Wealth Concentration in the United States Using an Expanded Measure of Net Worth

Lindsay Jacobs[*]   Elizabeth Llanes[*]   Kevin Moore[†]

Jeffrey Thompson[‡§]   Alice Henriques Volz[†]

This version: August 15, 2021

ABSTRACT: Defined benefit (DB) pensions and Social Security are important resources for financing retirement in the United States. However, these illiquid, non-market forms of wealth are typically excluded from measures of net worth. To the extent that these broadly held resources substitute for savings, measures of wealth inequality that do not account for DB pensions and Social Security may be overstated. This paper develops an alternative, expanded wealth concept, augmenting net worth data from the Survey of Consumer Finances with estimates of DB pension and expected Social Security wealth. We explore the concentration of wealth among households ages 40 to 59 and find that (1) including DB pension and Social Security results in markedly lower measures of wealth concentration and (2) trends toward higher wealth inequality over time, while moderated, are still present. Simulation exercises show that reductions in Social Security benefits significantly increase wealth concentration for the youngest birth-year cohorts.

JEL CLASSIFICATIONS: D14, D31, H55

[*]University of Wisconsin–Madison, 1225 Observatory Dr., Madison, Wisconsin, United States
[†]Federal Reserve Board, 20th & C St NW, Washington, DC, United States
[‡]Federal Reserve Bank of Boston, 600 Atlantic Avenue, Boston, Massachusetts, United States
[§]Corresponding Author, Jeffrey.Thompson@bos.frb.org

1. Introduction

Wealth and its distribution across households are sensitive to the elements of net worth that are measured. Because components of wealth—savings accounts, housing, stocks, and retirement plans, for example—have very distinct distributions, any inclusion or exclusion of certain components carries different implications for our understanding of wealth inequality. Two important resources in the United States for financing retirement—defined benefit (DB) pensions, provided voluntarily by employers, and the national public pension program—Social Security—are often excluded from data due to challenges in measuring these illiquid, non-market forms of wealth. To the extent that (a) financing retirement years is a significant motivator for households to save and (b) the broad availability of DB pensions and Social Security in retirement substitute for other forms of savings, accounting only for market wealth results in incomplete measures of wealth and representations of household wealth concentration. In this paper, we estimate an expanded measure of wealth that includes estimates of non-market wealth from both employer-sponsored defined benefit (DB) pensions and future Social Security for those just beginning the last half of their working life and show what impact using this broad measure of wealth has on estimates of wealth inequality in the United States, as well as trends over time. We further illustrate the impact Social Security has on these measures by simulating distributions under a scenario in which expected future Social Security Trust Fund shortfalls are addressed through a reduction in benefit payouts.

One reason that the illiquid, non-market resources of DB pensions and Social Security are typically excluded from studies of wealth concentration is that—unlike defined contribution (DC) assets such as 401ks—they are not available in survey data. Our work addresses this issue by taking data from the Survey of Consumer Finances (SCF), estimating work life histories to predict future Social Security income streams, and combining this with estimated DB assets and other market wealth holdings to form an expanded wealth measure. We look at households ages 40 to 59, who are building up to peak wealth accumulation, prior to the drawdown of assets in retirement.[1] Our estimates show that the value of DB pensions and Social Security are significant relative to other forms of wealth—throughout the wealth distribution but especially at the lower half of the wealth distribution. Indeed, even for the median household, the present value of DB pensions and Social Security benefits would account for over half of all wealth. With respect to their effects on the distribution of wealth, we find that (1) including DB pension and Social Security wealth results in markedly lower measures of wealth concentration and (2) trends

---

[1] We focused on this group of young savers for several reasons. In related work (Jacobs et al., 2020), we use the expanded wealth concept to explicitly explore retirement income adequacy in a population that is approaching retirement. Also, the estimation of future work histories is less dependent on assumptions, as respondents who are 40-59 have already spent significant time in the workforce. Finally, this has the added benefit that it reduces the impact of evolving age composition of households, which complicates interpretation of inequality trends.

toward higher wealth inequality over time, while moderated, are still present. In particular, the '90/50 ratio'—the ratio of wealth held by those at the 90th percentile of wealth to those at the 50th percentile—is reduced by nearly half for the 50-59 age group (from 13.4 to 6.8 in 2019) and for the 40-49 age group (10.7 to 6.4) when we include the estimated value of Social Security (SSW). The '50/10 ratio' declines even more with the inclusion of Social Security, in 2019 from a ratio of 13.1 to 4.3 among those ages 40-49 and from 21.3 to 4.2 for the 50-59 age group. The share of wealth held by the 'top 5 percent' goes from around 64% to 51% when adding DB pension wealth to non-retirement and DC wealth, and down further to 45% when including SSW for ages 40–59. The inclusion of each measure, however, has somewhat different effects: SSW decreases wealth concentration 'at the top' whether looking at the top 5% share of wealth or 90/50 ratios; DB decreases the top 5% share, but, in more recent years, actually increases the 90/50 ratio. The top 5% share of our expanded wealth measure rises more slowly than non-retirement and DC wealth over the 1989 to 2019 period (35% to 45% versus 49% to 64%).

Saving for retirement years—in addition to saving for consumption smoothing, bequest, and precautionary purposes—is a prominent reason for holding wealth. While there are several mechanisms for saving, the three primary resources in retirement are (1) defined contribution (DC) accounts and liquid, market wealth, (2) employer-provided DB pensions, and (3) Social Security benefits. Importantly, as described in Feldstein and Pellechio (1979) and Gustman and Steinmeier (1999), households do substitute over these different forms of retirement savings. Given this, a more comprehensive measure of wealth that includes employer-provided DB pensions and Social Security benefits offers a useful perspective for any policy discussion related to financing retirement as well as wealth concentration. Another area in which an expanded measure of wealth is appropriate concerns the study of *trends* in wealth concentration. The employment-based retirement system in the United States has evolved from one primarily based on DB pensions to one built around DC plans. DC plans, unlike DB plans, are a form of market wealth and are included in the SCF and other household wealth surveys. The steady increase in DC retirement accounts and account balances starting the 1980s, therefore, represents in large part a transition between systems and not necessarily the accumulation of additional household wealth and increased wealth inequality. We find that by capturing both types of retirement accounts, the growth in wealth concentration over the past 30 years is moderated, but still present.

As documented in Poterba et al. (2011) and Gustman and Steinmeier (1999), these additional forms of wealth are empirically important resources to retirees in the United States—but they also impact decisions leading up to retirement. Social Security may crowd out private savings, but its near universally required participation is the primary mechanism for financing retirement in most lower income households, as Social Security benefits alone represent the single-largest source of retirement income for more than 60% of retired households (Social Security Administration, 2016). Similarly, employer-provided

DB pensions also substitute for other private retirement savings. Both Social Security and DB pensions disproportionately benefit households below the top portion of the wealth distribution, and estimates of wealth concentration that do not include their value are potentially misleading, especially in the context of economic policy discussions. Despite this, nearly all research on wealth concentration relies on data which exclude the majority of assets that are linked to the most important income streams for retirees: Social Security and DB pensions.

Some recent efforts, however, have brought DB pension assets into the wealth concept to study wealth concentration. Saez and Zucman (2016) allocate DB pension plans assets from macro data sources across households in the tax data, and Devlin-Foltz et al. (2016) augmented SCF microdata by allocating DB plan assets across households based on their plan participation responses in the survey. Inclusion of improved measures of DB pension wealth results in somewhat lower measures of wealth concentration in the SCF (Sabelhaus and Volz, 2019). In recent work, Sabelhaus and Volz (2021) have also estimated SSW for SCF respondents to study the accumulation of SSW over the life-cycle. Their estimation approach for SSW and wealth concept are slightly different than ours here, but they reach similar conclusions about the levels and trends of overall wealth inequality. Notably, outside of the United States, Kuhn (2020) and Bönke et al. (2019) examine augmented wealth measures that incorporate pension wealth in Switzerland and Germany, respectively. They find pensions have an equalizing effect on inequality, and to a degree very similar to what we find. In particular, Kuhn (2020) finds a decrease in the Gini coefficient from 0.75 for non-pension wealth to 0.55 when including pension wealth in Switzerland using data from 2015, while Bönke et al. (2019) find a decrease in 2012 data from 0.79 for non-pension wealth to 0.59 in their measure of augmented wealth in Germany. Despite the countries, pension systems, and, to some extent, methodologies differing, we estimate a broadly similar decrease from 0.73 to 0.56 in 1992, and 0.82 to 0.67 for 2019 data.

While including future DB and Social Security resources in an expanded wealth measure provides an additional and, we believe, very useful perspective on wealth or resource concentration, it is important to note their difference from resources typically included in measures of net worth for studies of wealth concentration. Alvaredo et al. (2018) caution against strong interpretations when such illiquid resources are included to measure wealth inequality given that households do not have ownership over their Social Security wealth in the same way that they do over non-annuitized market wealth. Indeed, such resources cannot be used as collateral in part for these reasons and their provision is subject to the fulfillment of future government obligations. If we were to measure the *utility value* of these resources, this inflexibility would likely mean lower utility of Social Security than other forms of wealth. However, because there remains a high degree of substitutability of DB pensions and Social Security with the other wealth components, and, accordingly, much of the literature regarding wealth concentration is presented in levels, for comparabil-

ity we do as well. We discuss these aspects further below, and also include an exercise that highlights the impact of Social Security benefits on our measures of wealth concentration by showing the effects of a decrease in benefits that could arise from funding shortfalls.

Turning to the work that follows, in Section 2, we describe the SCF data we use in this analysis and detail the methods and additional data sources we use in estimating household level earnings histories and expected Social Security benefits. We then describe the projection of SCF net worth components forward and augment these components with estimates of the present value of both future Social Security and DB benefits to form our expanded wealth measure. In Section 3.2, we present our results, which show that incorporating the asset-value of expected retirement benefits, particularly Social Security, increases estimated wealth levels throughout the distribution and has a dramatic equalizing effect on the distribution of wealth. For example, among households with heads ages 40-49, in 2019 the top five-percent share of wealth excluding DB pension plans and Social Security is 58%. Once estimated DB and Social Security are included, the top five-percent wealth share falls to 41%. Examining trends in the distribution of wealth in our expanded wealth measure, we find that there is also a slight moderation of the trend toward greater inequality once we incorporate all forms of retirement wealth. Expanded wealth continues to become more concentrated over time, but at a somewhat slower rate than what is suggested by published SCF net worth statistics. In Section 4, we show how several measures of wealth concentration would be affected if Social Security benefits were reduced due to lack of program revenue, finding that wealth concentration would increase, especially for the younger cohorts. We conclude with a discussion in Section 5.

2. DATA AND METHODS

To present an alternative measure of wealth concentration, we use the SCF to develop an expanded measure of wealth that incorporates both estimates of DB wealth as well as the expected present value of Social Security among the 40-59 year old population. We directly incorporate the work of Sabelhaus and Volz (2019) who impute the value of DB wealth to current workers in the SCF using labor market and pension plan characteristics in the survey along with high quality, external data on DB plan assets. In this section, we discuss the SCF and the our methods to (1) estimate earnings histories of survey respondents, (2) calculate future Social Security benefits, and (3) age-forward SCF net worth, as well as DB pensions, to the point of retirement.

Our research adds to the literature by using the SCF to develop broader wealth measures to assess the distribution of wealth in the United States (Kennickell and Sundén, 1997, Wolff, 2007, 2014). These studies rely solely on self-reported information on pensions in the SCF to estimate DB wealth for future retirees, which results in levels of predicted

pension wealth inconsistent with economy-wide pension assets. Following Sabelhaus and Volz (2019), we combine aggregate data on plan assets from the Financial Accounts of the United States with the SCF survey data to estimate family level DB wealth. (See Section 2.2, below, and Jacobs et al. (2020) for additional details.) In calculating Social Security wealth of current workers, Kennickell (2006) uses reported earnings history augmented with one year of Current Population Survey data to estimate earnings profiles, and Wolff (2007) estimates in-sample human capital equations to predict future covered earnings. The static age-earnings profiles embodied in the Kennickell (2006) and Wolff (2007) approaches do not capture how earnings evolve over time for workers, an element we incorporate into our analysis using cohort earnings trajectories.

2.1. SCF Data

Our primary data source is eleven waves of the Federal Reserve Board's triennial Survey of Consumer Finances (SCF), conducted between 1989 and 2019. Several features of the SCF make it appropriate for exploring the distribution of wealth. The survey collects detailed information about households' financial assets and liabilities, and has employed a consistent design and sample frame since 1989. As a survey of household finances and wealth, the SCF includes some assets that are broadly shared across the population (e.g., bank savings accounts) and others that are concentrated in the tails of the distribution (e.g., direct ownership of bonds).

The primary purpose of the SCF is to collect information about household balance sheets. Assets measured in the SCF include the value of all financial and nonfinancial assets, including residential and non-residential real estate, privately-held businesses, and defined contribution (DC) retirement accounts, reported by the respondent at the time of the interview.[2] Questions on household debt reflects all types of debt, including credit cards, mortgage debt, student loans, business debts, and other miscellaneous forms of debt.[3]

The study of wealth inequality depends crucially on data sources that successfully include the assets and debts of affluent households. The unique design of the Survey of Consumer Finances (SCF), which includes a large over-sample of households with high predicted net worth, is motivated by the fact that business and financial wealth in particular are highly concentrated at the top of the distribution. Much of the research exploring

---

[2]Assets do not include—and the SCF does not collect information on—the value of defined benefit pensions or the implied annuity value behind future or current Social Security benefits.

[3]The unit of analysis in the SCF is the 'primary economic unit' (PEU) which refers to a financially-dependent related (by blood, marriage, or unmarried partners) group living together. This concept is distinct from either the household or family units employed by the Census Bureau, but is conceptually closer to the latter, and, throughout this paper, PEUs are referred to as 'families.' Single individuals living alone are included and simply considered a family of one. More details about the survey sample design are in the Online Appendix.

wealth inequality in the US uses the SCF, and suggests rising concentration at the top of the distribution (Bricker et al., 2016, Keister and Moller, 2000, Wolff, 1995, Kennickell, 2006). The top 1% share of wealth reported in the SCF rose from 30% in 1989 to 37% by 2019 (Bricker et al., 2020). A different approach to estimating wealth concentration is to use data estimated from the incomes of affluent households as in Saez and Zucman (2020) and Smith et al. (2020). This approach uses a capitalization model predicting wealth based on flows of capital income reported on federal income tax forms and rates of return estimated from the Financial Accounts and other macro-data sources, and report similar increases in top wealth shares as what is found in the SCF (Bricker and Volz, 2020).[4]

2.2. DEFINED BENEFIT PENSIONS AND SOCIAL SECURITY

Employer-sponsored retirement plans in the U.S. typically come in one of two forms, traditional DB plans or the now more common DC plan. DB plans provide a beneficiary with a promised income stream from retirement until death, and adequately funding those promised benefits is the responsibility of the employer. These plans are often a function of a worker's highest wage, the number years a worker participated in a plan, and a plan-specific generosity factor. Although the SCF includes carefully crafted and detailed questions about DB pension plans, measuring the expected present asset values of future DB pension payments is not well suited for a survey. Respondents enrolled in DB pension plans are asked questions about expected future benefits. However, many workers, particularly those further from retirement age, know less about their plans or future benefits, and the information collected from these questions is not necessarily a good reflection of what they will actually receive (Starr-McCluer and Sunden, 1999).

Instead of utilizing the expected future benefit responses provided by DB plan participants, we rely on the estimated DB pension wealth for SCF households developed by Devlin-Foltz et al. (2016) and Sabelhaus and Volz (2019). Their approach distributes aggregate household sector DB assets from the Financial Accounts of the United States (FA) to both current and future beneficiaries using survey information on benefits currently received for those receiving payments, reported future payments for those with coverage from a past job, and age, wages and years in a DB plan for those not-yet-receiving benefits. They combine the survey information with real discount rates that fluctuate over time, cohort life tables and differential mortality, and the assumption that current bene-

---

[4]Research using data that does not oversample high-wealth households, i.e. the Panel Study of Income Dynamics (PSID), reports substantially lower levels of wealth concentration (Fisher et al., 2016, Pfeffer et al., 2016). Because—by all accounts—a high share of wealth is concentrated at the top, surveys not aimed specifically at studying this inaccurately measure wealth inequality. The top 5% wealth share for 1989, for example, was 47% in the PSID, but 57% in the SCF (Wolff, 2006). Studies in the United States that incorporate Social Security and DB pension benefits in household wealth, chiefly using the Health and Retirement Study (HRS), do so only for the older, primarily retired, population and likewise do not have a sample design intended to incorporate particularly wealthy households as the SCF does, thus being less informative about wealth concentration across the population.

ficiaries have first claim to DB plan assets. Devlin-Foltz et al. (2016) and Sabelhaus and Volz (2019) find that inclusion of the implied assets from future pension benefits modestly reduces inequality in the distribution of wealth, but they do not include implied wealth from future Social Security benefits in their discussion of wealth distribution.

To measure the DB wealth of SCF respondents, we first calculate a present discounted value (PDV) of benefits being paid to current beneficiaries and individuals who have entitlements based on a previous job, using their reported current or expected future benefit, respectively. The sum of the PDV is subtracted from the aggregate accrued pension obligation reported in the FA. We allocate this residual—the aggregate minus sum of PDV above—to workers with DB entitlement from their current job using their age, current wage, and years in the plan.[5]

Social Security is a federal entitlement program in the United States.[6] What is colloquially referred to as 'Social Security' is, specifically, retirement or old-age benefits that are part of the Old-Age, Survivor, and Disability Income (OASDI) program under the Social Security Administration and covers nearly all workers. It is a 'pay-as-you-go' system, financed by a 12.4% tax on earnings, split equally between employees and employers, up to a wage cap, which was $137,700 in 2020. An individual's benefit is a function of their highest 35 years of wages. The Normal Retirement Age (NRA) has risen from 65 to 67, with the latter applying to all cohorts born after 1959. One's benefit is reduced if claiming prior to the normal retirement age, which can begin at age 62, and increased for delayed claiming up to age 70. To develop estimates of future Social Security benefits, and their implied asset value, we first must estimate earnings histories of and projections for respondents and their spouses for the SCF.

2.3. Estimating Earnings Profiles in the SCF using Current Population Survey Cohorts

In order to estimate future Social Security Old-Age benefits, we need to know a person's full earnings path up to the time of retirement. We estimate an individual's earnings history and also project earnings up to the time of claiming Social Security. To construct a full earnings history and projections going forward for SCF respondents, we apply the growth in earnings over one's working life implied by the shape of Current Population Survey (CPS) earnings estimates for individuals most similar to the SCF respondent based on birth year, occupation, education level, and sex. While the SCF is not a panel, retrospective questions

---

[5]See Jacobs et al. (2020) and Sabelhaus and Volz (2019) for more details on DB wealth estimation.

[6]In the U.S., an *entitlement* refers to 'A Federal program or provision of law that requires payments to any person or unit of government that meets the eligibility criteria established by law. Entitlements constitute a binding obligation on the part of the Federal Government, and eligible recipients have legal recourse if the obligation is not fulfilled.' Source: https://www.senate.gov/reference/glossary_term/entitlement.htm.

allow construction of a broad work and earnings history.[7]

From the 1989-2019 SCF data, we take respondents ages 40 to 59 at the time of the interview (and including spouses ages 30 to 65 years old) and use the information reported in the SCF on (1) current occupation, earnings, and tenure, (2) retrospective occupation, earnings, tenure information, and (3) future work expectations. For each respondent and spouse, we estimate a full history of past and future earnings using regression estimates described below, relying on CPS data from 1964 to 2020. Individuals are categorized into earnings-trajectory types by 22 possible birth-year cohorts (three-year cohorts beginning in 1924-26 and ending 1987-89), 3 education levels (less than high school, high school or equivalent, some college/degree), and 5 broad occupation categories ((1) management, professional, and related, (2) service, (3) sales and office, (4) construction, maintenance, production, transportation, and (5) the self-employed from all occupations).[8] When an individual's birth year cohort is not observed in the CPS at a given age, we broaden the categories, defining by education-occupation types instead (for men and women each). For instance, the youngest person whose earnings profile we want to estimate is born in 1989 and 30 years old at the time of the 2019 SCF interview. The estimates are based on earnings for those born in 1987-9 who are up to age 32 in the 2019 CPS. To forecast earnings growth after age 32, we use coefficient estimates from the education-occupation model. Similarly, for the oldest birth year in the earliest SCF (1989), 1924, we use the education-occupation model coefficients to fill in earnings at ages that are prior to 1964. Those born between 1942 and 1954 are fully covered by the CPS.

For each of type g, we estimate the following regression on log income in the CPS

$$\ln y^g = \beta_0^g + \boldsymbol{\beta}_{\text{age}}^g \mathbf{age} + \beta_{PT}^g \text{PT} \tag{1}$$

where $\boldsymbol{\beta}_{\text{age}}^g \mathbf{age} = \sum_{j=1}^4 \beta_j^g \text{age}^j$ and PT is an indicator for part-time work. We then back out an individual's individual effect, β_{0i} , at the time of the SCF survey, so that

$$\beta_{0i}^g = \ln y_i - \left(\boldsymbol{\beta}_{\text{age}}^g \mathbf{age}_i + \beta_{PT}^g \text{PT}_i \right) . \tag{2}$$

The individual effect in any year is a weighted average of the individual and group constants, and, respectively, where we place more weight on the group average constant as we estimate periods further out from the reported income in the SCF. Specifically, the constant at time t is $\beta_i^{W,t} = \rho^t \beta_{0i} + (1 - \rho^t)\beta_0^g$, where we set $\rho = .85$ to capture persistence in earnings. To predict income, we then apply $\beta_i^{W,t}, \boldsymbol{\beta}_{\text{age}}^g$, and β_{PT}^g for all ages for each individual. Anyone

---

[7]For additional details on the technical elements of development of the earnings profiles, calculation of Social Security benefits, or the 'aging-forward' of the elements of market wealth, see Jacobs et al. (2020).

[8]There are 822 possible types: 660 of the more specific cohort-occupation-education-sex combinations, 132 cohort-education-sex combinations (applied when occupation is unclear), and 30 occupation-education-sex combinations (applied when estimating earnings when outside the ages the birth year cohort is observed in the CPS or some information is missing).

who reports a longest prior occupation type that is different from his current occupation will have different coefficients applied to the relevant years.[9]

We assume when estimating an individual's future earnings that he or she will work until their expected retirement age, as reported in the SCF. The estimated earnings for a person's type will account for relatively short periods of unemployment, as it includes total earnings for those who were not employed for the entire year prior. However, with these measures, we will not be able to capture losses due to long-term unemployment, unanticipated early or partial retirement, or permanent labor force exit through disability. Nonetheless, our estimated earnings profiles of these SCF respondents match CPS profiles quite well.

2.4. Social Security Benefits Calculations

Armed with an earnings profile for each individual from ages 20 through 61, one can apply Social Security benefit calculations for each household. First, nominal earnings are indexed to age 60, the highest 35 of which are used to calculate each individual's averaged indexed monthly earnings (AIME). The AIME is transformed to a monthly payment using the primary insurance amount (PIA) formula and the cohort-specific actuarial adjustment. We assume all individuals begin benefit receipt at age 62, which provides a lower bound for total household Social Security wealth (SSW). Future benefits are discounted to survey year using a 3% real discount factor and survival rates which vary by sex, cohort and income percentile (relying on methodology from Sabelhaus and Volz (2021) who combine cohort life tables from the Social Security Administration with differential mortality estimates from Chetty et al. (2016)). Secondary earners, typically wives, are entitled to their own benefits calculated off of past earnings, but also spouse and survivor benefits. We assign spouse benefits to the household if expected spouse benefits are larger than the wife's worker benefits at age 62. If current marriages are less than 10 years at age 62, the wife does not receive spousal or survivor benefits.[10]

The measure of SSW used is net of expected future employee contributions. Thus, for every year following the survey, we calculate expected tax payments of 6.2%, the employee portion of the payroll tax, and subtract the present value of all future contributions from the gross SSW measure calculated, as detailed above.

---

[9]As an example, suppose we have a 2013 SCF respondent who is 50 years old at the time of the survey, reports current full-time earnings of $55,000 in his current job of 8 years. The longest prior job he reports, which lasted 12 years, was in a different occupation and ended 14 years ago with his earning $35,000. He reports having worked full-time every year since age 20 and expects to end work at age 65. The earnings history and projection for this individual would look something like what is shown in Figure A.1 of the Online Appendix.

[10]The SCF does not collect information about length of previous marriages, thus, some individuals with more than one marriage may not be accurately assigned dependent benefits from a former spouse.

2.5. Creating the Expanded Wealth Measure

The expanded wealth measure that we analyse below is created by bringing together (1) the implied wealth of Social Security benefits, net of contributions and including future projected work up until the time of retirement, (2) wealth from DB pensions projected to expected job end date and (3) projected future wealth from all assets—including DC retirement plans—and debt measured directly in the SCF data.

To be consistent with the estimates of future Social Security wealth (which reflect expected benefits at age 62, not only those accrued at interview date), we project the value of SCF net worth, not including DB wealth, to age 62 (part (3) above). These projections are based on in-sample estimates of the growth paths of wealth for individuals greater than 30 years old using all 11 SCF cross-sections (1989-2019). We categorize each household into one of three groups based on its age-specific location in the current wealth distribution among households in each survey.[11] We then estimate age-wealth profiles separately for each group, pooling all surveys, and apply the growth rates from these profiles to project households' survey wealth forward to age 62. Separate profiles are estimated for (a) DC pension wealth and (b) all other forms of wealth measured in the SCF. The projected wealth values at age 62 are then discounted back to the age at the time of the survey.

We also project forward DB wealth to an individual's expected job ending date, or age 62, whichever comes first. This also brings DB wealth conceptually in line with both Social Security wealth and projected DC wealth to acknowledge that households may have many more years of accumulating benefits, and allows us to better compare age groups over time better. To project DB benefits, we estimate the implied 'generosity factor' from the Sabelhaus and Volz (2019) accrued DB wealth estimate. The generosity factor reflects a percentage of final wages given as a DB benefit for each year of service one accumulates. For example, in a plan with a 1% generosity factor, an individual with 30 years of service would receive 30% of their final wages as a DB benefit. For a given generosity factor, one can project a final DB payment for each individual, given their projected wages and expected years remaining at one's current job. Expected DB payments then are transformed into present discounted value as of survey date. The 'expanded wealth' measure we analyse below combines the net present value of projected SCF net worth with projected DB wealth and expected net future Social Security wealth.

---

[11] The categories are defined as the bottom 40%, next 40%, and top 20% by wealth for 10-year age groups. Households were divided into these categories to estimate the growth in wealth for households showing the most similar wealth-accumulating behavior. The categories were kept relatively broad, however, to capture the group in which a household would likely remain over the ages of 40 to 62.

Figure 1: *Mean Retirement Wealth by Type, Age Group and Year (Real 2019$, thousands)*
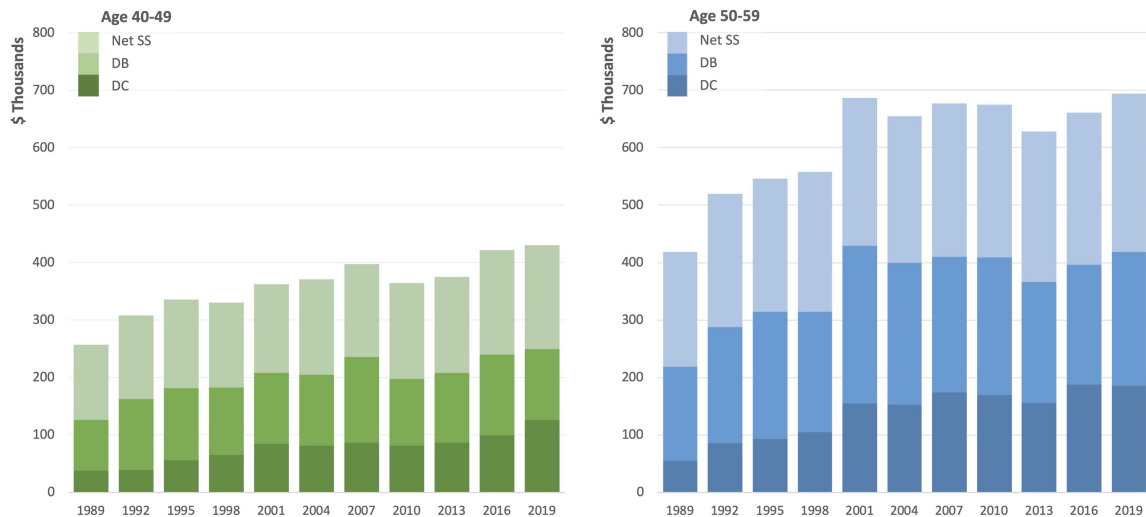
Note: DC and DB wealth are values as of the survey date. Net SS wealth is the future stream of projected benefits at age 62, discounted back to the age at survey. *Source:* Authors' calculations using SCF data and methods described in main text.

3. Expanded Wealth and Measures of Wealth Concentration

In this section, we describe the results for wealth concentration using our expanded wealth measure. We show results for both the 40–49 and 50–59 year old age groups over time for each SCF cross-section from 1989 to 2019. We first show summary statistics on non-retirement wealth, the components of retirement wealth, and the combined wealth measure. Then we calculate wealth percentile ratios and concentration measures. Overall, we find that there is substantial variation in asset-type holding across the distribution of expanded wealth. Additionally, by incorporating defined benefit wealth and Social Security wealth, we find lower measures of wealth concentration and moderated, but still present, increases in wealth inequality over time.

3.1. Components of Retirement Wealth

We first describe the major components of retirement wealth: defined contribution (DC) plans, defined benefit (DB) pensions, and Social Security wealth. We initially summarize the non-projected survey estimates of DC and DB wealth and the net present value of Social Security benefits. Broadly, defined contribution and Social Security wealth have grown over time. Defined benefit wealth reached a peak in the 2000s but still remains a significant component of wealth.

The average wealth in DC plans held by both age-groups has followed a well-documented

path, rising substantially in the years before the financial crisis, experiencing a period of stagnation, and then reaching a new peak around the 2016 and 2019 SCF surveys. Among those ages 40-49, mean DC balances started at $38,000 in 1989 and reached $126,000 in 2019, after hitting a plateau of around $85,000 between 2001 and 2013 (Figure 1, left panel). As individuals get closer to retirement age, average DC balances increase. Among ages 50–59, mean DC balances were $55,000 in 1989, rose to $174,000 in 2007, fell back to $156,000 in 2013, and rose to a new high of $188,000 by 2016 (Figure 1, right panel). As DC accounts were only introduced in the late 1970s, it is not surprising that there were low average balances in 1989. The data indicate both substantial preparation prior to age 40, but a considerable amount of retirement wealth accumulation is also taking place as households move closer to retirement.

For the 40–49 age group, mean DB wealth started at $88,000 in 1989, peaked in 2007 at $148,000, and was $123,000 in 2019 (Figure 1). Mean DB wealth for 50-59 year olds was $274,000 in 2001 and fell across the remaining waves, to a low point of $208,000 in 2016 but increasing somewhat in 2019. Some of the difference in DB wealth we observe between the two age groups is mechanical, as the same future benefit has to be discounted further back in time for younger ages. In addition, DB coverage is lower for younger workers, particularly in later years.

Predicted Social Security wealth (SSW) accounts for the largest portion of retirement wealth for both age groups in almost all years. Mean SSW rose from $130,000 in 1989 to $181,000 in 2019 among 40-49 year olds, and rose from $199,000 to $275,000 over the same period for 50-59 year olds. SSW rises along with earnings growth in the working population, but generally has been flat for the older age group since the Great Recession. The broad growth in SSW, particularly in the 1990s, comes generally from two sources: higher real wages and increased labor force participation of women.

3.2. Expanded Wealth Measures

To form our expanded wealth measure, we add the (1) retirement wealth made up of DC plan wealth, DB pensions, and estimated Social Security wealth to (2) non-retirement wealth, which includes housing and other forms of financial and non-financial wealth. In these expanded wealth measures, all wealth is projected forward to age 62 for non-retirement wealth and DC wealth, and to the age a current worker with a DB plan expects to separate from her firm. These components are then discounted back to one's age at the time of the of their SCF response, allowing for comparable wealth components and better comparisons across age groups and over time. Due to life-cycle patterns, those in their 40s are expected (and shown, in Figure 1) to have less wealth accumulated for retirement. In these measures, we can see in 2007 the effects of the Financial Crisis and housing market crash led to large losses of wealth throughout the economy. The bulk of these losses oc-

FIGURE 2: *Retirement Wealth by Concept, Mean and Median for Age Group and Year (Real 2019$, thousands)*
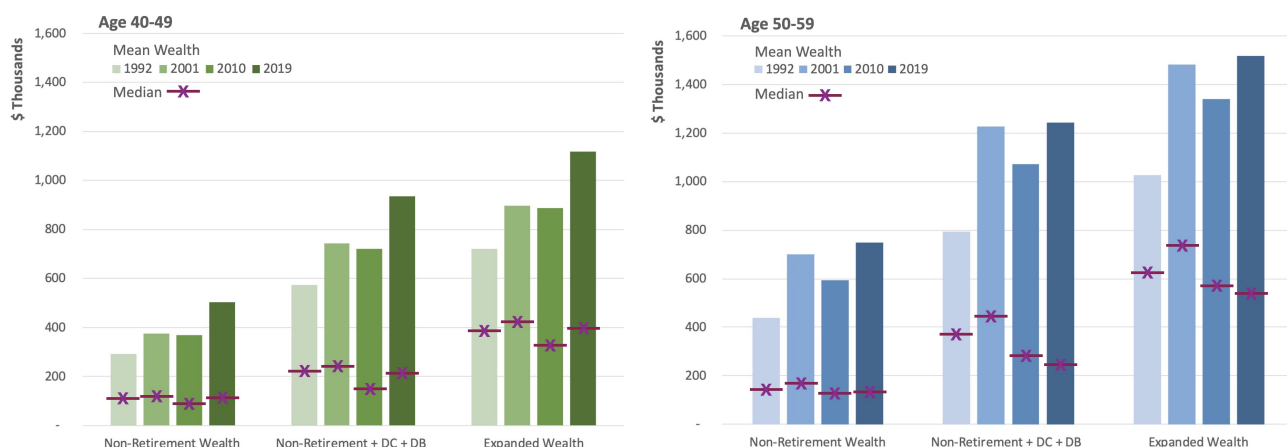
Note: Non-retirement wealth, DC wealth, and DB wealth are projected values, as described in the text, discounted back to the time of the survey. Net SS wealth is the future stream of projected benefits at age 62, also discounted back to age at survey. *Source:* Authors' calculations using SCF data and methods described in main text.

curred in assets that are not specifically identified as forms of retirement saving (Bricker et al., 2019).

Looking at the first set of bars in the left and right panels in Figure 2, showing trends in non-retirement wealth, both age groups see their highest mean wealth in 2019, although there has been little change in the median over time. The middle set of bars, which combines non-retirement wealth with private retirement wealth, indicate that when DC and DB pensions are included, average wealth has increased over time for both age groups. The inclusion of private retirement assets does not change the fact that median wealth has not increased. In fact, median wealth is lower for both age groups in 2019 than it was in 1992, substantially so for the 50-59 age group.

The third set of bars in the left and right panels of Figure 2 incorporates projected net Social Security wealth, and we again see the highest mean wealth in 2019 and stable or declining medians. Mean expanded wealth, including non-retirement wealth, DC and DB pension wealth, and net Social Security wealth rose from $720,000 in 1992 to about $1.1 million by 2019 for 40-49 year olds. Among 50–59 year olds, mean expanded wealth rose from just over $1 million in 1992 to $1.5 million in 2019. Over the same time period, median wealth rose slightly for 40-49 year olds, from $392,000 to $403,000, and median expanded wealth declined from $623,000 to $539,000 for the older age group.

Table 1: *Mean Wealth Levels at Points of the Expanded Wealth Distribution, by Age group and Wealth Component, 1992 and 2019 (real 2019$, in thousands)*

Wealth Percentile		Ages 40–49					Ages 50–59				
		Non-ret.	DC	DB	Soc. Sec.	Exp.	Non-ret.	DC	DB	Soc. Sec.	Exp.
p10											
1992	Level	$23	0.5	1.2	57	81	$20	0.8	1.6	91	113
	(% Share)	(28)	(1)	(1)	(70)	(100)	(17)	(1)	(1)	(80)	(100)
2019	Level	20	0.7	0.1	65	86	12	2.7	2.1	105	122
	(% Share)	(23)	(1)	(0)	(76)	(100)	(10)	(2)	(2)	(86)	(100)
p25											
1992	Level	$49	1.3	13	98	161	$86	4.1	13	174	276
	(% Share)	(30)	(1)	(1)	(68)	(100)	(31)	(1)	(5)	(63)	(100)
2019	Level	40	3.5	4.6	131	179	49	10	2.5	178	240
	(% Share)	(22)	(2)	(3)	(73)	(100)	(20)	(4)	(1)	(74)	(100)
p50											
1992	Level	$121	30	66	177	394	$177	27	152	270	627
	(% Share)	(31)	(8)	(17)	(45)	(100)	(28)	(4)	(24)	(43)	(100)
2019	Level	136	47	8.8	210	402	147	53	44	295	540
	(% Share)	(34)	(12)	(2)	(52)	(100)	(27)	(10)	(8)	(55)	(100)
p75											
1992	Level	$310	68	346	211	935	$389	100	387	304	1,180
	(% Share)	(33)	(7)	(37)	(23)	(100)	(33)	(9)	(33)	(26)	(100)
2019	Level	372	193	364	218	1,147	434	229	458	362	1,483
	(% Share)	(32)	(17)	(32)	(19)	(100)	(29)	(15)	(31)	(24)	(100)
p90											
1992	Level	$526	127	714	222	1,588	$898	206	751	350	2,205
	(% Share)	(33)	(8)	(45)	(14)	(100)	(41)	(9)	(34)	(16)	(100)
2019	Level	712	642	1,022	271	2,647	1,248	492	1,529	412	3,680
	(% Share)	(27)	(24)	(39)	(10)	(100)	(34)	(13)	(42)	(11)	(100)

Note: Each statistic is actually calculated as the mean of the wealth concept for households (by age group and year) within +/- five percentage points of the cut point of the expanded wealth distribution. So, for example, the values for P10 of the expanded wealth distribution is the mean for each wealth component for households between the 5th and 15th percentiles of the combined wealth distribution in their age range. Additional years displayed in Table A.1 of the Online Appendix. *Source:* Authors' calculations using SCF data and methods described in main text.

3.3. Components of Combined Wealth Across the Distribution

The individual components of the combined wealth measure have very different distributions across the population. Some components are widely held across all or much of the distribution, while others are only held by households at the very top.

We illustrate the wide variation of asset composition across households, by showing the values of wealth components at different points of the combined wealth distribution in

Table 1. These results make it very clear that households at the bottom of the combined wealth distribution rely heavily on Social Security, which accounts for over two-thirds of all wealth at the 10th and 25th percentiles of the wealth distribution for both age groups and for around half of combined wealth even for households at the 50th percentile. The role of non-retirement wealth has fallen dramatically for households in the bottom quarter of the combined wealth distribution. For instance, among 50–59 year olds in the 25th percentile of the wealth distribution, the share of their wealth that comes from non-retirement wealth has fallen from 31% in 1989 to 20% in 2019.

To be sure, Social Security continues to account for a considerable portion of combined wealth even for households higher up the wealth distribution. Among 50–59 year olds, SSW still accounts for one quarter of expanded wealth at the 75th percentile in 2019. It is only at the top of the distribution (the 90th percentile here) that SSW is surpassed by both DB and DC wealth as a share of expanded wealth. For both age groups in 2019, Social Security only accounts for between 10% and 11% of expanded wealth for households at the 90th percentile of the distribution. DB wealth, however, is primarily held by households at the 75th and 90th percentiles; indeed, DB wealth makes up the largest share of expanded wealth at the 90th percentile.

3.4. WEALTH INEQUALITY

Over the 1989 to 2019 period, we find that inequality rose and that the inclusion of Social Security and retirement plan wealth has an impact on both the level of inequality and its trend. In this section, we focus on ratios of the 90th and 50th percentiles of the wealth distribution (P90/P50), as well as ratios of wealth held at the 50th to wealth at the 10th percentiles (P50/P10), as measures of the skewness of the wealth distribution. In Figure 3, we see that among the 40-49 age group, the P90/P50 of non-retirement wealth rose from 4.9 in 1992 to 6.0 in 2019; among 50–59 year olds, it climbed from 5.2 to 8.0. The P90/P50 of expanded wealth for the younger age group rose from 3.9 in 1992 to 6.4 in 2019. For 50–59 year olds, the combined wealth P90/P50 rose from 3.4 in 1989 to 6.4 by 2019. In contrast, the P50/P10 ratio of expanded wealth has declined slightly for 40–49 year olds, from 4.4 to 4.3 between 1992 and 2019, as well as for 50–59 year olds, going from 4.9 to 4.2 over the same time period.

In Table 2, we show the top 5% and 10% shares of different wealth concepts for another perspective on wealth concentration. Here, we see that a large share of all types of wealth are held at the top of the distribution, but especially so for non-retirement wealth. For instance, those in the top 10% of the non-retirement wealth distribution among 40-49 year olds held 60.1% of all such wealth in 1989 and 75.3% in 2019. Using a more typical definition of 'net worth'—non-retirement and DC wealth— the figure goes from 60.7% in 1989, and an even higher 70.9% in 2019. Including Social Security, DC and DB retirement

FIGURE 3: *Distribution of Wealth by Concept, Year, and Age Group:*
Ratio of 90th percentile to Median (upper) and Median to 10th percentile (lower)

Source: Authors' calculations using SCF data and methods described in main text.

wealth in the wealth concept results in significantly lower top shares and also shows less growth in the concentration of wealth. For all households in our sample, we estimate that in 2019 the top 5% of the distribution held 71.5% of non-retirement wealth, but 63.5% including non-retirement and DC wealth, 51.2% when also adding DB pensions, and only 45.4% of expanded wealth, which includes net Social Security wealth.[12] Social Security is very broadly held and has an equalizing effect, as for this component alone the top 5% hold 8% of this resource. Likewise, although in Table 1 we saw that DB pensions are significant only at the top half of the total wealth distribution, DB pensions have a large equalizing effect on the top 5% and top 10% share measures.

Between 1989 and 2019, the top 5% share of non-retirement wealth rose 18 percentage points, while the share of expanded wealth rose only 10 points. Similar trends are seen in comparing the share of wealth held at the top 5% and 10% of the distribution for both age groups over time: concentration decreases substantially when considering DB and Social Security wealth, with increases in wealth concentration remaining over time for all wealth

---

[12]Households are re-ranked in each iteration of expanding the wealth concept.

TABLE 2: *Wealth Shares of the Top 5% and 10%*

	Ages 40–49				Ages 50–59				Ages 40–59			
	Non-Ret. Wealth	Non-Ret. + DC	Non-Ret. + DC + DB	Exp. Wealth (Incl. SS)	Non-Ret. Wealth	Non-Ret. + DC	Non-Ret. + DC + DB	Exp. Wealth (Incl. SS)	Non-Ret. Wealth	Non-Ret. + DC	Non-Ret. + DC + DB	Exp. Wealth (Incl. SS)
Top 10%												
1989	60.1	60.7	50.3	43.8	63.3	61.1	50.6	42.6	63.3	60.9	52.8	47.8
1992	61.2	61.0	48.4	41.6	63.2	62.3	50.2	42.2	66.7	63.6	54.2	47.5
1995	61.4	61.0	50.4	43.1	68.2	66.1	52.6	44.7	68.4	66.4	55.9	49.2
1998	62.8	61.3	52.2	45.1	70.3	67.6	56.6	48.1	68.9	65.3	56.2	50.3
2001	62.5	60.8	52.6	46.3	71.7	68.1	56.0	49.1	70.5	66.8	58.5	53.2
2004	66.3	63.2	54.7	47.6	70.2	65.7	55.8	48.6	71.4	66.7	58.8	53.0
2007	67.6	63.9	56.3	49.3	72.5	68.8	59.1	51.3	72.7	68.0	61.1	54.3
2010	72.5	69.3	60.4	52.0	72.4	69.2	58.1	50.0	77.0	72.0	62.9	56.0
2013	72.9	69.0	60.4	51.9	75.5	69.9	58.9	49.9	76.4	69.6	60.9	53.5
2016	69.7	65.6	58.5	50.3	81.6	76.8	67.3	58.4	80.5	74.7	66.7	59.5
2019	75.3	70.9	62.0	54.3	79.0	74.4	62.9	54.3	80.3	75.2	65.7	58.8
Top 5%												
1989	48.3	47.4	37.2	31.6	49.8	47.7	35.9	29.2	53.3	48.5	40.6	35.2
1992	49.3	47.8	34.5	29.1	51.7	49.0	36.5	29.9	55.4	52.1	40.6	35.0
1995	49.0	47.0	35.8	30.3	58.0	54.8	40.2	33.1	58.4	53.5	42.8	36.3
1998	51.1	47.6	38.2	32.9	59.6	56.0	43.4	36.0	59.1	52.0	42.0	37.9
2001	49.9	46.7	37.3	32.1	60.3	56.6	42.1	36.3	59.7	54.2	43.9	40.4
2004	54.8	49.9	39.5	33.7	59.7	54.4	41.6	35.8	60.5	54.8	44.4	39.8
2007	55.5	50.1	39.9	34.7	61.3	56.2	45.1	38.5	62.7	56.5	46.3	40.6
2010	61.5	55.2	44.6	37.8	58.9	54.4	42.3	35.2	65.2	59.0	48.4	42.8
2013	61.9	54.8	44.2	37.3	64.2	57.7	44.6	36.9	66.5	58.4	44.1	38.6
2016	57.6	49.8	42.7	35.9	70.9	64.4	52.7	44.7	71.5	62.4	51.8	46.8
2019	65.9	57.9	46.7	40.5	67.0	60.0	47.1	39.9	71.5	63.5	51.2	45.4

Note: Top 5% and Top 10% ranked by expanded wealth concept. *Source:* Authors' calculations using SCF data and methods described in main text.
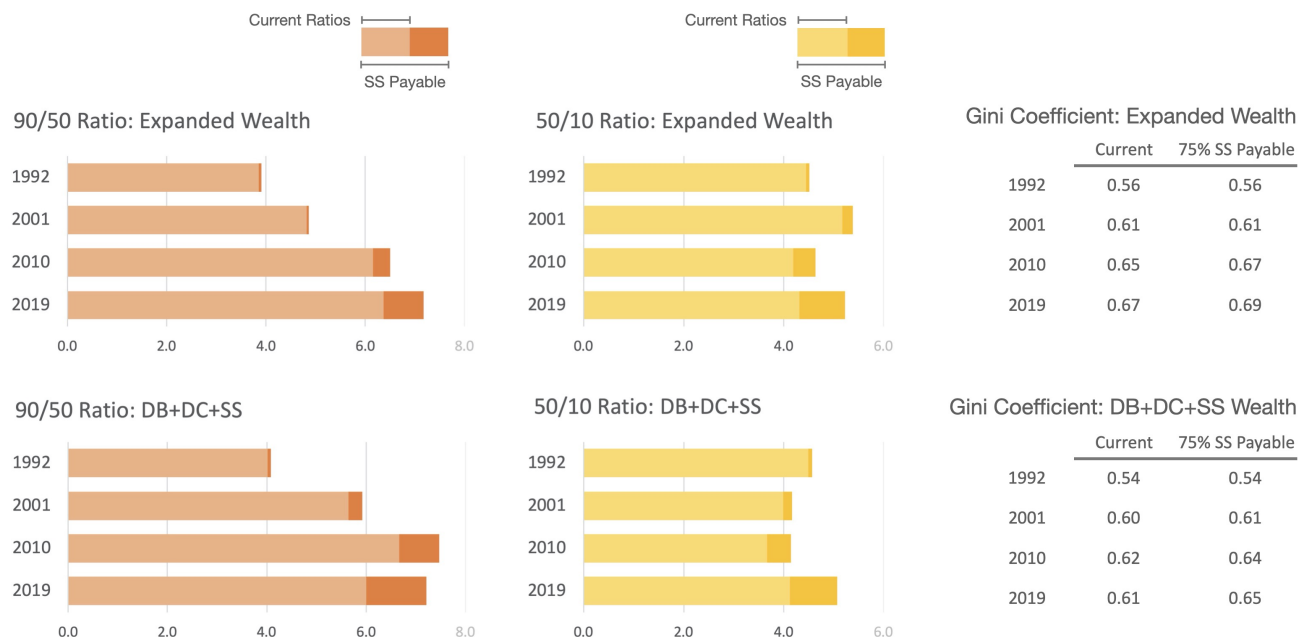
concepts.

4. Effects of Potential Social Security Shortfalls on the Wealth Distribution

So far we have shown that the distribution and trends over time differ substantially depending on whether one considers a more narrow definition of wealth versus a projected, expanded wealth concept. Our definition of expanded wealth includes both projected DB and DC private pension wealth and expected future Social Security resources. While we have found that conceptualizing Social Security as wealth reduces levels of wealth concentration, this is dependent on the level of Social Security benefits that are realized in the future. Based on projected earnings histories, we estimate the Social Security retirement benefits one would receive based on their contributions. However, while Social Security is classified as an entitlement program, current actuarial program projections show future payout obligations exceeding the 'pay-as-you-go' tax revenue that funds the Social Security program. To meet program obligations, there are several changes to policy that could be implemented. These include any one or some combination of: (1) further increases to the normal retirement claiming age, which has already occurred; (2) changing the cost of living adjustment formulas; (3) raising the income cap on Social Security taxation, among other proposals. However, if the funding shortfall is not addressed through any of these remedies, legally, the benefits paid out would be reduced to the level of concurrent program revenue.

In this section, we show what the effects would be of a reduction in Social Security benefits made in order for program revenue to meet annual funding obligations. While benefit obligations exceeding revenue are paid through the Social Security Trust Fund, past the year 2034, the Fund is expected to be depleted. At that time, program revenues are expected to be around 75% of obligations according to the 2020 OASDI Trustees Report, and if there are no policy changes, under current law payouts would be reduced to the level of program revenue. In this section, we consider the implications of this 'worst-case scenario' for future beneficiaries—in the sense of bringing about the largest reduction in benefits received— of a reduction of 25% of all benefits on our estimates of wealth trends, distributions, and the Gini coefficient.

In Figure 4, we show the P90/P50 and P50/P10 ratios and Gini coefficients for those ages 40–49 for expanded wealth as well as DB, DC, and Social Security wealth only. We find that in recent years, reducing Social Security benefits to 75% of the current benefit levels has an effect on all measures of wealth concentration for both wealth concepts. For expanded wealth, in the upper panel, we see that the P90/P50 ratio would increase from 6.4 to 7.2 in 2019, 4.3 to 5.2 for the P50/P10 ratio, while the Gini coefficient increases from 0.67 to 0.69. The effects are even greater when we look at DB, DC, and Social Security

Figure 4: *Measures of Wealth Concentration among Ages 40–49, Under Current and 75% Payable Social Security Benefits*

Gini Coefficient: Expanded Wealth	Current	75% SS Payable
1992	0.56	0.56
2001	0.61	0.61
2010	0.65	0.67
2019	0.67	0.69

Gini Coefficient: DB+DC+SS Wealth	Current	75% SS Payable
1992	0.54	0.54
2001	0.60	0.61
2010	0.62	0.64
2019	0.61	0.65

Source: Authors' calculations using SCF data and methods described in main text.

wealth only (lower panel), where the P90/P50 ratio increases from 6.0 to 7.2, from 4.1 to 5.1 for the P50/P10 ratio, with the Gini coefficient increasing from 0.61 to 0.65 in 2019.

One factor that matters in practice is that Social Security retirement benefits in the United States may be accompanied with Supplemental Security Income (SSI), which brings the total of Social Security and SSI monthly benefits up to a minimum level. For this exercise, a reduction in benefits of 25 percent would increase the share of households that would receive SSI due to their Social Security benefits falling below the threshold would increase from 4.2% to 14.1%. While SSI is not incorporated into the calculations for Figure 4, it would reduce the impact of decreasing Social Security benefits for the P50/P10 figures, as many in the bottom 10% would see their benefits supplemented by SSI, while those at the 50th percentile would not.

5. Conclusion

Focusing on two pre-retirement age groups from 1989 to 2019, we found that an expanded measure of wealth including DB pension and Social Security resources leads to lower levels of wealth concentration in the United States than the more common measure of market net worth. We presented this through a number of wealth concentration measures, including shares of wealth held by the top of the distribution, ratios of wealth held at different points in the distribution, and the Gini coefficient. We also found that while

wealth concentration is rising over the past three decades, it rises more slowly for this expanded wealth measure.

We believe that this expanded wealth measure offers a valuable perspective on wealth concentration and its evolution for two broad reasons. The first concerns the substitutability across different forms of wealth from the perspective of a household. Retirement is a major reason for saving among many households, and DB pensions and Social Security are significant resources for most households. Because they are to some degree a substitute for (i.e., 'crowd out') other forms of savings, their inclusion is appropriate for a more complete understanding of wealth and resources at older ages. Because Social Security especially is broadly held across the wealth distribution, its exclusion leads to higher measures of wealth concentration than what we found through our expanded wealth concept.

This expanded wealth measure also helps us understand the implications of policy for wealth inequality and economic well-being, as seen through our exercise on the effects of a hypothetical reduction in Social Security benefits. Our distributional simulations indicate that addressing projected shortfalls in the Social Security Trust exclusively by reducing benefit payouts can be expected to lead to significant increases in wealth concentration among the youngest cohort.

The second benefit of this expanded wealth measure is that by including DB pensions along with DC plans, we have an improved understanding of trends in wealth concentration over time. The transition away from private DB pensions—which are not included in surveys or typical measures of net worth—to DC plans—which are included—presents a measurement issue where growth in net worth that includes only DC plans is mechanically overstated. Estimating DB pension wealth helps to correct this issue, and its inclusion is one contributor to the lower rate of growth in wealth concentration over time that we find with the expanded wealth measure.

Although an expanded measure of wealth offers additional context for studying wealth inequality, there are some drawbacks relative to measures that include only standard, market wealth as household net worth. One clear advantage of measures that include only market wealth is that the value of market assets is readily measured, subject to standard treatment for taxation, accounting, and transaction purposes, and widely available in data sets for comparison, with very few assumptions are necessary (e.g., no assumptions about the timing Social Security claiming are needed). An additional drawback of the expanded measure of wealth lies in the challenge of merging resources that are not pure substitutes. While the resources we combine are to some extent treated as alternatives by households, they do not have the same degree of liquidity, allow for the same level of control, or even offer the same level of 'prestige'—that is, these resources yield different levels of utility. To address this issue, one could estimate a lifecycle model in which utility is separable over all forms of resources and wealth, measure substitutability, and use parameter estimates

to make approximate, representative utility comparisons.

While there are both merits and disadvantages when considering either narrow or expanded definitions of wealth, we see these multiple perspectives as complementary and, taken together, suitable and highly useful for the study of household resources and wealth concentration.

REFERENCES

ACKERMAN, S. AND J. SABELHAUS (2012): "The Effect of Self-Reported Transitory Income Shocks on Household Spending," *Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System*, 2012-64.

ALVAREDO, F., A. B. ATKINSON, AND S. MORELLI (2018): "Top wealth shares in the UK over more than a century," *Journal of Public Economics*, 162, 26–47, in Honor of Sir Tony Atkinson (1944-2017).

BANKS, J., R. BLUNDELL, AND J. P. SMITH (2003): "Financial Wealth Inequality in the United States and Great Britain," *Journal of Human Resources*, 38, 241–279.

BIGGS, A. G. AND G. R. SPRINGSTEAD (2008): "Alternate Measures of Replacement Rates for Social Security Benefits and Retirement Income," *Social Security Bulletin*, 68, 1–19.

BÖNKE, T., M. M. GRABKA, C. SCHRÖDER, E. N. WOLFF, AND L. ZYSKA (2019): "The Joint Distribution of Net Worth and Pension Wealth in Germany," *Review of Income and Wealth*, 65, 834–871.

BRICKER, J., L. J. DETTLING, A. HENRIQUES, J. W. HSU, L. JACOBS, K. B. MOORE, S. PACK, J. SABELHAUS, J. THOMPSON, AND R. A. WINDLE (2017a): "Changes in U.S. Family Finances from 2013 to 2016: Evidence from the Survey of Consumer Finances," *Federal Reserve Bulletin*, 103.

BRICKER, J. AND G. V. ENGELHARDT (2014): "A Test for Selection in Matched Administrative Earnings Data," *Journal of Economic and Social Measurement*, 39, 247–255.

BRICKER, J., S. GOODMAN, K. MOORE, AND A. H. VOLZ (2020): "Wealth and Income Concentration in the SCF: 1989–2019," *FEDS Notes. Board of Governors of the Federal Reserve System*, 2020-9-28.

BRICKER, J., A. HENRIQUES, J. KRIMMEL, AND J. SABELHAUS (2016): "Measuring Income and Wealth at the Top Using Administrative and Survey Data," *Brookings Papers on Economic Activity*, 261–321.

BRICKER, J., A. HENRIQUES, AND K. B. MOORE (2017b): "Updates to the Sampling of Wealthy Families in the Survey of Consumer Finances," *Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System*, 2017-114.

BRICKER, J., K. B. MOORE, AND J. P. THOMPSON (2019): "Trends in Household Portfolio Composition," in *Handbook of US Consumer Economics*, ed. by A. Haughwout and B. Mandel, Elsevier, 53–96.

BRICKER, J. AND A. H. VOLZ (2020): "Wealth Concentration Levels and Growth: 1989-2016," *FEDS Notes. Board of Governors of the Federal Reserve System*, 2020-2-20.

CHETTY, R., M. STEPNER, S. ABRAHAM, S. LIN, B. SCUDERI, N. TURNER, A. BERGERON, AND D. CUTLER (2016): "The Association Between Income and Life Expectancy in the United States, 2001-2014," *Journal of the American Medical Association*, 315, 1750–1766.

DEVLIN-FOLTZ, S., A. HENRIQUES, AND J. SABELHAUS (2016): "Is the U.S. Retirement System Contributing to Rising Wealth Inequality," *Russell Sage Foundation Journal of the Social Sciences*, 2, 59–85.

FELDSTEIN, M. AND A. PELLECHIO (1979): "Social Security and Household Wealth Accumulation: New Microeconometric Evidence," *The Review of Economics and Statistics*, 61, 361–68.

FISHER, J., D. JOHNSON, J. LATNER, T. SMEEDING, AND J. THOMPSON (2016): "Inequality and Mobility Using Income, Consumption, and Wealth for the Same Individuals," *Russell Sage Foundation Journal of the Social Sciences*, 2, 44–58.

GUSTMAN, A. L. AND T. L. STEINMEIER (1999): "Effects of Pensions on Savings: Analysis with Data from the Health and Retirement Study," *Carnegie-Rochester Conference Series on Public Policy*, 50, 271–324.

INTERNAL REVENUE SERVICE (1992): "Individual Income Tax Returns," 1990 Internal Revenue Service, United States.

JACOBS, L., E. LLANES, K. MOORE, J. THOMPSON, AND A. HENRIQUES VOLZ (2020): "Wealth Distribution and Retirement Preparation Among Early Savers," *Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System*, 2020-043.

JUSTER, T. F., J. P. SMITH, AND F. P. STAFFORD (1999): "The Measurement and Structure of Household Wealth," *Labour Economics*, 6, 253–275.

KEISTER, L. AND S. MOLLER (2000): "Wealth Inequality in the United States," *Annual Review of Sociology*, 26, 63–81.

KENNICKELL, A. B. (1999): "Revisions to the SCF Weighting Methodology: Accounting for Race/Ethnicity and Homeownership," *FRB Working Paper. Board of Governors of the Federal Reserve System*.

——— (2006): "Currents and Undercurrents: Changes in the Distribution of Wealth, 1989-2004," *Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System*, 2006-13.

KENNICKELL, A. B. AND A. E. SUNDÉN (1997): "Pensions, Social Security, and the Distribution of Wealth," *Finance and Economics Discussion Series. Board of Governors of the Federal Reserve System*, 1997-55.

KUHN, U. (2020): "Augmented wealth in Switzerland: the influence of pension wealth on wealth inequality," *Swiss Journal of Economics and Statistics*, 156.

PFEFFER, F., R. SCHOENI, A. KENNICKELL, AND P. ANDRESKI (2016): "Measuring Wealth and Wealth Inequality: Comparing two U.S. Surveys," *Journal of Economic and Social Measurement*, 41, 103–120.

POTERBA, J., S. VENTI, AND D. WISE (2011): "The Composition and Drawdown of Wealth in Retirement," *Journal of Economic Perspectives*, 25, 95–118.

POTERBA, J. M. (2014): "Retirement Security in an Aging Population," *American Economic Review: Papers and Proceedings*, 104, 1–30.

QUADRINI, V. (1999): "The Importance of Entrepreneurship for Wealth Concentration and Mobility," *The Review of Income and Wealth*, 45, 1–19.

RAVALLION, M. (2017): "A Concave Log-Like Transformation Allowing Non-Positive Values," *Economics Letters*, 161, 130–132.

SABELHAUS, J. AND A. VOLZ (2021): "Social Security Wealth, Ineqaulity, and Lifecycle Saving," in *Measuring and Understanding the Distribution and Intra/Inter-Generational Mobility of Income and Wealth*, ed. by R. Chetty, J. N. Friedman, J. C. Gornick, B. Johnson, and A. Kennickell, University of Chicago Press, National Bureau of Economic Research, Studies in Income and Wealth.

SABELHAUS, J. AND A. H. VOLZ (2019): "Are Disappearing Employer Pensions Contributing to Rising Wealth Inequality?" *FEDS Notes. Board of Governors of the Federal Reserve System*.

SAEZ, E. AND G. ZUCMAN (2016): "Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data," *Quarterly Journal of Economics*, 131, 519–78.

——— (2020): "The Rise of Income and Wealth Inequality in America: Evidence from Distributional National Accounts," *Journal of Economic Perspectives*, 34, 3–26.

SMITH, M., O. ZIDAR, AND E. ZWICK (2020): "Top Wealth in America: New Estimates and Implications for Taxing the Rich," *Griswold Center for Economic Policy Studies Working Paper*.

SOCIAL SECURITY ADMINISTRATION (2016): "Income of the Aged Chartbook, 2014," .

STARR-MCCLUER, M. AND A. SUNDEN (1999): "Workers' Knowledge of Their Pension Coverage: A Reevaluation," in *The Creation and Analysis of Employer-Employee Matched Data*, ed. by J. C. Haltiwanger, J. I. Lane, J. Spletzer, J. J. Theeuwes, and K. R. Troske, Emerald Group Publishing Limited, vol. 241 of *Contributions to Economic Analysis*, 469 – 583.

WILSON, O., J. WILLIAM, AND J. SMITH (1983): "Access to Tax Records for Statistical Purposes," *Proceedings of the Section on Survey Research Methods, American Statistical Association*, 595–601.

WOLFF, E. N. (1995): *Top Heavy: A Study of the Increasing Inequality of Wealth in America*, New York: The Twentieth Century Fund Press.

——— (2007): "The Retirement Wealth of the Baby Boom Generation," *Journal of Monetary Economics*, 54, 1–40.

——— (2014): "Household Wealth Trends in the United States, 1983-2010," *Oxford Review of Economic Policy*, 30, 21–43.

——— (2015): "U.S. Pensions in the 2000's: The Lost Decade?" *Review of Income and Wealth*, 61, 599–629.