieuwerburgh, Roine Vestman, and Ulf von Lilienfeld-Toal. 2016. "Identifying the Benefits from Home Ownership: A Swedish Experiment." NBER Working Paper 22882.

Turner, Tracy M., and Marc T. Smith. 2009. "Exits from Homeownership: The Effects of Race, Ethnicity, and Income." *Journal of Regional Science* 49(1): 1–32.

Urban Institute. 2015. "Nine Charts about Wealth Inequality in America." Urban Institute. <http://apps.urban.org/features/wealth-inequality-charts/>.

US Department of Housing and Urban Development. 1995. *The National Homeownership Strategy: Partners in the American Dream*, Washington DC, May.

US Census Bureau. 2016a. "American Housing Survey (AHS): About." Webpage, October 25. <https://www.census.gov/programs-surveys/ahs/about.html>.

US Census Bureau. Various years. *AHS National and Metropolitan Public Use File (PUF)*, CSV file for years 2002 to 2015. Available at: <https://www.census.gov/programs-surveys/ahs/data.All.html>.

Van Leuvensteijn, Michiel, and Pierre Koning. 2004. "The Effect of Home-Ownership on Labor Mobility in the Netherlands." *Journal of Urban Economics* 55(3): 580–96.

Van Order, Robert, and Peter Zorn. 2002. "Performance of Low-Income and Minority Mortgages." Chap. 11 in *Low-Income Homeownership: Examining the Unexamined Goal*, edited by Nicolas P. Retsinas and Eric S. Belsky. Brookings Institution Press: Washington, D.C.

Yahoo! Finance. 2017a. *iShares Core US Aggregate Bond (AGG): Monthly Historical Prices*, CSV file. Available at <https://finance.yahoo.com/quote/AGG/history?p=AGG>.

Yahoo! Finance. 2017b. *S&P 500 (^GSPC): Monthly Historical Prices*, CSV file. Available at: <https://finance.yahoo.com/quote/%5EGSPC/history/>.

Zillow, Inc. 2016. *Quarterly Historic Metro ZRI*, CSV file. Available at: <https://www.zillow.com/research/data/>.

Zillow, Inc. 2017. *ZHVI Single-Family Homes Time Series (\$): METRO/US*, CSV file. Available at: <https://www.zillow.com/research/data/>.

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