First-Time Homebuyers: Toward a New Measure

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System Working Paper 17-28
November 2017

This paper was originally published as *Working Paper No. 17-36* by the Federal Reserve Bank of Philadelphia. This paper may be revised. The most current version is available at https://www.philadelphiafed.org/-/media/research-and-data/publications/working-papers/2017/wp17-36.pdf.

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Abstract

Existing data sources show divergent estimates of the number of homes purchased by first-time homebuyers as a share of all home purchases. In this paper, we use a new data set to construct a time series of the share of first-time homebuyers. This series, based on the Federal Reserve Bank of New York Equifax Consumer Credit Panel (CCP), shows a significant decline in this share, particularly for young households, which is consistent with the decline in homeownership in this age cohort since the early 2000s.

Keywords: first-time homebuyer, homeownership, credit access, housing market trends
JEL Classification Codes: R310, R380, R300

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1. Introduction

The rate of homeownership in the U.S. has declined since the financial crisis and recession of 2007–2009. As of the third quarter of 2016, the homeownership rate in the U.S. was 63.5 percent, substantially below its peak of 69 percent in 2004 and near a 50-year low. The decline in homeownership is particularly pronounced for young and minority households. There is no disagreement on the measurement of this decline, which is based on census data reported quarterly (U.S. Census, 2017).[1] There is, however, disagreement on an important component of aggregate homeownership: first-time homebuyers as a share of all purchasers.

The estimated number of first-time homebuyers is an important statistic because it provides data on initial access to homeownership for those who may be renters or living with their parents. It also has implications for future economic activity in the housing sector because households typically move from rentals to starter homes and then to larger homes over the life cycle. Nonetheless, there is currently no comprehensive data source on the number or share of first-time homebuyers in the U.S. These statistics are not measured in the decennial census, the annual American Community Survey (ACS), or the monthly Current Population Survey (CPS). A measure of first-time homebuyers exists in the biennial American Housing Survey (AHS), but it is limited by the AHS sampling frame and thus cannot be used to identify changes over time for the U.S. market in aggregate.[2] In the absence of census data on this, two alternative data sources have been developed and used to provide updates on first-time homeownership trends. These data sources report divergent trends in the share of first-time buyers.

The two sources include a measure developed by the American Enterprise Institute (AEI) and the Urban Institute (UI), which shows no decrease over time, while the second source, a survey developed by the National Association of Realtors (NAR), points to a substantial decrease in the share of first-time homebuyers since the subprime crisis. The AEI/UI measure provides data on the share of first-time homebuyers among users of agency debt and the NAR, and the share among all purchasers, including cash purchasers. In this paper, we develop a new measure of first-time homebuyers using all sources of mortgage funding. Using this measure, we compare the use of mortgage debt for first-time

[1] See www.census.gov/housing/hvs/data/histtabs.html.

[2] Including a question about first-time homebuyers in the American Community Survey (ACS) and/or the Current Population Survey/Housing Vacancy Survey (CPS/HVS) would provide a source of reliable estimates. In its absence, the challenges to estimate the number of first-time homebuyers are similar to those faced to obtain a reliable measure of household formation (Masnick, Giordmaina, and Belsky, 2010; and McCue, Masnick, and Herbert, 2015).

purchases of homes by age group and by credit score characteristics of borrowers over time.

We make use of the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP), which was developed with the goal of tracking credit usage, including the use of mortgages in the aftermath of the 2007 subprime crisis (Lee and van der Klaauw, 2010). This data set consists of a nationally representative sample of credit records, based on a 5 percent sample, as discussed next.

Using the CCP, we measure the number of first-time homebuyers during the period 2002 through 2015 by identifying new mortgage borrowers who previously did not have a mortgage. We combine this with U.S. Department of Housing and Urban Development (HUD) data on all home purchases to derive a measure of the trend in first-time homebuyers as a share of overall purchases over time.

The rest of the paper is organized as follows. In Section II, we review homeownership shares and first-time homebuyer shares among all home purchasers, based on measures developed in previous studies. Section III applies the new measure of first-time homebuyers using the CCP to reconcile the different measures of first-time homebuyers and relates the findings to changes in the funding sources for access to homeownership. Section IV concludes.

II. First-Time Homeownership Trends: Measurement over Time

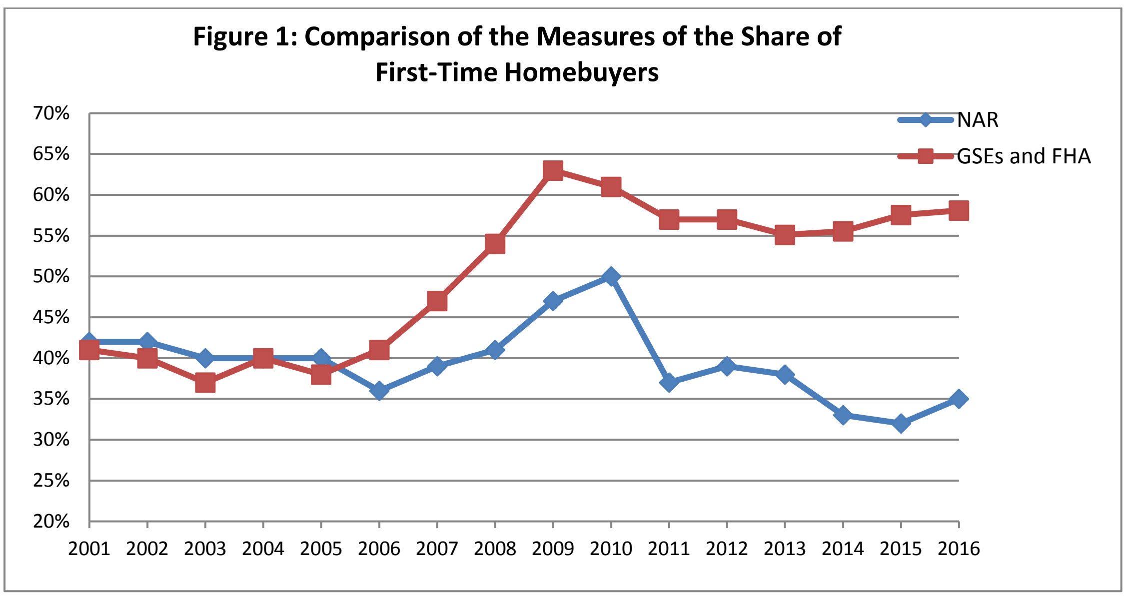
The U.S. homeownership rate fell from its post-World War II peak of 69.2 percent in the second quarter of 2004 to 62.9 percent in the second quarter of 2016 (U.S. Census, 2017). This decline is the largest on record reported in the Current Population Survey/Housing Vacancy Survey (CPS/HVS) and brings the U.S. homeownership rate back to the level last measured at the beginning of the survey in 1965. The decline in homeownership has been particularly pronounced for young and minority households.

As shown in Table 1, for young households (head of households under 35 years old), homeownership rates peaked at 43.6 percent in the second quarter of 2004, then dropped to 34.1 percent in the second quarter of 2016, a 21.8 percent decline. During the same period, homeownership rates among households aged 35 to 44 fell from 69.4 percent to 58.3 percent, a 16 percent decline. The decrease among older households (with heads at least 65 years old) are small.

As shown in Table 2, the decline in homeownership has been steeper for minority households. As of the second quarter of 2016, black households had experienced a drop from a peak homeownership rate of 49.7 in 2004 to 41.7 percent in 2016. Hispanic households' homeownership rate fell from a peak of 50 percent in 2006 to 45.1 percent in 2016. For non-Hispanic white households, the peak was 76.2 percent in 2004 and decreased to 71.5 percent in 2016. Additional sources beyond the CPS/HVS, such as the annual ACS and the AHS, show similar trends (Joint Center for Housing Studies, 2016).

While the decline in homeownership is well established, there is less agreement on what caused this decrease. Causes that have been identified include the foreclosure crisis in 2008–2011, changes in home price expectations and other preference related factors for owning versus renting, such as urban versus suburban location choices, and the tightening of credit availability (Acolin, Goodman, and Wachter, 2016; Acolin et al., 2016a, 2016b).

Trends in first-time homeownership are important in themselves, but they are also used to inform the debate on the underlying causes of the overall decline in the homeownership rate. In particular, the divergent measures of the share of first-time homebuyers have been used both to indicate that the mortgage market access is improving and that access continues to be tight.[3]



Source: the National Association of Realtors; the Federal Housing Finance Agency and the Federal Housing Administration

Figure 1 provides time series data on the share of first-time homebuyers from the two widely used sources, the NAR survey-based data and the composite data from Fannie Mae, Freddie Mac, and the FHA, which the AEI and the UI have used to report on first-time homeownership trends (Bai, Zhu, and Goodman, 2015; American Enterprise Institute, 2015). The two series provide broadly similar

[3] The currently high share of first-time homebuyers in the AEI/UI measure is cited as evidence of an easing of access to homeownership (American Enterprise Institute, 2017), while the low share in NAR's figures (National Association of Realtors, 2016) supports continued tightened credit access.

measures from 2001 to 2005 with the number of first-time homebuyers staying relatively constant at about 40 percent of overall homebuyers. The NAR measure shows a decrease in the first-time homebuyer share in 2006. They both exhibit increases after 2005–2006, which continue until 2009–2010, although the NAR trend line shows less of an increase. After that, there are major differences in the reported trends of the first-time homebuyer share: The AEI/UI estimate shows the share of first-time homebuyers currently far above the prevailing 40 percent rate prior to the housing market downturn, to rates of around 60 percent, with a peak of 63 percent in 2009 and at 58 percent in 2016. The NAR measure shows that the share of first-time homebuyers peaks at 50 percent in 2010, but then decreases to a near 30-year low of 32 percent in 2015 and increases to 35 percent in 2016. As of 2016, there is a 23 percentage point difference between the NAR and the AEI/UI measures.

These measures diverge because of differences in data sources and in the definitions used to identify first-time homebuyers. As noted, the NAR measure relies on survey results of all buyers. A questionnaire is sent to a random sample of primary resident homebuyers within the previous year (e.g., home purchases between June 2014 and June 2015 for the 2015 results). The survey based on all purchase transactions includes both cash transactions and mortgage transactions.[4]

The measure used by AEI and UI relies on historical monthly data from Fannie Mae, Freddie Mac, and the FHA. The data include mortgages sold to Fannie Mae and Freddie Mac and mortgages covered by FHA mortgage insurance. Purchases made with mortgages held in lenders' portfolios, cash purchases, and noninstitutional privately transacted mortgages are not included.[5]

With the disappearance of subprime lending and the withdrawal of private securitization from the mortgage market after 2006, the number of first-time homebuyers were concentrated in the FHA, Fannie Mae, and Freddie Mac segments of the mortgage market (with jumbo loans concentrated in the bank portfolio segment). Thus, the FHA, Fannie Mae, and Freddie Mac segments became less representative of the market as a whole and would be likely to overstate the share of first-time homebuyers. In addition, as the UI (Urban Institute, 2016) points out, exclusion of cash transactions, in the Urban Institute's measure, will increase the reported share of first-time buyers relative to the NAR

[4] The survey is restricted to principal resident purchases only; it does not include investor or vacation homes. For the 2016 "Profile of Home Buyers and Sellers," the NAR mailed a survey to a random sample of 93,171 recent homebuyers who had purchased a home between July 2015 and June 2016. Of the responses received, 5,465 responses were from primary residence buyers, resulting in an adjusted response rate of 5.9 percent after accounting for undeliverable addresses (National Association of Realtors, 2016).

[5] These historical databases were first available to the public by Federal Housing Finance Agency (FHFA) in 2013. In the data, first-time homebuyers are defined as those who did not own a property with a mortgage within the past three years.

estimate, since first-time homebuyers are less likely to be cash buyers.

III. The FRBNY Equifax CCP Data on First-Time Homeownership

Almost all first-time homebuyers use mortgage debt (instead of cash). A comprehensive measure of the share of first-time homebuyers using mortgage debt can be constructed with the Federal Reserve Bank of New York Equifax Consumer Credit Panel (CCP). The CCP provides a broad measure of first-time homebuyers using mortgage debt. The CCP data set also includes individual characteristics such as age, credit score, and information about household-level credit and debt, including second-lien mortgages, credit cards, auto loans, and student loans. Thus, it can be used to analyze the relationship among different uses of debt and the initiation of homeownership using a mortgage.

The CCP provides detailed credit report data each quarter dating to 1999[6] for a 5 percent representative random sample of individuals with at least one credit record. The random selection of the database is based on consumers' with a Social Security number (randomizing over the last two digits of the Social Security number). The database follows the characteristics and credit performance for these 5 percent randomly selected consumers (so-called primary consumers) for the entire data period (until their death or bankruptcy filing resulting in no credit record for at least six months). In addition to data on the primary consumers, the CCP also reports characteristics and credit performance of all the consumers who live in the same household (same address) as the primary consumers (although their characteristics would stop being reported once they moved out of the primary consumer's household). The data set of the consumer-quarter panel is not a balance panel because young adults acquire a credit record and exits from the panel, reflecting contributing factors such as death.

This longitudinal panel of individuals and households makes it possible to identify households that have taken out a mortgage and did not have one previously. We focus on the household level because the primary consumers in the CCP may not be the head of the household (and thus would not have mortgage debt), but others in the household who may not be the primary consumer would have mortgage debt. In addition, when the head of the household passes on homeownership to another household member, we also capture that it is not a new homebuyer. Using this FRBNY Equifax CCP data set, first-time homeownership is identified with households that obtain a mortgage in a given quarter and show no mortgages reported in their credit file during the previous three years.[7] The three-year

[6] Equifax has provided this data set to the Federal Reserve System since 2010 (Lee and van der Klaauw, 2010).

[7] This method is also used by Gyourko, Lee, and Tracy (2015),

prior observation window is similar to the one used in the AEI and UI measures. Note that some households identified as first-time homeowners by this criterion may have owned a home but did not have a mortgage (originally having purchased the home with cash or had already paid it off), but such cases should be relatively infrequent.

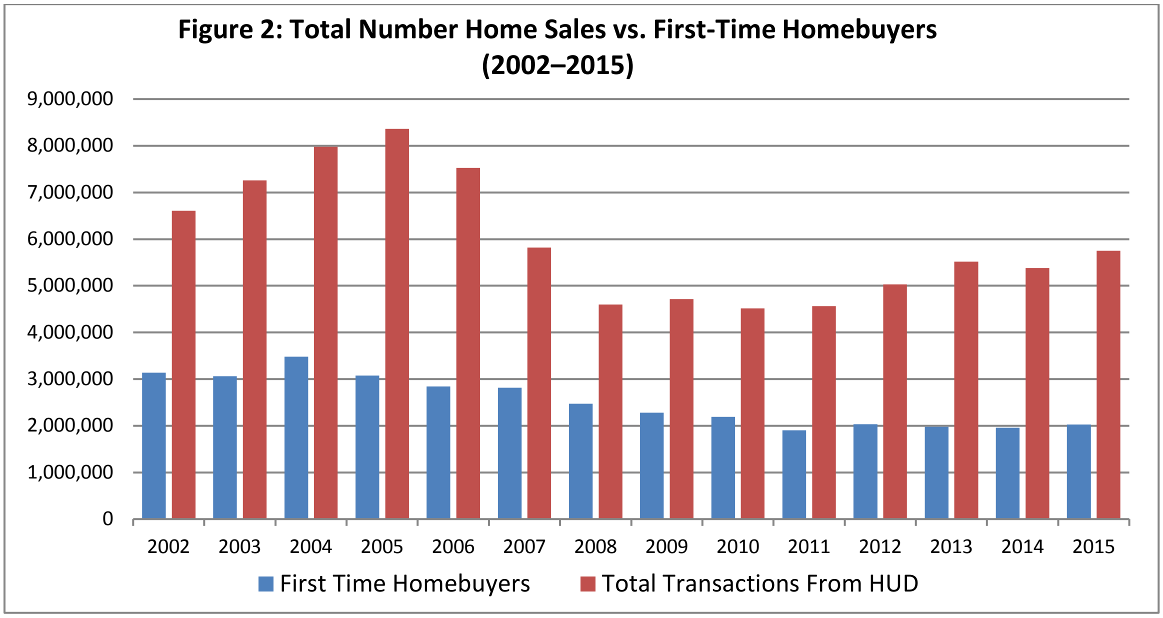
The CCP provides information about the number of new homebuyers using a mortgage but not about the total number of home purchase transactions, whether or not they involved a mortgage. Therefore, we use the U.S. Department of Housing and Urban Development (HUD)'s estimates for new and existing homes sold (U.S. Department of Housing and Urban Development, 2017), which aims to capture all transactions as the denominator.[8] Figure 2 shows the total number of home sales from HUD and the number of households that take out a first-lien purchase mortgage in a given year and did not have one in the previous three years, the CCP-based measure of first-time homebuyers.[9]

Given that the CCP data series starts in 1999, the measure of first-time homebuyers, with a three-year lag, begins in 2002 and continues until 2015. The number of first-time homeowners is estimated to be more than 3 million during the period 2002 to 2005, peaking at almost 3.5 million in 2004. It then declines to 1.9 million in 2011 and remains very stable at around 2 million until 2015, which is well below historical levels. As of 2015, the number of first-time homebuyers is estimated to be roughly one-third below the level during the housing boom.[10]

[8] We use HUD data for the denominator because of the difficulty of identifying owner-occupied home purchase mortgages in Equifax. This approach is limited, however, because of the potential biases and noise introduced by relying on two different sources for numerator and denominator. However, it should capture the universe of home purchases in a given year.

[9] The total number of first-time homebuyers is very sensitive to various sample construction methods in the CCP; however, the trend of declining first-time homebuyers is robust across multiple possible definitions. Appendix A provides details and assumptions of the steps followed to identify household members in the CCP and limits associated with the CCP household definition.

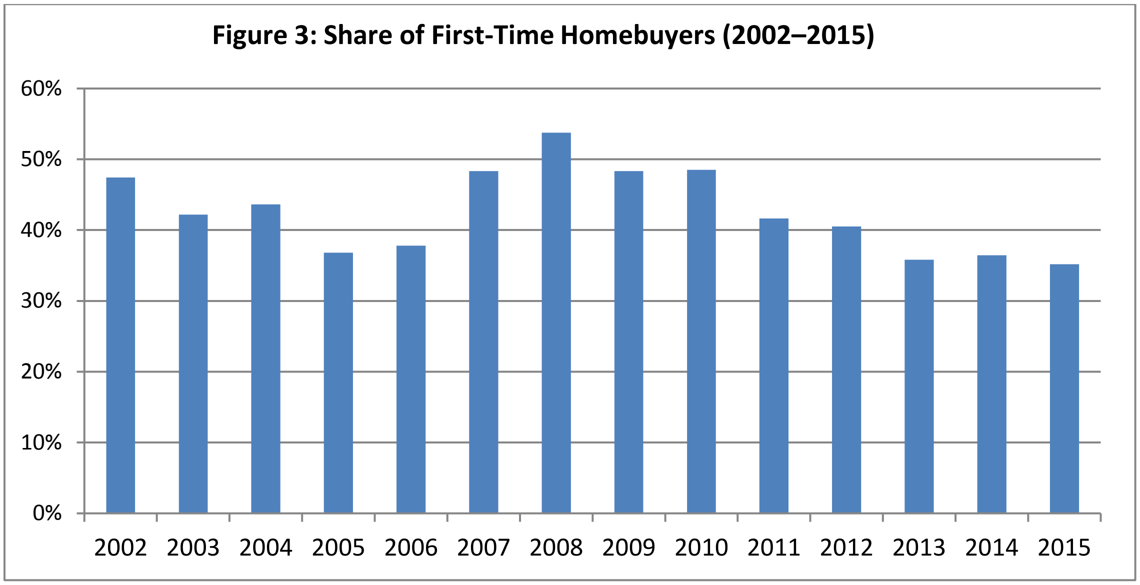
[10] Given the natural exit from homeownership because of households transitioning from owning to renting or passing away, and the added number of exits because of foreclosures, the decline in the number of first-time homeowners resulted in no net gains in the number of homeowners in the 2006 to 2016 period. As of 2016, the number of homeowner households was 75 million compared with 75.4 million in 2006 (U.S. Census, 2017).



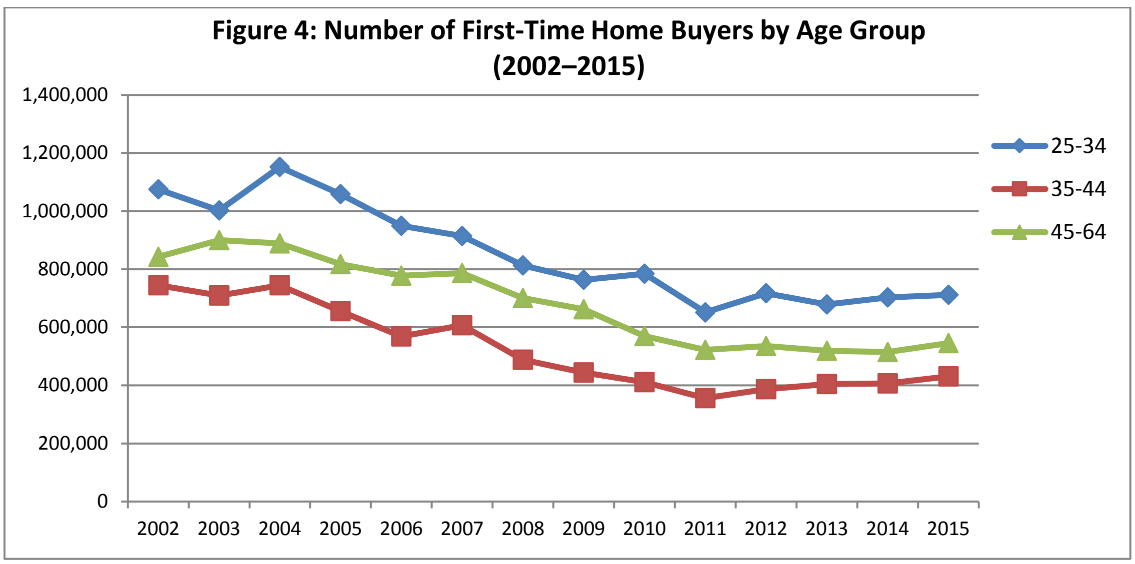
Sources: FRBNY Equifax Consumer Credit Panel and the U.S. Department of Housing and Urban Development database

First-time homebuyers comprised about 40 percent of homebuyers between 2002 and 2004 (Figure 3), using the HUD data to measure total home purchases, a share consistent with the two existing measures.[11] The share decrease to 37 percent and 28 percent of all homebuyers in 2005 and 2006, respectively. This decline was directionally similar to the NAR series. It may reflect that, during the peak of the housing boom, many households were trading up and investors represented an increasing share of purchases (Haughwout et al., 2011). Subsequently, during the downturn period from 2007 through 2010, the first-time homebuyer share is elevated, which likely reflects the reduced mobility of existing homeowners because of the drop in home prices, the weak job market, and a decrease of buyers with an investment motive. Between 2010 and 2013, the share of first-time buyers declines sharply in this series and has remained at a low since then. The share of first-time homebuyers represents about 35 percent of all transactions in 2015.

[11] This share would be lower if we used the category “never having had a mortgage” instead of “not having had one” within the last three years.



Sources: FRBNY Equifax Consumer Credit Panel for first-time homebuyers; the U.S. Department of Housing and Urban Development for home sales

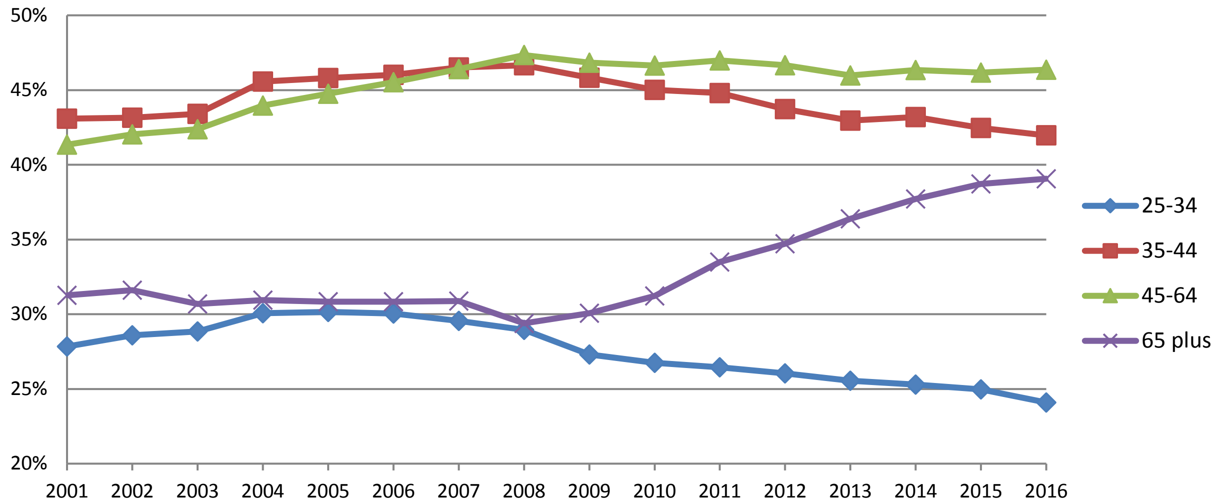


Source: FRBNY Equifax Consumer Credit Panel

Further, we divide the total number of first-time homebuyers by age group. Across all age groups, we see significant declines in the number of first-time homebuyers from 2004 to 2011 (Figure 4). After 2011, the number of first-time homebuyers stabilizes for each of the age groups at lower levels than during the precrisis highs. Overall, from 2004 to 2015, the number of first-time homebuyers has declined by roughly 40 percent for all three age groups. This suggests that the decline in first-time homebuyers is not simply because of younger people delaying home purchases by a few years; rather, there seems to have been a shift in purchase behavior across all age groups.

We also estimate the share of individuals with a mortgage (as a ratio of all individuals with a credit record) by age groups, the CCP data show that it is younger people, under the age of 35, who have experienced the largest drop in the share of individuals with a mortgage. (Figure 5).[12]

Figure 5: Share of Individuals with Mortgage Debt, First Liens Only (2001–2016)



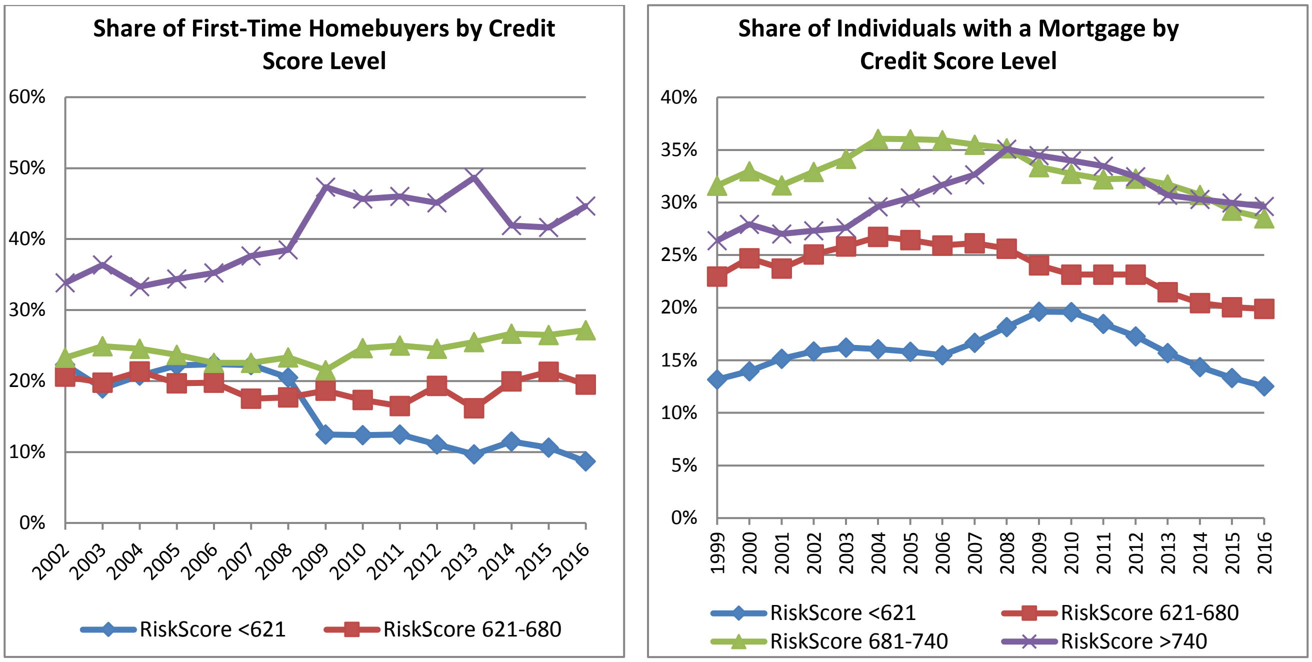
Source: FRBNY Equifax Consumer Credit Panel

The CCP allows us to examine the credit characteristics of mortgage debt holders. Figure 6 shows the share of first-time homebuyers by credit score level and the share of all households with a mortgage. It shows that the decline in the share of individuals with mortgage debt is most pronounced among lower credit score borrowers and that they represent a smaller share of first-time homebuyers in the postcrisis period. This is consistent with access to credit playing a role in the decrease in first-time homebuyers as reported in Bhutta (2015). Factors that might contribute to delay access to homeownership also include student debt (Elliott, Grinstein-Weiss, and Nam, 2013; Mezza et al., 2016).[13]

[12] These results on the decline in first-time homebuyers by age group imply that the drop in aggregate homeownership is not only the result of the forced transition from owning to renting by households experiencing foreclosure or short sales but also the result of a smaller number of households gaining access to homeownership, particularly among younger households. These results are supported by findings reported in Bhutta (2015) who decomposes the entry and exit of mortgage debtors and finds that the decrease in the volume of new entrants far outpaced the volume of exits.

[13] The role of student debt in postponing access to mortgages is consistent with findings that attribute the changes in the homeownership rate to the increased impact of credit constraints (Acolin et al., 2016a, 2016b).

Figure 6: Share of First-Time Homebuyers by Credit Score Bracket (2002–2016) and Share of Individuals with a Mortgage by Credit Score Bracket (1999–2016)



Source: FRBNY Equifax Consumer Credit Panel

V. Conclusion

In this paper, we present a new measure of first-time homebuyers as a share of all purchasers. Existing measures yield divergent assessments of this ratio. The NAR provides a measure based on a survey, while the AEI and UI provide measures based on administrative data and include only purchases with a mortgage that involved the government-sponsored enterprises (GSEs) or the FHA. We use a unique data set in this paper to construct a time series of the share of first-time homebuyers. This series, based on the Federal Reserve Bank of New York Equifax CCP, shows a significant decline in the share. We also find a decline the number of first-time homebuyers across all age groups relative to the early 2000s.

Table 1: Homeownership Rate by Age Group (1994:Q2 to 2016:Q2)

	Under 35 Years Old	35 to 44 Years Old	45 to 54 Years Old	55 to 64 Years Old	65 Years and Older
1994	36.8	64.6	75.2	79.1	77.2
1995	38.7	65.1	75.2	79.9	78.1
1996	39.3	65.5	75.5	80.0	78.9
1997	38.6	66.3	75.6	80.3	79.1
1998	39.3	66.2	75.5	80.4	79.2
1999	39.1	66.5	76.4	80.8	80.4
2000	40.2	67.5	76.7	80.3	80.3
2001	40.8	68.1	77.2	81.5	79.7
2002	41.9	67.8	76.3	81.6	80.2
2003	40.8	68.2	76.3	80.8	80.1
2004	43.6	69.4	77.0	82.4	81.1
2005	42.8	68.7	76.3	81.3	80.3
2006	42.4	68.9	76.3	81.0	80.6
2007	41.9	67.6	75.5	80.6	80.5
2008	41.2	67.6	75.4	80.1	80.2
2009	39.0	66.8	74.5	79.9	80.4
2010	39.0	65.6	73.6	78.7	80.4
2011	37.5	63.8	72.3	77.8	80.8
2012	36.5	62.2	71.4	77.1	81.6
2013	36.7	60.3	70.9	76.7	80.9
2014	35.9	60.2	70.7	76.4	80.1
2015	34.8	58.0	69.9	75.4	78.5
2016	34.1	58.3	69.1	74.7	77.9

Sources: U.S. Census; Current Population Survey/Housing Vacancy Survey

Table 2: Homeownership Rate by Race and Ethnicity (1994:Q2 to 2016:Q2)

	White	Black	Hispanic	All Other Races
1994	69.9	41.8	41.1	46.3
1995	70.2	42.6	42.2	47.6
1996	71.7	43.7	43.9	50.0
1997	72.1	44.4	43.3	52.7
1998	72.5	44.7	43.9	53.5
1999	73.2	45.3	44.9	53.2
2000	73.7	46.7	45.4	54.4
2001	74.1	47.9	46.1	55.2
2002	74.5	46.5	46.1	55.3
2003	75.2	47.3	46.2	55.3
2004	76.2	49.7	47.4	58.7
2005	75.6	48.0	49.2	58.0
2006	75.9	47.2	50.0	59.3
2007	75.4	46.3	50.0	59.4
2008	75.2	47.8	49.6	58.4
2009	74.9	46.5	48.1	57.6
2010	74.4	46.2	47.8	55.7
2011	73.7	44.2	46.6	56.0
2012	73.5	43.8	46.5	55.0
2013	73.3	42.9	45.9	54.5
2014	72.9	43.5	45.8	54.7
2015	71.6	43.0	45.4	52.6
2016	71.5	41.7	45.1	51.2

Source: U.S. Census; Current Population Survey/Housing Vacancy Survey

References

Acolin, Arthur, Jesse Bricker, Paul Calem, and Susan Wachter. "Borrowing Constraints and Homeownership." *The American Economic Review*, 106:5 (2016a), pp. 625–629.

Acolin, Arthur, Jesse Bricker, Paul S. Calem, and Susan M. Wachter. "Borrowing Constraints and Homeownership over the Recent Cycle." Wharton Real Estate Center Working Paper (2016b).

Acolin, Arthur, Laurie S. Goodman, and Susan M. Wachter. "A Renter or Homeowner Nation?" *Cityscape* 18.1 (2016), pp. 145–159.

American Enterprise Institute. "February 2017 First-Time Buyer Index from AEI's ICHR." (2017), www.aei.org/publication/february-2017-first-time-buyer-index-from-aeis-ichr/.

American Enterprise Institute. "June 2015 Mortgage Risk Index from AEI's ICHR." (2015), https://www.aei.org/publication/june-2015-mortgage-risk-index-from-aeis-ichr/.

Bai, Bing, Jun Zhu, and Laurie Goodman. "A Closer Look at the Data on First Time Homebuyers" (2015). Washington, D.C.: Urban Institute, www.urban.org/sites/default/files/publication/49876/2000210-A-Closer-Look-at-the-Data-on-First-Time-Homebuyers.pdf.

Bhutta, Neil. "The Ins and Outs of Mortgage Debt During the Housing Boom and Bust," *Journal of Monetary Economics,* 76 (2015), pp. 284–298.

Elliott, William, Michal Grinstein-Weiss, and Ilsung Nam. "Is Student Debt Compromising Homeownership as a Wealth Building Tool," Center for Social Development Working Paper 13-33 (2013).

Gyourko, Joseph, Donghoon Lee, and Joseph Tracy. "First-Time Homebuyers: The Role of Thin Credit Files," (2015).

Haughwout, Andrew, Donghoon Lee, Joseph S. Tracy, and Wilbert Van der Klaauw. "Real Estate Investors, the Leverage Cycle, and the Housing Market Crisis." Federal Reserve Bank of New York Staff Report 514 (2011).

Joint Center for Housing Studies. "The State of the Nation's Housing." (2016). www.jchs.harvard.edu/sites/jchs.harvard.edu/files/jchs_2016_state_of_the_nations_housing_lowres.pdf.

Lee, Donghoon, and Wilbert Van der Klaauw. *An introduction to the FRBNY Consumer Credit Panel*. Staff Report 479 (2010).

Masnick, George S., Diane Giordmaina, and Eric S. Belsky. *Updated 2010-2020 Household and New Home Demand Projections*, *Joint Center for Housing Studies of Harvard University*, 2010.

McCue, Daniel, George Masnick, and Chris Herbert. "Assessing Households and Household Growth Estimates with Census Bureau Surveys. Working Paper W15-5. Cambridge, MA: Joint Center for

Housing Studies of Harvard University, 2015.

Mezza, Alvaro, Daniel R. Ringo, Shane Sherland, and Kamila Sommer. *On the Effect of Student Loans on Access to Homeownership*, Working Paper 15 (2016).

National Association of Realtors. "First-Time Buyers, Single Women Gain Traction in NAR's 2016 Buyer and Seller Survey" (2016), https://www.nar.realtor/news-releases/2016/10/first-time-buyers-single-women-gain-traction-in-nar-s-2016-buyer-and-seller-survey.

Urban Institute. "Do We Have a Generation Stuck in Starter Homes?" (2016), www.urban.org/urban-wire/do-we-have-generation-stuck-starter-homes.

U.S. Census. "Housing Vacancies and Homeownership." (2017), https://www.census.gov/housing/hvs/data/histtabs.html

U.S. Department of Housing and Urban Development. "New and Existing Home Sales" (2017), https://www.huduser.gov/portal/ushmc/hd_home_sales.html.

Appendix A: Data Steps

The Consumer Credit Panel (CCP) is a 5 percent sample of all individuals with at least one credit record. These individuals form the principal sample, and they receive an ID that remains constant over time. In addition, in any quarter, a household ID (HHID) is attributed to all credit records sharing the same address as individuals in the principal sample. Credit records for the members of that household are also available over time (until they move out of the primary consumer's household).

We follow the following steps to identify the number of first-time homebuyers defined as not having had a first-lien mortgage in the previous three years and having one in that quarter:

- Extract all individuals in a given quarter and their household IDs
- Drop duplicate household IDs so that each household has only one record
- Draw a 1 percent sample of households
- Match the household IDs from the household sample back to the individual IDs
- Drop households with more than 10 records (likely to be multiunit addresses rather than real households); this is the sample of individuals in the households used to determine the number of first-time homebuyers
- Use the individual IDs to extract mortgage history for all individuals in the sample of households.
- Identify for individuals to see whether they had a mortgage in any of the previous 12 quarters; if they didn't have a mortgage in any of these quarters and one now, identify as first-time homebuyer, even if missing data during one or more quarters
- If any member of household is a new homebuyer and none of the household members had mortgages in the previous three years, identify household as a first-time homebuyer
- Sum up the number of first-time homebuyer households
- Extrapolate the number of first-time homebuyer households identified from sample to entire population