CONFERENCE DRAFT: COMMENTS WELCOME

Changing Wealth Accumulation Patterns: Evidence and Determinants

William Gale and Benjamin Harris*

February 2020

ABSTRACT

The patterns and determinants of household wealth accumulation have long been of interest to economists. Using the 1989 and 2016 Surveys of Consumer Finance, we examine the determinants of changes in mean and median wealth of households of given ages across different birth cohorts. While the Great Recession reduced wealth in all age groups, longer-term trends show that wealth of older age groups has increased while the wealth of younger age groups has declined. We show that a substantial share of these changes, in both directions, can be explained by the evolution of household demographic and economic characteristics.

*Gale: Brookings Institution and Urban-Brookings Tax Policy Center. Harris: Kellogg School of Management. This paper was prepared for the "Conference on Measuring and Understanding the Distribution and Intra/Inter-Generational Mobility of Income and Wealth," March 5-6, 2020.

We thank John Sabelhaus for sharing wealth data and Grace Enda and Claire Haldeman for outstanding research assistance.

I. Introduction

The patterns and determinants of household wealth accumulation have long been of interest to economists, with seminal contributions dating back at least to Modigliani and Brumberg (1954), Friedman (1957), and Ando and Modigliani (1963). Recent work by Piketty (2014) and Saez and Zucman (2019) has sparked a new generation of research interest in this topic.

Wealth accumulation is of interest for several reasons. At the household level, wealth provides a source of future consumption, as well as insurance against adverse economic shocks. At the aggregate level, wealth finances domestic and foreign investment, affects current consumption spending, and influences the efficacy of monetary and fiscal interventions. More broadly, as discussed further below, the sheer magnitude of changes in aggregate household wealth relative to GDP in recent decades merits attention.

Documenting and determining the causes of changes in the level and distribution of household wealth and its components across generations and over time is an extraordinarily ambitious goal. This paper takes an initial step in that general direction, building on Fichtner, Gale, and Gelfond (2019) and Gale and Pence (2006). Using data from the Federal Reserve Board's Survey of Consumer Finances (SCF) we document how mean and median household wealth levels have changed for households of given ages across different birth cohorts and we explore the determinants of those changes.

Our main results can be summarized in three statements. First, the Great Recession in 2007–2009 reduced wealth in all age groups. Second, the broader long-term trend has been that the wealth of older age groups has increased, while the wealth of successive cross-sections of younger age groups has fallen. Third, a significant share of these changes, in both directions, can be explained by the evolution of household demographic and economic characteristics.

The rest of the paper is organized as follows. Section II describes the SCF data. Section III provides background data and context for the analysis. Section IV presents descriptive data on mean and median net worth for constant-age categories across birth cohorts. Section V provides an analytical framework for examining the determinants of wealth change. Section VI presents the main empirical results and analysis. Section VII discusses preliminary policy implications and how the analysis could be extended in future research.

II. Survey of Consumer Finances

The SCF is a triennial household survey that is generally considered to provide the most reliable and complete survey-based measures of household wealth (or net worth, terms we use interchangeably below).[1] The surveys covering the period 1989 to 2016 follow a generally consistent methodology. Raw sample sizes vary from about 3,100 to about 6,200 in surveys during that period.

To capture how assets and debts are held broadly in the population, about two-thirds of the unweighted sample are drawn from a stratified, nationally representative random sample. The remainder of the sample is randomly selected from statistical records derived from tax returns, using a stratification technique that oversamples households likely to have substantial wealth. This sample design allows for more efficient and less biased estimates of wealth than are generally feasible through simpler designs. In particular, oversampling the wealthy is an important component of the survey, because wealth is so highly concentrated. All of the data presented in this paper represent weighted statistics, using the sample weights provided by the

[1] The SCF is conducted by the non-partisan and objective research organization NORC at the University of Chicago on behalf of the Federal Reserve Board and with the cooperation of the Department of Treasury.

SCF, which correct for selection probabilities and nonresponse.

The SCF covers all age groups and almost all household assets and liabilities, with two notable exceptions. First, the survey excludes households in the Forbes 400, who would be easily identifiable in the data. Second, because the SCF defines net worth as resources that a household may access and control immediately, the survey does not report defined benefit (DB) pension wealth—the present value of future income (minus future contributions) that households expect to receive from DB pension plans. To present a more complete analysis of household wealth, we add to the SCF definition of net worth a measure of the present value of DB wealth, following Sabelhaus and Volz (2019).

Our resulting wealth definition, like the SCF's, does not include future Social Security or Medicare benefits (or taxes), which often comprise a significant share of households' resources in retirement.[2]

The SCF also includes information on household demographic characteristics, income, attitudes, and current and past jobs. Some of the survey responses represent the head of household (e.g., age, gender, and level of education), while some represent the respondent (race and attitudinal feedback). Asset, debt, and income measures reflect the total value held by a household in certain categories.

The SCF uses a multiple imputation procedure to fill in missing data. Five implicates form an approximate distribution of the missing data, creating a sample that is five times larger than the actual sample. For descriptive statistics, we use all five implicates by dividing the sample weights by five. In our regressions, we use the first implicate only because using all five would inflate statistical significance.

[2] Social Security provides about 90 percent or more of the income for one-third of retirees and 50 percent or more of the income for two-thirds of retirees (Social Security Administration 2019).

For some purposes below, we divide household net worth into four mutually exclusive and exhaustive categories. Net financial assets include all financial assets except retirement accounts less unsecured debt (including student loans). Housing wealth is the difference between the value of the household's primary residence, if any, and the outstanding mortgage(s) against the primary residence. Retirement wealth is the sum of balances in defined contribution accounts, IRAs, and Keoghs, plus the present value of future defined benefit income (minus future contributions). Other wealth is the residual category and includes businesses, vehicles, second homes, and other items.

III. Background and Context

Aggregate household net worth rose from $20.6 trillion (3.7 times GDP) in 1989 to $89.2 trillion (4.8 times GDP) in 2016, the first and last years for which we have SCF data.[3] While macro factors clearly have affected the level of household wealth, micro factors may also play an important role (Gale and Pence 2006). A substantial share of the micro research on household saving and consumption focuses explicitly or implicitly on variations of the life-cycle/permanent income hypothesis, in which households equalize the marginal utility of consumption over time. The framework is quite flexible and can incorporate borrowing constraints, family formation, bequest motives, health shocks, uncertain income, and many other considerations. Life-cycle models generally predict that households may accrue some debt prior to entering the labor market, will accumulate net wealth during their working life, and then spend down their assets to some extent in retirement (Browning and Crossley 2001, Fieveson and Sabelhaus 2019). Using a broad version of the life-cycle framework as motivation, this section provides background

[3] https://www.federalreserve.gov/releases/efa/efa-distributional-financial-accounts.htm

information on several factors that have changed over time and plausibly have influenced the level or composition of household wealth accumulation between 1989 and 2016. The SCF-based statistics used below are reported in 2016 dollars and are summarized in Table 1.

Aging

The population aged considerably between 1989 and 2016. For example, the share of households with heads aged 45 and older rose from 50.4 percent in 1989 to 62.9 percent in 2016. This trend affects aggregate household wealth accumulation for the simple reason that wealth tends to rise with a household head's age, at least through the working years. For example, in 1989, average net worth among households headed by someone 55–64 years old was more than twice as large as for households headed by someone 35–44 years old. Multiplying the 2016 average net worth of each age category by the groups' 1989 population share shows that if the age distribution had not changed, average net worth in 2016 would have been about $705,000 (opposed to the actual average of about $761,000). That is, the aging of the population alone explains about one-sixth of the difference in average household net worth between 1989 and 2016.

Student loans

The prevalence and average size of student loan debt exploded between 1989 and 2016. For example, in 1989, 24 percent of households with heads aged 25–34 held student debt and the average balance among debtholders was about $12,000. By 2016, these figures had increased to 40 percent and $36,000.

The impact of rising student debt on wealth accumulation depends critically on why debt rose. To the extent that it is due to increases in high-quality educational attainment, rising student debt is financing investments in human capital that will be associated with higher lifetime earnings and could therefore raise lifetime wealth accumulation. In contrast, to the extent it is due to lower public spending on higher education, or to spending on low-quality institutions, the rise in student debt is similar to a negative wealth shock and can be expected to reduce wealth accumulation trajectories across cohorts.

Evidence shows that the sharp increase in debt is due to a combination of rising gross and net tuition prices, changing composition of education including increased attendance at for-profit schools and in graduate programs, and changing composition of student borrowers.[4] Recent analyses suggest that higher student debt may delay people's decisions to marry and buy a house and may affect early-career choice of occupation. Evidence regarding the impact on people's willingness to make retirement contributions is mixed.[5]

Homeownership

Primary residences are the largest asset for many households and a principal vehicle through which households accumulate wealth. Homeownership rates generally rose from 1989 to 2007, then fell significantly in the Great Recession. Since then, the aggregate homeownership rate has fallen back to 1989 levels. Controlling for age, however, the figures changed substantially. Relative to 1989, homeownership rates were substantially lower in 2016 for households under the age of 65 but higher for households aged 65 and older. Housing values followed a similar time pattern as aggregate homeownership rates, rising from 1989 to 2007, falling sharply in the Great Recession and recovering since then.[6] Mean age if first-time

[4] Akers and Chingos (2014) find that over half of the change in mean debt between 1989 and 2010 was due to increased tuition, and that roughly one-quarter was due to increased educational attainment. Similarly, Looney and Yannelis (2015) attribute much of the increase in debt between 2000 and 2011 to a soaring rise in "non-traditional" borrowers—namely students at for-profit institutions and in two-year degree programs.
[5] See Givecha (2016) on marriage, Mezza et al (2020) on home purchases, and Rothstein and Rouse (2011) on early career choices. Elliott et al. (2013) and Rutledge et al. (2018) obtain contrasting results on the impact of student debt on retirement contributions.
[6] https://fred.stlouisfed.org/series/ASPUS

homeownership has also occurred later in life, rising by four years since the 1980s.

The decline in housing price growth, housing equity, and the rate of homeownership for younger households does not necessarily imply, in isolation, that aggregate wealth accumulation patterns are changing. In theory, households substitute housing investment with other forms of investment—financial assets in particular. However, the decline in ownership for younger households does not necessarily imply a rise in non-housing saving; for example, Fisher and Gervais (2011) atribute the bulk of the long-term decline in younger household homeownership to a combination of delayed marriage and increased earnings risk. .

Retirement saving

The retirement saving landscape has undergone a massive shift over time from defined benefit plans to defined contribution plans. In 1989, more than 31 percent of households were covered by a DB plan but not a DC plan, a figure that fell below 21 percent by 2016.   In contrast, the share covered by a DC plan but not a DB rose from about 12 to 24 percent. The share of households with no retirement plan remained roughly constant around 45 percent.

The switch from defined benefit pensions to defined contribution retirement plans can have subtle impacts on wealth accumulation. First, pension wealth accumulates in a back-loaded manner in DB plans relative to DC plans. Consider two workers who are identical in every way except one has a DB plan that pays $30,000 per year at retirement and the other has a DC plan that features contributions equal to a constant share of earnings and pays $30,000 per year at retirement upon conversion to an annuity. (Assume the employer makes all contributions to both accounts.) Because benefits accrue more slowly under the typical DB plan than under the DC plan, reported measures of wealth accumulation will show the first worker having less wealth than the second worker at any given age before retirement, even though the plans give the workers equal amounts of income in retirement.

A second factor is that households may consider DB plans to be less substitutable for ordinary saving than DC plans are. DC plans typically have provisions for hardship or early withdrawal and workers typically have control over the level of contributions. Both factors make DC plans better substitutes for ordinary saving than DB plans are. To the extent that a tax-deferred saving vehicle is more substitutable for ordinary saving, contributions to that tax-deferred saving vehicle are less likely to represent net additions to saving (Engen, Gale, Scholz 1996).

Household formation and fertility

Over time, the age of first marriage and the age when having one's first child have increased. For example, in 1989, 63 percent of household heads aged 25–34 were married and 60 percent of all households in this age group had children. By 2016, these figures had fallen to 58 percent and 51 percent, respectively. Different trends occurred for older households, though. For households aged 65 and older, the share of households represented by married couples rose significantly over the same period. As a result, the share of all households that are married did not change very much over the sample period.

The delay in marriage among younger households likely reduces wealth accumulation in earlier ages. Marriage is associated with wealth building through several channels, including two-earner households, economies of scale, and increased rates of homeownership (Grinstein-Weiss et al. 2008, Vespa and Painter 2011). While the precise impact of marriage per se is complicated by the potential for cohabitation, the substantial delay in marriage may well have an impact on the trajectory of wealth for younger households. In contrast, later-in-life childbearing and lower fertility rates may increase wealth accumulation (Scholz and Seshardi 2007).

Wages

SCF data show that average household wages (which aggregate wages of married couples) rose by about 20 percent from 1989 to 2007 and were at about the same level in 2016 as in 2007. The data show increases in all constant-age groups and in particular in households age 55–74. The latter result may be due to changing female labor force participation and delayed retirement. Guvenen et al. (2017) show that lifetime earnings have been stagnant or falling for successive generations of males that reached aged 25 in 1957 through 2013, while rising somewhat for females (from a very low base).

IV. Age-Wealth Profiles

Figure 1 shows median age-wealth profiles for constant-age groups across birth cohorts. The data are scaled so that each generation's 1989 value is set to 100. The graph demonstrates two points. First, the Great Recession in 2007–2009 significantly reduced household wealth in all age groups. Second, younger age groups have been doing far worse than older age groups. For example, in 2016, all groups aged 55 and older had more median wealth than their 1989 counterparts. Households aged 25–34 in 2016—roughly the millennial generation—held about 12 percent less wealth than did households who were the same age in 1989.

Figure 2 shows scaled mean age-wealth profiles. Because of the growth of income and wealth at the top of the distribution, the mean increases exceed the median increases, but they follow the same general pattern, with wealth rising much more slowly for younger age groups than for older age groups.

Appendix figures 1 and 2 report median and mean net worth levels by age and year.

V. Modeling the Effects of Demographic Changes on Wealth

We analyze the influence of changes in demographic characteristics on wealth accumulation across cohorts by utilizing basic median and ordinary least squares regressions, in the absence and presence of demographic variables.

Basic Regressions

We run median (least-absolute-deviation or LAD) regressions and ordinary least squares regressions, pooling data from the 1989 and 2016 SCFs. We break the data into four age-category subsets, one for 25–34 year-olds, one for 35–44 year-olds, one for 45–54 year-olds, and one for 55–64 year-olds. For each household *i* in each age category *k*, we specify wealth as a function of a constant and a survey year indicator variable:

(1)
$$w_{k1} = \alpha_{k1} + \beta_{k1}(\text{year} = 2016)_i + \varepsilon_{k1i}$$

In this model, the coefficient β_{k1} captures the change in median or mean wealth between the 1989 and 2016 samples of each age category.

In a second basic regression specification, we add a vector of demographic indicators, denoted by *X*. This demographic specification is described in detail below.

(2)
$$w_{k2} = \alpha_{k2} + \beta_{k2}(\text{year} = 2016)_i + \gamma_{k2}X_i + \varepsilon_{k2i}$$

If demographic changes explain most of the difference in wealth between 1989 and 2016 for age category *k*, β_{k2} should be close to zero, and the coefficients for the variables in the demographic vector should be statistically significant.

The specifications above assume that the relationship between wealth and demographic characteristics is the same in both years (other than a shift in the intercept), an assumption that does not apply to the mean-based decomposition described below.

VI. Empirical Analysis

Specification of Demographic Characteristics

Each of the analyses we describe above uses a vector of demographic variables, denoted *X*. This vector is constructed from SCF data, which is constrained in a few important ways. First, the survey respondent and the household head are not necessarily the same person. The SCF designates the household head to be the man in a mixed-gender relationship and the older partner in a same-gender relationship, while the respondent is (supposed to be) the person most familiar with the family's finances. The SCF reports the race of the survey respondent, not of the household head. Similarly, it reports the educational attainment of only the household head.

As a result, demographic characteristics do not always map neatly onto households, our unit of observation. For instance, in the 2001 SCF, mixed-gender partnerships accounted for 87 percent of responses, but an estimated 46 percent of respondents from mixed-gender partnerships were female; the respondent and the household head were different in at least 40 percent of surveyed households (Lindamood, Hanna, and Bi 2007). And while partners are often people of similar demographic characteristics, this is not always the case, so demographic insights must be constrained to reflect this uncertainty.

A second constraint on demographic insights is sample size. Because we are analyzing changes among age groups within years, our sample sizes are fairly limited, ranging from 452 to 1,446 people per age group per year. Notably, 2016 sample sizes for each age group are about 2 to 3 times the size of the sample sizes of the same age groups in 1989. The uncertainty this introduces will manifest in standard errors and significance levels, which are reported in our results.

Our demographic vector includes the following characteristics: race, marital status, sex, educational attainment, and income category.[7]

Race, as described above, applies to the race of the respondent, and is reported as indicator variables over each of the four categories: non-Hispanic white, Black, Hispanic, or other (including those of Asian and Native descent). Non-Hispanic white is the omitted category.

Marital status reflects whether the household consists of a single financially independent adult or two financially interdependent adults. Importantly, the survey does not distinguish between two financially interdependent unmarried people living together and a married couple. We use an indicator for "marriage" to describe those households with two financially interdependent adults. Single households are the omitted category.

We control for the sex of the household head. But, as described above, the household head is either a man, a single female head of household, or the older member of a same-sex female couple, so it is more accurately interpreted as the presence or absence of a man in the primary economic unit. Single male is the omitted category.

The educational attainment variable reflects the maximum educational attainment of the household head. This is represented through indicators for each of the following categories: less than a high school diploma, high school diploma, some college, bachelor's degree, and graduate

[7] In the dataset, these variables correspond to categorical variables "RACE", "MARRIAGE", "HHSEX", an "EDCL" categorical variable adjusted with information from "EDUC" to provide more granularity with less than high school and graduate school specifications, and a household income category variable generated from "INCOME," all as defined in https://www.federalreserve.gov/publications/files/scf17.pdf. See also https://www.federalreserve.gov/econres/files/Networth%20Flowchart.pdf.

degree. Less than a high school diploma is the omitted category.

We also include an income category variable to reflect the household's reported income level, with an indicator for each level. The income cutoffs are $20,000, $50,000, $100,000, and $200,000. Less than $20,000 is the omitted category.

Specification of the Dependent Variable

We employ two different wealth specifications, one that uses the level of wealth, and one that uses the inverse hyperbolic sine transformation of wealth. The results derived from the level-of-wealth analysis describe absolute changes in wealth over the period, while the results from the inverse hyperbolic sine specification describe proportional changes in wealth over the period. We use this transformation, instead of the more traditional logarithmic transformation, because it approximates the logarithm while remaining defined for the non-positive values common in wealth data.

More formally, if θ is a scaling parameter and w is a measure of wealth, the inverse hyperbolic sine of wealth can be written as $\theta^{-1}\sinh^{-1}(\theta w) = \theta^{-1}\ln[\theta w + (\theta^2 w^2 + 1)^{\frac{1}{2}}]$. This symmetric function is linear around the origin but approximates the logarithm for larger values of wealth. To see this, note that if w is large, $\ln\left[\theta w + (\theta^2 w^2 + 1)^{\frac{1}{2}}\right] \approx \ln 2\theta + \ln w$, which is simply a vertical displacement of the logarithm. Following previous research and our own prior methodology, we set $\theta = 0.0001$.[8] When multiplied by this scaling parameter, coefficients and standard errors from an inverse hyperbolic sine specification, like logarithmic coefficients and standard errors, can be interpreted as the percentage change in wealth implied by a change in a

[8] Burbidge, Magee, and Robb (1988) find the optimal value of θ to be 0.0000872 (within rounding distance of our choice). Pence (2002) finds that 0.0001 is the optimal value of θ, a value also used by Kennickell and Sundén (1997). See Gale and Pence (2006) for author's prior work conforming to this methodology.

particular demographic characteristic, assuming that wealth values are sufficiently large.[9]

Results

Table 2 reports results from median regressions. The first specification follows equation (1) in the paper, explaining the level of household wealth as a function only of only a constant and an indicator for whether the observation occurred in 2016. The constant term replicates the 1989 median age-wealth profile shown in Appendix Table 1. The 2016 indicator shows that median wealth was substantially lower in 2016 than in 1989 for households aged 35–44 and 45–54—by about $77,000 and $97,000, respectively. Median wealth for 25–34 year-olds and 55–64 year-olds was not significantly different in the two sample years.

The effects shown in Table 2 could be due to changes in the general economic environment and/or to changes in specific household characteristics. To isolate the impact of these two groups of determinants, the second specification includes several household-level demographic variables, following equation (2).

The results show that changes in household characteristics reduced wealth for households aged 25–54 in 2016 relative to 1989 but raised wealth for households aged 55–64 over the same period. For example, for households aged 35–44, the coefficient on the 2016 indicator was about -$54,000, compared to about -$97,000 in the first specification. This implies that changes in household characteristics explain about 45 percent of the decline in wealth for this age group over time.

Likewise, for households aged 35–44, the 2016 effect reduced wealth by $77,000 when demographic variables were excluded but by only $15,000 when demographic variables were included. Thus, more than 80 percent of the decline in wealth for that group can be explained by

[9] See Pence (2006) for further explanation of the logarithmic approximation, and Burbidge, Magee, and Robb (1988) for more information about the inverse hyperbolic sine transformation itself.

demographic factors.

In contrast, for households aged 55–64, the coefficient on the 2016 indicator is about -$29,000, which is lower (algebraically) than the coefficient in the first equation—which is about $15,000 but not significantly different from zero.

The coefficients on the demographic variables are consistent with much prior work. Households that are black or Hispanic have lower wealth than other households, even after controlling for observables. Households where the head has more formal education and/or higher income accumulate more wealth. To some extent, married households have more wealth and female-headed households often have lower wealth.

Table 3 repeats the exercise using mean (ordinary least squares) regressions. The first specification shows that average wealth rises substantially in the 45–54 and 55–64 age groups. Coupled with the changes in median wealth shown in Table 2, these figures suggest a substantial widening of the distribution of wealth in those age groups over time.

The second specification shows, again, that changes in household demographic variables served to raise wealth substantially in the 55–64 age group. More than two-thirds of the increase in wealth in that age group documented in the first specification can be explained by changes in demographic characteristics in the second specification.

The impact of the individual demographic variables are qualitatively similar to those found in the median regressions in Table 2—minorities and female-headed households have less wealth, households where the head is married or has more formal education, or where income is higher, tend to have higher wealth.

Appendix Tables 1 and 2 provide regression results using the hyperbolic sine of wealth as the dependent variable and generate broadly similar conclusions.

VII. Conclusion

This paper aims to document and explain changing wealth levels across the life cycle. There is good reason to believe that that path of wealth accumulation is changing for American households. As we discuss in Section III, the economics literature suggests that many determinants of wealth accumulation are shifting later in life. Young workers are more frequently entering their working years with substantial student debt, including in particular higher debt for attendees of for-profit institutions. The mean age of entering into homeownership—one of the most prominent forms of wealth accumulation—has increased by four years since the early 1980s. The ongoing transformation from defined benefit plans to defined contribution plans can, for some workers, mean diminished retirement savings through middle-age. Marriage—also a determinant of wealth—typically takes place about seven years later than it did in the 1950s. And while wages are rising for all groups, mean increases are higher for older workers.

Not all trends suggest that wealth accumulation should be occurring later in life. For example, Americans are increasingly choosing to have children later in life, which can depress middle-age wealth accumulation. On the whole, however, the bulk of the evidence provides support for the view that wealth accumulation trends should be shifting later in life.

Indeed, we find empirical support for this view. Our analysis suggests that while the Great Recession reduced wealth in all age groups, we also find a longer term trend of increasing wealth in older age groups paired with falling wealth among younger households. We show that a significant share of these changes can be attributed to the evolution of household demographic and economic characteristics.

This topic is primed for future study. To start, future research can address changing wealth patterns by race, sex, educational attainment, and marital status. Given that many of the changing wealth determinants can be expected to have differential impact along these margins, further studying trends along these lines is an important extension of the research on wealth accumulation. In addition, this research can be extended to address the lack of a life-long, high-quality panel dataset measuring changes in wealth and incorporating multiple waves of respondents. One potential strategy to address this concern is the construction of a synthetic, microdata set that allows for the comparison of wealth accumulation patterns across successive birth cohorts. In addition, more research is needed to quantify the changing relationship between various determinants of wealth and observed wealth accumulation, including the wealth determinants discussed in Section III and others not identified in this paper. Lastly, further attention can be directed at determining the impact of changing wealth trajectories on aggregate wealth inequality. If wealth accumulation is indeed occurring later in life, this trend (all else equal) could increase cross-sectional wealth inequality, without necessarily increasing inequality across the life cycle.

We conclude by noting that shifts in wealth trajectories may well be linked to explicit policy decisions. The rise in early-life student debt can be linked, for example, to an accommodative stance by policymakers regarding for-profit universities and fiscal decisions by state legislatures to shift a greater share of the public university funding burden to students and families. Sharp cuts in the estate tax since 2001 have made the after-tax cost of bequests cheaper relative to *intervivos* giving. And a growing preference by policymakers to provide increased benefits for families relative to single taxpayers, coupled with an outward shift in childbearing ages, means that tax breaks are increasingly targeted towards those later in middle age. While it is difficult to isolate the precise impact of policy decisions on observed shifts in wealth determinants, the incentives for later-in-life wealth accumulation often correspond to the empirical patterns.

Policymakers have an array of options for countering the shift in wealth accumulation; we raise several potential options:

One, the structure of the up-front exclusion on contributions to retirement accounts could be converted to a flat-rate credit (Gale, John, and Smith 2012). For example, one revenue-neutral option would be to replace the current exclusion for contributions to retirement account with a tax credit of approximately 25 percent. Such a reform would weaken the link between the present value of retirement saving contributions and marginal tax rates, which disproportionately benefits older workers, without foregoing the inside build-up benefit, which disproportionately benefits younger savers.

Two, tax rates could be a function of age, in addition to income and filing status. As suggested by Weinzeirl (2011), lowering tax rates for saving constrained younger workers can result in a welfare gain equal to 0.6 to 1.5 percent of consumption.

Three, the Saver's Credit—which benefits low-income savers—could be substantially expanded, including a more generous maximum credit amount, a more generous matching rate, and a higher eligibility threshold. Evidence from field experiments suggests that such a reform can significantly boost saving rates (Duflo et al. 2006).

Four, a first-time homebuyer's tax credit can replace the current itemized deduction for mortgage interest expense. Such a reform would benefit younger savers relative to older ones, who often take on excess mortgage debt exclusively due to the tax subsidy. A first-time homebuyer tax credit could potentially boost housing prices and more progressively distribute tax incentives for homeownership (Harris, Steuerle, and Eng 2014).

Five, the formula for determining Social Security benefits can be made more progressive. This reform may seem counterintuitive because Social Security benefits are not typically received until beneficiaries reach retirement age. However, to the extent that Social Security benefits are *accumulated* throughout workers' careers, the timing of the benefit receipt is immaterial. A more progressive benefit formula would disproportionately benefit younger workers, who typically have lower wages relative to their older counterparts.

Six, lifetime benefits for defined contribution accounts could be limited. In President Obama's FY2014 Budget, he proposed to equalize the lifetime benefit limit for pensions by introducing a limit on the amount in 401(k)-type plans (Department of Treasury 2013). Under current law, annual defined-benefit distributions are limited to $205,000 per plan; the Obama proposal extended the limitation to defined-contribution accounts like 401(k)s and IRA. If the combined value of a worker's retirement accounts exceeds the amount necessary to provide a $205,000 annuity, they can no longer receive tax benefits for retirement saving. As under current law, the maximum benefit level would be indexed to the cost-of-living and would be sensitive to interest rates, which determine the price of an annuity. In 2014, the cap would affect individuals with defined-contribution account balances exceeding about $3.4 million.

Seven, the estate tax breaks in the 2017 Tax Cuts and Jobs Act could be repealed, and estate tax parameters could be amended to match the tax's structure in earlier years, such as 2009 when the top rate was 45 percent and the per-person exemption was $3.5 million. Similarly, stepped-up basis—whereby all capital gains held until death are excluded from tax—could be repealed. Both provisions would encourage more *intervivos* giving relative to end of life bequests, which would shift up the receipt of wealth in beneficiaries' lifecycle.

References

Akers, Beth and Matthew M. Chingos. 2014. "Is a Student Loan Crisis on the Horizon?" Brookings Institution, Washington, DC.

Ando, Albert and Franco Modigliani. 1963. "The Life Cycle Hypothesis of Saving: Aggregate Implications and Tests." *The American Economic Review* 53(1): 55-84.

Blinder, Alan S. 1973. "Wage Discrimination: Reduced Form and Structural Estimates." *Journal of Human Resources* 8(4): 436–55.

Board of Governors of the Federal Reserve System. Distributional Financial Accounts. Retrieved from https://www.federalreserve.gov/releases/efa/efa-distributional-financial-accounts.htm.

Burbidge, John B., Lonnie Magee, and A. Leslie Robb. 1988. "Alternative Transformations to Handle Extreme Values of the Dependent Variable." *Journal of the American Statistical Association* 83(401): 123–27.

Congressional Budget Office. 2019. Historical Data and Economic Projections. Retrieved from https://www.cbo.gov/about/products/budget-economic-data#7.

Department of Treasury. 2013. "General Explanations of the Administration's Fiscal Year 2014 Revenue Proposals." Government Printing Office, Washington, DC.

Duflo, Esther, William Gale, Jeffrey Liebman, Peter Orszag, and Emmanuel Saez. 2006. "Saving Incentives for Low- and Middle-Income Families: Evidence from a Field Experiment with H&R Block." *Quarterly Journal of Economics* 121(4): 1311-1346.

Elliott, William, Michal Grinstein-Weiss, and Ilsung Nam. 2013. "Student Debt and Declining Retirement Savings." *CSD Working Paper 13-34.* St. Louis, MO: Washington University, Center for Social Development.

Federal Reserve Bank of St. Louis. Average Sales Price of Houses Sold in the United States. Retrieved from https://fred.stlouisfed.org/series/ASPUS.

Fisher, Jonas D. M., and Martin Gervais. 201. "Why has Homeownership Fallen Among he Young?" International Economic Review 52(3): 883-912.

Friedman, Milton. 1957. *A Theory of the Consumption Function.* Princeton: Princeton University Press.

Gale, William G., and Karen M. Pence. 2006. "Are Successive Generations Getting Wealthier, and If So, Why? Evidence from the 1990s." *Brookings Papers on Economic Activity* 2006(1): 155 – 234.

Gale, William, Hilary Gelfond, and Jason Fichtner. 2019. "How will retirement saving change by 2050? Prospects for the millennial generation." Brookings Institution, Washington, DC.

Gale, William G., David C. John, and Spencer Smith. 2012. "New Ways to Promote Retirement Saving." AARP Public Policy Institute, Washington, DC.

Givecha, Dora. 2016. "Student Loans or Marriage? A Look at the Highly Educated." Economics of Education Review 53: 207-216.

Grinstein-Weiss, M., Lung-Sook Lee, Johanna Greeson, Chang-Keun Han, Yeong Yeo, and Kate Irish. 2008. "Fostering low-income homeownership: A longitudinal randomized experiment on individual development accounts." *Housing Policy Debate* (19)4: 711-739.

Guvenen, Faith, Greg Kaplan, Jae Song, and Justin Weidner. 2017. "Lifetime Incomes in the United States over Six Decades." NBER Working Paper No. 23371. National Bureau of Economic Research, Cambridge, MA.

Benjamin H. Harris, C. Eugene Steuerle and Amanda Eng. 2013. "New Perspectives on Homeownership Tax Incentives." *Tax Notes* Special Report, December 23.

Kennickell, Arthur B., and Annika Sundén. 1997. "Pensions, Social Security, and the Distribution of Wealth." *Finance and Economics Discussion Series Paper* 1997–55. Washington: Board of Governors of the Federal Reserve System (October).

Lindamood, Suzanne, Sherman D. Hanna, and Lan Bi. 2007. "Using the Survey of Consumer Finances: Some Methodological Considerations and Issues." *Journal of Consumer Affairs* 41(2): 195 – 214.

Looney, Adam and Constantine Yannelis. 2015. "A crisis in student loans? How changes in the characteristics of borrowers and in the institutions they attended contributed to rising loan defaults." *Brookings Papers on Economic Activity*, Fall 2015.

Modigliani, Franco and Richard Brumberg. 2005. "Utility Analysis and the Consumption Function: an Interpretation of Cross Section Data." *The Collected Papers of Franco Modigliani.* Cambridge and London: MIT Press. (Original work published in 1954)

Oaxaca, Ronald. 1973. "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review* 14(3): 693–709.

Pence, Karen M. 2002. "401(k)s and Household Saving: New Evidence from the Survey of Consumer Finances." *Finance and Economics Discussion Series Working Paper* 2002–06. Washington: Board of Governors of the Federal Reserve System (January).

Pence, Karen M. 2006. "The Role of Wealth Transformations: An Application to Estimating the Effect of Tax Incentives on Saving." *Contributions to Economic Analysis and Policy* (5)1.

Picketty, Thomas. 2014. *Capital in the Twenty-First Century*. Cambridge: The Belknap Press of Harvard University Press.

Rothstein, Jesse and Cecilia Rouse. 2011. “Constrained after college: Student loans and early-career occupational choices.” *Journal of Public Economics* 95(1-2): 149-163.

Rutledge, Matthew S., Geoffrey T. Sanzenbacher, and Francis M. Vitagliano. 2018. “Do Young Adults with Student Debt Save Less for Retirement?” *Center for Retirement Research at Boston College* IB#18-13.

Sabelhaus, John and Alice Henriques Volz. 2019. “Are Disappearing Employer Pensions Contributing to Rising Wealth Inequality?” *FEDS Notes*. Washington: Board of Governors of the Federal Reserve System.

Saez, Emmanuel and Gabriel Zucman. 2019. *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*. New York, NY: W.W. Norton & Co., Inc.

Scholz, John Karl and Ananth Seshadri. 2007. “Children and Household Wealth.” Michigan Retirement Research Center Paper No. WP 2007-158.

Social Security Administration. 2019. “Fact Sheet.” Retrieved from https://www.ssa.gov/news/press/factsheets/basicfact-alt.pdf.

Vespa, Jonathan and Matthew Painter. 2011. “Cohabitation History, Marriage, and Wealth Accumulation.” *Demography* 48(3): 983-1004.

Weinzierl, Matthew. 2011. “The Surprising Power of Age-Dependent Taxes.” Review of Economic Studies 78(4): 1490-1518.

Table 1

Variable	Age	1989	2007	2016
Population Share (%)	**<25**	5.8	5.4	4.9
	25-34	22.4	16.2	15.3
	35-44	21.5	19.6	16.8
	45-54	15.1	20.8	18.3
	55-64	13.9	16.8	19.2
	65-74	12.6	10.5	14.1
	75+	8.9	10.6	11.2
Mean Net Worth (thousands of dollars)	**<25**	23	55	95
	25-34	131	169	107
	35-44	335	469	378
	45-54	661	955	883
	55-64	731	1310	1419
	65-74	659	1318	1292
	75+	484	798	1154
Has student debt (%)	**<25**	24.0	30.7	40.2
	25-34	15.3	34.6	46.2
	35-44	10.9	14.7	34.3
	45-54	7.3	14.5	23.7
	55-64	4.1	10.6	12.9
	65-74	0.9	1.7	3.4
	75+	0.0	0.3	1.1
Average student loan debt, conditional on having student loans (thousands of dollars)	**<25**	7	18	22
	25-34	12	30	36
	35-44	9	22	35
	45-54	12	24	37
	55-64	6	21	34
	65-74	10	23	35
	75+	0	23	29
Homeownership (%)	**<25**	11.7	12.2	11.2
	25-34	46.4	50.1	40.2
	35-44	66.1	66.1	57.8
	45-54	76.4	77.3	68.8
	55-64	80.1	81.0	73.7
	65-74	77.8	85.5	79.1
	75+	69.9	77.0	83.1
Married (%)	**<25**	29.5	42.7	34.7
	25-34	63.3	67.2	57.8
	35-44	66.5	63.8	63.9
	45-54	65.6	62.2	62.0
	55-64	60.5	59.0	58.2
	65-74	49.9	61.0	54.2
	75+	39.3	36.1	46.2
Defined benefit only (%)	**<25**	4.4	4.9	2.2
	25-34	16.4	7.5	8.9
	35-44	27.6	7.7	9.7
	45-54	33.5	12.1	11.0

	55-64	40.9	27.0	21.9
	65-74	55.6	41.2	42.2
	75+	45.7	51.6	49.9
Defined contribution only (%)	**<25**	4.8	19.8	19.3
	25-34	18.8	32.7	31.6
	35-44	17.7	31.2	36.1
	45-54	13.2	29.6	35.1
	55-64	10.4	22.6	22.2
	65-74	1.1	7.3	8.3
	75+	0.0	3.7	3.2
Both DB and DC (%)	**<25**	1.3	0.5	0.5
	25-34	11.2	5.9	7.3
	35-44	19.5	14.4	9.0
	45-54	21.5	21.6	11.7
	55-64	11.8	15.1	15.5
	65-74	1.4	7.8	8.4
	75+	0.0	0.3	3.0
Neither DB nor DC (%)	**<25**	89.5	74.9	78.0
	25-34	53.5	53.8	52.2
	35-44	35.2	46.7	45.2
	45-54	31.8	36.8	42.2
	55-64	37.0	35.2	40.5
	65-74	42.0	43.7	41.1
	75+	54.3	44.3	43.9

Table 2
Pooled (Least Absolute Deviations), 1989-2016

	(1) 25-34	(2) 35-44	(3) 45-54	(4) 55-64
Constant	28,344***	165,024***	267,826***	303,986***
	(4,933)	(17,388)	(27,166)	(31,336)
Year 2016	-3,504	-77,124***	-96,826***	14,777
	(5,971)	(19,188)	(31,389)	(39,818)
Observations	1,250	1,712	1,848	2,015

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Pooled (Least Absolute Deviations), 1989-2016

	(1) 25-34	(2) 35-44	(3) 45-54	(4) 55-64
Constant	3,920	30,074***	65,327***	79,198***
	(3,190)	(11,528)	(13,574)	(13,388)
Year 2016	-5,593***	-15,531***	-54,126***	-28,942**
	(1,851)	(4,845)	(4,273)	(13,631)
Black	-3,455	-26,437***	-39,108***	-48,274***
	(2,494)	(7,304)	(10,299)	(12,695)
Hispanic	-3,828	-30,169***	-48,019***	-50,256***
	(2,548)	(8,094)	(16,030)	(16,682)
Other race	3,614	9,675	-9,410	-186,183
	(13,758)	(17,545)	(43,261)	(122,426)
Married	5,531	13,188	27,567*	35,934*
	(3,471)	(11,361)	(14,096)	(19,371)
Female head of household	-91.99	-3,637	-17,308**	-30,924***
	(2,430)	(9,633)	(7,494)	(10,544)
High school	-373.2	858.3	11,117	1,908
	(1,290)	(5,730)	(8,802)	(17,342)
Some college	3,143	1,191	41,406***	37,743
	(2,458)	(5,337)	(15,508)	(26,406)
Bachelors degree	7,435	5,598	69,355**	124,374***
	(6,183)	(17,855)	(33,578)	(46,634)
Graduate degree	-10,080	53,990	191,573***	353,881***

	(7,310)	(33,056)	(39,322)	(40,847)
Income $20,000-$49,999	8,814***	15,755***	27,701***	77,470***
	(2,210)	(3,608)	(9,801)	(15,622)
Income $50,000-$99,999	61,027***	105,037***	138,641***	250,679***
	(8,297)	(12,188)	(17,915)	(31,010)
Income $100,000-199,999	192,005***	330,295***	440,104***	931,367***
	(18,780)	(29,884)	(37,589)	(81,094)
Income 200,000+	552,695***	692,671***	1.762e+06***	3.320e+06***
	(63,712)	(126,735)	(210,929)	(387,076)
Observations	1,250	1,712	1,848	2,015

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3

Pooled (Least Squares), 1989-2016

	(1)	(2)	(3)	(4)
	25-34	35-44	45-54	55-64
Constant	137,580***	324,112***	642,123***	720,288***
	(19,883)	(21,669)	(43,958)	(50,043)
Year 2016	-29,057	51,286	239,161***	678,944***
	(21,870)	(34,665)	(72,015)	(85,037)
Observations	1,250	1,712	1,848	2,015
R-squared	0.001	0.000	0.001	0.003

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Pooled (Least Squares), 1989-2016

	(1)	(2)	(3)	(4)
	25-34	35-44	45-54	55-64
Constant	39,433	116,867**	288,633***	90,083
	(26,654)	(48,669)	(86,452)	(79,836)
Year 2016	-45,801	23,300	86,261	228,623***
	(29,179)	(32,799)	(64,748)	(82,572)
Black	-31,235**	-72,481***	-158,248***	-117,262***
	(13,747)	(24,152)	(50,633)	(42,454)
Hispanic	-1,583	-70,476***	-223,419***	-98,899
	(18,388)	(22,248)	(73,088)	(114,311)
Other race	96,456	88,757	-312,730	-176,079
	(114,685)	(102,032)	(198,873)	(208,243)
Married	-16,724	-81,212	-63,855	32,847
	(40,366)	(69,203)	(78,603)	(97,075)
Female head of household	-68,678*	-108,210**	-184,932***	-183,642**
	(39,782)	(50,805)	(64,980)	(85,200)
High school	22,449	-2,743	-49,880	-39,510
	(18,222)	(24,304)	(69,432)	(72,367)
Some college	52,286**	492.3	-77,073	64,189
	(23,852)	(24,963)	(78,077)	(93,117)
Bachelors degree	81,266**	102,380**	158,422	453,799***
	(31,810)	(43,964)	(124,104)	(154,877)

Graduate degree	125,120	86,950	274,424	815,027***
	(104,349)	(67,423)	(187,570)	(223,226)
Income $20,000-$49,999	33,828	25,129	2,574	15,576
	(30,250)	(16,272)	(43,827)	(40,098)
Income $50,000-$99,999	74,576***	153,071***	146,827**	196,780***
	(20,560)	(28,784)	(61,597)	(65,308)
Income $100,000-$199,999	227,544***	426,417***	554,695***	921,836***
	(37,855)	(41,490)	(91,061)	(110,392)
Income $200,000+	749,899***	1.788e+06***	3.984e+06***	5.878e+06***
	(128,048)	(219,066)	(340,753)	(405,410)
Observations	1,250	1,712	1,848	2,015
R-squared	0.078	0.023	0.118	0.109

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 1

Pooled (Least Absolute Deviations), Inverse Hyperbolic Sine

	(1)	(2)	(3)	(4)
	25-34	35-44	45-54	55-64
Constant	4.840***	32.036***	52.581***	59.813***
	0.172	0.113	0.203	0.120
Year 2016	-0.116	-0.466***	-0.361***	0.049
	0.224	0.153	0.141	0.146
Observations	1,250	1,712	1,848	2,015

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Pooled (Least Absolute Deviations), Inverse Hyperbolic Sine

	(1)	(2)	(3)	(4)
	25-34	35-44	45-54	55-64
Constant	0.264	1.266***	1.588***	4.877***
	(0.161)	(0.182)	(0.190)	(0.256)
Year 2016	-0.207***	-0.184**	-0.313***	-0.121
	(0.093)	(0.082)	(0.009)	(0.102)
Black	-0.204***	-0.469***	-0.398***	-0.515***
	(0.117)	(0.129)	(0.136)	(0.162)
Hispanic	-0.204**	-0.493***	-0.3478***	-0.427**
	(0.109)	(0.091)	(0.135)	(0.270)
Other race	0.198	0.085	0	-0.472*
	(0.330)	(0.201)	(0.165)	(0.427)
Married	0.367***	0.089	0.104	0.004
	(0.128)	(0.169)	(0.137)	(0.098)
Female head of household	-0.007	-0.169	-0.204*	-0.432***
	(0.131)	(0.171)	(0.144)	(0.178)
High school	0	0.092	0.513***	0.146
	(0.126)	(0.103)	(0.147)	(0.142)
Some college	0.193	0.129	0.839***	0.594***
	(0.128)	(0.127)	(0.171)	(0.138)
Bachelors degree	0.196	0.234	1.132***	0.760***
	(0.143)	(0.158)	(0.173)	(0.147)
Graduate degree	-0.063	0.544***	1.458***	1.259***
	(0.259)	(0.162)	(0.187)	(0.138)

Income $20,000-$49,999	1.213***	2.073***	3.2060***	5.006***
	(0.128)	(0.196)	(0.195)	(0.265)
Income $50,000-$99,999	7.789***	11.945***	12.48***	12.335***
	(0.169)	(0.114)	(0.146)	(0.255)
Income $100,000 – 199,999	23.360***	28.702***	24.230***	27.148***
	(0.159)	(0.138)	(0.159)	(0.272)
Income $200,000+	70.215***	51.876***	88.423***	77.086***
	(0.103)	(0.210)	(0.232)	(0.280)
Observations	1,250	1,712	1,848	2,015

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 2

Pooled (Least Squares), Inverse Hyperbolic Sine

	(1) 25-34	(2) 35-44	(3) 45-54	(4) 55-64
Constant	5.325***	19.080***	37.974***	40.484***
	(0.102)	(0.098)	(0.105)	(0.110)
Year 2016	-0.316***	-0.378***	-0.358***	0.127
	(0.132)	(0.125)	(0.129)	(0.131)
Observations	1,250	1,712	1,848	2,015
R-squared	0.009	0.013	0.011	0.001

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Pooled (Least Squares), Inverse Hyperbolic Sine

	(1) 25-34	(2) 35-44	(3) 45-54	(4) 55-64
Constant	0.863***	1.946***	3.892***	6.331***
	(0.246)	(0.220)	(0.194)	(0.178)
Year 2016	-0.329***	-0.300***	-0.433***	-0.281***
	(0.109)	(0.095)	(0.093)	(0.089)
Black	-0.333***	-0.453***	-0.391***	-0.459***
	(0.146)	(0.155)	(0.139)	(0.135)
Hispanic	-0.217	-0.336***	-0.335***	-0.437***
	(0.177)	(0.128)	(0.155)	0.163)
Other race	0.172	0.408**	-0.070	-0.417**
	(0.239)	(0.179)	(0.217)	(0.276)
Married	0.189	0.079	0.076	0.219
	(0.156)	(0.164)	(0.125)	(0.131)
Female head of household	-0.270**	-0.311**	-0.201*	-0.335***
	(0.158)	(0.191)	(0.13)	(0.142)
High school	0.111	0.159	0.262*	0.226*
	(0.189)	(0.141)	(0.149)	(0.121)
Some college	0.262	0.072	0.484**	0.784***
	(0.203)	(0.143)	(0.170)	(0.131)
Bachelors degree	0.256	0.235	0.957***	1.090***

	(0.244)	(0.168)	(0.174)	(0.157)
Graduate degree	-0.216	0.229	1.143***	1.381***
	(0.315)	(0.216)	(0.203)	(0.167)
Income $20,000-$49,999	0.841***	1.337***	1.582***	2.426***
	(0.169)	(0.167)	(0.176)	(0.148)
Income $50,000-$99,999	3.875***	6.189***	6.028***	6.561***
	(0.210)	(0.183)	(0.185)	(0.160)
Income $100,000-$199,999	13.457***	21.143***	16.959***	16.582***
	(0.273)	(0.198)	(0.206)	(0.171)
Income $200,000+	46.418***	52.861***	66.627***	54.813***
	(0.366)	(0.226)	(0.241)	(0.194)
Observations	1,250	1,712	1,848	2,015
R-squared	0.301	0.436	0.490	0.584

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1