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**Trends in Household Portfolio Composition**

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## **Trends in Household Portfolio Composition\***

Jesse Bricker, Kevin B. Moore and Jeffrey P. Thompson

### **I. Introduction**

Understanding the composition and distribution of household balance sheets—and how they have evolved over time—is important for a host of economic policies. The allocation of assets and debts will influence household exposure to unexpected economic shocks (Mian, Rao, and Sufi, 2013) and the preparedness of the current workforce for future retirement (Henriques, Jacobs, Llanes, Moore, and Thompson, 2018), and portfolio composition has implications for the transmission of monetary and fiscal policy (Mian, Rao, and Sufi, 2013; Benmelech, Miesenzahl, and Ramcharan, 2017; and Poterba and Samwick, 2003), and can influence the future path of wealth and income inequality (Piketty, 2012; Stiglitz, 2012).

In this chapter we use data from the Federal Reserve Board’s Survey of Consumer Finances (SCF) to explore how household asset portfolios in the United States have evolved from 1989 to 2016. Overall, household assets have grown from around \$25 trillion in 1989 to just above \$100 trillion in 2016. Because the aggregated wealth and asset data in the SCF are consistent with the Financial Accounts of the United States (FA), the National Income and Product Accounts (NIPA), and other macroeconomic data sources (Dettling, Devlin-Foltz, Krimmel, Pack, and Thompson, 2015), we can use the SCF to better understand the distribution of aggregate U.S. household assets.<sup>1</sup>

Throughout this period, two key assets—housing and financial market assets—have driven the household balance sheet evolution. The relative importance of housing and financial market

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<sup>1</sup> The SCF captures the entire balance sheet, but here we focus primarily on assets since there are other treatments of debt in this volume. In this chapter we use portfolio to refer to all types of assets, both financial and non-financial.

assets has fluctuated over time. From 1989 to 2001, financial market assets became more prevalent in the household portfolio as retirement accounts—such as IRAs and workplace 401(k)s—increased across families, and defined benefit retirement plans faded away. From 2001 to 2007, the increases in house values and the homeownership rate pushed the share of assets in housing higher, while the fall of homeownership and the rise of financial markets from 2010 to 2016 has pushed up the share of financial assets.

However, we also describe a great heterogeneity in household balance sheets that is overlooked in averages and aggregates. For example, in 2016, housing makes up about 30 percent of the average household asset portfolio and financial market assets make up about 40 percent. However, most families hold a relatively small share of assets in financial markets, and instead hold primarily housing assets. Families near the median, for example, hold about 60 percent of assets in housing and only 20 percent in financial markets. The asset portfolio of the average household most closely resembles families near the 90th percentile of assets.

We also observe that ownership of assets has become more concentrated over time. Increased concentration is shown within the distribution of assets, the distribution of income, and also by age. Since the processes that create wealth for a household unfold over time, the relationship between assets and age can be complicated. We explore the trends in asset levels and portfolio composition over the lifecycle later in this chapter using a birth-year/income-group cohort analysis of the SCF.

We observe the typical life-cycle asset accumulation processes among low, middle, and high-income families. Though the levels are different magnitudes, assets generally increase throughout the typical working life in each income group, and peak just before the typical retirement age. Afterwards, asset levels de-cumulate, but only partly. We also observe movement out of “risky” assets (asset classes especially exposed to asset price shocks), particularly business and equities, as households transition into retirement. Homeownership remains high up through the early eighties – the last point where we observe the oldest cohorts. The housing share of total assets actually rises in retirement as families remain in their homes and start to consume out of their other assets.

Finally, we focus on quantifying financial vulnerabilities in family balance sheets. We first show that families with a combination of two potential vulnerabilities—high debt payments and high loan-to-value ratio on their primary residence—peaked in the late 2000s, and are at the

lowest level in 2016 since the early 1990s. We also show that nearly all of the time series variation is due to middle income families, who also hold most of their assets in housing and are often the most highly-levered in the housing market.

## **II. SCF data and comparison to aggregates**

The SCF is a cross-section survey, conducted every three years by NORC on behalf of the Federal Reserve Board (FRB) and with the cooperation of the Department of Treasury (SOI).<sup>2</sup> The SCF provides the most comprehensive and highest quality survey microdata available on U.S. household wealth. SCF families respond to questions about financial and nonfinancial assets, debts, employment, income, and household demographics.

The concentrated nature of wealth means that a random sample of U.S. families is unlikely to capture the small minority of families that hold the large majority of wealth. Wealthy families are also less likely to participate in a survey, meaning that a random sample of families may incorrectly estimate the mean and variance of wealth. The SCF provides unbiased and efficient estimates of the distribution of household wealth by using a dual-frame sample design, whereby a nationally representative set of families (the area probability or “AP sample”)—selected from an address-based frame—is supplemented with an oversample of wealthy families selected from administrative records derived from income tax returns (the “list sample”).

The AP sample provides a nationally-representative sample of families.<sup>3</sup> In the 2016 SCF, there are about 6,000 families surveyed by the SCF, of which about 1,500 are from the list sample. There are no administrative data directly associated with measuring the cross-section of wealth at a point in time.<sup>4</sup> Thus, selecting the list sample depends on inferring wealth from administrative records derived from income tax returns—the Individual and Sole Proprietor (INSOLE) data file maintained by SOI (Statistics of Income, 2012).<sup>5</sup> The INSOLE file is a

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<sup>2</sup> See Bricker, et al (2017) for results from the most recent triennial SCF.

<sup>3</sup> See Tourangeau, et al. (1993), and O’Muircheartaigh et al. (2002) for more information on the AP sample selected by staff at NORC at the University of Chicago.

<sup>4</sup> The only official wealth record that exists in the U.S. comes from an estate tax. This tax applied at death and only to families with estates greater than \$5 million (since the mid-2000s).

<sup>5</sup> The INSOLE file consists of a sample of individuals and sole proprietorship tax filings from the IRS administrative tax data, statistically edited for quality by SOI. Tax filings with unique income are oversampled and many high-income records in the INSOLE file are sampled with certainty (Statistics of Income, 2012). The INSOLE file is a sample of the IRS administrative tax data, so the LS is a sample from a sample. No correction for this is made during the LS sampling procedure, though, because the certainty sample and rare incomes found in the INSOLE file are a near certainty sample of the LS target population (Kennickell and Woodburn, 1999). The unit of observation in

sample of tax filings from the IRS administrative tax data, statistically edited for quality by SOI. In the list sampling process, wealth is inferred from these income records through two models that relate wealth to income.<sup>6</sup>

The SCF not only oversamples wealthy families but also ensures adequate response rates through careful field work (Kennickell, 2007). Response rates for list sample families range from about 35 percent (for families near the 99<sup>th</sup> percentile percent of the wealth distribution) to about 10 percent for the very wealthiest families (the 99.9<sup>th</sup> percentile). These response rates are constructed before the field period begins, and should not be taken as evidence that differential non-response biases the upper end estimates in the SCF. In fact, high-end families that respond to the SCF are observably similar to those that do not respond (Bricker et al 2016).

The SCF AP and list families are woven together by a set of sample weights (Kennickell and Woodburn, 1999 and Kennickell, 1999). In each sample, the base sampling weight is adjusted to account for non-response, population targets, and the strengths of each sample. Overall, the sampling and weighting mechanisms serve to select a set of high-wealth tax filers and fit those families into a set of US families.

#### *Wealth measurement: Comparing the SCF to Macro Aggregates*

A test of the success of the SCF sample design is a comparison of aggregate assets and debts measured in the SCF to those measured in other data sources used to track the macro-economy—including the Financial Accounts of the United States (FA). There are some conceptual measurement differences between the SCF and the other sources, though, which make a direct comparison inappropriate. However, once these concepts are put into comparable terms the SCF and the other data sources produce very similar aggregate measures (Henriques and Hsu, 2013 and Dettling et al, 2015).

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the INSOLE data is a tax unit while the SCF unit of observation is a family. In practice, there are millions more tax units than families because several members of a family can file distinct tax returns; without a correction, these multi-filer families would have a disproportionately large chance of being selected. To account for this in the SCF LS sampling process, the INSOLE sampling weight of tax units that filed “married filing separately” is divided in half. Further, all filers below the age of 18 are dropped (a family headed by someone less than age 18 is ineligible for the SCF). Still, to a certain extent, the discrepancy between tax units and families remains in the adjusted INSOLE sampling frame.

<sup>6</sup> See Bricker, Henriques and Moore (2017) for more detailed information on SCF sampling.

Notably, the SCF asset measure used in the paper does not measure the family's implied asset claims for defined benefit (DB) pensions, while national wealth measured in the FA *does* include DB pension wealth. After adjusting the FA measure to exclude DB pension wealth, the level and trend in aggregate total financial assets in the SCF is similar to that from the Financial Accounts (Figure 1). Various other studies have added DB pension wealth to the SCF measure of wealth; those studies find that DB pension wealth is claimed by families in the upper-middle part of the wealth distribution (Devlin-Foltz, Henriques, and Sabelhaus, 2016; Henriques, Jacobs, Llanes, Moore, and Thompson, 2018; Bricker et al, 2016).

The primary differences across the two sources are that the SCF find greater business assets and housing values (**Figure 1**). Since real estate holdings account for a large portion of non-corporate business assets, the differences between both categories are linked to real estate. In the case of housing values, the SCF relies on self-reports by homeowners while the FA uses housing wealth from the American Housing Survey (AHS) up through the mid-2000s, which is then updated by repeat-transaction house price indices in the years since. The divergence in real estate assets across the surveys dates back to this change in methodology adopted by the FA in the mid-2000s. If the aggregate housing values in the FA data were calculated instead using Zillow's AVM model, the SCF and FA values would be much closer (Gallin, Molloy, Nielsen, Smith and Sommer, 2018). This shows that aggregate asset valuations can potentially differ considerably across data sources.

#### *The SCF and other household finance research*

As more attention has been paid to household finance, the SCF is often the source for household balance sheet information in the United States (Campbell, 2006). The SCF has been used to examine the impact of the Great Recession on the balance sheet of young people (Dettling and Hsu, 2014), mortgage borrowing leading up to the Great Recession (Foote, Lowenstein, and Willen, 2016), entrepreneurship and asset diversification (Moskowitz and Vissing-Jorgensen, 2002; Cagetti and Di Nardi, 2006), the marginal propensity to consume (Carroll, Slacalek and White, 2017), precautionary saving (Cagetti, 2003), and the equity participation puzzle (Bertaut and Starr-McCluer, 2001; Haliassos and Bertaut, 1995), among other issues.

### **III. Composition of Average Household Portfolios**

Households can choose to hold two main types of assets: those financial in nature—such as those held at depository institutions and brokerages—or non-financial, such as housing and businesses. Throughout the 1989-2016 sample period, nearly all families owned assets of some kind (**Table 1**). Early in the sample period ownership rates were about 90 percent for each main type; by the end of the period, financial assets are more widely-held by families than non-financial assets. Throughout this section, we use averages to describe how household portfolios have changed between the 1989 and 2016 sample period.

Mean asset holdings in the early (1989-1995) part of the sample period were about \$375,000 thousand (in \$2016) (**Table 2**). In total, financial assets were about 30 percent of the aggregate household balance sheet at that time (described in the gray striped areas of Figure 2), and non-financial assets are about 60 percent of the total (the solid gray areas of Figure 1). The remaining “other” assets—such as vehicles, cash-balance life insurance, and savings bonds—are about 10 percent of the total. Average debt levels were about \$52,000, and about three-quarters of total debt owed was in the form of mortgage debt. Though the balances are smaller, credit card debt and vehicle debt were widely-owed by families at the time, too.

Mean real assets grew by 50 percent from the early sample period to 1998-2001. The growth was led by financial assets, which grew to be almost 40 percent of assets (**Figure 2**), up from about 30 percent in the previous period. Financial asset growth was led by directly-held financial market assets (such as stocks, bonds, and mutual funds) and indirectly-held financial market assets held for retirement (such as IRAs and 401(k)-type pension plans).<sup>7</sup>

The growth in directly-held and indirectly-held financial market assets occurred at both the intensive and extensive margins, and for voluntary and involuntary reasons. At the intensive margin, the mean value of financial market and retirement accounts more than doubled from the earlier period (**Table 2**), reflecting the growth of in the value of publicly-traded equities. At the extensive margin, the share of families that owned equity—whether held directly or through a retirement account—grew from about 35 percent to 50 percent (**Table 1**). Part of the growth at the extensive margin was due to families entering the financial markets through employer-sponsored defined contribution (DC) pension plans, such as 401(k)s. DC pension plans gained in popularity during the 1990s, and employee coverage by DC pension plans overtook coverage by

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<sup>7</sup> The other group of financial assets are bank-type assets (such as checking and saving accounts, and CDs).

defined benefit (DB) pensions during this time.<sup>8</sup> But families also entered the equity markets by directly purchasing equities—nearly 30 percent of families did so by 2001, up from 20 percent in the early period—and through self-directed retirement accounts (IRAs). The 2001 peak in equity ownership coincided with the end of the “dot-com bubble,” the stock market correction of 2000-2001, and the 2001 recession.

The mean value of housing assets also increased in the 1998-2001 period (Table 1), as homeownership rates and mean housing values both increased (**Table 2**). Housing debt grew, too: 10 percent more families owed mortgage debt than in the earlier period, and mortgage debt levels grew by about 25 percent. The growth in mortgage debt pushed total debt higher by about 25 percent.

In the 2004-2007 period, the real value of average household assets grew again by about 50 percent, though driven by house price increases this time. The homeownership rate continued to increase after the 2001 recession, peaking in 2004 at more than 69 percent and remaining near that level through 2007. As housing prices increased from 2004 to 2007, then, more families enjoyed the asset price increase; for both of these reasons, housing became the dominant asset on household balance sheets. In the 2004-2007 period, about 40 percent of household assets were held in the form of housing.

Along with the increase in housing assets was an increase in mortgage debt (**Tables 1 and 2**). Relative to the 2001-2004 period, about 10 percent more families owed mortgage debt—48 percent of families now held a mortgage—and the real value of average mortgage debt increased by 50 percent—from \$52,000 to \$80,000. The increase in mortgage debt was partly due to new entrants in the housing market, and also to repeat buyers, and cash-out refinancing. Other debts, though, were still widely held at the time, especially through credit cards and vehicle loans.

During the 2004-2007 period, the average value of financial market and retirement assets remained near their 1998-2001 levels, but shrank as a share of the balance sheet. The share of families directly holding financial market assets fell, but the share of families holding any type of equity remained at around 50 percent (Table 1).

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<sup>8</sup> Part of this increase in household assets, then, was due to a previously off-the-books asset entering the household balance sheet.

Housing values and the homeownership rate began falling at the end of the 2004-2007 period, and by 2010 housing prices had also fallen by 25 percent, on average, from the 2006 market highs. Equity markets had also experienced a 15 percent decline. Overall, mean asset values fell by about 15 percent between the 2007 and 2010 surveys.

As the U.S. economy recovered in 2013-2016, the real value of assets has grown by about 25 percent (**Table 2**). Though the equity market began a recovery in 2010, housing prices did not increase until around 2013. Financial assets are again almost 40 percent of total assets (**Figure 2**), and housing as a share of assets is just over 30 percent, the lowest point in the 1989-2016 period. The real value of equities, businesses, and housing has increased. However, because the homeownership rate has continued to fall—to less than 64 percent by 2016—fewer families have been able to benefit from the recovery in house prices.

Between 2010 and 2013, though, both the fraction of families with debt and average debt balances declined. This decline was observed across nearly all debt types except student loans. The fraction of families with mortgages fell from 49 percent to 43 percent, the fraction revolving credit card debt fell from 46 percent to 38 percent, and the fraction with other debt remained at about 50 percent. Average real debt balances fell by about 10 percent from 2010 to 2013, led by declines in mortgage, other residential, and credit card debt balances, while the real average family debt balances of other forms of debt increased by about 1 percent.

From 2013 to 2016, however, the fraction of families with any debt increased markedly—rising above the previous peak from 2007—to 77 percent, despite a continued decline in the fraction of families with mortgage debt (down to 42 percent). The fraction revolving credit card debt rose to nearly 44 percent, and the fraction with other forms of debt rose to 52 percent—led by vehicle and education debt—to its highest value since 1989. Real debt balances rose by about 1 percent despite a 5 percent decline in mortgage debt (to \$66,000). Average real credit card debt rose by 11 percent and other debt rose by 26 percent.

#### **IV. Household portfolios across the asset distribution**

Though the average household asset portfolio is mixed between housing and financial market assets, the main asset for most families is housing, with financial market assets representing a relatively small part of the portfolio. In fact, because asset holdings are highly

concentrated at the top of the asset distribution, much of the change in the aggregate portfolio is driven by asset changes in the top 10 percent of the asset distribution.

**Figure 3** shows the asset composition of households at various points in the asset distribution and the average asset composition in 2016. The most noticeable feature is how much asset portfolios vary across the distribution. Housing is the most common asset for most families, while families in the top 1 percent of the asset distribution hold mostly private equity in businesses and financial market assets.<sup>9</sup>

The main assets of families in the bottom 25 percent of the asset distribution are “other” assets, which include vehicles, savings bonds, cash value life insurance, and other miscellaneous assets. Transaction accounts, such as checking and savings accounts, are the next most common assets, and only about 10 percent of the portfolio is in housing and retirement assets. The debt to asset ratio of these families is more than 100 percent, and the mean asset value is about nine thousand (**Table 3**). There are families of all ages in this group, but the average age is 43, which is seven years younger than the average age of household heads in 2016. In the next section we consider age and cohort may be influencing these results, but for now it is left untreated.

The asset portfolio of families near the median—in the 25<sup>th</sup> to 50<sup>th</sup> percentiles or the 50<sup>th</sup> to 60<sup>th</sup> percentiles—is heavily skewed toward housing.<sup>10</sup> About 60 percent of the asset portfolio of these households is housing, compared to 30 percent of the average household portfolio. The portfolio of households near the median is also less composed of financial market and retirement assets, which make up less than 15 percent of assets, while they are about 35 percent of assets in the average portfolio. The average value of assets in the 25<sup>th</sup> to 50<sup>th</sup> percentiles is about 97 thousand and is about 228 thousand in the 50<sup>th</sup> to 60<sup>th</sup> percentiles (**Table 3**).

The portfolio composition of families in the 80<sup>th</sup> to 90<sup>th</sup> percentiles, and 90<sup>th</sup> to 99<sup>th</sup> percentiles is similar to the average portfolio, underscoring how different the aggregate asset portfolio is from most families’ asset portfolios. However, the portfolio composition of the top 1

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<sup>9</sup> The composition of assets across the U.S. asset distribution is remarkably similar to that found in Sweden (Bach, Calvet, and Sodini, 2016), where the wealthiest families are invested in private equity and families from the 50<sup>th</sup> to 95<sup>th</sup> percentiles are mainly invested in housing. In Sweden, as in the U.S., leverage ratios also decline as assets increase.

<sup>10</sup> The asymmetry of the groups we use to show portfolios across the distribution is largely a function of the concentration of assets in the right tail of the distribution.

percent is dominated by business and financial market assets, highlighting the concentration of these assets at the top the distribution.

The composition of assets across the distribution in 1989 is fairly similar to that at the end of the sample in 2016 (bottom panel of **Figure 3**). The most common asset for families in the bottom 25 percent, for example, is “other” assets in both years, the most common asset for most families is housing in both years, and the most common assets for the top 1 percent are privately-held businesses and financial market assets. However, we can see the rise of retirement account assets across the distribution (in the light gray striped bars), and in financial market assets (in the medium gray striped bars). The leverage ratio is typically higher in 2016 for all percentile groups below the 80<sup>th</sup> percentile, underscoring the increase in debt observed for most families.

**Figure 3** also shows the ratio of total debts to total assets—a measure of leverage—for each percentile group in black (with scale in the right hand side). Two things stand out: the general increase in leverage from 1989 to 2016, and that—within a given year—leverage decreases as assets increase.

First, despite the decline in aggregate debt since 2010, leverage ratios are higher for each group below the 80<sup>th</sup> percentile in 2016 than in 1989. For families in the bottom 25 percent of the asset distribution, the leverage ratio is almost 1.4, meaning that they have aggregate debts that are almost 40 percent larger than aggregate assets; in 1989 this figure stood at 0.9. Much of the increase is due to education debt, which is almost 70 percent of this group’s debt in 2016 (**Appendix Figure 1**).<sup>11</sup>

Second, leverage ratios are lowest at the top of the asset distribution and rise steadily moving down the asset distribution. Increases in the leverage ratio are incremental over the top three-quarters of the asset distribution, and rise sharply for the bottom 25 percent. In 2016, for example, the leverage ratio for the 90 to 99<sup>th</sup> percentiles was less than 0.10, but was about 0.45 for the 50 to 60<sup>th</sup> percentiles. Families in the middle percentiles hold mostly housing assets, which is typically a highly levered asset.

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<sup>11</sup> Mortgage debt makes up the largest share of debt for all groups except the bottom 25 percent (appendix figure 1). The share of debt in mortgages to finance a primary or secondary residence is about 75 percent, on average, and is between 75 and 90 percent for most asset percentile groups.

Because the main asset of families in the middle percentiles is housing, and housing is typically financed by debt, we re-ran **Figure 3** and included home equity—the asset value of the home minus the outstanding debt on the home—in place of the asset value of the house (not shown). Using this measure, housing occupies a smaller share of the asset bundle for families in each asset percentile, and where average leverage ratios are highest there is typically a greater reduction in share. But the qualitative takeaways from Figure 3 remain unchanged, and housing continues to be the dominant asset for most families, especially those in the 25<sup>th</sup> to 80<sup>th</sup> percentiles.

#### *Across time*

Looking at bookended years can obscure the changes in the distribution across the whole 1989-2016 sample. **Figures 4 and 5** shows these changes across survey years by plotting the share of assets in two key assets—housing and financial markets—for families near the median (the 25<sup>th</sup> to 50<sup>th</sup> percentiles or the 50<sup>th</sup> to 60<sup>th</sup> percentiles), near the 75<sup>th</sup> percentile (the 70<sup>th</sup> to 80<sup>th</sup> percentiles), the 90<sup>th</sup> to 99<sup>th</sup> percentiles, and the average.

The most noticeable feature of **figure 4** is that for families in the 80<sup>th</sup> percentile and below (represented by the 25<sup>th</sup> to 50<sup>th</sup>, the 50<sup>th</sup> to 60<sup>th</sup>, and 70<sup>th</sup> to 80<sup>th</sup> percentiles), housing has always been the key asset, usually ranging from 55 to 65 percent of assets. However, each group shows the same cyclical trend as the average, as housing became less important in the late 1990s, more important in the mid-2000s, and then less important again by 2016.

The share of assets in financial and retirement assets (**Figure 5**) has slowly trended up for families in the 25<sup>th</sup> to 50<sup>th</sup> and 50<sup>th</sup> to 60<sup>th</sup> percentiles, but has remained relatively low—between 10 to 15 percent of assets—from 1998 to 2016. Families in the 70<sup>th</sup> to 80<sup>th</sup> percentiles have a higher share of financial and retirement assets—around 20 percent—since 1998, though the share has ticked up to about 25 percent by the end of the sample.

The share of assets in housing and the share in financial and retirement assets for the families in the 90<sup>th</sup> to 99<sup>th</sup> percentiles almost perfectly tracks the average share of assets in housing over time, both in level and in trend.

An important factor in the accumulation of wealth (distinct from net savings and inheritances) over time is accrual of capital gains. The longer assets are held, and the greater the

asset price increases over the period of ownership, the larger will be the gains in wealth. For several major asset classes (real estate, directly-held businesses, and equities) the SCF includes information that allows us to measure unrealized capital gains. Unrealized gains account for an important share of total assets, particularly for wealthier families. Between 1989 and 2007, unrealized gains accounted for 25 to 35 percent of total assets for the 90 to 99<sup>th</sup> percentiles (**Figure 6**). Over this same period, unrealized gains were about one-third of total assets for households around the middle of the asset distribution.

In the 2007-08 financial crisis, the housing and stock markets collapsing resulted in dramatic losses in wealth and a sharp decline in the unrealized gains share of assets. On average the unrealized gain share fell over 10 percentage points, dropping from 36 percent of all assets in 2007 to 24 percent in 2010. With the recovery of the stock market in 2010 the unrealized gain share started to recover at the top of the distribution. For the 70 to 80<sup>th</sup> percentiles and below, however, the unrealized gain share continued to decline as the housing market continued to languish between 2010 and 2013. Between 2013 and 2016 with the housing market recovering and the stock market booming, the unrealized gain share of assets rose across the distribution of assets.

## V. Asset concentration

During our 1989-2016 sample period, there has been a well-known increase in wealth concentration, documented by the rising share of wealth held by the “top 1 percent” of families in the SCF (Bricker, Henriques, Krimmel, and Sabelhaus, 2016), in capitalized income tax data (Saez and Zucman, 2016; Bricker, Henriques, and Hansen, 2018), and in a combination of the SCF and other wealth surveys (Fisher, Johnson, Smeeding, and Thompson, 2018). The focus of this chapter is household *assets* while the focus of these papers is *wealth*—the difference between household assets and debts.

As shown in **Figure 7**, though, asset concentration has increased along with wealth concentration during our sample period. From 1989-1992, the top one percent of families—ranked by asset holdings—owned about 27 percent of all assets. This share increased to about 30 percent during the 1995 survey year and remained at that level until the 2010 survey year. Since then, though, the share has risen notably to 32 and then 35 percent in the 2013 and 2016 surveys, respectively.

The asset concentration plateau from around 1995 to 2010 is generally consistent with wealth concentration estimates from the SCF (Bricker et al., 2016; Kuhn Schularick, and Steins, 2018) and from estate tax data (Kopczuk and Saez, 2004; Saez and Zucman, 2016). The SCF also shows a notable increase in wealth concentration from 2010 to 2016; there are no recent estate tax data estimates, though. These wealth concentration estimates stand in contrast to those first published from capitalized income tax data (Saez and Zucman, 2016), where wealth concentration estimates rise fairly steadily from 1989 to 2013, though tweaking the capitalization model assumptions generally reproduces the SCF and estate-tax wealth concentration trend (Bricker, Henriques, and Hansen, 2018).

In each survey year, the share of assets held by the top 1 percent—ranked by assets—are smaller than the corresponding share of wealth held by the *wealthiest* top 1 percent, usually by about 3 to 5 percentage points (not shown, see Bricker et al., 2016). Leverage tends to increase as assets decrease (**Figure 3**), which reflects the leading role of housing in the asset bundle held by families outside of the top groups and which serves to equilibrate asset concentration relative to wealth concentration.

The asset share for the top 10 percent is similar to the top 1 percent—described above—which started rising slowly in the 1990s, and then somewhat more rapidly in the 2010s, such that the top ten percent held 70 percent of total assets by 2016.

Concentration of assets and wealth has also occurred along other dimensions, including by income and by age. Higher-income families' share of total assets has risen, as has the share of assets held by older families. For example, young families (with a head under age 45) now hold only 13 percent of total assets, down from about 30 percent in 1989 (**Figure 8**). The share of assets held by older families (head age 55 or older) rose from nearly 50 percent in 1989 to 70 percent in 2016.

Some of this shift in the distribution, certainly by age but also by income and asset group, are a result of the general trend toward an aging population that we have experienced over the last three decades. Assets are accumulated and wealth is built over time, and the life-cycle processes that influence household-level decisions could have important implications for the economy-wide levels, composition, and distribution of assets.

## **VI. Cohorts**

Life cycle processes are important to understanding the evolution of wealth and its composition over time. The balance of debt and assets change over the life cycle as does the composition of assets. Young people take on debt, first, as they build their human capital, and then as they take ownership of a primary residence. Accordingly, residential real estate dominates the balance sheets of young families. Progressing through life, families accumulate wealth that they will ultimately draw upon in retirement and potentially pass on to heirs in the form of bequests.<sup>12</sup> Financial assets, including directly held equities and employment-related pension plans, become increasingly prominent over time. While these processes play out across individual households, as society ages they also influence overall composition of wealth.

One thing we seek to understand in this section is the ways in which the stylized life-cycle processes described above are different for different parts of the distribution. Since wealth is so highly concentrated, the life-cycle patterns observed at mean of the data are driven primarily by wealth dynamics of households at the top of the distribution. We are interested to see if households at the bottom or the middle of the distribution exhibit the same broad life-cycle patterns exhibited in the aggregate data. In addition, we would like to know how the financial crisis affected life-cycle patterns across the wealth distribution and for different birth cohorts.

The composition of wealth also differs dramatically across the distributions on wealth and income. Businesses and directly-held financial assets account for a substantial portion of assets for families at the top, but only a minor share at the middle of the distribution, and are almost completely absent at the bottom. Housing dominates the portfolios of households at the middle of the distribution, and illiquid assets—primarily vehicles—account for the lion’s share at the bottom. Since the portfolios of low, middle, and high-wealth families differ substantially, the long-term trends toward rising concentration in the distribution of wealth might also be influencing the overall composition of wealth. Part of the cohort analysis will explore how these different components of wealth evolve over the life-cycle for households at different part of the

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<sup>12</sup> Households tend to not exhaust their wealth, with substantial numbers leaving inheritances for future generations. Past research has concluded that the bequest motive is powerful, and accounts for one-third to as much as one-half of all savings (Davies and Shorrocks, 2000; Kopczuk and Lupton, 2007). Whether it is best to view bequests as a distinct motive for saving that is separate from the life-cycle model (Kotlikoff and Summers, 1981) one that can be incorporated into the into the standard model through extension is beyond the scope of this chapter. As a practical matter, we follow Dynan, Skinner, and Zeldes (2002) and think of the motivation for saving at older ages (precautionary vs. bequest) as potentially impossible to disentangle. The focus of this chapter is less about the precise motive for saving as it is using the life-cycle process as a way to separate age effects from wealth trends.

wealth distribution, and examine whether recent cohorts are following similar patterns compared to previous cohorts.

Household saving decisions are, of course, not solely motivated by life-cycle considerations. The need to smooth consumption against adverse shocks – through precautionary savings – is ubiquitous. Previous research using the SCF indicates that precautionary savings accounts for a relatively small but important part of total savings, particularly among younger households and business owners (Cagetti, 2003; Hurst, Lusardi, Kennickell, and Torralba, 2010).

In this section we explore the joint influence of these factors – age and distribution – on trends in wealth and the composition of wealth using a cohort analysis of the SCF. We identify cohorts based on ten-year bins of birth-year; the earliest of the six cohorts analyzed was born between 1924 and 1933 (ages 83 to 92 in 2016) and the most recent was born between 1974 and 1983 (ages 33 to 42 in 2016). Within each of these cohorts, we also sort households by their location in the distribution of “normal” income for each year of the survey. The income groups we use are the bottom half of the distribution, the next 45 percent (between the 51<sup>st</sup> and 95<sup>th</sup> percentiles), and the top five percent of the income distribution.

The SCF asks households not just about wealth and income, but also about the income that households “usually” receive in a “normal year.” Normal income is viewed as a proxy for permanent income, and has been shown in previous research to be a stable classifier that smooths transitory shocks and ranks households by the resources that are typically available to them (Ackerman and Sabelhaus, 2012). Since the questions about normal income have only been included in the SCF since 1995, the analysis in this section is limited to the eight cross-sections between 1995 and 2016.

### ***Interpreting the Cohort Figures***

Below we examine trends in a select group of wealth indicators by birth-year & income group cohorts. First we explore trends in median cohort assets, then the share that own homes, equities, and business, the share holding a mortgage on their primary residence, and finally the share of total assets accounted for by houses, equities, and businesses. Each of the nine figures in this section uses the same format, which we will discuss in detail before introducing the first cohort figure in order to aid interpretation.

The cohorts in the bottom half of the income distribution are shown with dots, the next-45 percent are shown with solid lines, and the high-income cohorts are shown with dashes. Each birth-year/income-group cohort is represented by a line-segment that spans between five and eight survey years. Most birth-year cohorts are represented in all eight of the SCF cross-sections between 1995 and 2016. The exceptions are the youngest cohort (born in 1974-83) which is only represented from 2001 to 2016, and the oldest cohort (born in 1924-33) which is only represented from 1995 to 2007.

All three different income-groups for each birth-year cohort use the same color. For example, the lines for the most recent birth-year cohort (born between 1974 and 1983 and shown at the far left of the figure) are all the lightest shade of gray, with the lowest-income cohort in those birth years shown in dots, the middle-income group shown in a solid line, and the highest-income shown in dashes.

The numbers on the horizontal axis represent the lower-bound of the 10-year age range for the birth cohorts when they appear in an SCF survey year. When multiple birth-year cohorts have adjacent lower-bound ages represented in the data, we show the mean of the lower-bound age. For example, the first time that we see the most recent cohort (born 1974 to 83) represented in the data is 2001, when the youngest member of this cohort is 18. The 1974-83 cohort is the only one that we see at that age. Three years later, the youngest age from that birth cohort is 21. The first time we observe the second-youngest birth cohort (born 1964 to 73) is in 1994, when the lower bound of its age range is 22. We only observe these two cohorts around that age, and represent the lower bound age on the horizontal axis with 22 (the rounded value of 21.5).

### *Median Household Assets*

**Figure 9** shows trends in the  $\log(10)$  of median assets across the life-cycle – adjusted for inflation using 2016 dollars – for eighteen birth-year/income-group cohorts using SCF data from 1995 to 2016. For each normal income group we observe the anticipated growth in assets as the cohorts approach retirement age. Total assets peak for each income-group when the mid-point of the age range is at or slightly above 60.<sup>13</sup>

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<sup>13</sup> One issue that could affect the cohort analysis is the role of intergenerational transfers in asset accumulation, as younger households may be implicitly accumulating assets via their parents. Any transfers already received by household are included in their assets, but expected transfers are not included. Modeling the expected transfers is

Several differences between the high and low-income cohorts stand out. First are the substantial differences in wealth across the entire life cycle. Peak median assets – reached between the ages of 54 to 63 for the cohort born between 1944 and 1953 – were \$6 million for the top-income group, \$698,000 for the next 45 percent, and \$170,000 for the bottom-half of the normal income distribution. Similarly, wide differences across the normal income groups are present at the younger ages and in retirement years.

Another notable difference is the relative performance of successive “generations” of cohorts and how they were affected by the financial crisis of 2008-09. The period when the financial crisis occurs can be identified easily in **Figure 9**, as it is accompanied by large decline in median assets for all birth-year cohorts and income groups. For the four middle cohorts (born between 1934 and 1973) that are represented by all eight surveys between 1995 and 2016, the financial crisis occurs in the fifth segment of each cohort line, which is book-ended by data from the 2007 and 2010 SCFs.

Evaluated at the same age levels, we see that more recent cohorts in the high-income group had higher median assets than the previous cohort in the period leading up to the financial crisis. For example, for the two successive birth-year cohorts born between 1944-53 and 1954-63, we observe them at the same ages five different times. In the survey years preceding the financial crisis, the median assets of the younger cohort were substantially higher. Following the crisis median assets are approximately the same across successive cohorts.

Prior to the financial crisis lower-income cohorts appeared to have very similar median assets as previous cohorts at the same age. Since the crisis more recent cohorts have fallen behind the previous generation. For example, median assets over the ages of 44 to 53 were \$130,000 for the cohort born in 1954-63, slightly larger than the median of \$114,000 for the one born in 1944-53. Following the financial crisis, we see the 1954-63 cohort at ages 50 to 59 when their median assets had fallen to \$70,400, compared to median assets of \$141,000 for the previous cohort at the same ages.

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beyond the scope of this chapter, see Feiveson and Sabelhaus, 2018 for evidence on the role of intergenerational transfers from the SCF.

In the “next 45” percent of the distribution more recent cohorts consistently had higher median assets than previous cohorts in the years leading up to the financial crisis. Post-crisis we see that more recent cohorts have lower median assets than previous cohorts.

### ***Ownership of Risky Assets: Business, Equity, and Housing***

There are a number of different ways to think about the risk – the potential for losing value – associated with different assets. Very few – if any – assets are truly free of any risk. In an economy where inflation has been low and stable for decades, bonds seem like a relatively safe asset, but that assumption of relatively low-risk is dependent on inflation. The most dramatic form of risk, and the one that has dominated recent financial crises is sharp, unexpected declines in asset prices. Using this concept of risk – exposure to sharp declines in asset prices – we identify three risky assets – businesses, equity, and housing – and explore how exposure to these assets varies across income group and over the life cycle.

#### ***Business ownership***

A substantial majority of high-income households have business assets, including both directly and passively run businesses (**Figure 10**). Business assets consist of privately-held active or passive businesses, such as sole proprietorships, partnerships, limited-liability companies, subchapter S and C corporations.<sup>14</sup> Business ownership is much less common among the next 45 percent, and quite rare among those in the bottom half of income. We consider business assets as risky assets due to exposure of businesses to competitive market forces, such as raw material input prices, labor costs, and output prices.

For all three income groups we see business ownership peaking in the 40s and 50s, and then declining markedly in the 60s. We see the pattern most clearly at top-incomes. In their twenties and early thirties, roughly one-third of top five percent income families have any business assets. This share climbs sharply with age, such that by the time high income cohorts are in their forties and fifties nearly seventy percent own businesses. As they head into retirement, high-income business ownership falls off considerably, dropping back to about one-third by the time they are in their seventies. All three income groups follow a similar arc over the life-cycle, with rates of

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<sup>14</sup> Note that business assets are measured as the equity value of the business.

business ownership in retirement returning to levels that earlier cohorts from the same income group had exhibited in their twenties.

For families in the top-half of the income distribution, we see that business ownership is less common among the 1944-53 and 1934-43 cohorts than those that followed. This is particularly evident in the top five percent, where business ownership in the 1944-53 cohort is greater than that in the 1934-43 cohort at every comparable age. Likewise, business ownership among the 1934-43 cohort consistently outstrips that of the cohort born in 1924-33. For the most recent cohorts, and in the bottom-half of income in general, there is no general movement toward or away from business ownership.

### *Equity Ownership*

Ownership of equity is considerably more common than businesses for all income groups (**Figure 11**). Equity includes both direct holdings of stocks and stocks in pooled investment funds and indirect holdings in retirement accounts (401k, IRA and other defined contribution accounts) and other managed assets (trusts, annuities and managed investment accounts). We consider equities risky assets due to exposure to price volatility in equity markets. By age 30, equity ownership is nearly universal among top-income households. Equity holding falls off only slightly as high-income families enter retirement age.

Large majorities of families in the next 45 percent also hold equities in one form or another. For most cohorts and ages the rate of equity ownership among the middle-income group only lags that of the top-income group by ten to fifteen percentage points. A non-trivial share of families in the bottom half of income also own equities; the share with equities peaks at just over forty percent when household heads are in their forties. The decline in equity ownership is more pronounced among the low and middle-income groups than for those with top-incomes. As they enter retirement age, the share owning equities falls off nearly twenty percentage points.

One pattern shared broadly across the income groups is the rise in equity ownership across successive generations of cohorts. Expanded equity holding is particularly evident after age thirty – is limited to the cohorts born prior to 1964 – and occurs primarily between 1989 and 2001. Within the middle-income group these changes are especially dramatic. Equity ownership for the cohort born in 1934-43 is thirty points higher than for the previous birth-year cohort when we see them both at ages 61 to 70.

### *Home ownership*

The final risky asset, housing, is one that some might not categorize as a risky asset. However, we feel that given housing is the largest asset held by most households and the volatility in house prices over the past few decades, housing should be considered a risky asset.

Over the age of 40 home ownership is nearly universal for households in the top half of the income distribution (**Figure 12**).<sup>15</sup> Ownership climbs sharply when households are in their twenties and thirties, peaks at over 90 percent after age forty and remains high in retirement.

Home ownership is much less common for lower-income households, but even among the bottom half of income home-owning climbs steadily with age. The rate of ownership at the bottom finally peaks when households are in their late 60s, with nearly 80 percent owning homes.

Since the financial crisis the rate of ownership outside of the top-income group has fallen relative to previous birth-year cohorts. For households in the “next 45” percent of income, for example, between the ages of 34 and 43 the home ownership rate of the most recent cohort (born between 1974 and 1983) was 71 percent, compared to an ownership rate of 85 percent for the previous birth-year cohort. The decline in ownership is even more widespread in the bottom half of income. Following the crisis each of the three most recent cohorts of lower-income families (born after 1953) have ownership rates ten percentage points lower than the preceding birth-year cohort.

### *Mortgage Holding*

The share of households with a mortgage for a primary residence rises sharply when household heads are in their twenties and thirties, in parallel with the rise in home ownership (**Figure 13**). Mortgage holding, though, begins to decline after age 40, while home ownership remains steady or, in the case of lower-income households, continues to rise. As they enter their forties, roughly 8 in 10 households in the top half of the income distribution hold mortgages, but this share falls sharply as households approach and enter retirement. Less than fifteen percent of

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<sup>15</sup> Home ownership refers to ownership of the primary residence and does not include ownership of any other residential real estate.

households in the oldest cohort, regardless of income level, hold mortgages when we see them between the ages of 73 and 82.

Trends in mortgage holding across successive birth-year cohorts share some features with what we saw earlier with home ownership, but are also distinct in important ways. Following the decline in home ownership among more recent cohorts after the financial crisis, we also see lower rates of mortgage holding for the same groups over the same period. For the middle-income group, we see that 66 percent of the 1974-83 cohort held a mortgage over the ages of 34 to 43, compared to 82 percent in the previous birth-year cohort. Among older cohorts (those born prior to 1954), however, we see substantially higher rates of mortgage holding compared to previous birth-year cohorts. This rise in mortgage holding is present for all income groups. For example, between the ages of 70 and 79, the cohort born between 1934 and 1943 is between 7 and 9 percent more likely, depending on their income level, to be holding a mortgage than the previous birth-year cohort.

### ***The Risky Asset Share***

This section explores that share of total assets held in these three risky asset types, and how those shares evolve over the life cycle for different income groups.

#### *Business Share*

Businesses represent a substantial share of assets only for high-income cohorts. Unlike the likelihood of owning a business, however, there is little curvature in the business share of assets over the life cycle (**Figure 14**). For the high-income group, businesses account for approximately one-third of total assets when household heads are in their thirties, forties, and fifties, and as these households transition into retirement the business share declines modestly. One implication is that the businesses shed in retirement by high-income households are relatively low-value companies, with more valuable businesses possibly held onto for bequest purposes.

For low and middle-income households, business account for roughly 10 percent of total assets over most of the life-cycle. As these households enter retirement, the business share declines and approaches zero.

In comparing business shares across successive cohorts by income group, there appear to be few systematic differences moving from one birth-year cohort to the next. The two differences

that do stand out can be found within the high-income group at the tails of the age distribution. The business asset share is higher among more recent of the two represented cohorts when we see households at the youngest and at the oldest age levels. When we see them between their early-20s to mid-30s, the most recent cohort (born 1974-83) has a business share that is between 10 and 20 points higher than the previous birth-year cohort. At the other end of the life cycle, the 1934-43 cohort has between two and six percent higher business share than the previous birth-year cohort in four out of the five points when we see them at the same ages.

### *Equity Share*

In both levels and patterns over the life-cycle, the equity share is quite similar across income groups (**Figure 15**). For the three different birth cohorts when we see household heads from ages 54 to 63 the equity share of assets averages 27 percent among top-income households, 22 percent for the “next 45” percent of households, and 11 percent in the bottom half of the income. The equity share also rises slowly and steadily across the life-cycle. As households hit retirement age, the equity share appears to flatten out in the top-half of the income distribution and modestly decline in the bottom half.

### *Housing Share*

The housing share of total assets rises sharply for all income groups at the very youngest ages when observe households (**Figure 16**). When households are in their twenties, the housing share is also similar across income. For the 1964-73 cohort the housing share at ages 22 to 31 was 43 percent for top-income households, 46 percent for the next-45, and 35 percent for the bottom half. In their thirties and beyond the housing share behaves quite differently by income.

Among high-income households, the housing share falls steadily with age until it accounts for slightly more ten percent of total assets for heads in their late forties through their early eighties. For the middle-income group the housing share remains mostly flat – at around 50 percent – in the thirties and starts to steadily fall as household heads enter their forties. The housing share appears to bottom out at roughly 30 percent of total assets when the middle-income group hits their mid-50s. For the oldest cohort (born 1924-33) the housing share starts to rise as household heads start to enter their seventies, presumably as these retirees continue to live in their home and begin to draw down other assets.

Across the entire life-cycle housing remains the dominant asset for households in the bottom half of income. From the mid-twenties through their thirties, housing accounts for just over half of all assets of the low-income group. Starting in their forties, the housing share declines slightly, but never falls below forty percent of total assets. As low-income households approach retirement age, though, the housing share starts to rise markedly, climbing to well over 60 percent for the older cohort when we see them in the seventies. It looks as if the draw-down of non-housing assets is happening earlier and more rapidly in the bottom half of the income distribution than in the next-45 percent of the distribution.

#### *Combined Risk Asset Share*

Despite the clear differences in the business share and the housing share of total asset between low, middle, and high-income groups, the combined risky asset share is very similar over the life-cycle for the different income groups. The combined risky asset shares rises in the twenties for each of the income groups, peaking between 70 and 80 percent of all assets in the thirties (**Figure 17**). Between the thirties and the sixties, the combined risky asset share slowly and steadily declines, hitting 60 to 70 percent at the point of transition into retirement. In their seventies, each of the income groups exhibits a small up-tick in the combined risky asset share.

### **VII. Financial vulnerability, shocks, and the health of the household balance sheet**

In the previous sections we saw that asset composition varies considerably across the asset distribution (section V) and across the age and income distribution (section VI). In this section we discuss how these portfolio differences influence the level of financial risk to which families are exposed, and how this exposure has evolved over time. First, we discuss how housing and equity price shocks would affect wealth across the distribution. Second, we discuss exposure to risk that takes housing leverage, consumer debt and income into account.

#### *Risk from asset price shocks*

The composition of assets for middle class families by assets (**Figure 3**) and by income (**Figure 16**) are heavily skewed toward housing. Housing is a highly levered asset for these families: average debt levels for these families are about 40 percent of total assets (**Figure 3**) and mortgages are about 75 percent of total debts for these families (**Appendix Figure 1**). On the other hand, families with high levels of assets and income often hold extensive public and private equity positions (**Figures 3, 14, and 15**).

While equity is the traditional barometer of portfolio riskiness, house price declines often affect a family's wealth position to a greater degree because of leverage. Here we calculate the share of total household wealth lost from two stylized asset price shocks—a 10 percent decline in house prices and a 10 percent decline in equity prices—and the share of households experiencing large losses from these stylized shocks.

Families outside of the top 5 percent by income are particularly susceptible to a housing shock. In 2016, on average these families would lose between 4 and 6 percent of their net worth from a 10 percent decline in housing prices. Further, nine percent of the bottom 50 percent by income and 24 percent of the 50<sup>th</sup> to 95<sup>th</sup> percentile by income would lose more than 10 percent of net worth (**Table 4**).

The top 5 percent by income would lose about 1 percent of total net worth and only about 4 percent of these families would lose more than 10 percent of wealth from this hypothetical shock. These families, though, would lose about 7 percent of wealth based on a hypothetical equity price decline, while lower income families would lose between 3 and 4 percent.<sup>16</sup>

Applying these shocks to past waves of SCF, we can see that the impact of leveraged housing on middle income (50<sup>th</sup> to 95<sup>th</sup> percentile) family net worth in the early to mid-2000s. In 2007, for example, 33 percent of these families would have lost 10 percent of wealth in a 10 percent house price decline.<sup>17</sup> In general, though, the fraction of these families that would lose more than 10 percent of wealth is lower in 2016 than in 2010 or 2013, indicating that these families are a bit less susceptible to a house price shock (as in Haughwout, Guttman-Kenney, and Fuster, 2018, and Bhutta, Bricker, Dettling, Kelliher, and Laufer, 2018).

*Financial vulnerability: income and asset price shocks*<sup>18</sup>

These stylized asset-price shocks are suggestive, but do not identify all of the households whose portfolios are vulnerable to adverse shocks. For one thing, asset price shocks do not usually happen without being accompanied by a labor market shock—whether as a cause or as an effect. Given the large role of housing and housing debt in shocks in **Table 3**, we investigate

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<sup>16</sup> Included here are equities—directly or indirectly held—and businesses.

<sup>17</sup> The loss in 2010 is larger than in 2007 because the families in 2010 SCF had already experienced a large house price decline—averaging 25 percent over the previous three years—while the 2007 SCF households had just begun to experience a decline in house prices.

<sup>18</sup> This discussion was inspired by conversations with our colleagues Neil Bhutta, Lisa Dettling, Joanne Hsu, Alice Henriques, and Lindsay Jacobs.

further the health of the household balance sheet by seeing how vulnerable families are to simultaneous house price and income shocks.

**Figure 18** shows the joint distribution of household loan-to-value (LTV) ratios and debt service ratios, in the form of debt payment-to-income (PIR) ratios in the 2016 SCF. The columns describe levels of LTVs and rows describe levels of PIRs, and the number in the cells indicate the fraction of families in the cells. We illustrate it this way because families are more susceptible to financial distress—and more likely to default—when they experience both an income and house price shock.<sup>19</sup>

All else equal, declines in income move families down the heat map, resulting in higher payment to income ratios. Declines in house prices move families across the heat map (to the right) resulting in higher LTVs. Families in the darkest gray have a combination of very elevated LTVs and PIRs, and are thus most the most vulnerable to economic shocks. Families in lighter shades of gray have elevated PIRs or LTVs, and may also be vulnerable. Families in white include renters as well as homeowners with very low LTVs, including no mortgage.

One lesson from the heat map is that very few families in 2016—about 2 percent—currently are coded in dark gray. Another five percent of families are shaded in medium gray, demonstrating either vulnerability on one—but not both—dimensions or borderline vulnerability along both dimensions. A large majority of families occupy the white area, where debt payment and loan balances are considered manageable.

#### *Trends in Vulnerability Across time*

Using the same color scheme from the heat map in **Figure 18**, we can track fluctuations in this multidimensional vulnerability measures over time. **Figure 19** displays the cell totals in a stacked bar (omitting the white group) to facilitate a comparison over time. We see that fewer families meet any degree of vulnerability/susceptibility to an economic shock in 2016 than in previous surveys back to 2001. This decline is mainly driven by fewer families occupying the dark and medium gray areas – where LTVs and PIRs are the most elevated. The fraction of families in the dark gray area has fallen by a third since its peak in 2010, and the dark and medium gray area combined has halved since 2010. In the aftermath of the financial crisis, just over 13 percent of all households were identified as financially vulnerable.

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<sup>19</sup> See, for example, evidence for the double trigger theory of mortgage default in Bricker and Bucks (2016) or Foote, Gerardi, and Willen (2008).

Both the levels and the trends in financial vulnerability vary by income group. This makes sense, as homeownership, income and debt each vary differently across these groups.

For the bottom half of the income distribution, vulnerability has remained flat over most of the last two decades, fluctuating around 20 percent (**Figure 20**). 2016 marks a modern low-point in financial vulnerability for households in the bottom half of the distribution, with only 7.5 percent of families shaded as either dark or medium gray. At the 2010 peak, nearly 11 percent of families had extreme (dark gray) or moderate (medium gray) financial vulnerability.

The highest levels of and the greatest degree of variation over time in financial vulnerability is seen among the families in the “next 45” percent of the income distribution (**Figure 21**). These families have high rates of home ownership and carry substantial debt, particularly tied to their homes, so joint income and house price shocks hit them hardest. By 2010—after a large house price shock—nearly 35 percent were vulnerable in some way, with 16.5 percent in dark or medium gray areas. After seven years of economic expansion (by 2016), financial vulnerability among the “next 45” had receded to 2001 levels, particularly for dark and medium gray areas.

Financial vulnerability is unsurprisingly lowest among high-income families (**Figure 22**). Between 2007 and 2010, the share of high-income families coded as either dark or medium grey jumped from 3.5 percent to more than 7 percent. By comparison, the combined post-crisis measure of vulnerability among high-income families remains below that of middle and lower-income families in the very best of economic times. By 2016 financial vulnerability at the top had receded sharply, with just 2.5 percent coded as dark or medium gray.

### **VIII. Conclusion**

Understanding developments in household portfolios are arguably more important than ever. To identify the causes and consequences of long-term rise of inequality in the distribution of wealth, and to monitor the degree of financial vulnerability that households face it is crucial to understand the allocation of assets, across asset types, age groups and the distribution of income.

The data from the Survey of Consumer Finances that we reviewed in this chapter establishes several clear patterns and allows us to draw number of conclusions. First, the household asset portfolio inferred from aggregate data—which is spread across housing and financial assets—does not look like the portfolio of most households, which is composed mostly of housing assets. Second, the time series dynamics of the aggregate portfolio—which has swung toward and from financial assets—does not appear in the time series of most families, which has always been

mostly composed of housing. This is also the case when taking a longer view of household assets (Kuhn, Schularick, and Steins, 2018).

Third, we also see a slow and steady increase in the concentration of assets which has picked up in the 2010-2016 period. Since the processes that create wealth for a household unfold over time, the relationship between assets and age can be complicated. We explore the trends in asset levels and portfolio composition over the lifecycle later in this chapter using a birth-year/income-group cohort analysis of the SCF.

Fourth, viewing the data through birth-year cohorts by income, we observe the typical life-cycle asset accumulation processes among low, middle, and high-income families. Though the levels are different magnitudes, assets generally increase throughout the typical working life in each income group, and peak just before the typical retirement age before partially decumulating.

However, recent cohorts have fallen behind in homeownership and asset accumulations. In general, though, recent cohorts are also more highly educated than previous cohorts (**Figure 23**), so these gaps may close if past relationship between education and wealth persists. Another chapter in this volume (Kurz, Li, and Vine) shows that the relationship between consumption, income, and wealth is similar in younger cohorts (Millennials) compared to older cohorts (Generation X and Baby Boomers).

Finally, we focus on quantifying financial vulnerabilities in family balance sheets. We first show that families with a combination of two potential vulnerabilities—high debt payments and high loan-to-value ratio on their primary residence—peaked in the late 2000s, and are at the lowest level in 2016 since the early 1990s. We also show that nearly all of the time series variation is due to middle income families, who also host most of their assets in housing and are often the most highly-levered in the housing market.

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Figure 1. SCF and FA Assets

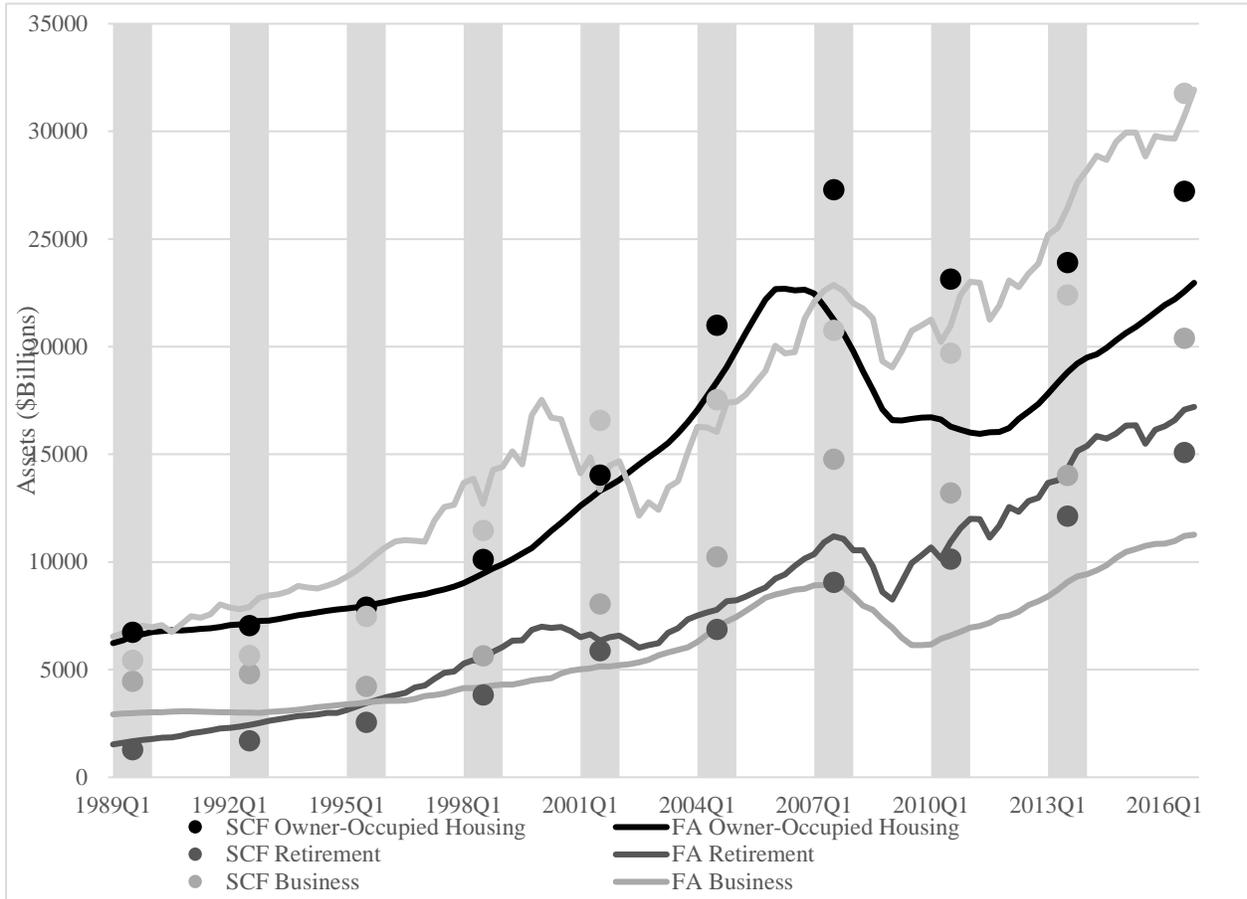


Figure 2. Average composition of household assets

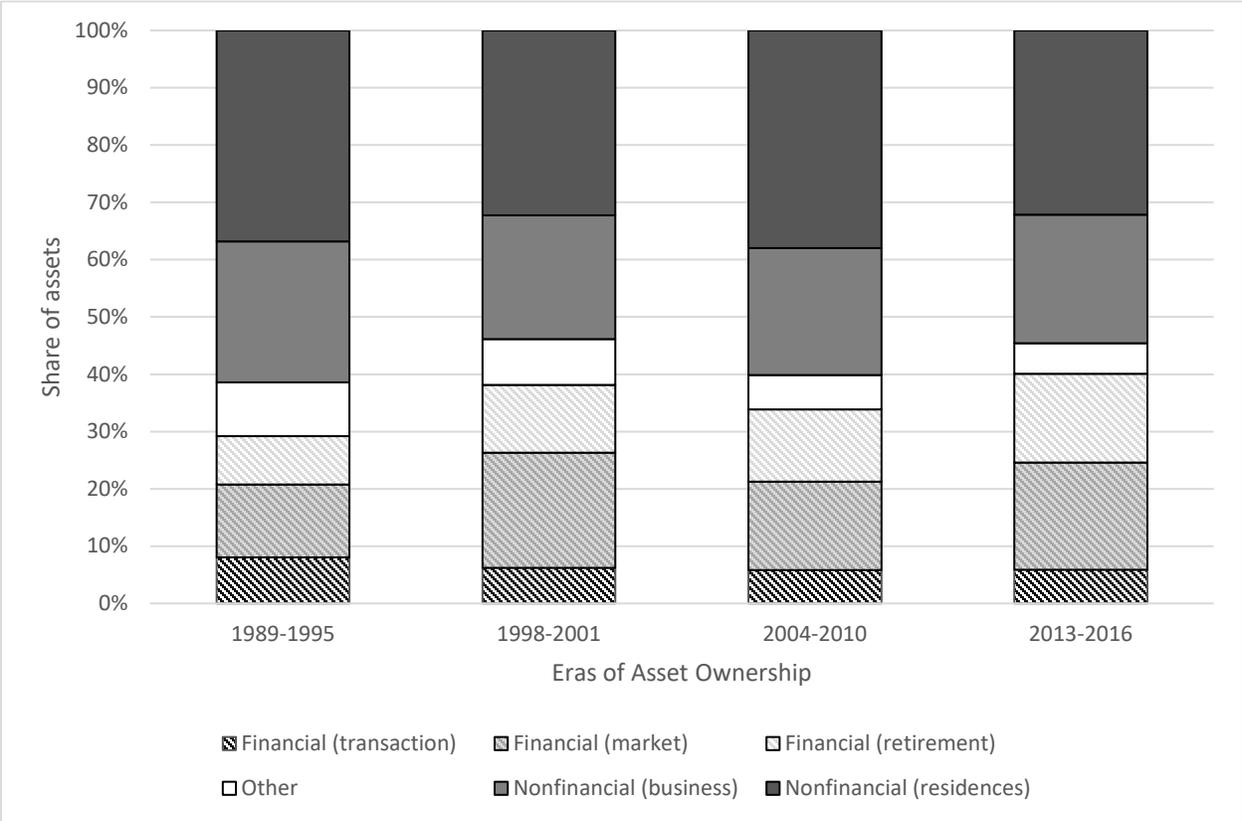


Figure 3. Share of assets in household asset portfolios: 2016 and 1989

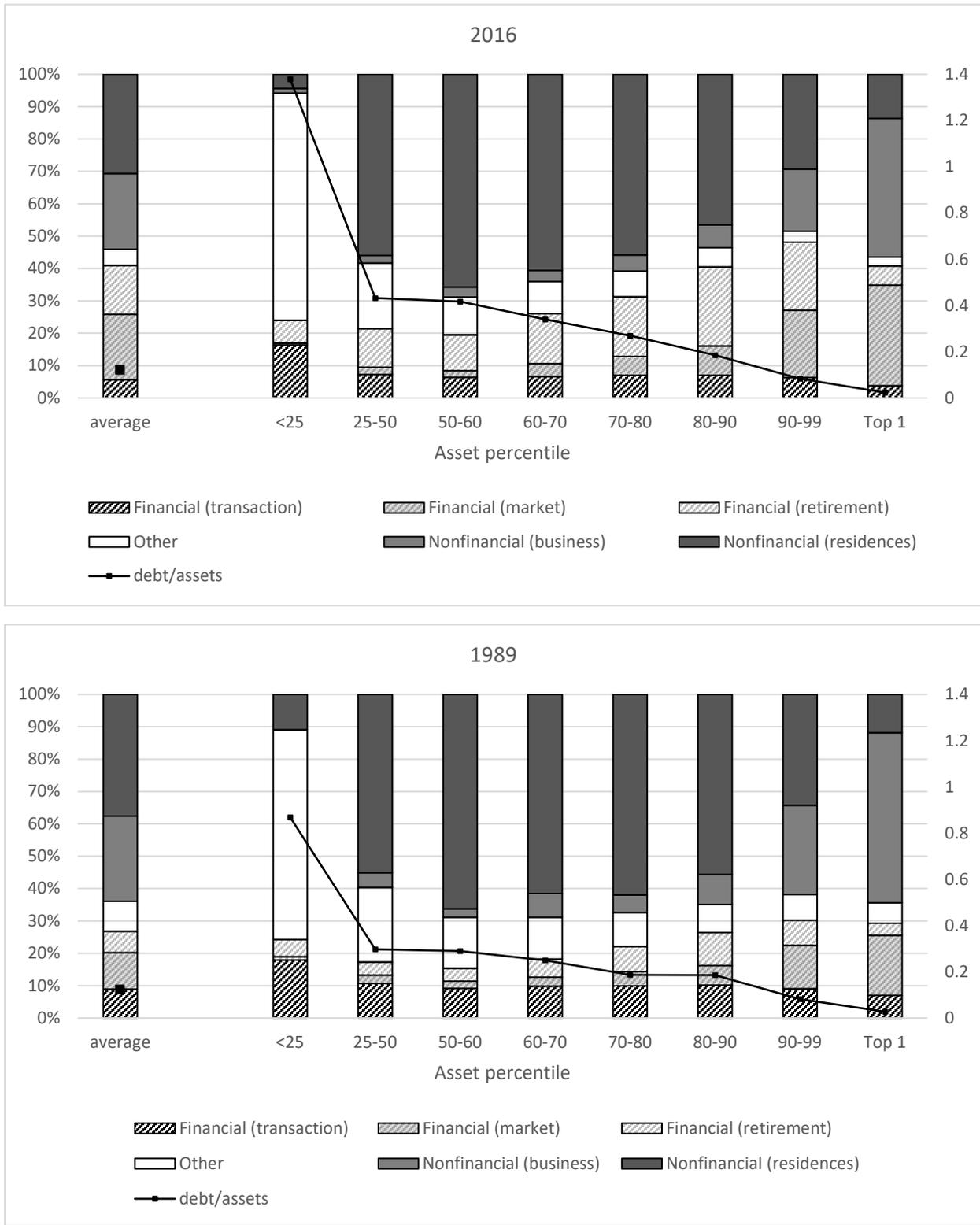


Figure 4. Share of assets in housing: average and at various percentiles, 1989-2016

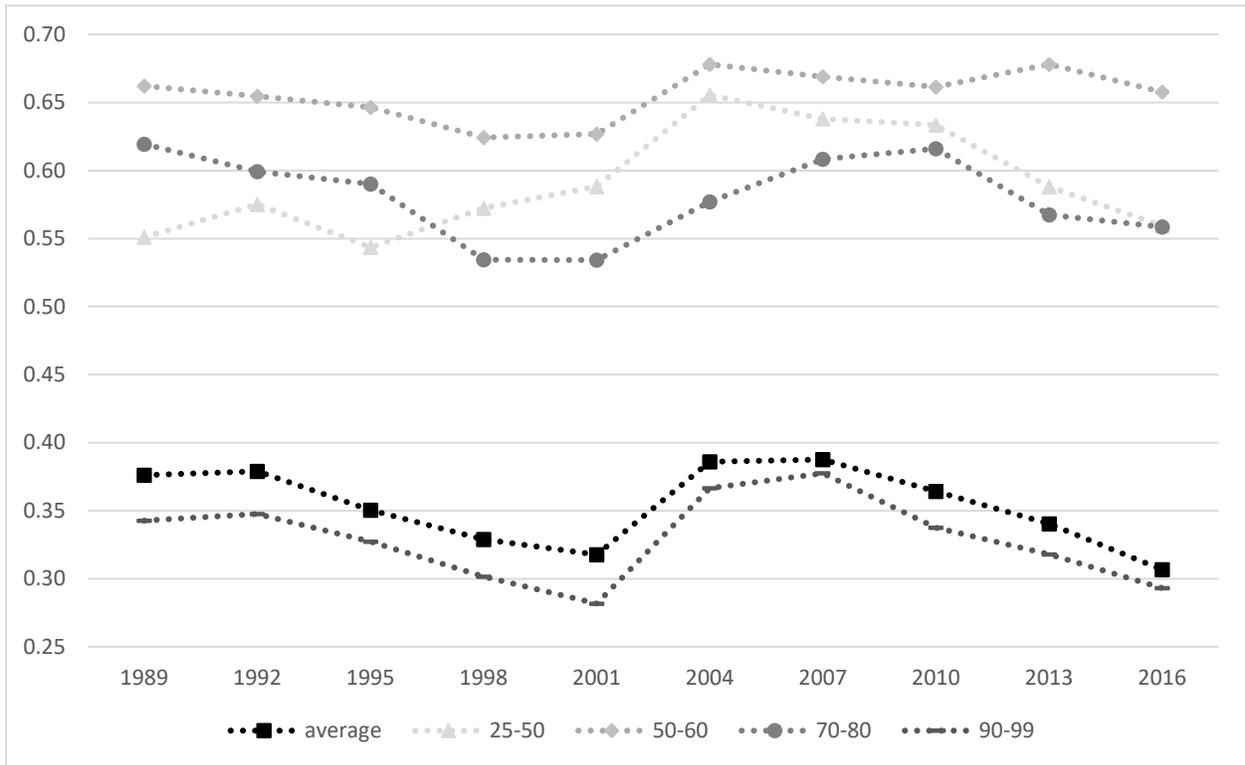


Figure 5. Share of assets in financial markets: average and at various percentiles, 1989-2016

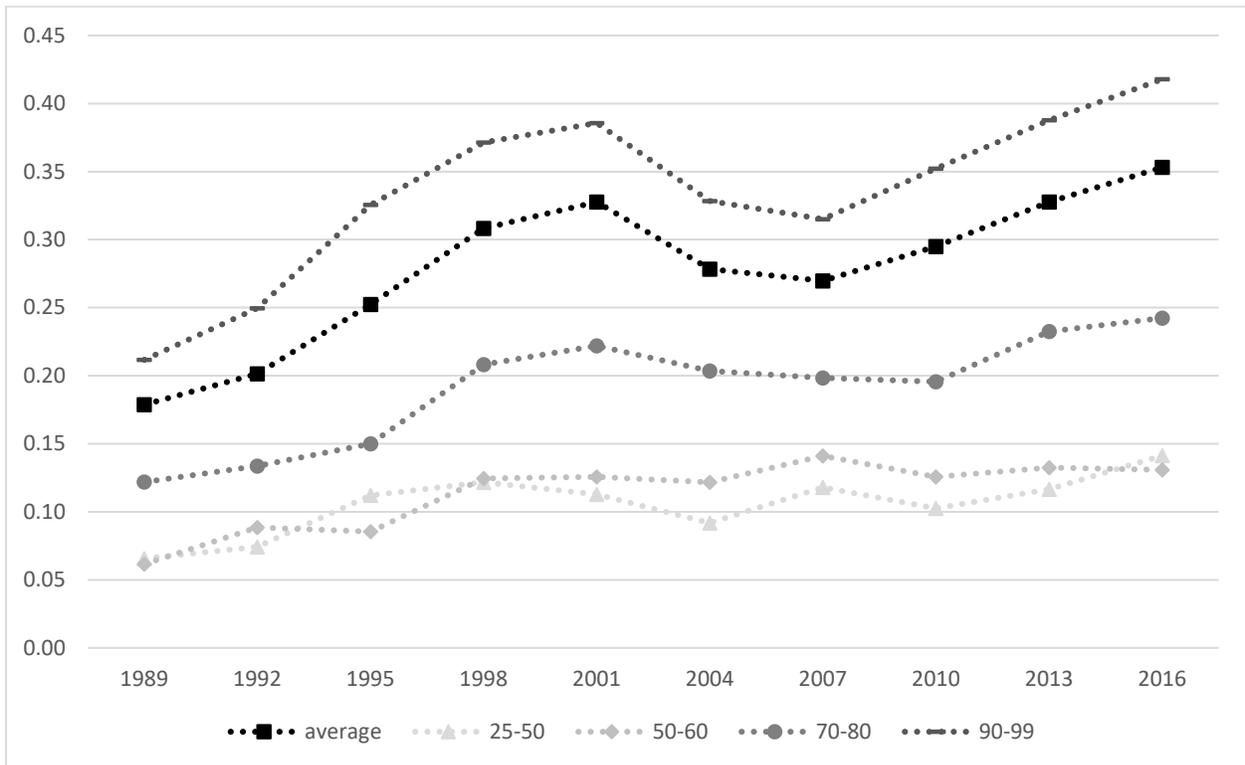


Figure 6. Share of assets that are unrealized capital gains: average and at various percentiles, 1989-2016

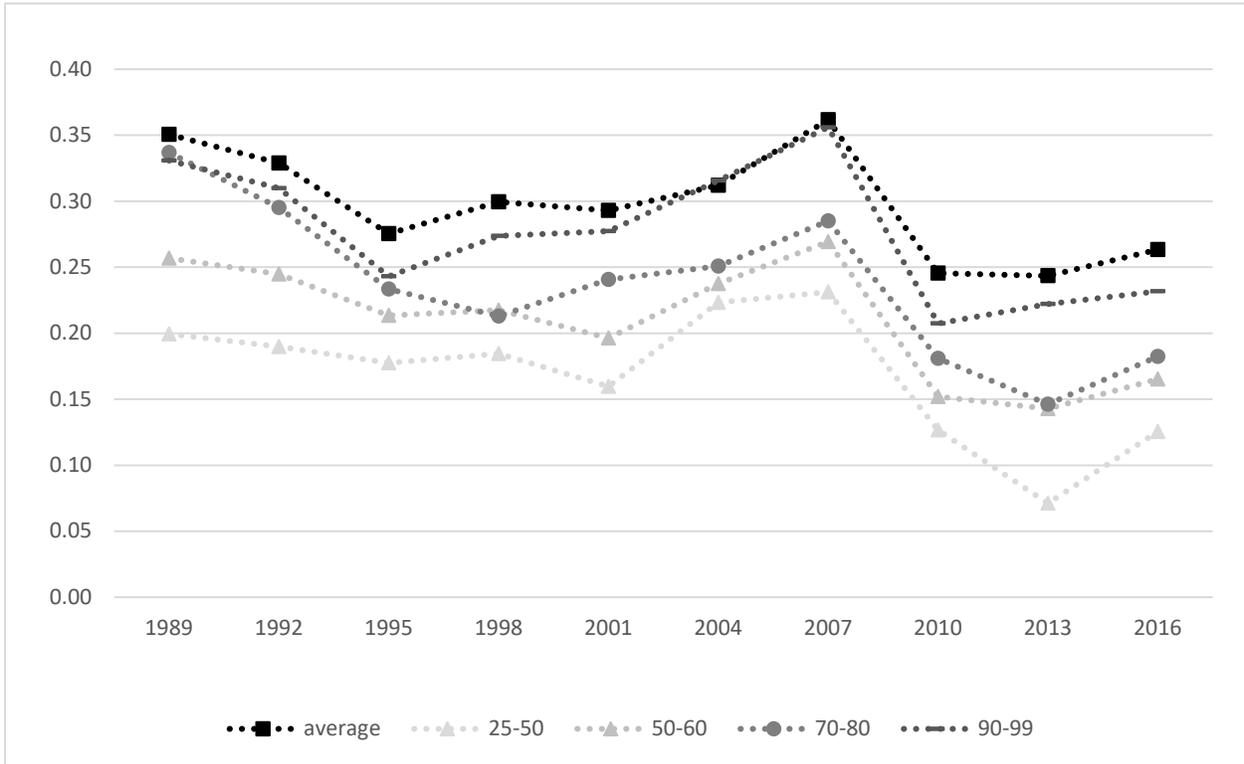


Figure 7. Share of assets held by asset percentile group, 1989-2016

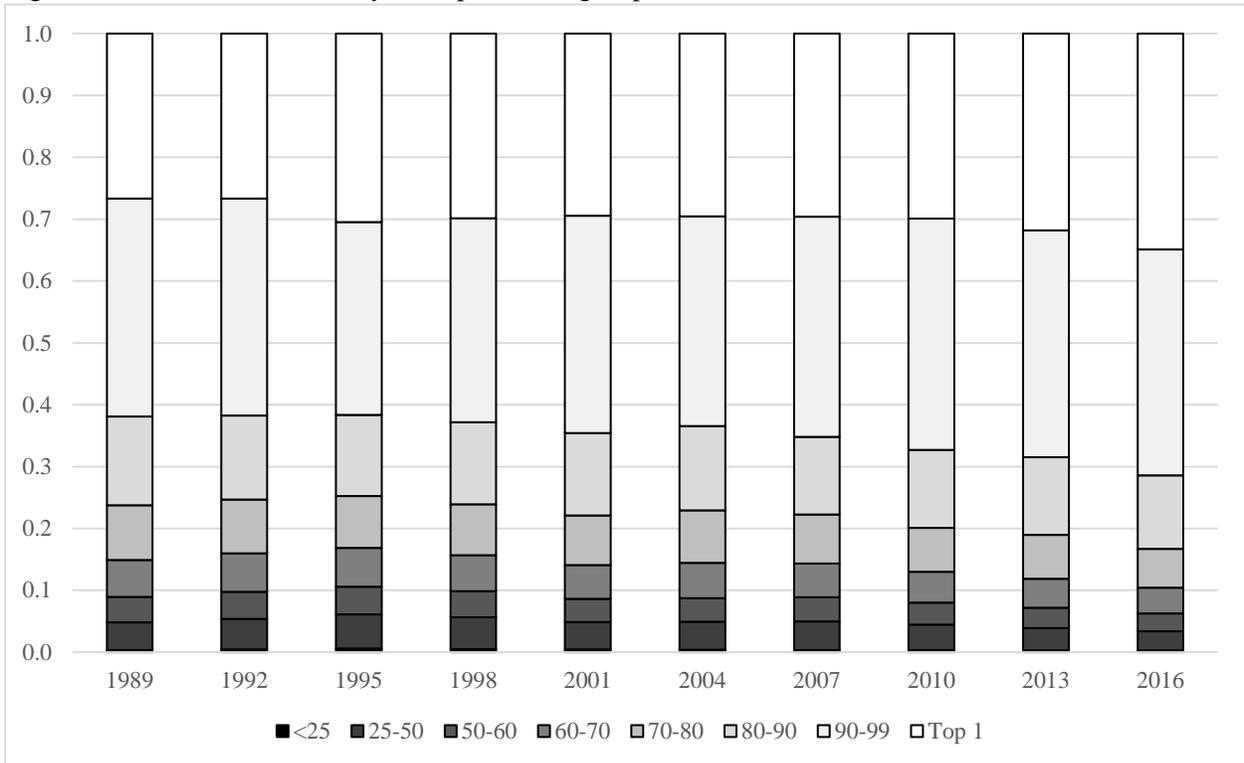


Figure 8. Share of assets held by age group, 1989-2016

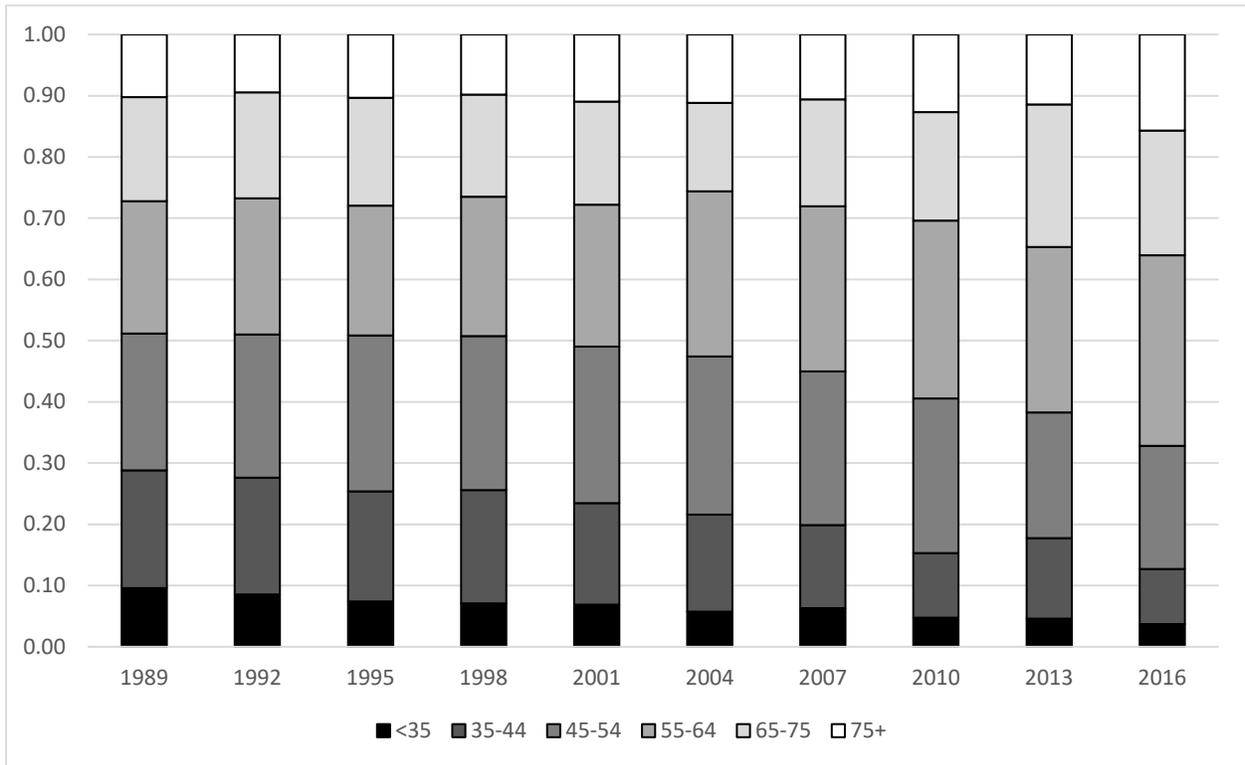


Figure 9. Median Assets (Log10) by Birth-year/Normal-income cohort

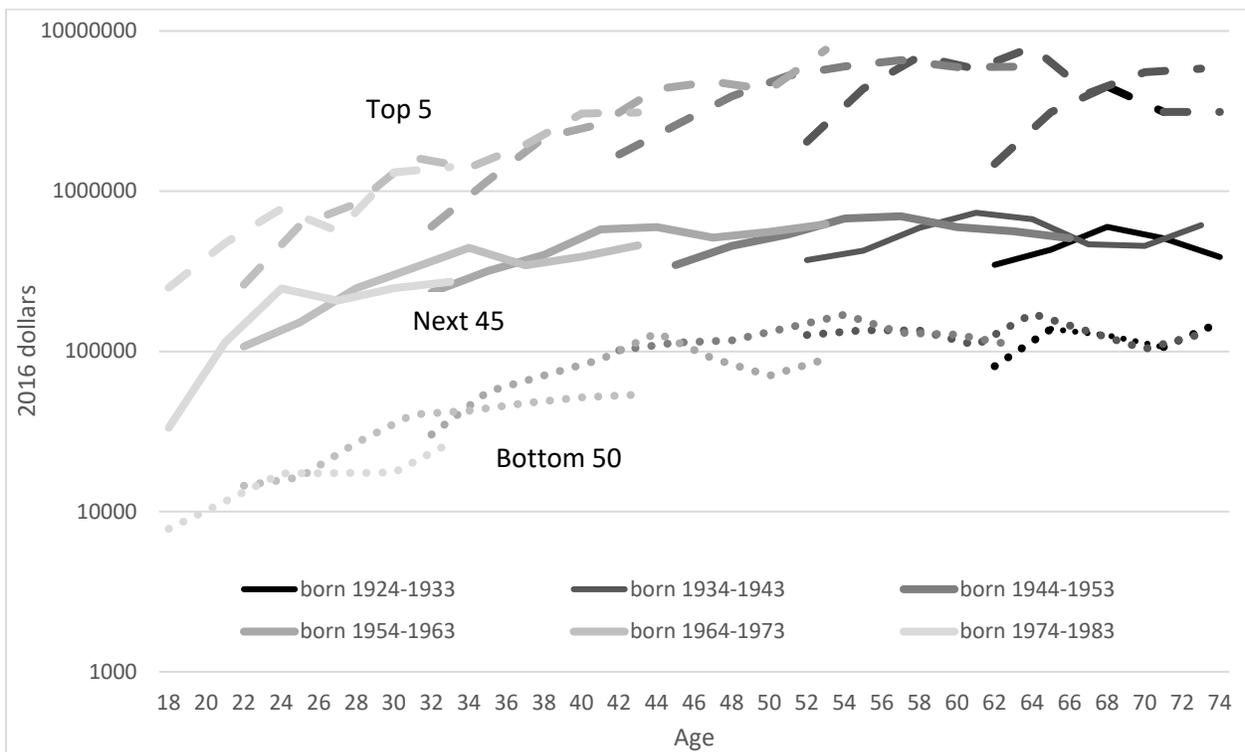


Figure 10. Share with Business Assets by birth-year/Normal-income cohort

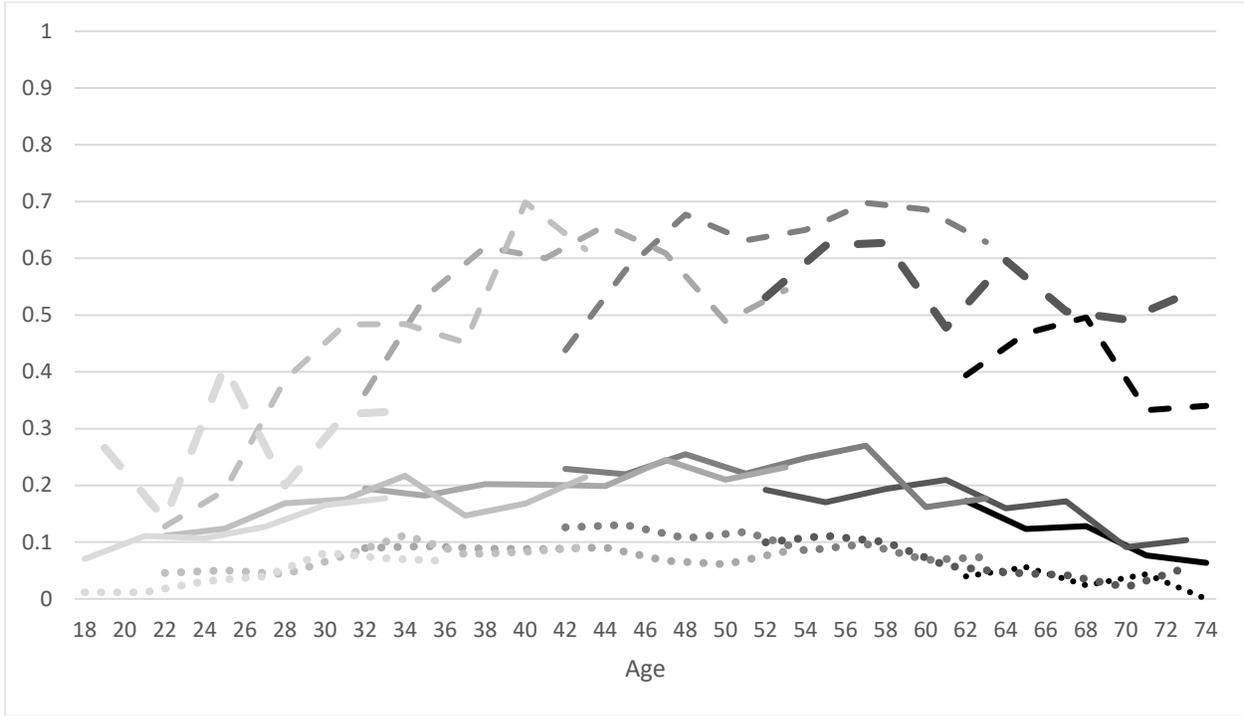


Figure 11. Share with Equity by birth-year/Normal-income cohort

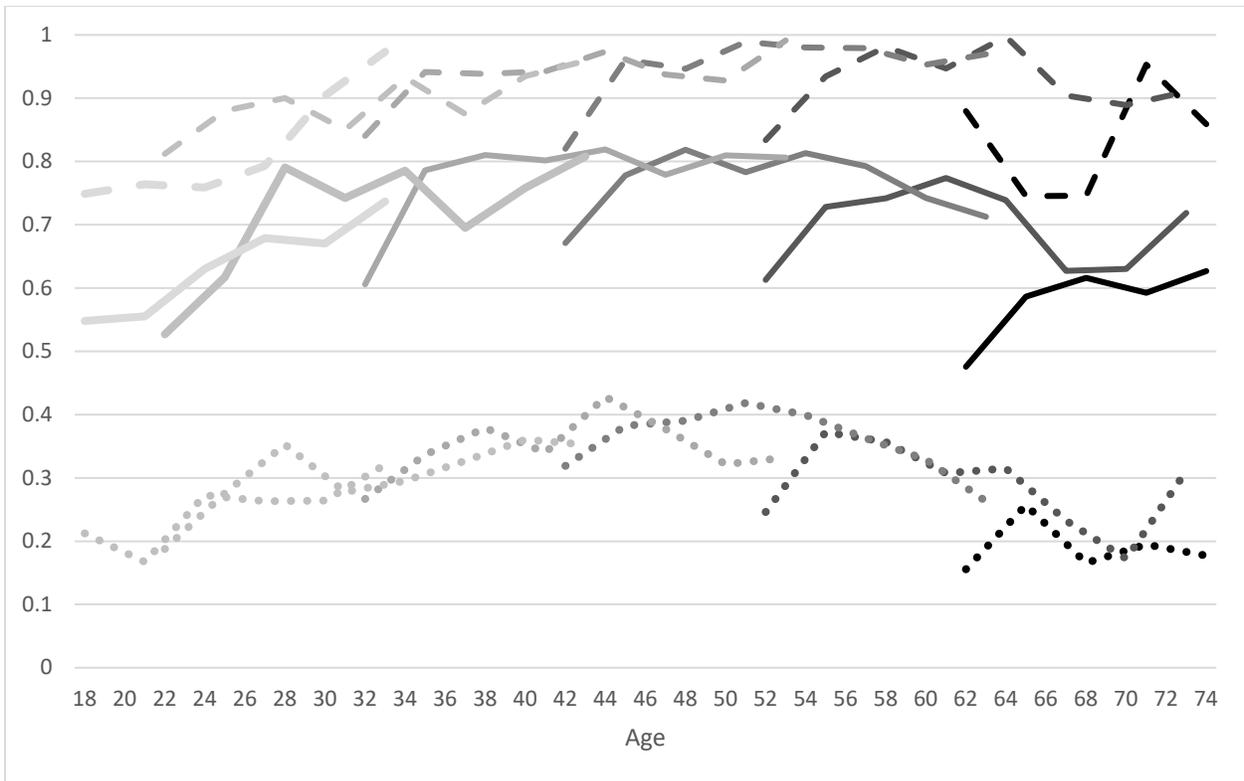


Figure 12. Homeowner share by birth-year/Normal-income cohort

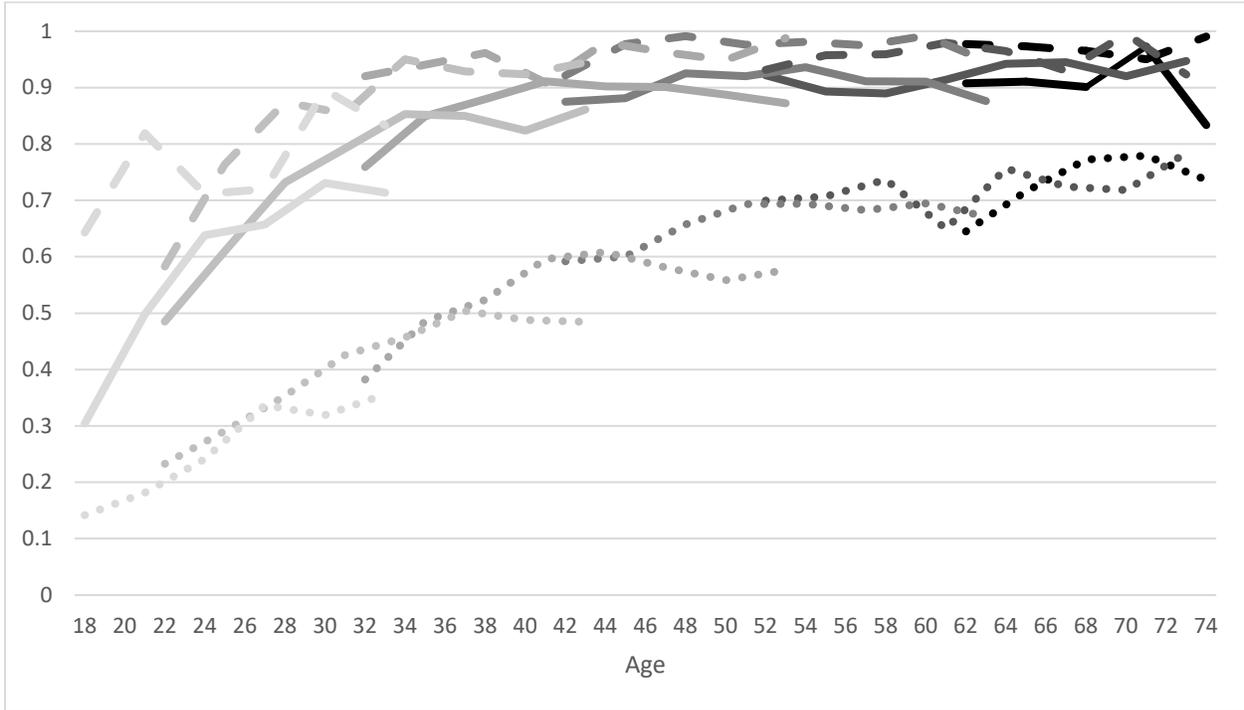


Figure 13. Share with mortgage on primary residence by birth-year/Normal-income cohort

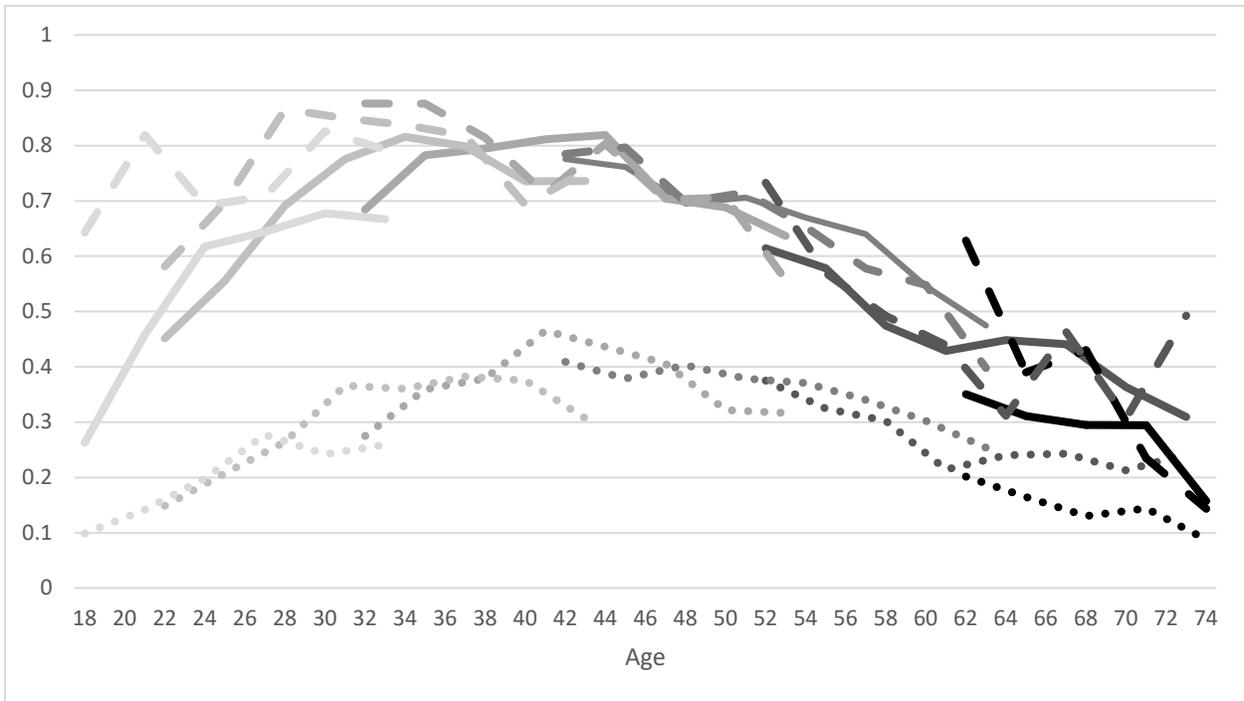


Figure 14. Business share of total assets by birth-year/Normal-income cohort

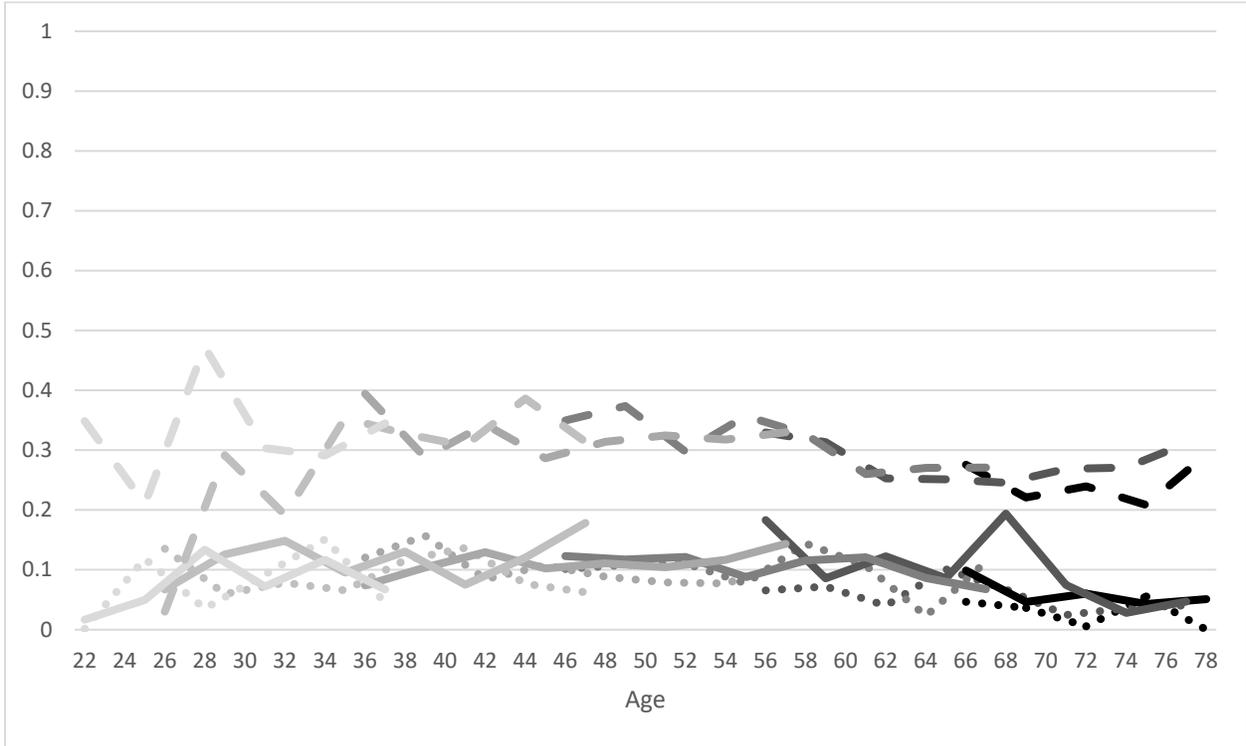


Figure 15. Equity share of total assets by birth-year/Normal-income cohort

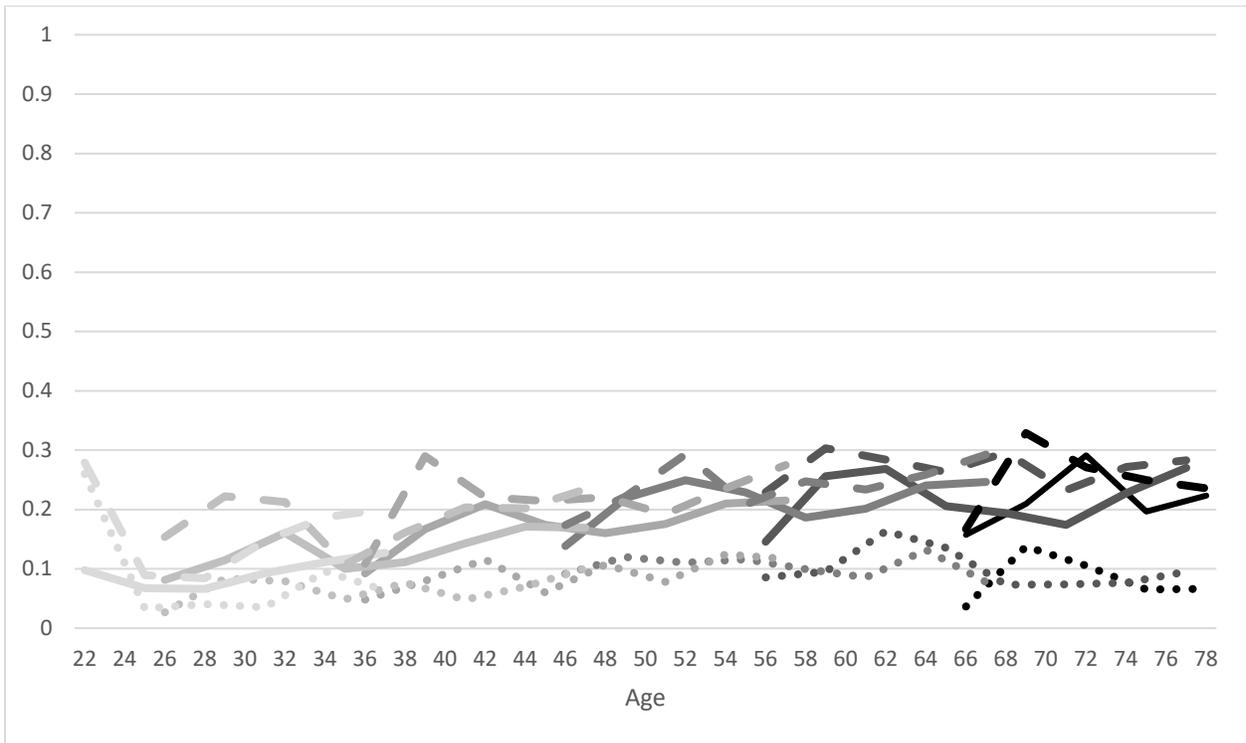


Figure 16. House value share of total assets by birth-year/Normal-income cohort

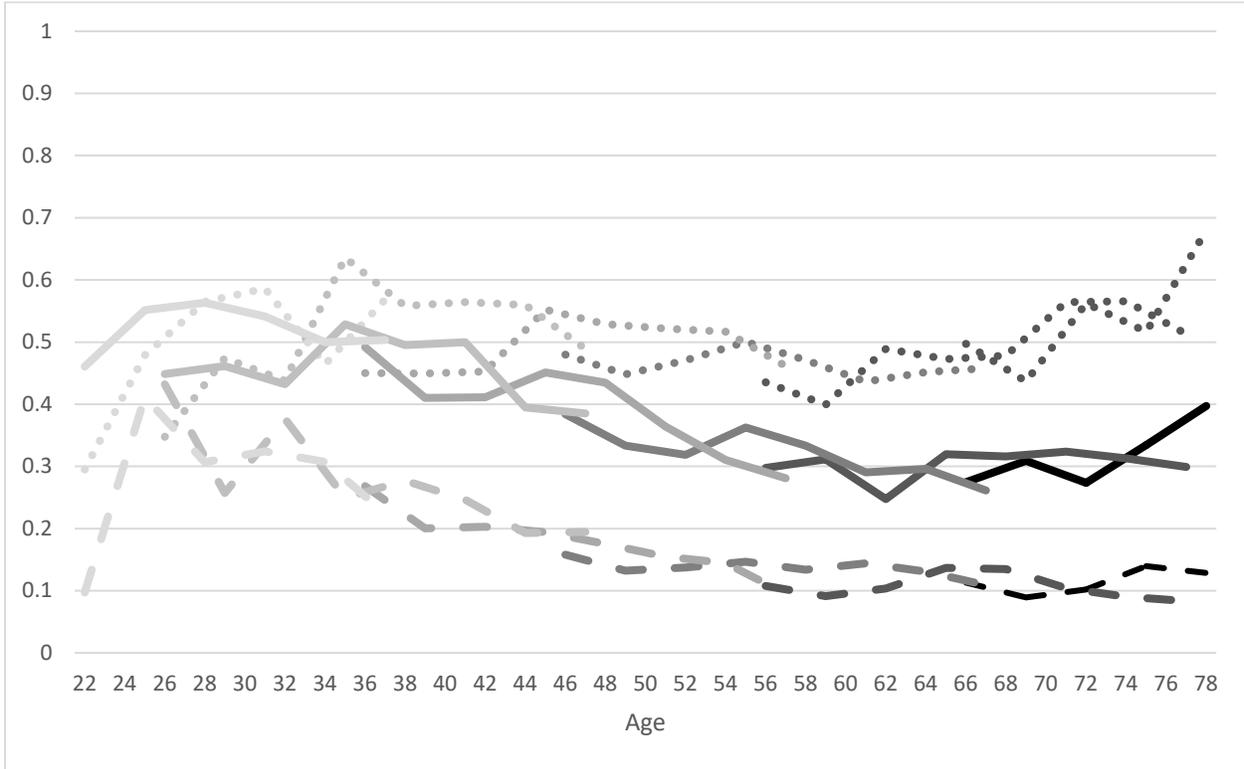


Figure 17. Combined “Risky Asset” Share of total assets by birth-year/Normal-income cohort

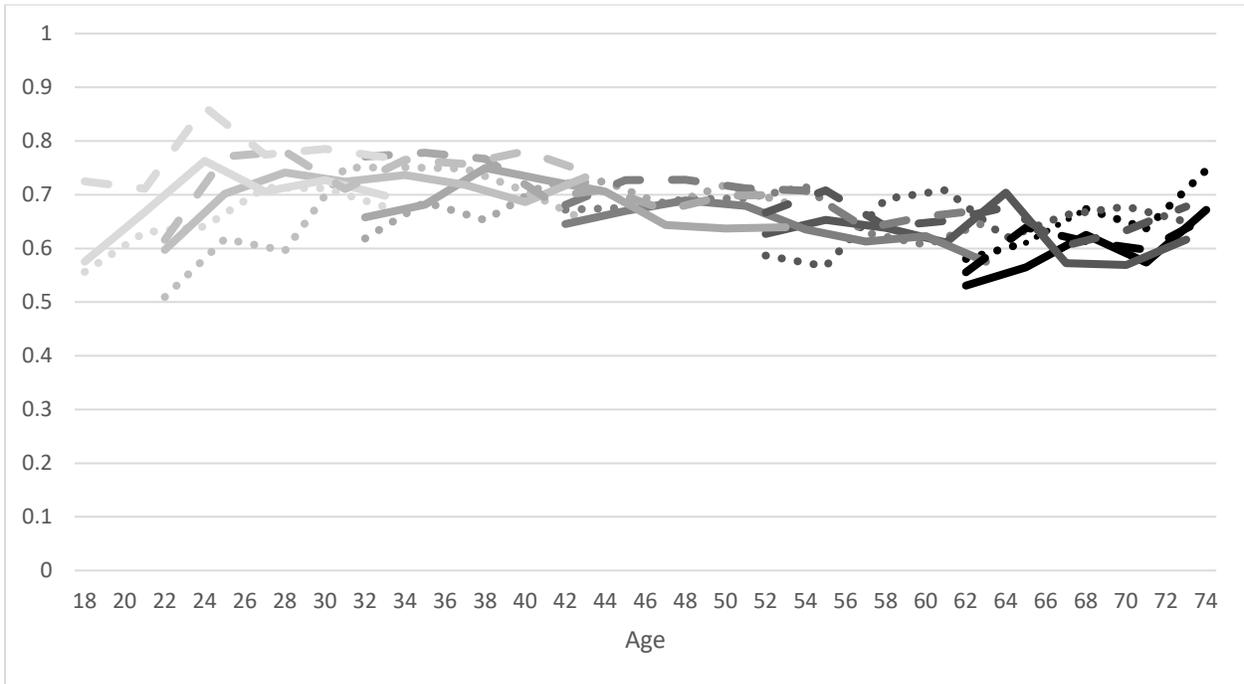


Figure 18. PIR and LTV 2016 SCF

		Mortgage Loan to Value (LTV) Ratio			
		Less than 79	80-89	90-99	100+
Debt Payment to Income (PIR) Ratio	0-29	80.3%	2.9%	1.8%	0.7%
	30-39	5.1%	1.1%	0.4%	0.5%
	40-49	1.9%	0.5%	0.2%	0.1%
	50+	3.3%	0.4%	0.3%	0.4%

Figure 19. PIR and LTV across time

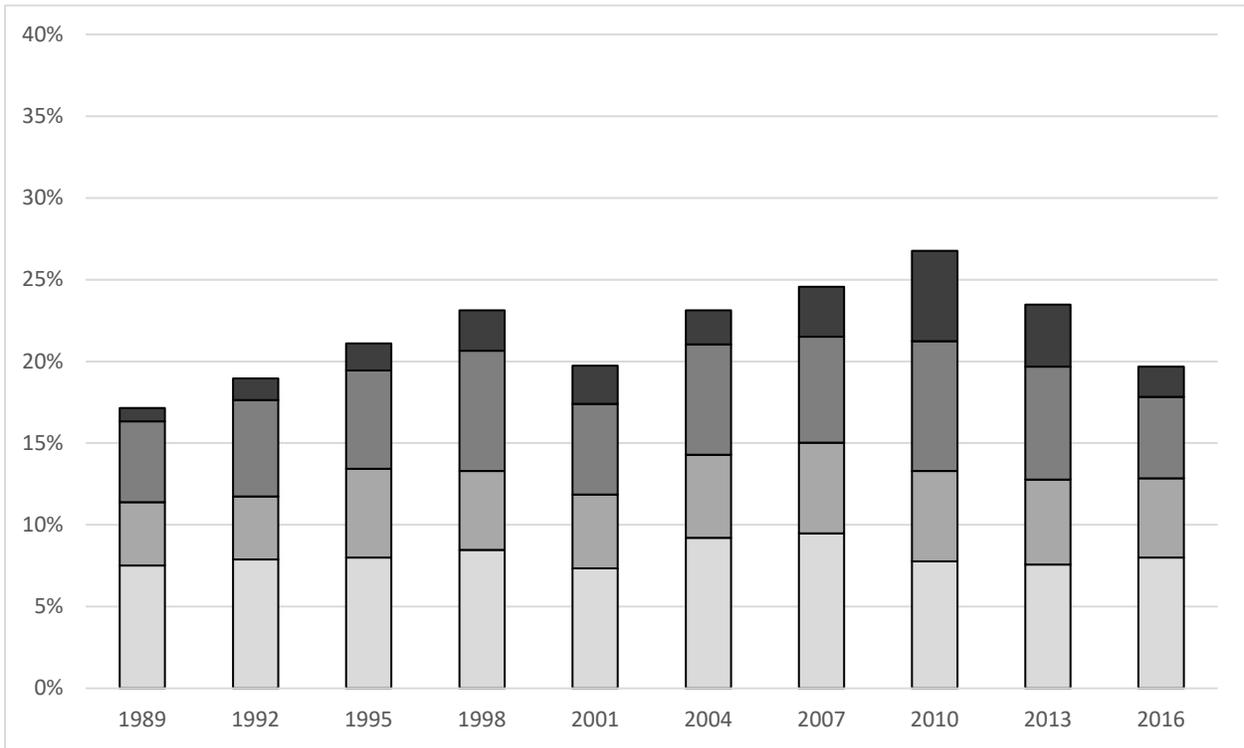


Figure 20. PIR and LTV across time, bottom 50 percent of usual income

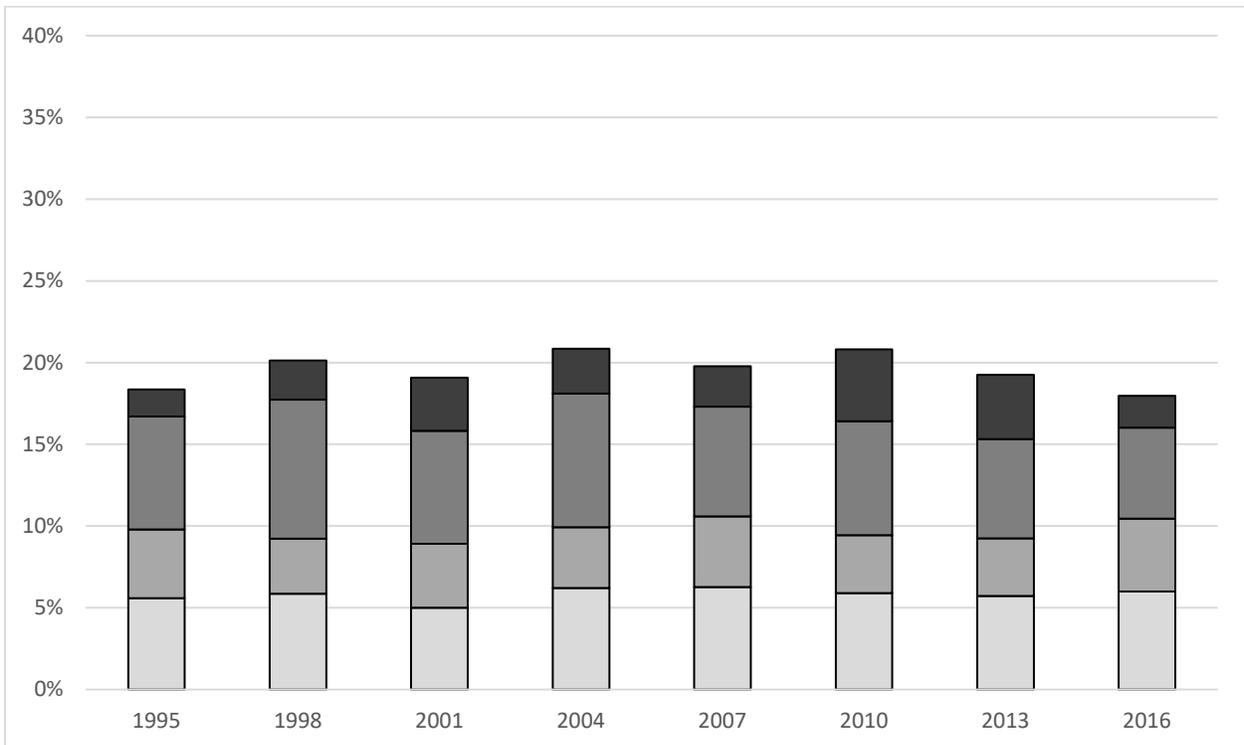


Figure 21. PIR and LTV across time, 50<sup>th</sup> to 95<sup>th</sup> percentiles of usual income

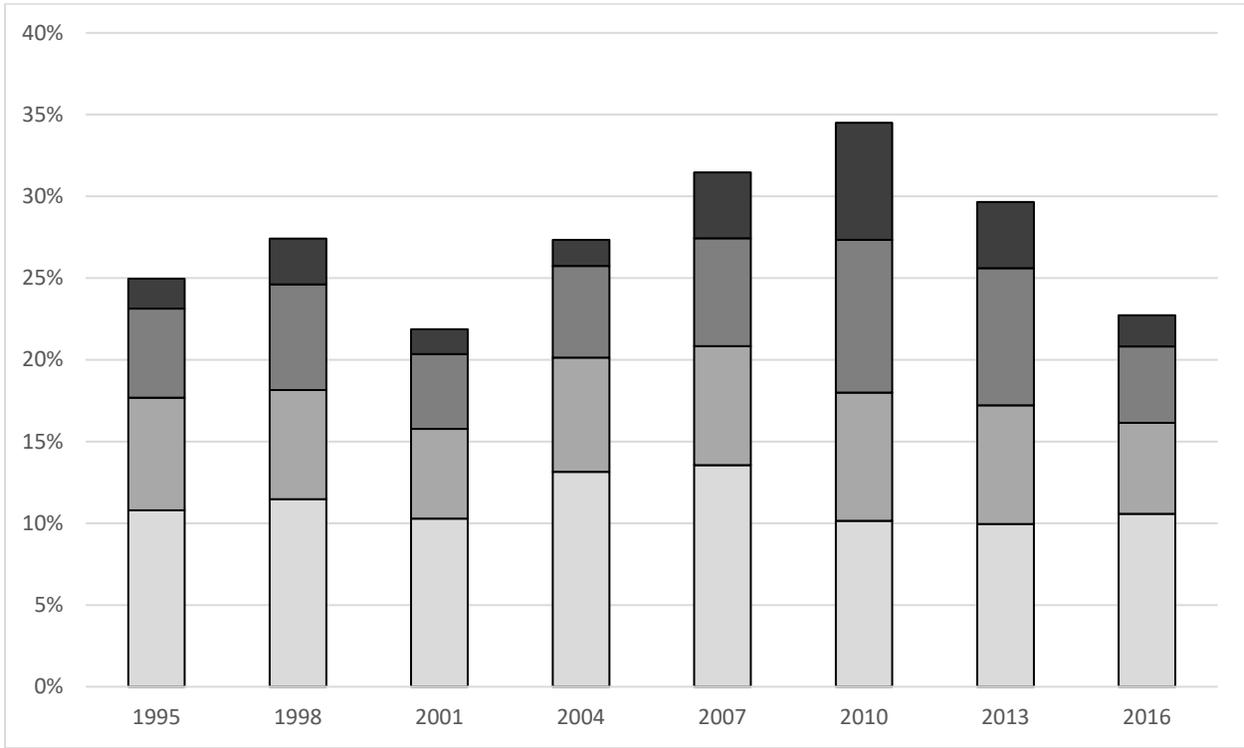


Figure 22. PIR and LTV across time, top 5 percent of usual income

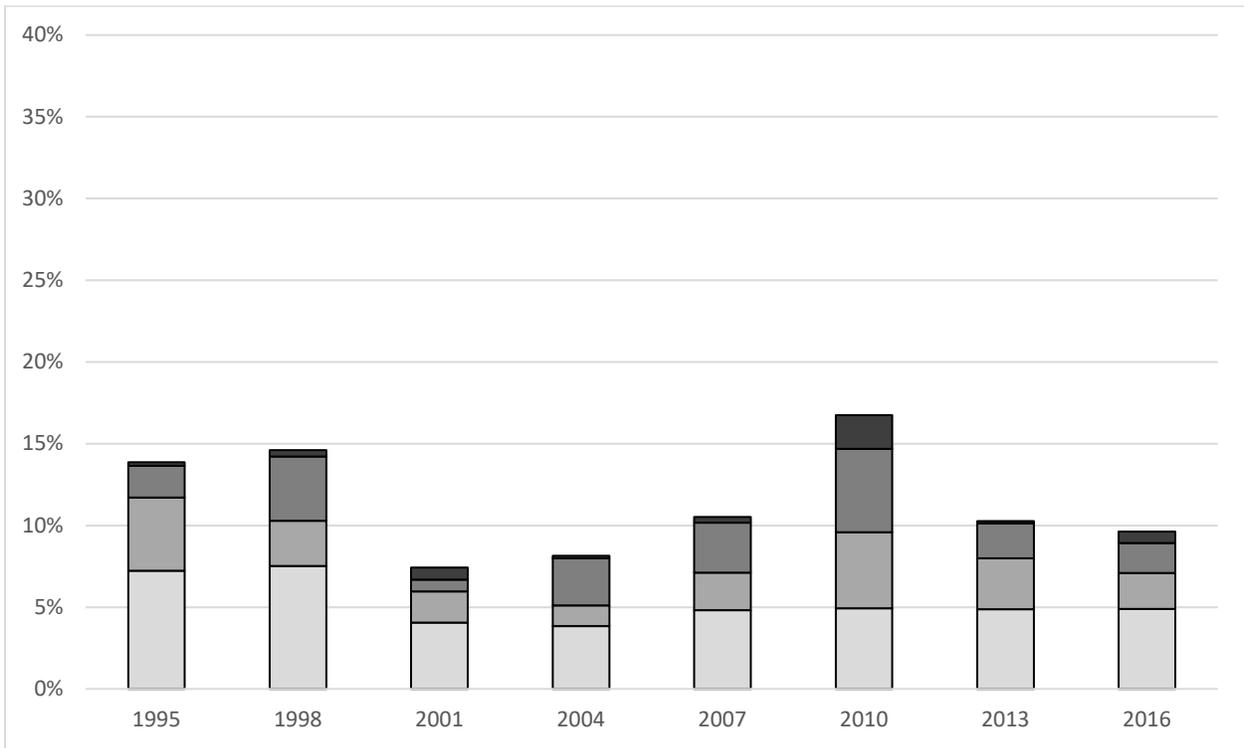
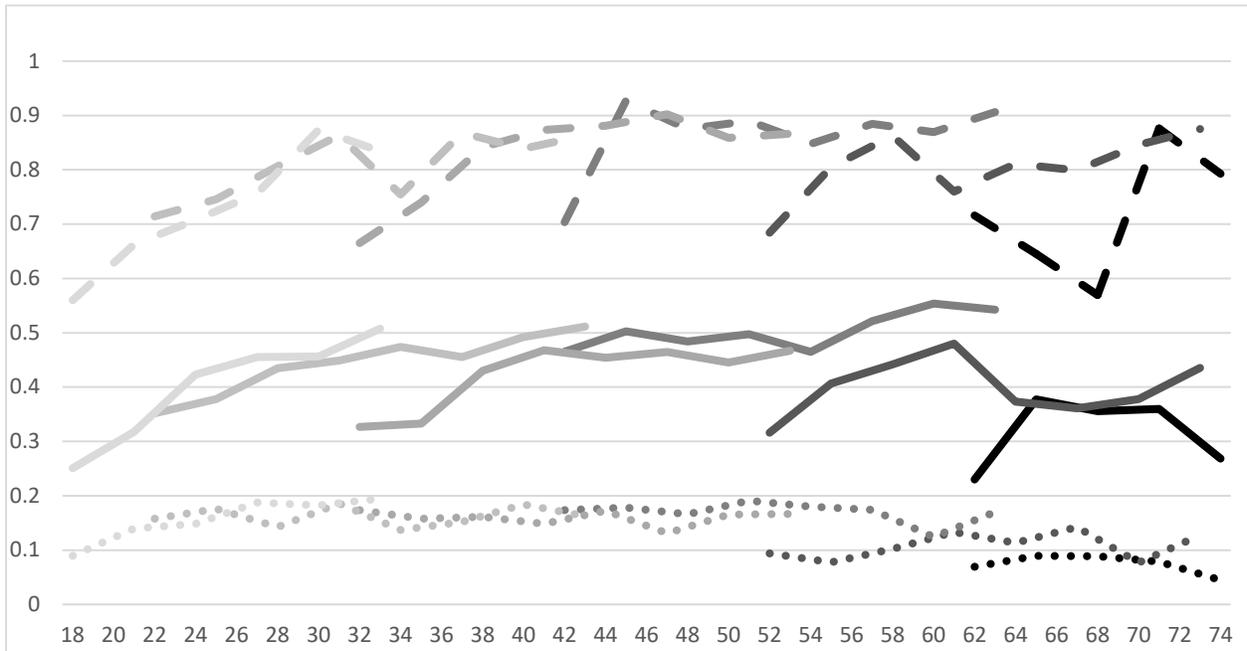


Figure 23. Percent with college degree by birth-year/Normal-income cohort



Appendix Figure 1. Share of debt, by asset percentile groups

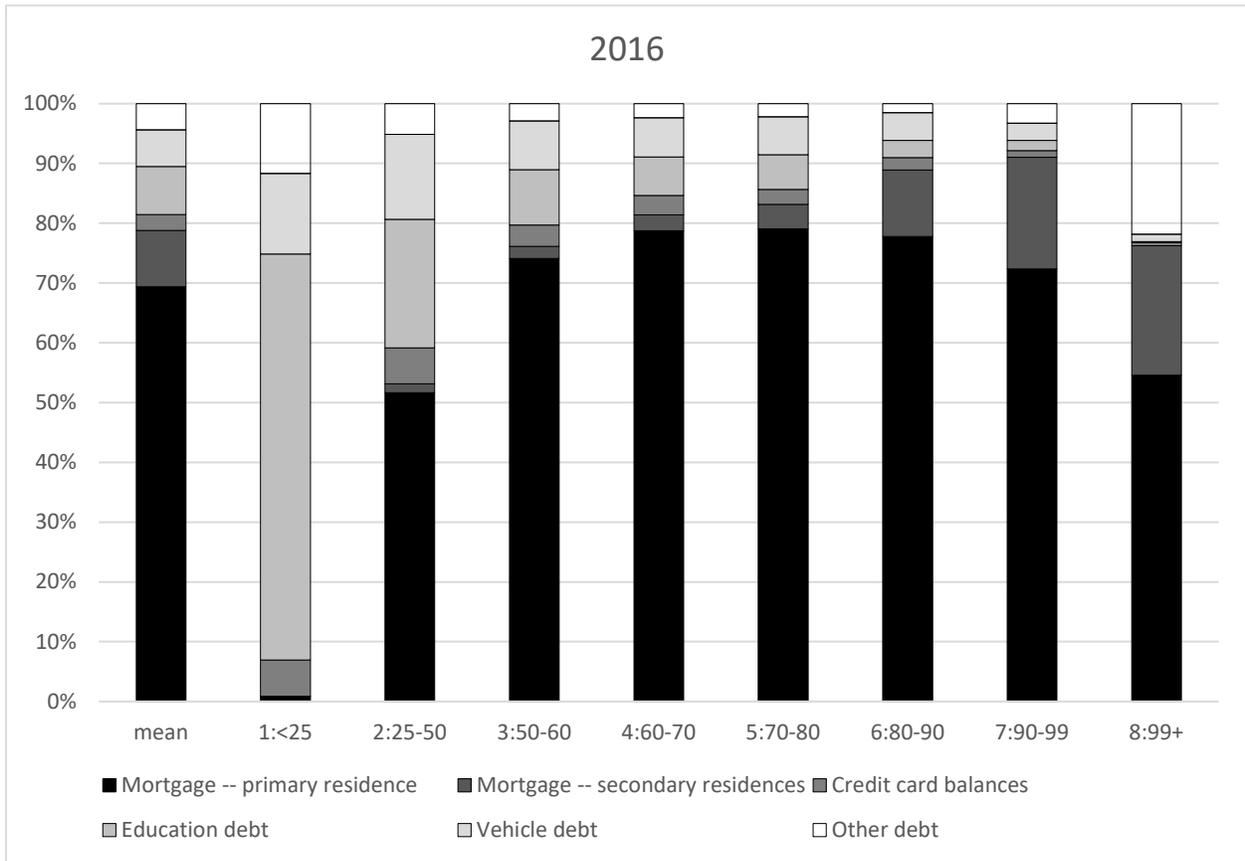


Table 1. Percent of families that hold assets, 1989-2016

	1989	1992	1995	1998	2001	2004	2007	2010	2013	2016
Any asset	94.7	95.8	96.4	96.8	96.7	97.9	97.7	97.4	97.9	99.4
Financial asset	88.9	90.3	91.2	93.1	93.4	93.8	93.9	94.0	94.5	98.5
Liquid asset	85.5	86.9	87.4	90.6	91.4	91.3	92.1	92.5	93.2	98.0
CDs	19.9	16.7	14.3	15.3	15.7	12.7	16.1	12.2	7.8	6.5
Mutual fund (dir.)	7.2	10.4	12.3	16.5	17.7	15.0	11.4	8.7	8.2	10.0
Stocks (dir.)	16.8	17.0	15.2	19.2	21.3	20.7	17.9	15.1	13.8	13.9
Bonds (dir.)	5.7	4.3	3.1	3.0	3.0	1.8	1.6	1.6	1.4	1.2
Managed acct.	3.6	4.0	3.9	5.9	6.6	7.3	5.8	5.7	5.2	5.5
DC pension or IRA	37.1	40.1	45.3	48.9	52.8	49.9	53.0	50.4	49.2	52.1
Other financial	55.0	51.2	50.0	45.1	43.7	41.5	38.5	33.1	30.7	30.9
Memo:										
Equity (dir. or indir.)	31.8	36.9	40.5	48.9	53.0	50.3	53.2	49.9	48.8	51.9
Directly-held equity	19.9	21.1	22.3	27.6	29.9	27.7	23.8	19.4	18.2	19.7
Non-financial	89.3	90.8	90.9	89.9	90.7	92.5	92.0	91.3	91.0	90.8
Primary residence	63.9	63.9	64.7	66.2	67.7	69.1	68.6	67.3	65.2	63.7
Second+ home	13.1	12.7	11.8	12.8	11.3	12.5	13.8	14.3	13.2	13.8
Business	21.1	20.8	19.2	18.7	19.0	19.1	19.0	18.5	16.7	17.4
Other nonfin.	84.5	86.4	85.0	83.6	85.5	87.0	87.7	87.2	86.8	85.8
Any debt	72.3	73.2	74.5	74.1	75.1	76.4	77.0	74.9	74.5	77.1
Mortgage	39.5	39.1	41.0	43.1	44.6	47.9	48.7	47.0	42.9	41.9
Mortg. (2 <sup>nd</sup> + home)	5.1	5.7	4.7	5.0	4.6	4.0	5.5	5.3	5.2	5.6
Credit card balance	39.7	43.7	47.3	44.1	44.4	46.2	46.1	39.4	38.1	43.9
Other installment	52.5	50.2	50.3	48.5	48.5	49.8	49.8	49.2	50.0	52.4

Table 2. Mean asset holdings, 1989-2016 (thousands of \$2016)

	1989	1992	1995	1998	2001	2004	2007	2010	2013	2016
Any asset	395.3	365.8	388.9	486.6	612.2	672.0	758.3	659.5	645.3	787.1
Financial asset	120.6	115.7	143.0	198.2	258.3	240.9	257.9	250.1	263.0	334.7
Liquid asset	23.0	20.1	19.9	22.5	29.4	31.6	28.2	33.2	34.9	39.4
CDs	12.3	9.3	8.0	8.5	7.9	8.9	10.4	9.8	5.2	4.9
Mutual fund (dir.)	6.4	8.8	18.1	24.6	31.3	35.2	40.8	37.4	39.0	77.8
Stocks (dir.)	18.1	19.0	22.3	44.9	55.5	42.1	45.9	35.1	41.7	45.7
Bonds (dir.)	12.3	9.7	8.9	8.5	11.7	12.7	10.7	11.1	8.5	9.4
Managed acct. DC pension or IRA	7.9	6.3	8.4	16.9	27.2	19.1	16.8	15.5	19.9	25.8
Other financial	26.0	29.9	40.5	55.1	74.9	78.1	90.4	95.4	102.2	119.2
Memo: Equity (dir. or indir.)	14.8	12.5	16.9	17.2	20.5	13.4	14.9	12.6	11.6	12.4
Non-financial	274.7	250.2	245.9	288.3	353.8	431.1	500.4	409.4	382.2	452.4
Primary residence	126.3	117.5	116.7	135.5	165.8	216.8	240.4	194.4	176.4	191.9
Second+ home	22.4	21.2	19.6	24.5	28.6	42.6	53.5	45.8	43.2	49.5
Business	103.9	93.1	86.4	104.6	132.6	143.1	177.6	142.9	137.1	184.2
Other nonfin.	22.2	18.4	23.2	23.6	26.8	28.6	28.9	26.4	25.5	26.9
Any debt	48.4	52.9	56.8	69.2	73.8	100.5	112.4	108.2	94.0	95.1
Mortgage	33.4	38.1	41.5	49.4	55.5	75.6	84.0	80.2	69.4	66.0
Mortg. (2 <sup>nd</sup> + home)	3.7	5.4	4.3	5.2	4.6	8.5	11.4	10.6	8.4	9.0
Credit card balance	1.4	1.7	2.2	2.7	2.5	3.0	3.9	3.1	2.3	2.5
Other installment	9.9	7.6	8.7	11.9	11.2	13.4	13.1	14.4	13.9	17.6
Memo: Net worth	346.9	312.9	332.1	417.3	538.4	571.5	645.9	551.3	551.3	692.0

Table 3. Average assets and debts of asset groups, 1989-2016 (in thousands of \$2016)

Asset percentile	2016		2013		2010		2007		2004	
	asset	debt	asset	debt	asset	debt	asset	debt	asset	debt
<25	9.0	12.4	8.4	9.8	9.1	9.3	11.3	8.9	11.5	9.3
25-50	96.9	41.8	91.9	41.1	108.4	51.9	140.2	53.7	120.7	47.8
50-60	227.6	94.9	212.9	97.8	234.8	105.8	296.0	109.7	257.8	99.2
60-70	327.9	111.4	302.9	110.6	327.9	136.5	412.1	135.3	380.2	130.6
70-80	495.8	133.7	456.0	139.2	469.7	164.1	601.5	164.9	571.7	151.1
80-90	935.3	173.0	810.1	174.5	831.3	166.7	951.3	188.3	914.9	166.3
90-99	3,191.2	264.7	2,627.2	257.5	2,740.1	317.3	2,996.0	335.6	2529.5	251.5
Top 1	27,448.8	643.9	20,523.4	587.2	19,674.0	703.5	22,403.0	669.6	19834.5	879.5
average	787.1	95.1	645.3	94.0	659.5	108.2	758.3	112.4	672.0	100.5

Asset percentile	2001		1998		1995		1992		1989	
	asset	debt	asset	debt	asset	debt	asset	debt	asset	debt
<25	11.5	7.3	9.6	7.4	9.2	6.5	7.0	4.9	5.2	4.5
25-50	108.3	40.0	100.2	34.7	85.7	26.2	72.1	20.8	70.7	21.0
50-60	227.7	78.4	204.5	69.4	175.7	53.9	159.6	49.4	164.5	47.7
60-70	333.3	84.3	284.0	88.9	242.4	79.6	227.8	68.2	235.3	58.7
70-80	493.4	114.0	400.8	101.3	325.8	86.6	317.1	70.7	348.4	64.9
80-90	814.7	124.6	645.1	113.3	510.1	104.2	496.3	96.8	567.4	105.6
90-99	2,388.6	190.3	1,781.9	190.0	1,347.5	138.6	1424.3	159.0	1546.8	126.8
Top 1	17,938.4	463.4	14,516.2	428.4	11,779.5	366.3	9757.4	361.6	10549.3	289.4
average	612.2	73.8	486.6	69.2	388.9	56.8	365.8	52.9	395.3	48.4

Table 4. Effect on wealth from hypothetical price changes, by income groups

	1989	1992	1995	1998	2001	2004	2007	2010	2013	2016
A. Hypothetical 10% decline in house prices										
Families in bottom 50% of normal income										
Avg. pct. of wealth lost from shock	0.03	0.03	0.06	0.06	0.06	0.07	0.07	0.07	0.07	0.06
Fraction losing > 10 pct. of wealth	0.10	0.16	0.25	0.15	0.18	0.16	0.11	0.19	0.15	0.09
Families in next 45% of normal income										
Avg. pct. of wealth lost from shock	0.04	0.06	0.05	0.05	0.04	0.05	0.06	0.05	0.05	0.04
Fraction losing > 10 pct. of wealth	0.10	0.12	0.15	0.14	0.11	0.15	0.33	0.38	0.26	0.24
Families in top 5% of normal income										
Avg. pct. of wealth lost from shock	0.05	0.06	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Fraction losing > 10 pct. of wealth	0.06	0.18	0.06	0.05	0.04	0.05	0.04	0.06	0.23	0.04
B. Hypothetical 10% decline in equity prices										
Families in the bottom 50% of normal income										
Avg. pct. of wealth lost from shock	0.04	0.05	0.02	0.02	0.03	0.02	0.02	0.03	0.02	0.03
Fraction losing > 10 pct. of wealth	0.01	0.02	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.02
Families next 45% of normal income										
Avg. pct. of wealth lost from shock	0.04	0.03	0.04	0.04	0.05	0.04	0.04	0.04	0.04	0.04
Fraction losing > 10 pct. of wealth	0.01	0.02	0.02	0.04	0.04	0.03	0.04	0.04	0.04	0.04
Families in top 5% of normal income										
Avg. pct. of wealth lost from shock	0.03	0.02	0.06	0.07	0.07	0.06	0.07	0.06	0.06	0.07
Fraction losing > 10 pct. of wealth	0.01	0.01	0.04	0.05	0.05	0.05	0.05	0.05	0.05	0.05