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Defined Benefit and Defined Contribution Plans and the Distribution of Family Wealth

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Abstract

Family wealth inequality in the United States has risen over the past several decades, as documented by researchers using a variety of methods and data. Much of family wealth is in tax-preferred, employer-sponsored retirement plans—typically either a traditional defined benefit (DB) plan or the now more prevalent defined contribution (DC) plan. Because retirement wealth is generally less concentrated than other types, changes in the distribution of retirement wealth and in the type of retirement assets could affect overall wealth inequality.

Using data from the Survey of Consumer Finances and the Financial Accounts of the United States from 1989 through 2019, we examine how changes in retirement wealth, including those stemming from the shift from DB to DC plans, affect measures of wealth concentration. We account for the fact that unlike DC plans, in which workers own their account balances, DB plans promise workers a stream of annuity income in retirement. Workers' expected retirement wealth in DB plans is subject to projections of life expectancy, inflation, interest rates, and plans' ability to pay promised benefits.

Accounting for DB and DC wealth lowers the Gini coefficient in 2019 from 0.88 to 0.83 and reduces the share of wealth held by families in the top 10 percent of the distribution from 80 percent to 72 percent. We estimate that the shift from DB to DC retirement coverage modestly affected wealth concentration overall. Between 1989 and 2019, that shift accounted for about a fifth of the increase in the Gini coefficient and a fifth of the increase in the share of wealth held by families in the top 10 percent of the wealth distribution. We find evidence that retirement wealth varied markedly by socioeconomic characteristics. Overall, estimates of retirement wealth and its effect on measures of wealth concentration are marginally sensitive to alternative modeling choices.

Keywords: wealth inequality, retirement, pension plans, defined benefit plans, defined contribution plans

JEL Classification: J21, J26

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Introduction

Changes in wealth inequality and the factors driving such changes are of increased interest to academics and policymakers. Although researchers' estimates vary across studies and data sources, most conclude that the distribution of private family wealth in the United States skews toward the top, with the wealth concentration increasing over the past several decades.

Using data from the Survey of Consumer Finances (SCF), the Congressional Budget Office (2016) documented trends in the distribution of family wealth. That analysis focused on a measure of marketable family wealth, which includes only marketable assets. Marketable assets can be bought or sold and can outlive the owner. Marketable wealth conceptually equals net worth, or the difference between a family's marketable assets and total debt. Marketable wealth does not include nonmarketable assets, such as defined benefit (DB) pension plans. But it does include defined contribution (DC) plans, whose value is easily measurable and equals the balance in respondents' employer-sponsored, DC-type accounts and individual retirement accounts (IRAs).

By including one type of retirement wealth but not the other, marketable wealth can give a misleading picture of a family's private resources. With the shift from DB to DC plans in the United States, retirement wealth increasingly consists of DC wealth in saving-type accounts, and the share of retirement wealth held in DB plans is declining. Excluding DB wealth in comparisons of family wealth across time can lead to upward bias in estimates of wealth growth. However, the effect on measures of wealth concentration can go in either direction and depends on how concentrated DB wealth is relative to other types of wealth. In this report, we measure wealth concentration as the share of wealth held by the top 10 percent of the distribution and as the Gini coefficient.¹ Whether the concentration declines when DB wealth is added depends on both the relative concentration of DB wealth to nonretirement wealth and the relative concentration of DC and DB wealth.

CBO used a measure of augmented wealth, the sum of marketable wealth and the value of promised income from DB pension plans, in a 2022 report to the Congress on the distribution of family wealth. This paper outlines the method CBO used to estimate the distribution of family DB wealth in that report. In doing so, the paper makes CBO's work more transparent by describing the analysis underlying the agency's (2022) report to the Congress.

The paper also explores more generally the role of retirement wealth in the distribution of family wealth. The distributional analysis of wealth in this work abstracts from the role of other types of

¹ The Gini coefficient is a standard measure of inequality that here summarizes an entire wealth distribution in a number ranging from zero, the most equal distribution, to one, the least equal distribution.

resources, such as expected Social Security income or those stemming from other government programs, such as Medicare.²

Other researchers have explored the interaction of retirement assets and measures of wealth inequality. Sabelhaus and Volz (2019) and Devlin Foltz, Henriques, and Sabelhaus (2016a) used the SCF to examine the relative concentration of retirement versus nonretirement assets and to discuss implications for trends in wealth inequality.

We build on the work of those authors by—

- providing updated estimates with recent SCF data,
- improving the imputation of DB wealth,
- exploring the distribution across socioeconomic groups, and
- assessing the sensitivity of our results to other modeling choices in imputing DB wealth.

Using the most recent data from the SCF covering 1989 through 2019, we follow methods established in the recent literature in imputing DB wealth while refining the analytic method. We adjusted the value of DB wealth for the additional risk associated with unfunded benefits and used more of the SCF self-reported information on expected DB income of current workers in the imputation process.

We document increases in concentration of both DB and DC wealth. Nevertheless, between 1989 and 2019 DB wealth remained less concentrated than DC wealth. Adding DC and DB wealth to nonretirement wealth lowers three measures of wealth inequality: the share of wealth held by families in the top 10 percent of the wealth distribution, the Gini coefficient, and the share of wealth held by families in the top of the income distribution.

DB and DC assets reduce the wealth gap by education and reduce the wealth gap between White families and Black and Hispanic families. Using all the SCF waves, we construct a panel of birth cohorts. We document a decline in DB coverage, an increase in DC coverage, and an overall slowing of wealth accumulation on a life-cycle basis of more recent birth cohorts. Between 1989 and 2019, the shift from DB to DC coverage can account for about a fifth of the increase in the top 10 percent of augmented wealth and for about a fifth of the increase in the Gini coefficient.

² A measure of wealth that includes Social Security is beyond the scope of this paper, but such a measure could more accurately represent the expected resources during a person's lifetime. Other research groups measured Social Security wealth as the present discounted value of future Social Security income. Their analysis showed that the share of wealth in the top 10 percent of the distribution is lower when Social Security wealth is added to family wealth than when family wealth includes only marketable wealth and DB wealth. However, the results are sensitive to the economic and analytical assumptions those researchers used and they have reached different conclusions about how the share of wealth in the top 10 percent has evolved. See Catherine, Miller, and Sarin (2020) and Sabelhaus and Volz (2022).

Finally, we explore the sensitivity of measures of concentration to other modeling choices in the DB imputation method. Those modeling choices are of second-order importance and do not qualitatively change the conclusions.

Data

Our analysis used mainly data from the SCF spanning the surveys from 1989 to 2019. The SCF is a nationally representative cross-sectional survey, undertaken every three years by the Board of Governors of the Federal Reserve System in cooperation with the IRS Statistics of Income division. We supplement those data with information from the Financial Accounts of the United States (FAUS) on total DB wealth, which the SCF does not directly measure.³ (Total DB wealth is defined as the accrued, or earned-to-date, value of DB income, represented by the total DB liabilities of plan sponsors—including both funded and unfunded liabilities.⁴) Because the SCF does not sample the wealthiest group, the data are supplemented with information on the nation’s 400 richest people as listed by *Forbes* magazine (Dolan, Peterson-Withorn, and Wang 2021). CBO (2022) further describes data used in the analysis (see that report’s appendix).

The SCF data describe families’ assets and liabilities, income, work, retirement status or expectations, and demographic characteristics. When measuring family wealth, we rely on information directly reported in the SCF for all wealth components except DB wealth.⁵ For the other type of retirement assets, such as those in DC plans and IRAs, the SCF includes information on respondents’ gross account balances, reflecting the current value of the underlying financial assets, but no analogous measure exists in the survey for DB wealth. For DB plans, the SCF collects data both on spouses’ (or partners’) DB income received now and on DB income to be received at a specific future date. Those expected benefits can be associated with a current or past job. To impute family DB wealth, we use survey questions about the

³ The FAUS are national accounts that measure total wealth by economic sector. The FAUS data used here were released June 19, 2020, and downloaded July 22, 2020. New data are released quarterly. The most recent data available at the time of writing this paper were released December 9, 2022. (For the most recent release of the FAUS data, see www.federalreserve.gov/releases/z1/current/.) The total DB liabilities and the share of unfunded liabilities were revised between the June 2020 and December 2022 releases. Those revisions are concentrated in years since 2016. For example, total DB liabilities in 2019 are 1.3 percent higher overall in the most recent release than in the data released in June 2020. In particular, DB liabilities are 4.6 percent higher for private DB plans, 1.9 percent higher for federal DB plans, and 0.3 percent lower for state and local DB plans. The share of unfunded DB liabilities increased from 36.2 percent to 39.0 percent, reflecting mostly increases in funding shortfalls in the private DB plans—that share in the private sector in 2019 was revised from less than 1.4 percent to 11.3 percent. The section “Imputing DB Wealth and Sensitivity to Other Modeling Choices” discusses potential impacts of those revisions on results in the paper.

⁴ In imputing DB wealth, we also accounted for the additional risk that recipients face of not receiving their full promised benefits because of the funding shortfall. See “Imputing DB Wealth and Sensitivity of Results to Other Modeling Choices” for details on our adjustments.

⁵ Account-type retirement assets, such as those held in DC plans and IRAs, in the SCF track well with published totals. See Devlin-Foltz, Henriques, and Sabelhaus (2016b) and Dettling and colleagues (2015).

respondent and the spouse’s past and current pension participation, current pension income, expected retirement age, expected future pension income, and work history. The approach is described in “Imputing DB Wealth and Sensitivity of Results to Other Modeling Choices.”

We supplement the SCF data with information from the FAUS on total DB liabilities. Each quarterly release shows assets and liabilities of each economic sector at the end of the period in question. We obtain a measure of total DB liabilities for each SCF year from Table L.117, “Private and Public Pension Funds,” which includes total DB liabilities of private, federal, and state and local funds. To mitigate any potential underreporting in the survey, total DB wealth according to information in the SCF is scaled up to match the appropriate total values in the FAUS. Our imputation process broadly follows established recent methods, such as Sabelhaus and Volz (2022), Devlin-Foltz, Henriques, and Sabelhaus (2016a), and Batty and colleagues (2019).

The SCF oversamples high-income, high-net-worth households to cover nearly the full distribution of family wealth. However, by design the survey does not include information on the nation’s richest people, as listed by *Forbes*. The combined net worth of the *Forbes* 400 in 2019 was about \$3 trillion, with which we supplement net worth in the SCF. When calculating percentiles of the wealth distribution and shares of wealth, we considered people on the *Forbes* 400 to be at the top of the wealth distribution (Bricker, Hansen, and Volz 2019 used a similar approach). The resulting data set covers the entire wealth distribution and allows us to more accurately calculate measures of concentration, such as shares of wealth held at the top of the distribution. Because we do not know the portfolios of the *Forbes* 400, we impute the various categories of assets and debt in their portfolios according to the portfolio allocations of families in the top 0.1 percent of the distribution of net worth.⁶ However, that approach would have resulted in implausibly high values of DB wealth for the *Forbes* 400 (because annual DB income is subject to statutory limits). Instead, we imputed DB wealth for the families of the *Forbes* 400 to equal the average DB wealth of families in the top 0.1 percent of the net worth distribution. Once DB wealth of people in the *Forbes* 400 is imputed, the remaining assets and debt in their portfolios are scaled proportionately to align with total *Forbes* 400 wealth in each calendar year.

⁶ A similar method is used to impute the portfolio allocation of the *Forbes* 400 for the Distributional Financial Accounts data (see Batty and colleagues 2019). Other researchers have further adjusted the allocation of public and private equity in the portfolios of the *Forbes* 400 by using public information about which individuals derive most of their wealth from public companies and which from private companies. For each person on the *Forbes* 400, Smith, Zidar, and Zwick (2021) allocated fixed income, pensions, housing, and other wealth to reflect the portfolio allocation of the top 0.1 percent of the SCF and then allocated the remaining amounts to either public or private equity depending on whether most of his or her wealth was derived from public or private companies.

We use the family (the primary economic unit, or PEU) as the unit of analysis.⁷ Both the SCF's structure and the examined outcome of interest motivate our choice for the unit of analysis. Because the SCF collects only limited information on the ownership of assets and liabilities within the PEU, separate estimates of the financial characteristics of people within the family are not generally possible. Moreover, financial resources are typically shared within a family. That is why the estimated statistics of wealth are reported on a family basis. By contrast, the SCF collects separate information on pension coverage and retirement expectation of both spouses in a family. For couples, we separately estimate each spouse's DB wealth, which we then sum to get to a family measure.

We examine wealth concentration with three measures: nonretirement wealth, net worth, and augmented family wealth. Nonretirement wealth is a family's net worth outside retirement assets such as DB or DC plans. Net worth (or marketable wealth) is the difference between a family's marketable assets and a family's total debt and consists of nonretirement wealth plus DC assets. Marketable assets can be bought or sold and can outlive an owner. Net worth also includes the value of DC plans—the sum of both spouses' reported balances in DC-type accounts, including IRAs.⁸ However, the concept does not include the value of DB plans because those are nonmarketable assets. Augmented family wealth equals net worth plus the value of DB pension plans. Occasionally we refer to “retirement wealth,” the family's wealth in DB and DC plans combined.

Although DB plans are an important source of income that funds consumption in retirement, families' DB wealth differs in important ways from DC wealth or other marketable wealth. Workers can typically borrow against or withdraw funds from DC plans before retirement (with a penalty), but those activities are considerably more restricted in DB plans. DB wealth is therefore not as liquid, limiting families' abilities to use it as precautionary savings to insure

⁷ The SCF defines family as the primary economic unit (PEU) in a household. The actual unit of observation in the SCF is the PEU, somewhere between the Census “family” and “household” concepts. In this context a family consists of one person or a couple and all other household members financially interdependent with that person or couple. See the appendix to Bricker and colleagues (2017) for a precise definition.

⁸ We measure DC wealth as the sum of balances reported in the SCF for the family's DC-type retirement accounts—including Keogh plans, 401(k) plans, and similar tax-deferred retirement accounts from current and past jobs. DC plans offer participants a tax-preferred savings account that both employee and employer can contribute to; assets in those accounts vary with investment returns. Here, DC wealth also includes balances in IRAs (tax-advantaged retirement savings accounts that are not employer sponsored). We did not account for potential early withdrawal fees or for future income taxes to be paid when funds are withdrawn. Differences in the tax treatment of DB and DC plans and the resulting consumption and saving incentives because of the timing of when taxes are due could also affect trends in wealth accumulation and wealth concentrations. Although not part of our analysis, those are important avenues for future research.

against income or wealth shocks before retirement.⁹ DB wealth also cannot be inherited or bequeathed.¹⁰ However, DB plans hold a sizable portion of families' future consumption in retirement, which has already been earned. Omitting that source of future consumption from the analysis of wealth inequality while including other employer-sponsored sources of retirement consumption such as DC wealth would suggest a higher inequality in family resources than otherwise.

We also examine wealth variation across families by income, race, education, and birth cohort, characteristics reported in the SCF. Race and ethnicity groups are classified according to the self-identification of that family's original respondent to the SCF interview. Before 1998, the SCF asked for only one response to the question about race. In 1998, respondents could give multiple responses but were asked to give first the category they identified with most strongly. Starting in 2004, respondents also were asked to determine whether they were of Hispanic/Latino culture or origin. To make survey years more comparable, we group respondents into four classifications according to their responses to the racial identification question: non-Hispanic White; non-Hispanic Black; Hispanic; and Asian, another race, and multiple races (for simplicity herein, White, Black, Hispanic, and Asian and other).¹¹ The Asian and other classification consists of respondents identifying as Asian, American Indian, Alaska Native, Native Hawaiian, Pacific Islander, other race, and all respondents reporting more than one racial identification.

When family wealth is analyzed by education or birth cohort, the categorization is based on the reference person's characteristics. The reference person in the SCF is the male in a mixed-sex couple or the older person in a same-sex couple. In a one-person family, that person is the reference person. The reference person's educational attainment and birth cohort are used to group families by those characteristics. The reference person in a family is not always the same person as the survey respondent in a family. Because of data limitations, the racial self-identification of the survey respondent is used to create racial and ethnic groups in the analysis.¹²

⁹ Some DC plans have offered full or partial single-sum distributions at retirement since the 1970s, and most DB plans today offer some type of lump-sum option. Banerjee (2013) discusses how plan rules affect workers' decisions about annuity versus lump-sum distributions.

¹⁰ Survivor benefits are an exception to this rule if the beneficiary has chosen the joint-and-survivor annuity option because the surviving spouse will continue to receive benefits until death. In addition, if the original beneficiary has chosen a "single life with term certain" option, a designated beneficiary would receive payments for a preset number of years should the original beneficiary die before the end of the term.

¹¹ Under this classification, the shares of families in the various race and ethnicity categories evolve smoothly over the examined period. Between 1989 and 2019, the share of families in the White category declined and shares in the other three categories increased.

¹² In the SCF, the respondent is the person identified by the person contacted in the initial interview as the more financially knowledgeable person. The respondent is usually the reference person. For example, the respondent was the reference person in 79 percent of families in 2019 and 77 percent in 2016, and 73 percent in 1989.

To analyze wealth by income, we used a measure of a family’s annual income for the previous calendar year. For each year of the SCF, we sort families into income groups on the basis of adjusted family income. To better rank families by their relative economic status, we adjusted the family income reported in the SCF with an adjustment factor known as an equivalence scale. We used the square root scale: Family income was divided by the square root of the number of people in the family.¹³ Family income changes over the life cycle. To remove such life-cycle effects, we sorted families into income groups based on their adjusted family income within age groups defined on the basis of the age of the family’s reference person.¹⁴ To remove the effects of inflation, we adjusted family wealth and family income in years before 2019 with the price index for personal consumption expenditures from the Bureau of Economic Analysis. Unless indicated otherwise, all values are reported in 2019 dollars.

Defining DB Wealth

Traditional DB plans guarantee a certain stream of income in retirement until death, usually based on a final salary or the average salary calculated over the highest several consecutive years and accumulated years of service. We consider only expected DB income based on people’s own working history and plan coverage; we do not explicitly account for the value of potential survivor DB benefits. Most DB plans offer a joint-and-survivor annuity option, the default annuity life option since 1974. But the monthly payments under that option are actuarially reduced when both spouses are alive to offset the cost of the survivor coverage. Thus, the overall present discounted value of the DB annuity stream remains, on average, the same under the joint-and-survivor and single-life options. Thus, for workers who have not started receiving DB annuities, omitting survivor benefits in the calculation has little effect. For current recipients who chose the joint-and-survivor option, the current method potentially understates the present discounted value of their DB benefits by omitting the income the surviving spouse would receive should the primary beneficiary die first. A sensitivity analysis showed that although omitting survivor benefits of current DB recipients slightly understates wealth inequality, the effect is minimal. For example, the share of augmented wealth held by the top 10 percent of the distribution would be 72 percent versus 71.7 percent under the preferred approach, and the share of wealth held by the bottom half of the distribution would be 1.9 percent versus 2 percent under the preferred approach. Holden and Nicholson (1998) further discussed the effect of default options on choosing the joint-and-survivor option.

¹³ Similar adjustments to income have been made in other CBO reports. For a discussion of the method, see CBO (2021a), Appendix A.

¹⁴ The *Forbes* data were not used to analyze family wealth by income, education, race and ethnicity, age, or birth cohort because the data do not include information about those characteristics. In 2019, those 400 people accounted for less than 0.001 percent of the nation’s 129 million families. Adding the *Forbes* 400 to the analysis would not have affected the median wealth of any of the groups based on family characteristics.

To measure DB wealth in our analysis, we use the present value of expected future DB income. Because the SCF does not ask respondents to estimate their DB wealth, nor does it estimate such a measure, we need to estimate the value from the available information. Other researchers used the SCF to estimate family-level DB wealth, developing several approaches. Our method is closest to that of Sabelhaus and Volz (2022), with some modifications and an improved analytic method using more respondent-provided information in the SCF. We elaborate on that below.

The measure of DB wealth in our analysis can be described as the family's (respondent plus spouse) accrued value of expected future DB income at the time of the SCF survey. For people not yet receiving benefits but who expect to start receiving them later owing to a DB plan from a past or current employer, the measure is equivalent to the present value of future DB income if they leave their job today or stop accruing future benefits. The accrued, or earned-to-date, measure of DB wealth contrasts conceptually with another measure, the continuation value, that instead focuses on projected DB wealth at retirement if the worker keeps accruing benefits in future years (Wolff [2022] measured DB wealth by using a continuation value).

The earned-to-date measure of DB wealth that we use has three advantages. First, the measure is conceptually consistent with the way that the SCF measures other asset categories—namely, DC wealth is measured as a family's (respondent and spouse) combined balances in DC-type accounts at the time of the SCF survey. Similar, other categories of assets and debt also are measured at the time of the survey and do not include projected changes. Second, the accrued measure of DB wealth is equivalent to the present value of benefits that workers would be entitled to receive if their employment terminated immediately or if they stopped accruing benefits. That measure represents the workers' legal claim to DB wealth and corresponds to the measure of total DB liabilities in the FAUS that we use to align our total SCF estimate.¹⁵ The FAUS measure captures only what DB sponsors legally owe workers at a specific point in time. Finally, measuring DB and DC wealth consistently with each other and with nonretirement wealth facilitates comparisons of wealth across people of different birth cohorts that might have had different types of pension coverage over their lifetimes.

A later section describes the methods used to estimate the value of DB wealth for each family in the SCF. We describe our preferred approach and assess the sensitivity of our results to other modeling choices.

¹⁵ Stefanescu and Vidangos (2014) further described how DB liabilities are measured in the FAUS. Those authors estimated the actuarial liabilities of private, state and local, and federal pensions in the FAUS on the basis of annual estimates of pension entitlements produced by the Bureau of Economic Analysis (BEA). BEA adopted accrual accounting for DB pensions in 2013. Private and state-and-local pension liabilities are reported using the accumulated benefit obligation (ABO) method, and federal pensions are reported using the projected benefit obligation (PBO) method, in accordance with the estimates published by the Board of Actuaries of the Federal Civil Service Retirement System. PBO incorporates projected future salary growth, whereas ABO does not.

Results

Here we examine trends in DB and DC coverage and wealth. We also explore how including retirement wealth in the definition of wealth changes measures of wealth concentration and the distribution of wealth more broadly. Next, we explore the distribution of retirement wealth across socioeconomic groups and birth cohorts. Finally, we describe some illustrative results on the effect of the shift from DB to DC plans on wealth concentration, and we discuss sensitivity of select results to other modeling choices

Pension Plan Coverage and Change in DB and DC Wealth

Between 1989 and 2019, average retirement plan coverage—having positive DB or DC wealth—rose only slightly for U.S. families, from 60 percent to 63 percent. The type of coverage, however, changed dramatically. The share of families with DB wealth declined 13 percentage points, from 43 percent to 29 percent over the period. Over the same period, the share of families with DC wealth increased 13 percentage points—from 37 percent to 50 percent (see [Figure 1](#)). (The increase in DC coverage and the decline in DB coverage was concentrated mostly between 1989 and 2007, with little change in the rate since 2007.) Despite a stable rate of retirement plan coverage, the change in composition of pensions implies that net worth, which includes DC wealth but not DB wealth, misleadingly suggests an increasing importance of retirement wealth as DC plans have grown in popularity and total DC wealth has increased.

The transition from DB to DC pension plans can be seen in the different growth rates of total DB and DC wealth over the period and their shares in total augmented family wealth (net worth plus DB wealth; see [Figure 2](#)). In 2019 the total amount of DB and DC wealth was about equal—\$15.8 trillion for DB and \$16.6 trillion for DC, making up 14 and 15 percent of total augmented family wealth, respectively. In contrast, in 1989, total DB wealth was 2.6 times that of total DC wealth. As seen with overall pension coverage, the share that retirement wealth (DB and DC combined) constitutes of augmented family wealth has changed relatively little since 1989. Meanwhile, the share of DB wealth continued to decline and that of DC wealth continued to increase.

Retirement Wealth and Wealth Concentration

Whether we examine nonretirement wealth, net worth, or augmented wealth, family wealth became more unequally distributed between 1989 and 2019. Of the examined percentiles, family wealth increased the most at the 75th and 90th percentiles, whereas wealth grew more modestly at the median (see [Figure 3](#)). At the 90th percentile, nonretirement wealth increased by 44 percent, net worth increased by 84 percent, and augmented wealth increased by 87 percent. At the median, those categories grew by 14 percent, 43 percent, and 40 percent, respectively. For all three measures, the ratio of the 90th percentile to the 50th percentile was higher in 2019 than in 1989: It increased from 7.3 to 9.3 for nonretirement wealth, from 7.8 to 10.0 for net worth, and from 7.3 to 9.7 for augmented wealth.

To illustrate the rising equalizing role of DC and DB wealth in the trend of rising wealth inequality, we also estimate for each definition of wealth two more measures of wealth concentration—the Gini coefficient and the share of wealth held by families in different parts of the distribution. In 2019 the Gini coefficient of nonretirement wealth was 0.879. Adding DC wealth to the calculation brings the Gini coefficient down to 0.857, and adding DB wealth further reduces it to 0.826 (see [Figure 4](#)). Nevertheless, the Gini coefficient increased over the studied period, indicating that the concentration of all three definitions has increased. The Gini coefficient increased by 0.076 for nonretirement wealth, by 0.063 for net worth, and by 0.060 for augmented wealth.

Nonretirement wealth is the most concentrated, followed by net worth and augmented wealth, as measured by the share of wealth held by families in the top 10 percent of the distribution (see [Figure 5](#)). For example, in 2019 the share held in the top 10 percent of the wealth distribution was 80 percent for nonretirement wealth (45 percent by families in the top 1 percent), but it was reduced to 77 percent for net worth (39 percent in the top 1 percent) and to 72 percent for augmented wealth (34 percent in the top 1 percent).¹⁶ DB wealth’s equalizing effect is stronger than that of DC wealth because adding its value to the definition of wealth has a larger effect on the shares than adding DC wealth. Moreover, the relative equalizing effect of both DC and DB wealth seems to have increased. Adding DC and DB wealth to nonretirement wealth results in a larger percentage-point reduction in the share of wealth held by the top 10 percent of the distribution in 2019 than it did in 1989. In 1989, the top 10 percent held 69 percent of nonretirement wealth and 63 percent of augmented wealth. In 2019, by contrast, the top 10 percent held 80 percent of nonretirement wealth and 72 percent of augmented wealth.

The increase in the equalizing effect of DB and DC wealth also can be seen in the change in the share of wealth held by families in the 51st to 90th percentiles. In 2019, that share was 19 percent for nonretirement wealth, 21 percent for net worth, and 26 percent for augmented wealth. By contrast, in 1989 adding DC and DB wealth to net worth increased the share by only 4 percentage points (from 29 percent to 33 percent). However, doing so affects the estimated share of wealth held by families in the bottom 50 percent of the wealth distribution only marginally—by about 1 percentage point in both 1989 and 2019. The reason is that families in the bottom 50 percent of the distribution held a minimal share of total retirement wealth in the economy both in 1989 and 2019, which we show below.

To better explore differences in the distribution of all three wealth measures, we directly examine the distribution of retirement wealth. We first compare the relative concentration of the three types by examining the share of wealth held by families in each quartile of augmented

¹⁶In a similar analysis using the SCF data, Jacobs and colleagues (2021) reported that the share of wealth held by the top 5 percent of the distribution drops from about 72 percent to 51 percent when the measure of wealth includes the value of DC plans and DB plans.

wealth.¹⁷ Had family wealth been equally distributed, each quartile would have held a quarter of wealth (see [Figure 6A](#)). Instead, in 2019 the top quartile held 85 percent of augmented wealth, whereas the bottom quartile held less than 1 percent. Moreover, over the period the concentration of augmented wealth increased—the share of wealth held by the top quartile rose 6 percentage points—from 79 percent in 1989 to 85 percent in 2019. The shares of wealth held in all other quartiles declined.

Increasing concentration in all three categories contributed to the increased concentration of augmented wealth between 1989 and 2019. Nevertheless, both DB and DC wealth remain less concentrated than nonretirement wealth; DB wealth is the least concentrated (see [Figure 6A](#)).¹⁸ For example, in 1989 families in the top quartile of wealth held 82 percent of nonretirement wealth, 69 percent of DB wealth, and 75 percent of DC wealth. By 2019, those shares had increased to 88 percent, 76 percent, and 83 percent, respectively. DC wealth is more unevenly distributed in the population than DB wealth. Therefore, the shift from DB to DC, which results in the declining share of DB wealth in total wealth, must have contributed to the increased inequality in augmented wealth over the period. We quantify that effect later in the paper.

Almost all DB and DC wealth is held by families in the top half of the wealth distribution, and those families are considerably more likely to have some form of pension coverage. For example, in 2019, those families held 95 percent of DB wealth and 96 percent of DC wealth (see [Figure 6A](#)). Pension coverage is almost universal in the top half of the distribution—in 2019, 94 percent of families in the top quartile of wealth had some type of pension plan, as did 79 percent of families in the third quartile (see [Figure 6B](#)). By contrast, coverage is considerably lower in the bottom half—56 percent and 24 percent of families in the second and bottom quartiles of wealth, respectively, had some type of pension plan in 2019. Considerable gaps in coverage between the quartiles exist in both DC and DB coverage, and the gaps have not closed.

¹⁷ To create wealth quartiles, we ranked families by total family wealth adjusted for age of the family head. The ranking for each family is assigned according to the ranks for families within age groups—younger than 35 years, 35 to 49 years, 50 to 64 years, and 65 years or older. For years for which we did not have age information on people in the *Forbes* 400, we assigned them the average age of *Forbes* 400 people within deciles of augmented wealth in adjacent SCF years. Ranks are based on families' total augmented wealth, and families maintain their assigned ranks when the concentration of DB, DC, and nonretirement wealth is compared with the concentration of augmented wealth.

¹⁸ Part of that difference in relative concentration of retirement wealth compared with other types is due to federal regulations on compensation. For example, in DC plans, salary deferrals are limited, as are total employee and employer contributions. Companies also must show that annual employer contributions do not impermissibly discriminate in favor of highly compensated employees. In DB plans, benefits are capped to the lesser of 100 percent of final salary or a statutory limit; benefits are often a function of tenure, final salary, and universal generosity factor, and coverage is near universal in firms that sponsor such plans.

For 2019, the gap in coverage between the top and bottom wealth quartiles remains higher in DC coverage (58 percentage points) than in DB coverage (52 percentage points).¹⁹

The composition of wealth among quartiles also differed considerably. In 2019, families in higher wealth quartiles had, on average, higher values of assets in all examined categories. Nonmortgage debt was highest in the bottom and top quartiles, on average (see [Figure 6C](#)). As a share of total assets, nonmortgage debt was highest among families in the bottom quartile of wealth (98 percent) and lowest among those in the top quartile (1 percent). Home equity accounted for a larger share of the assets of the families in the bottom half of the wealth distribution than of those in the top half (34 percent and 43 percent, respectively, among families in the bottom and second quartiles of wealth). DB wealth, as a share of assets, was most prevalent among families in the middle two quarters of the distribution (14 percent and 23 percent, respectively, for families in the second and third quartiles). By contrast, DC wealth was most prevalent in the top half of the distribution, constituting 17 percent and 14 percent of family assets in the third and fourth quartiles, respectively.

Shifting from DB to DC Coverage Affected Wealth Concentration

DC wealth is more unevenly distributed than DB wealth. To quantify the effect of the shift from DB to DC coverage during the studied period on wealth concentration, we apply a semiparametric decomposition approach developed by DiNardo, Fortin, and Lemieux (1996), which we refer to as DFL.

In its core, the DFL method is a reweighting procedure. The method estimates a counterfactual distribution by replacing the marginal distribution of the observable characteristics X for group A with the marginal distribution of X for group B, using an easily estimable particular reweighting factor, $\Psi(X)$. In essence, the method estimates the counterfactual distribution of a given outcome for group B if group B had the observable characteristics of group A.

The DFL decomposition method allows us to examine characteristics of the distribution aside from the mean. Other methods, such as the Oaxaca–Blinder approach, are appropriate for decomposing differences in means (Oaxaca 1973). In fact, the DFL approach allows us to

¹⁹ Age differences do not drive these differences in pension coverage. Older heads of families are more likely to have pension coverage from having had more time in the workforce to gain access to a plan either through a current or former employer. Meanwhile, older families have more wealth on average because they have had more time to accumulate it. However, wealth rankings are defined conditional on age. In other words, families are ranked within their age groups and with respect to peers in a given birth cohort. As a result, little difference exists in the age distribution of various wealth quartiles. For example, in 2019 the average age of the reference person in families in the bottom quartile of wealth was 51.1 years, whereas the average age of those in the second, third, and fourth quartiles was 51.8, 51.8, and 52.2 years, respectively. Similar small differences existed in 1989 when the average age in the first, second, third, and fourth quartiles was 47.6, 47.5, 48.0, and 48.6 years, respectively.

construct the whole counterfactual distribution of wealth, which is needed to estimate measures such as the Gini coefficient or shares of wealth.

We use the DFL method to explore how the concentration of wealth in 2019 would have looked had the type of pension coverage remained fixed as of 1989 or had DB plans not been replaced by DC plans. Namely, we apply the method in every SCF year from 1992 to 2019 such that the share of families with DB and DC coverage in every SCF wave equals those shares in 1989.²⁰ Our estimates suggest that had the composition of DB and DC coverage remained fixed as of 1989, the Gini coefficient of augmented wealth in 2019 might have been 1.1 percentage points lower and the share of wealth held by the top 10 percent of the distribution might have been 1.7 percentage points lower (see [Figure 7](#)). (For reference, between 1989 and 2019 the Gini coefficient had increased by 6.0 percentage points and the share of wealth held by the top 10 percent had increased by 8.5 percentage points.) In other words, the shift in DB and DC coverage might account for about a fifth of the increase in the Gini coefficient and about a fifth of the increase in the top 10 share of augmented wealth. We find that effect to be of modest size.²¹

This analysis has an important caveat. One should think of this exercise as an accounting type of calculation that is not a causal statement. The calculation does not take into account potentially important behavioral aspects, which are hard to estimate. For example, had the composition of pension plans remained unchanged as of 1989, families' patterns of accumulating nonretirement wealth might also have changed, affecting the resulting counterfactual wealth distribution.²²

DB and DC Wealth and Wealth Differences by Socioeconomic Characteristics

The distribution of family wealth also has become more unequal across families with socioeconomic characteristics such as income, race, and education. The shift from DB to DC retirement coverage contributed to some of that widening in overall wealth.

²⁰ The observable characteristics that we control for are DB and DC coverage within age and income groups in each SCF year. We control for age to avoid confounding the estimate with the changing age composition across the SCF surveys as the population ages. We also control for income quintiles to avoid confounding the estimate with other changes that occurred during the period—namely, that pension access became more unequal—it increased for high-income groups and declined for low-income groups. The counterfactual exercise aims to estimate how the wealth distribution would have looked had the type of pension coverage remained fixed as of 1989.

²¹ The assessment of Devlin-Foltz, Henriques, and Sabelhaus (2016a) is similar, reporting that the shift from DB to DC modestly increased the wealth concentration.

²² For example, DB plans are generally considered to carry less financial risk to workers than DC plans. Had DB plans remained dominant, households on average might have needed less precautionary saving and might have reduced their saving outside retirement accounts. Essentially, in calculating the Gini coefficient or shares of wealth in years past 1989, this exercise puts more weight on families with DB coverage and less weight on those with DC coverage. Although that approach keeps the pension coverage constant over time, it takes as given the values of retirement and nonretirement wealth of those families in each survey year.

Income. Between 1989 and 2019, the wealth gap between families in low-income and high-income groups widened, as did the gap in pension coverage.²³ Increased concentration in nonretirement and DC wealth, combined with declining DB coverage, can explain some of the increase in augmented wealth inequality across income groups.

In 1989, families in the top 25 percent of the income distribution held two-thirds of augmented wealth, and that share rose to three-quarters by 2019 (see [Figure 8A](#)). Although the concentration of all wealth categories increased over the period, retirement wealth—particularly DB wealth—remained more equally distributed in 2019 across the income quartiles than other categories of wealth. Between 1989 and 2019, the share of nonretirement wealth held by the top quartile of income increased from 69 percent to 79 percent; the corresponding increase in DC wealth was from 72 percent to 77 percent. The share of DB wealth held by the top quartile of income remained roughly unchanged, declining from 53 percent to 52 percent, although the share held by the third quartile increased from 29 percent to 32 percent.

Over the period, pension coverage declined in the bottom quarter of the income distribution but increased for the rest of the distribution (see [Figure 8B](#)). Overall, DC coverage increased among all income quartiles, whereas DB coverage declined, reflecting the shift from DB to DC plans in the private sector. In addition, both DB and DC coverage rates remained higher among high earners than among low earners, and the gradient remained steeper in DC than in DB coverage rates. For example, in 2019 the DC pension coverage for families in the top income quartile was 20 and 40 percentage points higher than for families in the third and second income quartile, respectively, and 69 percentage points higher than for families in the bottom quartile. DB pension coverage rates were more similar across families in various income quartiles. In 2019, DB coverage among families in the top income quartile was only 2 and 10 percentage points higher than coverage in the third and second income quartiles, respectively, and 27 percentage points higher than coverage in the bottom quartile.

The composition of wealth also differed considerably across families by quartiles of income. In 2019, families with more income, on average, had more assets and debt. Overall, however, of the categories examined, the difference between average values among families in the top quartile of the income distribution and families in the second or bottom income quartile was smaller in retirement wealth, particularly DB wealth, than in financial nonretirement assets or other assets. DB wealth accounted for a larger share of assets among families in the second and third quartiles—26 percent and 30 percent, respectively, than among families in the bottom or top

²³ We created income groups by ranking families by total family income adjusted for family size and age of the family head. We adjusted family size by dividing family income by the square root of the number of family members. We adjusted age by calculating ranks for families within age groups (younger than 35 years, 35 to 49 years, 50 to 64 years, and 65 years or older). Thus, families' income is ranked in relation to peers by age, allowing a more direct comparison of wealth differences by income.

quartiles. By contrast, DC wealth accounted for a larger share of assets of families in the third and fourth quartiles—16 percent and 15 percent, respectively, than of families in the bottom two quartiles (see [Figure 8C](#)).

As DC plans became more common over the period, they offset the declining share of families with DB coverage in all income groups. However, because low-income families remained considerably less likely to have DC plans than high-income families, a sizable gap in retirement plan coverage between income groups remained at the end of the examined period. But differences in retirement wealth among families in different income groups are probably attributable not only to lower-income families' being less likely to have retirement plans but also to changes in the type of retirement plan coverage that occurred during the period.

The change from DB- to DC-type plans probably further exacerbated inequality among income groups in both retirement and augmented wealth. Wealth accumulation differs under the two types of plans: In DB plans, participation is often mandatory if the worker is eligible and the expected monthly benefit is relatively easy to predict, being a function of plan generosity and workers' final salary and tenure. Workers need decide only when to retire or leave the firm. In DC plans, which are more like employee-owned savings accounts, wealth accumulation can be more uncertain. To guarantee financial security, workers in those plans must make informed, forward-looking decisions every step of the way. Workers choose whether to participate, how much to contribute, how to invest, and whether to withdraw early or borrow against the plan.²⁴ Workers also bear the investment risk in DC plans, whereas employers bear that risk in DB plans. DC plans can generate significant wealth if workers contribute consistently for a long time, invest soundly, and minimize leakages. However, evidence suggests that most workers' balances are below their potential. Moreover, workers' propensity to save through those plans varies considerably, even if eligible. Typically, low-income, less-educated, non-White workers are less likely to participate. They also contribute less, invest more conservatively, are more prone to cash out accounts when leaving an employer, and accumulate only small balances. Biggs, Munnell, and Chen (2019) discussed why 401(k) plan balances are often under their potential. Choi (2015) reviewed the literature on employee's saving behavior in DC plans.

Race and Ethnicity. Over the 1989–2019 period, retirement and nonretirement wealth were unevenly distributed among racial groups: DB wealth remained the most equally distributed, DC

²⁴ Automatic enrollment is a relatively new feature of some DC plans that became more popular among plan sponsors, particularly after the passage of the Pension Protection Act of 2006. In DC plans that have such a feature, workers are automatically enrolled in the plan if eligible and a percentage of their pay is automatically deducted and contributed to the account unless the worker opts out. According to Vanguard (2022), as of 2021, 56 percent of large plans in its data set had adopted automatic enrollment. Many researchers conclude that DC plans' automatic features can positively affect plan participation and could equalize participation and contribution rates among enrolled workers. Choi and colleagues (2004) described the effect of such plan features in the private sector, and Falk and Karamcheva (2022) discussed the effect in the public sector.

wealth was less equally distributed, and nonretirement wealth was most unequal. The wealth gap between White families and Black and Hispanic families is thus smaller when wealth is defined to include DB wealth than when wealth is defined as net worth (including only marketable wealth). We measure differences in average wealth as the ratio of average wealth of Black families, Hispanic families, or families in the Asian and other group in comparison with the average wealth of White families (see [Figure 9A](#)).²⁵ For example, if Black and White families had the same average wealth, their wealth ratio would equal 1. The wealth gap widens as the ratio between their average wealth approaches zero. In 2019, the ratio of average DB wealth was 0.75 and 0.43 for Black and Hispanic families, respectively, compared with White families. By contrast, the gap in nonretirement wealth and in DC wealth was larger. For example, the ratio in nonretirement wealth was 0.13 and 0.17 for Black and Hispanic families, respectively, compared with White families, and the ratio for DC wealth was 0.23 and 0.16, respectively.

Overall, the racial gap in augmented wealth fluctuated over the period, and in 2019 the gap in augmented wealth was slightly higher than in 1989 (see [Figure 9A](#)). In 1989, average wealth of Black families was 24 percent of the wealth of White families. For Hispanic families, it was 23 percent, and for Asian and other families it was 71 percent. In 2019, those numbers had declined to 22 percent, 20 percent, and 66 percent, respectively. Throughout the period, and in comparison with White families, the gap remained larger for Black and Hispanic families than for families in the Asian and other category. On average, between 1989 and 2019, Black and Hispanic families had about one-quarter the wealth of White families, whereas Asian and other families had about two-thirds. DB wealth was most equally distributed, and the ratio of mean DB wealth of Black families to that of White families averaged 0.65. The ratio of mean DB wealth of Hispanic families compared with that of White families averaged 0.38, and the ratio of mean DB wealth of Asian and other families in comparison with White families averaged 0.75. By contrast, for nonretirement wealth those ratios were 0.17, 0.21, and 0.64, respectively. For DC wealth the ratios were 0.20, 0.19, and 0.59, respectively.

Some differences in wealth across racial groups over the period, particularly differences in DB and DC wealth, can be accounted for by differences in retirement plan coverage—that is, the presence of DB or DC assets. During the examined period, more White families had DC, DB, or either type of coverage than families in other racial groups (see [Figure 9B](#)). Retirement plan coverage increased only slightly among all racial groups and the share of families with DC wealth increased, whereas the share of families with DB wealth declined. In 2019, the gap in

²⁵ Related to the findings presented here, Thompson and Volz (2021) reported that DB and Social Security wealth are disproportionately important to the wealth of non-White families. The authors found that when DB pensions and Social Security are included in the definition of wealth, disparities in wealth between White families and Black and Hispanic families are substantially smaller and that they are not rising over time. Also using data from the SCF, Madowitz, Price, and Weller (2020) showed that Black families have considerably lower levels of wealth by using various measures of wealth, and the Black–White wealth gap is smaller in government than in private industries, due largely to the presence of DB plans.

coverage with any retirement plan between White and Black families was 21 percentage points and it was 29 percentage points in 1989. The gap between White and Asian was 9 percentage points in 2019 and 22 percentage points in 1989. However, the gap between White and Hispanic families was roughly unchanged over the period (33 percentage points in 1989 versus 34 percentage points in 2019). However, gaps in retirement coverage fluctuated. For example, the gap in any retirement coverage between White and Black people was lowest in 2004, at 18 percentage points, and has since risen to 21 percentage points.

As DC-type plans became more common over the period, they offset the declining share of families with DB coverage in all racial groups. However, because of the persistent racial gap in DC access, a considerable gap in retirement plan coverage remained at the end of the period.

Moreover, the shift from DB to DC coverage probably contributed to the wealth inequality by race over time similarly to the change's effect on wealth inequality by income. Because of DC plans' voluntary nature of participation and contributions, balances accumulate more unequally across racial groups than in DB plans. Evidence suggests that non-White workers are less likely to participate, contribute less on average, have more conservative portfolios, and accumulate assets more slowly. Falk and Karamcheva (2022) documented differences by race and ethnicity in participation, contribution rates, and balance-to-pay ratios in the DC plan for federal workers, whereas Kuan, Cullen, and Modrek (2015) found similar evidence in the private sector. As DC plans become even more common, rising inequality in retirement wealth across racial groups could be expected.

Retirement wealth—particularly DB wealth—is more equally distributed across racial groups. In terms of portfolio composition, retirement wealth in the form of DB wealth therefore accounts for more of the assets of Black and Hispanic families than White families. In 2019, DB wealth accounted for 39 percent of Black families' assets and 25 percent of Hispanic families' assets. In comparison, DB wealth was only 14 percent of White families' assets (see [Figure 9C](#)). In 2019, retirement wealth constituted more than half of the wealth of Black families and more than a third of the wealth of Hispanic families.

Education. Between 1989 and 2019, the gap in augmented wealth widened between low-educated and high-educated families. Among families with less than high school education, average augmented wealth declined from 16 percent to 7 percent of the wealth of families with a graduate degree. Among families with high school education, the decline was from 23 percent to 17 percent; among those with some college, from 35 percent to 22 percent; and among those with bachelor's degrees, from 64 percent to 61 percent (see [Figure 10A](#)).

In both 1989 and 2019, the overall difference in average wealth between families with various levels of education was lower in DB wealth than in DC wealth (measured as the ratio of average wealth). For example, in 2019 the average DB wealth of families with less than high school education was 9 percent of the average DB wealth of families with graduate degrees, and average

DC wealth of families with less than high school education was 4 percent of the average DC wealth of families with graduate degrees. The corresponding values for families with high school education were, respectively, 28 percent and 14 percent; for those with some college, 48 percent and 17 percent; and for those with bachelor's degrees, 59 percent and 56 percent (see [Figure 10A](#)). Between 1989 and 2019, the difference widened in average DB and DC wealth of families with no more than high school education and families with a graduate degree.

The pension gap in coverage also widened over the period and partly explains the increased disparity in DB and DC wealth among education groups (see [Figure 10B](#)). Overall, between 1989 and 2019 pension coverage increased slightly for families with bachelor's and graduate degrees (from 76 percent to 80 percent and from 82 percent to 88 percent, respectively). But for all other education groups, overall pension coverage declined: from 44 percent to 28 percent among families with less than high school education, from 58 percent to 54 percent among families with no more than high school education, and from 62 percent to 59 percent among families with some college.

The decline in pension coverage among those groups was the result of a loss of DB coverage not fully offset by higher DC coverage. The decline in DB coverage over the period was steepest among the less educated—23 and 17 percentage points among those with less than high school and high school education, respectively, and 13, 15, and 11 percentage points among those with some college, bachelor's degrees, and graduate degrees, respectively (see [Figure 10B](#)).

Despite the steep decline in DB pension coverage, particularly among less-educated families, DB wealth in 2019 still accounted for more of the portfolios of less-educated families than of more-educated families. As a share of assets, DB wealth was highest for families with some college, 23 percent, and smallest among those with bachelor's or graduate degrees, 11 percent.²⁶ By contrast, the share of assets held in DC wealth generally increased with education. On average, families with graduate degrees held 16 percent of assets in DC plans; with bachelor's degrees, 15 percent; with some college, 12 percent; and with less than high school education, 8 percent (see [Figure 10C](#)).

As with the earlier discussion by income and race, we expect that some differences in retirement wealth by educational attainment over the period may be traced to the change from DB- to DC-type plans. Less-educated workers are less likely to participate in and contribute to a DC plan when eligible and accumulate assets more slowly. Thus, DC plans' increasing prevalence might further increase inequality in retirement and augmented wealth across education groups.

²⁶ Differences in workers' occupations or industries might also account for some of the effect. DB plans are more prominent in goods-producing than service-producing industries and are more common among unionized workers.

DB and DC Wealth and Wealth Accumulation Over the Life Cycle

Changes in the distribution of retirement and nonretirement assets might reflect changes in the evolution of wealth over the life cycle of families of various generations. On average, families work, consume, and save when young and use their savings to consume when retired.

Differences in pension coverage, income, or saving rates between generations, among other factors, might affect the distribution of wealth.

We cannot track the same families over time in the SCF. But we can use the survey's repeated cross-sectional nature to construct a panel to analyze for trends in average DB and DC coverage and wealth accumulation over the life cycle for various birth cohorts.

Because of the shift from DB to DC coverage, more recent cohorts are considerably less likely to have DB coverage at similar points in the life cycle than their predecessors. On average, those cohorts are more likely to have DC-type coverage at earlier ages (see [Figure 11](#)). (As before, we define coverage as having positive DB or DC wealth.) However, at least some more recent cohorts show a pattern of lower overall coverage, suggesting that higher DC coverage did not fully replace lower rates of DB coverage. For example, for people born in the 1960s and 1970s, pension coverage overall is lower in their 40s than for people born in the 1940s and 1950s.²⁷ For people born in the 1980s, not enough time has elapsed to observe whether pension coverage would reach that of older cohorts, when those families reach middle age.

For some more recent birth cohorts, lower pension coverage might lead to lower wealth accumulation at similar points in the life cycle.²⁸ To make that comparison, we calculate average wealth-to-income ratios for nonretirement, net worth, and augmented wealth (see [Figure 12](#)). Because of productivity gains, we would expect both income and wealth to increase in real terms for families of more recent cohorts in comparison with families of older cohorts at similar ages. Instead, by relating the stock of wealth to income, those wealth-to-income measures allow us to create apples-to-apples comparisons across cohorts. In addition, the wealth-to-income measures more closely relate to measures used in the literature to assess families' retirement preparedness, such as replacement rates—or families' available resources for consumption in retirement in relation to their income before retirement.²⁹

²⁷ Devlin-Foltz, Henriques, and Sabelhaus (2016a) also used the SCF but through 2013 documented similar results. Our analysis suggests that the trend has not reversed since 2013.

²⁸ Although vehicles for retirement saving typically offer a tax-preferred method for accumulating wealth, families could save through other channels. However, most people are passive savers, for whom retirement savings do not completely crowd out other savings, on average (Chetty and colleagues 2014).

²⁹ Replacement rates also are often used to compare retirement preparedness across generations. In the calculation, families' wealth often is transformed into its annuity value to estimate potential annual income in retirement and is expressed as a ratio of income during retirement to income before retirement. See Munnell and Soto (2005) and Purcell (2012).

Overall, a similar pattern emerges for all three wealth measures—cohorts born since the 1950s have lower ratios of augmented wealth to income than earlier cohorts. The pattern is particularly pronounced in the last four waves of the SCF—the years since the 2007 to 2009 recession. That pattern for augmented wealth seems driven by growing differences in the ratio of nonretirement wealth to income between the cohorts and the fact that fewer of those more recent cohorts have DB wealth.

Taken together, the patterns in lower pension coverage and lower wealth-to-income ratio of more recent cohorts might have important implications for their retirement income security compared with that of their predecessors.

Imputing DB Wealth and Sensitivity of Results to Other Modeling Choices

This section describes how we imputed families' DB wealth in each survey year of the SCF and how other modeling choices affected our results.

Micro-Based Approach and Alignment With Total DB Wealth

Our method for imputing DB wealth uses micro-level information from the SCF in estimating the present value of DB pensions for current and future recipients. That approach is combined with adjusting the estimated DB wealth for some of those recipients such that the total DB wealth from the SCF aligns with total household DB liabilities from the FAUS. (Bricker and colleagues 2015 and Saez and Zucman 2016 used variations on the approach.) In the process, we calculate the present value of DB benefits for each respondent and spouse we identify as having DB pension coverage either through a past or current employer, or who now reports receiving DB income.

As done in Devlin-Foltz, Henriques, and Sabelhaus (2016a), we impute DB wealth for each family in the SCF through three steps:

1. Take the total DB wealth from the FAUS.
2. Use information from the SCF to calculate the present value of DB income for beneficiaries no longer accruing benefits (current retirees and workers with DB coverage at a previous job) and beneficiaries covered by a DB plan at their current employer.³⁰
3. Attribute the difference between total DB wealth in the FAUS and total DB wealth in the SCF accounted for by beneficiaries no longer accruing benefits to workers accruing benefits

³⁰ The SCF collects information about the DB income that respondents receive when interviewed and the DB income that they expect to receive in the future. Those expected benefits can be associated with a current or past job.

now. The DB wealth of those workers is first estimated using information on expected benefits in the SCF and then scaled to match the appropriate FAUS total value.³¹

Our method departs from that of Devlin-Foltz, Henriques, and Sabelhaus (2016a) in the way we estimate DB wealth for individual beneficiaries covered by a DB plan at their current employer. Those authors estimate accrued DB liabilities for each beneficiary on the basis of his or her earnings and the number of years spent in the plan, instead of using the reported information in the SCF on expected DB income and expected retirement age. Those authors calculate a person's monthly DB benefit by following a formula method:

$$\text{Benefit} = \text{Generosity factor} \times \text{Years of service} \times \text{Average final salary.}$$

On one hand, the formula method simply applies one formula to all beneficiaries and assumes that all recipients would start receiving their benefits at the same age. The authors also cite Starr-McCluer and Sundén (1999), indicating that workers may not perfectly understand their pension plans, so the method avoids the bias introduced by measurement error in self-reported values.

On the other hand, the formula method requires an assumption about the generosity factor in each person's pension plan. Whereas data on years of service and salary are available in the SCF, the plan's generosity factor is not. DB generosity is considerably higher in the public sector than in the private sector (Munnell and colleagues 2011). DB plans have been mostly phased out in the private sector but remain dominant in the public sector. As a result, we would expect the share of current public-sector workers with DB plans to have increased during the 1989–2019 period, affecting the average generosity of the DB plans of workers still accruing benefits. Accounting for the wedge in generosity between private and public plans in the imputation is important to accurately reflect the distribution of DB wealth across current workers over the analyzed period.

Using data on workers' occupation from the restricted-use SCF, Sabelhaus and Volz (2022) built in a wedge between public- and private-sector DB plans in their assumption of average generosity that they apply to those two groups of workers. Thus, they potentially capture some, though not all, of the difference in DB benefits between those two types of beneficiaries. However, the formula method applied to the public-use SCF data—the data available for our analysis—cannot fully capture that aspect of variability in plan generosity. The public-use SCF data, for privacy concerns, totals workers' occupation information in a few bins, thereby

³¹ The FAUS data used here were released June 19, 2020, and downloaded July 22, 2020. Those data have been revised. Total DB liabilities in the release on December 9, 2022—the most recent available when this paper was written—were 1.3 percent higher than in the June 19, 2020, release. Overall, revisions in total DB wealth are relatively small and not expected to materially affect our results. The revised total DB wealth is higher in private-sector plans than public-sector plans, and private DB plans are more likely to be held by people with greater wealth than those holding public DB plans. As a result, the updated data might suggest a slightly higher concentration of DB wealth and augmented wealth overall. However, the differences should be minimal.

precluding data users from using the formula method to incorporate the difference in benefit generosity between the public and private sectors.

Even with restricted data, Devlin-Foltz, Henriques, and Sabelhaus (2016a) omitted potentially important differences in plan generosity along other dimensions, such as industry, geographical location, unionization status, and establishment size.³² Not accounting for differences in DB generosity across workers and changes in generosity over time would distort our estimated distribution of DB wealth among current workers at a point in time. In addition, given the variability in plan generosity across types of employers or workers, changes in the share of respondents with DB plans and in the composition of respondents with DB plans over the period also would affect the distribution of DB wealth over time.

Taking a different approach for estimating current workers' DB wealth, other researchers relied solely on information in the SCF. They estimated the present value of benefits on the basis of workers' self-reported expected DB income, along with assumptions about life expectancy and discount rates (Wolff 2015; Munnell and colleagues 2009). Although that method arguably better captures the variation in DB generosity, its deficiency is the overreliance on self-reported data with the associated measurement error. In fact, the method results in an imputed total DB wealth that is considerably lower for some years than the reported total DB wealth in the FAUS (see [Figure 13](#)). Future work on the differences between self-reported values and administrative records would help in constructing more accurate estimates of the distribution of retirement wealth. Bee and Mitchell (2017) set the stage for that kind of analysis by documenting disparities in pension income in administrative data and that reported in some survey data such as the Current Population Survey.

Our preferred approach uses the strengths of both methods. Like Devlin-Foltz, Henriques, and Sabelhaus (2016a), we scale the estimated DB wealth in the SCF up to the totals in the FAUS. However, for people currently working for an employer offering a DB plan, we estimate the expected present value of their future DB income by using respondents' self-reported information on expected benefits, expected retirement age, and projections about life expectancy and interest rates. Although our projections are imperfect, workers' self-reported information on expected DB income carries relevant information on their benefit generosity. We refer to that method as prorated ongoing treatment, described in the next section. Using that information with the aggregation method allows us to capture more variation in DB wealth while ensuring correct accounting for total DB wealth in the economy.

³² Works (2016) discussed trends in employer costs for DB plans and differences in employer DB costs along the mentioned dimensions. Although factors besides plan generosity can affect employer cost for DB plans, generosity and costs are highly correlated. And in general, more generous plans that pay higher benefits at retirement are more costly to employers.

Estimating Individual DB Wealth

For current recipients and future recipients with a DB plan from a former job, we calculate the present value of their lifetime DB wealth associated with that DB plan according to Equation 1:

$$DB_i = \sum_{t=t_{age_i}}^{119} \left[amt_{it} \times \frac{1}{(1+rate_t)^{t-t_{age_i}}} \times surv_{it} \right]. \quad (1)$$

The DB income, amt_{it} , is the annual income reported in the survey. The discount rate is denoted by $rate_t$, and $surv_{it}$ captures the probability of survival. The expected present value, calculated at the time of the SCF survey year, captures the estimated stream of income from person i 's current age until death, which in our model happens with certainty at age 119. From responses in the SCF, we can calculate the annual DB income of current recipients. As explained below, we allow the probability of survival to vary by observable characteristics.

We use the same method for future recipients with a DB plan associated with a former job. Those recipients report their expected retirement age and expected DB income. Their stream of income begins at the expected retirement age. Sometimes the individual plans to take a lump-sum payment instead of a lifetime guaranteed income; amt_{it} then equals the total lump sum in the year of retirement and zero in all future years. We cap the annual DB income and lump sum by using IRS guidelines (for example, \$265,000 in 2023 annual DB income; see <https://tinyurl.com/IRSDBlimits>).

Finally, we use two methods to estimate the present value of DB wealth for plans associated with a current job: the formula method, outlined earlier, and the prorated ongoing treatment method. We prefer the latter method, used in all our estimates here unless specified otherwise. But we use the formula method for consistency with work in the literature and present those results in the sensitivity analysis. The prorated ongoing treatment method incorporates information about expected DB income in the SCF. People know how generous their pension plans are and how long they expect to be employed, aspects they consider when expressing expectations about pension income and retirement. Therefore, we take expected DB income amount and expected retirement age as givens. Unlike people with a DB plan associated with a former job, current workers have not earned the expected value of their pension at retirement at the time of the survey. To measure DB pension value at the time of the survey, we prorate the present value of lifetime DB wealth to account for not having fully earned their pension, as shown in Equation 2:

$$DB_i = prorate_i \times \sum_{t=t_{reti}}^{119} \left[amt_{it} \times \frac{1}{(1+rate_t)^{t-t_{age_i}}} \times surv_{it} \right]. \quad (2)$$

For that method, we infer that people report their expectation of DB income as though they will stay in their current job until retirement. *Prorate_i* equals the number of years worked at the current job divided by the total number of years the person plans to work in that job.³³

Alternatively, the formula method uses employment history to predict already-earned pension wealth. Unfortunately, the SCF does not include DB plan parameters. Therefore, we use a standard DB pension formula (Equation 3):

$$DB_i = yrs \times maxwage \times generosity\ factor, \quad (3)$$

where *yrs* is the number of years at the current job, *maxwage* is the highest wage over a period in recent years at the current job, and *generosity factor* is a value between zero and one. We use reported current annual wage to proxy *maxwage*, inferring that the current wage is the highest annual wage associated with the person's current job. If the current wage for a person is missing, we proxy current wage by using reported information on individual annual income from a business, total family earnings less spousal earnings, and the wage at the person's previous longest job. The wage is capped so that the resulting DB annual income falls within IRS limits. To reflect public-sector DB plans' higher generosity, we projected a generosity factor of 3 percent for workers in the public administration and 1.5 percent for the rest.³⁴

In both the formula and the prorated method, as a final step, we scale the estimated DB wealth associated with a current job proportionately to match the total residual from Equation 4:

$$FAUS = DB_{retiree} + DB_{past\ job} + residual. \quad (4)$$

There, *FAUS* denotes total DB liabilities in the economy derived from the information in the FAUS data, *DB_{retiree}* denotes total DB wealth of retirees now receiving DB income, *DB_{past job}* denotes total DB wealth of people who expect to start receiving benefits in the future accrued from a previous job, and *residual* is the difference between *FAUS* and the sum of *DB_{retiree}* and *DB_{past job}*, or the part of total DB wealth in the economy that represents the legal claims of

³³ Other authors similarly prorated the present value of future benefits. For example, to compare Social Security wealth with other types of wealth among people who have not reached retirement age, Hou and Sanzenbacher (2020) prorate the value of Social Security wealth by using the ratio of benefits that would result from a complete earnings history until retirement to benefits that would result from earnings to date.

³⁴ As mentioned, ideally, we would like to know the generosity factor of the worker's DB plan. Because the SCF does not include that information, a proxy way is to model the difference in generosity factors by industry or occupation. Unfortunately, workers' detailed industry and occupation are not available in the public-use SCF. Instead, workers are grouped in seven industry and six occupation categories. A classification available was the separation between public administration workers and the rest. We validated our assumption for public and private DB plan generosity with recent estimates (see Munnell and colleagues 2011). However, the public administration sector captures only a small portion of all public-sector workers, leaving the approach using the formula method deficient.

workers who have a DB plan at their current job and are now accruing benefits. In both the formula and the prorated method, current workers with higher estimated DB wealth according to survey responses receive a proportionately higher share of the residual. In the end, both methods ensure that total DB wealth in the SCF matches that in the FAUS for each survey year. The imputed present value of DB wealth for plans associated with a current job should be thought of purely as a scaling factor for each person with such a plan, which will determine the share of the total residual that beneficiary is allocated.

Survival Rates

As the previous equations show, information on people's survival rates is needed to estimate a lifetime value of expected DB benefits. One common approach is to apply mortality rates by sex and birth cohort, which would allow estimating DB wealth values for each spouse in a family, and then total the values to a family DB wealth measure.³⁵ The mortality rate is the opposite of the survival rate: $\text{mortality rate} = 1 - \text{survival rate}$. In the results section we refer to that approach as using uniform survival rates. However, researchers have documented considerable variation in survival rates even within people of the same birth cohort and the same sex. For example, positive correlation between income and survival rates has been well established, and income is highly correlated with wealth. Using the same survival rates for families with different levels of wealth would understate DB wealth at the top of the wealth distribution and overstate it at the bottom, thereby understating wealth inequality. Controlling for other sources of variability in survival rates also is important for accurately capturing DB wealth differences between families with different socioeconomic characteristics, such as education, marital status, income, and race and ethnicity.

Therefore, in our preferred approach we apply differential survival rates. Our method adjusts the survival rates in the actuaries' life tables by using logistic regression estimates from Cristia (2007).³⁶ The adjustment allows for differential survival rates by sex, earnings quintile, marital status, race and ethnicity, and educational attainment for each birth cohort in the SCF.

Mortality rates are generally higher for people with lower earnings and wealth (see [Figure 14](#)). We show that gradient as the ratio of the differential mortality rate to average mortality rate within each sex and birth cohort group by ventiles (twentieths) of family earnings and family wealth. Data are shown for three age groups—35 to 49 years, 50 to 64 years, and 65 years or older. Overall, mortality rates decline with both family earnings and family wealth. In addition,

³⁵ CBO (2021b) discusses the agency's projections of mortality rates. That report's supplemental data describe current mortality rate estimates by age and sex. Researchers also have used mortality rates from the Social Security Administration's actuarial life tables.

³⁶ In practice, Cristia (2007) does not include all the coefficient estimates necessary to do the adjustment. For example, one must infer the constant term in those regression results, which we found through iterative methods. Details on our method are available on request.

mortality ratio profiles are flatter among older families and steeper among younger families, suggesting that the variability in mortality rates by earnings and wealth is more pronounced among younger families than older families. In part, that finding reflects the convergence in remaining life expectancy as a person ages. Finally, mortality ratios are lower in the first and second wealth ventile than in the third. The bottom of the wealth distribution has a significant share of high-income but low-net-worth people with large amounts of debt. Those workers have relatively low mortality rates and pull down the ratio of differential to uniform mortality in the first and second ventiles of wealth.

In the sensitivity analysis, we use three alternative survival rates: uniform survival rates; differential survival rates similar to those used in Cristia (2007), which control for education, marital status, and income, but not race and ethnicity; and differential survival rates that use an earlier approach developed by Brown, Liebman, and Pollet (2002). Those authors estimate differential mortality ratios for different subgroups on the basis of race and ethnicity, sex, and educational attainment, but they do not include earnings. Previous work has used those more simplified approaches. By examining the resulting differences in wealth concentration measures when different survival modeling approaches are used, we can assess the importance of that modeling choice in analyzing wealth concentration over time. Doing so also allows us to assess whether modeling differentials in survival rates across a wider set of individual characteristics meaningfully changes the estimated distribution of DB wealth.

Discount Rate

In our preferred approach, when calculating the present value of future DB payments, we use a discount rate equal to the Treasury market yield curve, adjusted for the additional risk stemming from the underfunding of DB liabilities. In the sensitivity results part of the paper we also show estimates with a flat 3 percent real discount rate, as used in some previous works (Devlin-Foltz, Henriques, and Sabelhaus 2016a; Coile and colleagues 2002).

The Treasury yield curve reflects the yield of zero-coupon Treasury bonds of various maturities. The yield curve represents the cost of borrowing money for different periods. For calculating the present value of DB income, each annual DB income payment is discounted by the yield of a bond of maturity that matches how far in the future that payment will be received. Novy-Marx and Rauh (2011), for example, used the default-free yield curve (as approximated by the Treasury zero-coupon yield curve) to discount public employee pension income, under the assumption that liabilities are default free.³⁷

³⁷ CBO (2017) used a similar method to project revenues and outlays of the federal retirement system. To estimate the present value of future DB payments for federal civilian workers, that report used a discount rate equal to CBO's long-term projection of the nominal rate of return on 20-year Treasury securities because 20 years was approximately the average maturity of the DB obligations.

DB plans generally must keep enough assets to cover the present value of already-earned benefits. According to FAUS data, 36 percent of total DB liabilities were unfunded in 2019, and 99 percent of unfunded liabilities were in state and local and in federal DB plans (see Figure 15).³⁸ As mentioned, in our imputation method we total families' DB wealth up to total pension liabilities in the FAUS, including the unfunded portion. Conceptually, that method considers the unfunded portion of DB a liability to the firm and an asset to the household.

Private-sector DB plans are insured by the Pension Benefit Guaranty Corporation, a government-owned corporation that insures the benefits of recipients up to a statutory maximum. For state and local governments, an underfunded pension represents a liability that must be financed from future revenues, such as the municipal bonds sold to investors. From employees' perspective, a small but nonzero risk exists that the government will not have the funds necessary to pay their pension, just as investors in municipal bonds perceive a small but nonzero risk that they will not be repaid.

In our preferred method of DB estimation, we adjusted for the additional risk that recipients of state and local DB plans face of not receiving their full promised benefits because of funding shortfalls. Our adjustment lowers the value of unfunded expected benefits and reflects the market value of promised benefits. The approach is similar to the method CBO uses to produce fair-value estimates of federal programs (CBO 2017; 2020). In the adjustment, we used a higher discount rate—by 21.7 basis points—based on the yield on municipal bonds that includes a risk premium to reflect the higher market risk borne by DB recipients because of their underfunded promised benefits.³⁹ Because we had no information on the funding status of each recipient's DB

³⁸ A DB plan is underfunded if the value of the plan's assets is less than the accrued pension liabilities for current workers and retirees. The unfunded share of the plan's liabilities is the difference between the plan's liabilities and assets, expressed as a proportion of the liabilities. CBO (2011) discussed underfunded state and local pension plans and implications for funding decisions.

³⁹ A basis point represents 1/100 of a percentage point. Our estimated risk premium is based on the average historical spread between municipal bonds and AAA corporate bonds. To calculate the change in value for each DB recipient, we calculated each recipient's modified duration, taking into account the relevant market yield curve and differential mortality. In the calculation, we do not differentiate between single and multiemployer plans because of lack of information. Multiemployer plans make up a small share of all DB plans—3 percent in 2017—but cover almost one-third of all DB plan participants. Multiemployer plans have drawn more scrutiny from policymakers in recent years because projected insolvencies of some plans could render the Pension Benefit Guaranty Corporation insolvent.

plan, we applied the adjustment reflecting the overall unfunded share of DB liabilities in state and local plans and in proportion to each recipient's imputed DB wealth.⁴⁰

A discount rate can substantially affect the present discounted value of annuities, particularly in periods of low real interest rates, such as the one that followed the 2007–2009 recession until the COVID-19 pandemic. Because future DB or Social Security benefits are not traded in any market, researchers debate the appropriateness of various discount rates as used in valuations. Recently, Catherine, Miller, and Sarin (2020) also used the yield curve in a risk-free valuation of Social Security wealth. Those authors also report a second set of results with a similar but adjusted approach. They add a market beta to the discount rate to reflect the labor market risk associated with the Social Security program, namely, that benefits are wage indexed to tie future payouts to economic growth. The authors point out that conceptually under that approach, Social Security wealth and marketable wealth are treated consistently because \$1 of Social Security wealth affords the same consumption as \$1 of marketable wealth in any given year.

Finally, in the sensitivity section of the paper, we also show another estimation method in which DB recipients are expected to receive only the funded portion of DB benefits. To calculate that effect, we take the unfunded portion of DB liabilities according to the FAUS in each SCF year and allocate that loss of wealth to families proportionately based on their imputed DB wealth. Under that approach, current and future beneficiaries bear a reduction in their DB wealth equal to the funding gap, as estimated in the FAUS. Because DB wealth is less concentrated than nonretirement wealth and offsets some skewness in the distribution of nonretirement wealth, we expect the method to result in an increase in wealth concentration over our baseline estimate. In addition, the adjustment results in a wealth loss proportionate to imputed DB wealth. The method overallocates unfunded DB liabilities to families in the top of the wealth distribution, who probably participate in well-funded private DB plans, and to current beneficiaries, who probably will receive their full DB income before DB insolvency. Because of that overallocation, our illustration would suggest a smaller increase in wealth concentration than if one could allocate the funding gap in accordance with the funding status of each beneficiary's DB plan.

Sensitivity of Results to Other Modeling Choices

As outlined in the preceding section, imputing families' DB wealth requires a range of modeling choices that potentially affect the distribution of DB wealth among recipients. We model access

⁴⁰ The FAUS data used here were released June 19, 2020, and downloaded July 22, 2020. The share of unfunded liabilities in state and local DB plans was 46.3 percent in 2019. The most recent data release available (December 9, 2022) showed a slightly higher share—47.5 percent. Because the risk adjustment for the underfunding is proportional to each person's expected DB wealth, the data revision is not expected to affect the distribution of DB wealth. And because the change in the share of unfunded benefits is small, the revision would have little effect on the distribution of augmented wealth.

to DB assets from current or past employers on the basis of survey responses in the SCF, and those remain unchanged, regardless of modeling choices. However, the actual level of DB wealth imputed to each person with a DB plan can vary with those choices.

To illustrate the sensitivity of our results, we present estimates of wealth concentration such as the Gini coefficient and the share of wealth held by the top 10 percent of the distribution under our preferred method and several other modeling choices (see [Figure 16](#)). We also calculate the percentiles of augmented wealth under other modeling choices (see [Table 1](#)). The main conclusion is that the biggest differences in wealth concentration are between the various measures of wealth—nonretirement wealth, net worth, and augmented wealth—and to a much smaller degree between differences in the analytic method. Overall, differential mortality suggests a slightly higher concentration, whereas the formula method and the 3 percent real discount rate suggest a lower concentration early in the period and a higher concentration later. The method of not using aggregation to FAUS suggests higher concentration, as does the method that reduces DB wealth by the size of the funding gap. The reason is that DB wealth is less concentrated than other wealth, and both methods result in lower total DB wealth than under the preferred method (see [Figure 13](#)).

Overall, the effects of those modeling choices on measures of wealth concentration are small, and the trends in wealth concentration over time are largely invariant to the examined alternatives.

Conclusion

Using data from the SCF, we document that over the last 30 years, family wealth in the United States became more unequally distributed. Families in the top 10 percent of the distribution held 63 percent of augmented wealth in 1989, increasing to 72 percent in 2019. The share of wealth held by families in the top 1 percent increased from 27 percent to 34 percent over the same period. Both the level of and change in wealth concentration over the period are lower when family wealth is defined to include the accrued value of future DB income that families expect to receive than if family wealth is defined as net worth—marketable assets (including DC wealth) less family debt. For example, the top 10 percent of families held 67 percent of net worth in 1989 and 77 percent in 2019, and the net worth held in the top 1 percent increased from 31 percent to 39 percent over the same period. But regardless of the measure used, growth in the top 10 percent share of wealth is driven mainly by growth in the top 1 percent of wealth.

Retirement wealth in the form of DB and DC plans remained more evenly distributed than other wealth throughout the 1989–2019 period. Despite the shift in the type of retirement plans that employers sponsored over that time, DB wealth remained more evenly distributed than DC wealth in 2019. Because of the shift toward DC, however, the concentration of retirement wealth increased during the period. Overall, the shift from DB to DC retirement coverage modestly affected wealth concentration overall. Between 1989 and 2019, the shift accounted for about a

fifth of the increase in the Gini coefficient and a fifth of the increase in the share of wealth held by families in the top 10 percent of the wealth distribution.

Examining differences in family wealth across socioeconomic groups shows that wealth gaps in education and income worsened over the period, and the racial gap did not change meaningfully. Still, the wealth gap in retirement assets such as DB wealth remains smaller than in nonretirement wealth. Overall, the distribution of DC wealth across socioeconomic groups looks closer to the distribution of other nonretirement wealth than to the distribution of DB wealth. Finally, families belonging to some more recent birth cohorts had lower pension coverage and lower wealth-to-income ratios than families in older cohorts at similar ages.

Wealth concentration (as measured by the Gini coefficient and by the share of wealth held by people in the top 10 percent of the wealth distribution) changes only by small amounts under other modeling choices in our imputation method for DB wealth, such as for differential mortality, the discount rate, and allocating the unfunded portion of DB liabilities.

Our analysis excluded other forms of family resources available for consumption in retirement, such as expected future income from Social Security. However, unlike the case with DB pensions, workers do not have legal claims to future Social Security payments according to current benefit formulas. Catherine, Miller, and Sarin (2020) and Sabelhaus and Volz (2022) estimated the share of wealth in the top 10 percent of the distribution when the expected income streams from Social Security are added to the measure of wealth. Those analyses showed that the share of wealth in the top 10 percent of the distribution is lower when Social Security wealth is added to family wealth than when family wealth includes only marketable wealth and DB wealth. However, the results are sensitive to the economic projections and modeling choices those researchers made, and they reached different conclusions about how the share of wealth in the top 10 percent has evolved. A measure of wealth that includes Social Security might more accurately represent a person's expected resources during his or her lifetime and could have implications for the distribution of lifetime resources across families with different socioeconomic characteristics. Those questions are beyond the scope of this paper but present an important avenue for future work.

References Cited

- Banerjee, Sudipto. 2013. *Annuity and Lump-Sum Decisions in Defined Benefit Plans: The Role of Plan Rules*, Issue Brief 381 (Employee Benefit Research Institute, January 2013), <https://tinyurl.com/5n7spy9y>.
- Batty, Michael M., Jesse Bricker, Joseph S. Briggs, Elizabeth Holmquist, Susan Hume McIntosh, Kevin B. Moore, Eric R. Nielsen, Sarah Reber, Molly Shatto, Kamila Sommer, Tom Sweeney, and Alice Henriques Volz. 2019. *Introducing the Distributional Financial Accounts of the United States*, Finance and Economics Discussion Series Paper 2019-017 (Board of Governors of the Federal Reserve System, March 2019), <https://doi.org/10.17016/FEDS.2019.017>.
- Bee, Adam C., and Joshua W. Mitchell. 2017. *Do Older Americans Have More Income Than We Think?* Working Paper SEHSD-2017-39 (U.S. Census Bureau, July 2017), <https://tinyurl.com/Census2017-39>.
- Biggs, Andrew G., Alicia H. Munnell, and Anqi Chen. 2019. *Why Are 401(k)/IRA Balances Substantially Below Potential?* Working Paper 2019-14 (Center for Retirement Research at Boston College), <https://tinyurl.com/BCWP2019-14>.
- Bricker, Jesse, Lisa J. Dettling, Alice Henriques, Joanne W. Hsu, Lindsay Jacobs, Kevin B. Moore, Sarah Pack, John Sabelhaus, Jeffrey Thompson, and Richard A. Windle. 2017. “Changes in U.S. Family Finances From 2013 to 2016: Evidence From the Survey of Consumer Finances,” *Federal Reserve Bulletin*, vol. 103, no. 3 (September 2017), pp. 1–40, <https://tinyurl.com/FRB2017103140>.
- Bricker, Jesse, Peter Hansen, and Alice Henriques Volz. 2019. “Wealth Concentration in the U.S. After Augmenting the Upper Tail of the Survey of Consumer Finances,” *Economics Letters*, vol. 184, article 108659 (November 2019), <https://doi.org/10.1016/j.econlet.2019.108659>.
- Bricker, Jesse, Alice M. Henriques, Jake A. Krimmel, and John E. Sabelhaus. 2015. *Measuring Top Income and Wealth at the Top Using Administrative and Survey Data*, Finance and Economics Discussion Series Paper 2015-030 (Board of Governors of the Federal Reserve System, May 2015), <http://doi.org/10.17016/FEDS.2015.030>.
- Brown, Jeffrey, Jeffrey B. Liebman, and Joshua Pollet. 2002. “Appendix: Estimating Life Tables That Reflect Socioeconomic Differences in Mortality,” in Martin Feldstein and Jeffrey B. Liebman, eds., *The Distributional Aspects of Social Security and Social Security Reform* (University of Chicago Press, 2002), pp. 447–458, <https://tinyurl.com/DASSSSR>.
- Catherine, Sylvain, Max Miller, and Natasha Sarin. 2020. *Social Security and Trends in Wealth Inequality*, Jacobs Levy Equity Management Center for Quantitative Financial Research Paper (February 2020), <https://doi.org/10.2139/ssrn.3546668>.

- Chetty, Raj, John N. Friedman, Søren Leth-Petersen, Torben Heien Nielsen, and Tore Olsen. 2014. “Active vs. Passive Decisions and Crowd-Out in Retirement Savings Accounts: Evidence From Denmark,” *Quarterly Journal of Economics*, vol. 129, no. 3 (August 2014), pp.1141–1219, <https://doi.org/10.1093/qje/qju013>.
- Choi, James J. 2015. “Contributions to Defined Contribution Pension Plans,” *Annual Review of Financial Economics*, vol. 7 (December 2015), pp. 161–178, <https://tinyurl.com/ChoiARFE2015>.
- Choi, James J., David Laibson, Brigitte C. Madrian, and Andrew Metrick. 2004. “For Better or for Worse: Default Effects and 401(k) Savings Behavior,” in David A. Wise, ed., *Perspectives on the Economics of Aging*. Chicago, IL: University of Chicago Press, pp. 81–121, <https://tinyurl.com/CLMM2004>.
- Coile, Courtney, Peter A. Diamond, Jonathan Gruber, and Alain Jouten. 2002. “Delays in Claiming Social Security Benefits,” *Journal of Public Economics*, vol. 84, no. 3 (June 2002), pp. 357–385, [https://doi.org/10.1016/S0047-2727\(01\)00129-3](https://doi.org/10.1016/S0047-2727(01)00129-3).
- Congressional Budget Office (CBO). 2011. *The Underfunding of State and Local Pension Plans* (May 2011), www.cbo.gov/publication/22042.
- . 2016. *Trends in Family Wealth, 1989 to 2013* (August 2016), www.cbo.gov/publication/51846.
- . 2017. *Including Market Risk in Estimates of the Budgetary Effects of Changing the Federal Retirement System for Civilian Workers: Supplemental Material for Options for Changing the Retirement System for Federal Civilian Workers* (October 2017), <https://tinyurl.com/ye29fu7z> (PDF, 669 KB).
- . 2020. *Income-Driven Repayment Plans for Student Loans: Budgetary Costs and Policy Options* (February 2020), www.cbo.gov/publication/55968.
- . 2021a. *The Distribution of Household Income, 2018* (August 2021), www.cbo.gov/publication/57061.
- . 2021b. *The 2021 Long-Term Budget Outlook* (March 2021), www.cbo.gov/publication/56977.
- . 2022. *Trends in the Distribution of Family Wealth, 1989 to 2019* (September 2022), www.cbo.gov/publication/57598.
- Cristia, Julian P. 2007. *The Empirical Relationship Between Lifetime Earnings and Mortality*, Working Paper 2007-11 (Congressional Budget Office, August 2007), www.cbo.gov/publication/19096.
- Detting, Lisa J., Sebastian J. Devlin-Foltz, Jacob Krimmel, Sarah J. Pack, and Jeffrey P. Thompson. 2015. *Comparing Micro and Macro Sources for Household Accounts in the United States: Evidence From the Survey of Consumer Finances*, Finance and Economics

- Discussion Series Paper 2015-086 (Board of Governors of the Federal Reserve System, October 2015), <http://doi.org/10.17016/FEDS.2015.086>.
- Devlin-Foltz, Sebastian, Alice Henriques, and John Sabelhaus. 2016a. “Is the U.S. Retirement System Contributing to Rising Wealth Inequality?” *Russell Sage Foundation Journal of the Social Sciences*, vol. 2, no. 6 (October 2016), pp. 59–85, <https://doi.org/10.7758/rsf.2016.2.6.04>.
- . 2016b. *The Role of Social Security in Overall Retirement Resources: A Distributional Perspective*, FEDS Notes (Board of Governors of the Federal Reserve System, July 29, 2016), <https://tinyurl.com/DF2016b>.
- DiNardo, John, Nicole M. Fortin, and Thomas Lemieux. 1996. “Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach,” *Econometrica*, vol. 64, no. 5 (September 1996), pp. 1001–1044, <https://doi.org/10.2307/2171954>.
- Dolan, Kerry A., Chase Peterson-Withorn, and Jennifer Wang, eds., “The *Forbes* 400: The Definitive Ranking of the Wealthiest Americans in 2021,” *Forbes* (October 5, 2021), www.forbes.com/forbes-400/.
- Falk, Justin, and Nadia S. Karamcheva. 2022. “The Impact of an Employer Match and Automatic Enrollment on the Savings Behavior of Public-Sector Workers,” *Journal of Pension Economics and Finance*, pp. 1–31, <https://doi.org/10.1017/S1474747221000366>.
- Holden, Karen C., and Sean Nicholson. 1998. *Selection of a Joint-and-Survivor Pension*, Discussion Paper 1175-98 (Institute for Research on Poverty, September 1998), <https://tinyurl.com/Holden1998> (PDF, 29 KB).
- Hou, Wenliang, and Geoffrey T. Sanzenbacher. 2020. *Measuring Racial/Ethnic Retirement Wealth Inequality*, Working Paper 2020-2 (Center for Retirement Research at Boston College, January 2020), <https://tinyurl.com/y44vhj4r>.
- Jacobs, Lindsay, Elizabeth Llanes, Kevin Moore, Jeffrey P. Thompson, and Alice Henriques Volz. 2021. *Wealth Concentration in the United States Using an Expanded Measure of Net Worth*, Working Paper 21-6 (Federal Reserve Bank of Boston Research Department, April 2021), <https://doi.org/10.29412/res.wp.2021.06>.
- Kuan, Kai Yuan, Mark R. Cullen, and Sepideh Modrek. 2015. *Racial Disparities in Savings Behavior for a Continuously Employed Cohort*, Working Paper 20937 (National Bureau of Economic Research, February 2015), www.nber.org/papers/w20937.
- Madowitz, Michael, Anne Price, and Christian E. Weller. 2020. “Public Work Provides Economic Security for Black Families and Communities” (Center for American Progress, October 23, 2020), <https://tinyurl.com/mrxeb2wu>.
- Munnell, Alicia H., Jean-Pierre Aubry, Josh Hurwitz, and Laura D. Quinby. 2011. *Comparing Compensation: State–Local Versus Private Sector Workers*, SLP 20 (Center for Retirement Research at Boston College, September 2011), <https://tinyurl.com/svj2ahr>.

- Munnell, Alicia H., Richard W. Kopcke, Francesca N. Golub-Sass, and Dan Muldoon. 2009. *An Update on 401(k) Plans: Insights From the 2007 Survey of Consumer Finances*, Working Paper 2009-26 (Center for Retirement Research at Boston College, November 2009), <https://tinyurl.com/4t6uwj7t>.
- Munnell, Alicia H., and Mauricio Soto. 2005. *What Replacement Rates Do Households Actually Experience in Retirement?* Working Paper 2005-10 (Center for Retirement Research at Boston College, August 2005), <https://tinyurl.com/4vjnx47b>.
- Novy-Marx, Robert, and Joshua Rauh. 2011. “Public Pension Promises: How Big Are They and What Are They Worth?” *Journal of Finance*, vol. 66, no. 4 (July 2011), pp. 1211–1249, <https://doi.org/10.1111/j.1540-6261.2011.01664.x>.
- Oaxaca, Ronald 1973. “Male–Female Wage Differentials in Urban Labor Markets.” *International Economic Review*, vol. 14, no. 3 (October 1973), pp. 693–709, <https://doi.org/10.2307/2525981>.
- Purcell, Patrick J. 2012. “Income Replacement Ratios in the Health and Retirement Study,” *Social Security Bulletin*, vol. 72, no. 3, <https://tinyurl.com/ycye9hze>.
- Sabelhaus, John, and Alice Henriques Volz. 2019. “Are Disappearing Employer Pensions Contributing to Rising Wealth Inequality?” FEDS Notes (Board of Governors of the Federal Reserve System, February 1, 2019), <https://doi.org/10.17016/2380-7172.2308>.
- . 2022. “Social Security Wealth, Inequality, and Life-Cycle Saving,” in Raj Chetty, John N. Friedman, Janet C. Gornick, Barry Johnson, and Arthur Kennickell, eds., *Measuring Distribution and Mobility of Income and Wealth* (University of Chicago Press, 2022), <https://tinyurl.com/54e7zfyz>.
- Saez, Emmanuel, and Gabriel Zucman. 2016. “Wealth Inequality in the United States Since 1913: Evidence From Capitalized Income Tax Data.” *Quarterly Journal of Economics*, vol. 131, no. 2 (May 2016), pp. 519–578, <https://doi.org/10.1093/qje/qjw004>.
- Smith, Matthew, Owen M. Zidar, and Eric Zwick. 2021. *Top Wealth in America: New Estimates and Implications for Taxing the Rich*, Working Paper 29374 (National Bureau of Economic Research, October 2021), www.nber.org/papers/w29374.
- Starr-McCluer, Martha, and Annika Sundén. 1999. *Workers’ Knowledge of Their Pension Coverage: A Reevaluation*, Finance and Economics Discussion Series Paper (Board of Governors of the Federal Reserve System, January 1999), <https://tinyurl.com/32z8zks8>.
- Stefanescu, Irina, and Ivan Vidangos. 2014. “Introducing Actuarial Liabilities and Funding Status of Defined-Benefit Pensions in the U.S. Financial Accounts,” FEDS Notes (Board of Governors of the Federal Reserve System, October 31, 2014), <https://tinyurl.com/2p9y3kfv>.

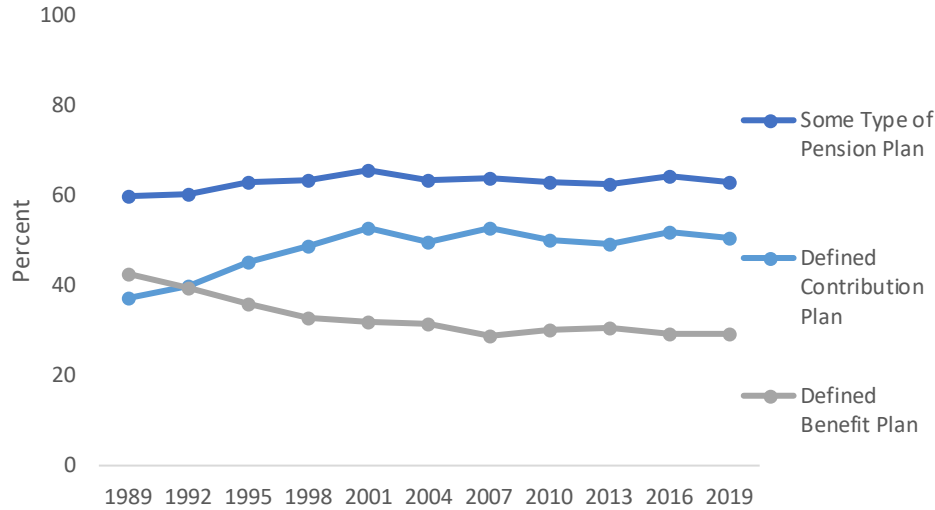
- Thompson, Jeffrey P., and Alice Henriques Volz. 2021. “A New Look at Racial Disparities Using a More Comprehensive Wealth Measure,” *Current Policy Perspectives*, Federal Reserve Bank of Boston (August 16, 2021), <https://tinyurl.com/4dhae6r5>.
- Vanguard. 2022. “How America Saves, 2022,” Valley Forge, PA: Vanguard Institutional Investor Group, <https://tinyurl.com/47mcv5au> (PDF, 4.5 MB).
- Wolff, Edward N. 2015. “U.S. Pensions in the 2000s: The Lost Decade?” *Review of Income and Wealth*, vol. 61 no. 4 (December 2015), pp. 599–629, <https://doi.org/10.1111/roiw.12123>.
- . 2022. “Taxes and the Revaluation of Household Wealth,” *Journal of Pension Economics and Finance*, vol. 21, no. 4 (October 2022), pp. 537–564, <https://doi.org/10.1017/S147474722100024X>.
- Works, Richard. 2016. “Trends in Employer Costs for Defined Benefit Plans,” *Beyond the Numbers: Pay and Benefits*, vol. 5, no. 2 (February 2016), <https://tinyurl.com/mwvwm94xr>.

Figures

Figure 1.

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Households With Pension Coverage, by Type

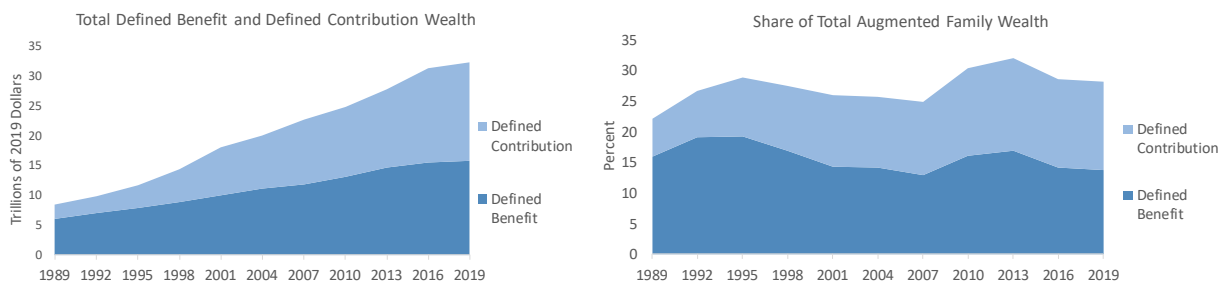


Data source: Authors' calculations, using data from 1989–2019 Survey of Consumer Finances.

Figure 2.

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Holdings of Family Retirement Wealth

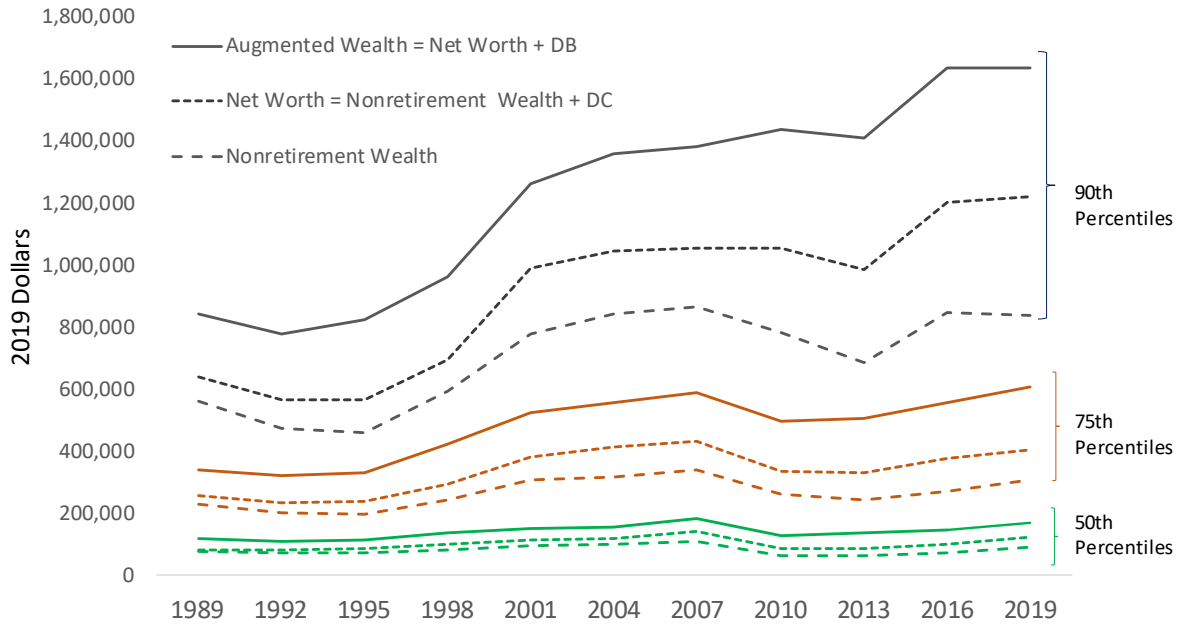


Data source: Authors' calculations, using data from 1989–2019 SCF.

Data on total defined benefit wealth is derived from the Financial Accounts of the United States. Dollar amounts are expressed in 2019 real dollars, adjusted for inflation by using the price index for personal consumption expenditures as calculated by the Bureau of Economic Analysis. We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people.

SCF = Survey of Consumer Finances.

Family Wealth at Select Percentiles, by Type



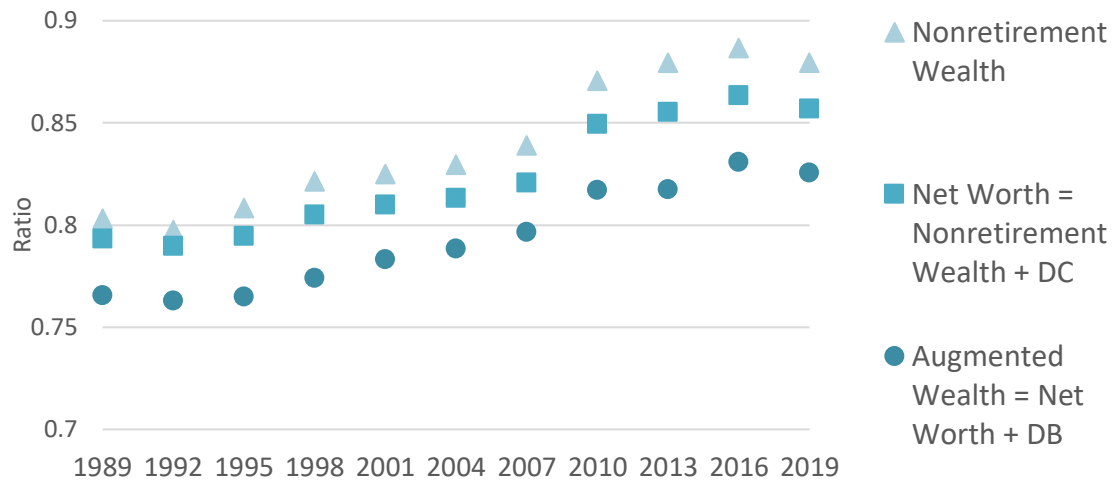
Data source: Authors' calculations, using data from 1989–2019 SCF.

Dollar amounts are expressed in 2019 real dollars, adjusted for inflation by using the price index for personal consumption expenditures as calculated by the Bureau of Economic Analysis. We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people.

Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. Percentiles are based on augmented wealth. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts.

DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Family Wealth Concentration, Gini Coefficient

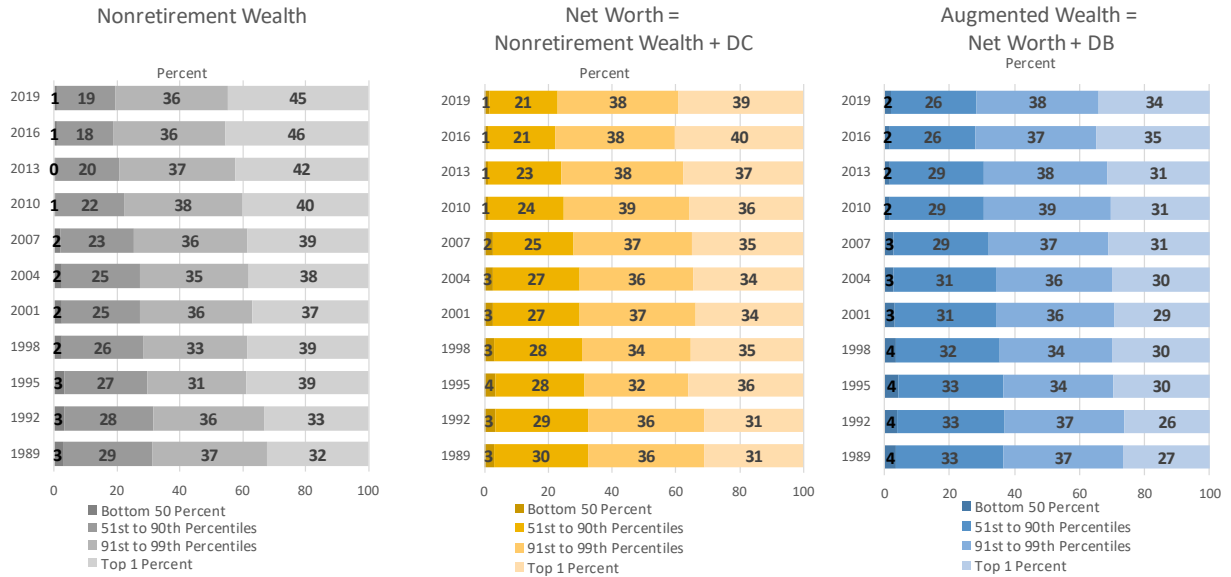


Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. The Gini coefficient is a standard measure of inequality that summarizes an entire distribution of wealth in a number ranging from zero, the most equal distribution, to one, the least equal distribution. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers.

DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Family Wealth Concentration, by Type of Wealth



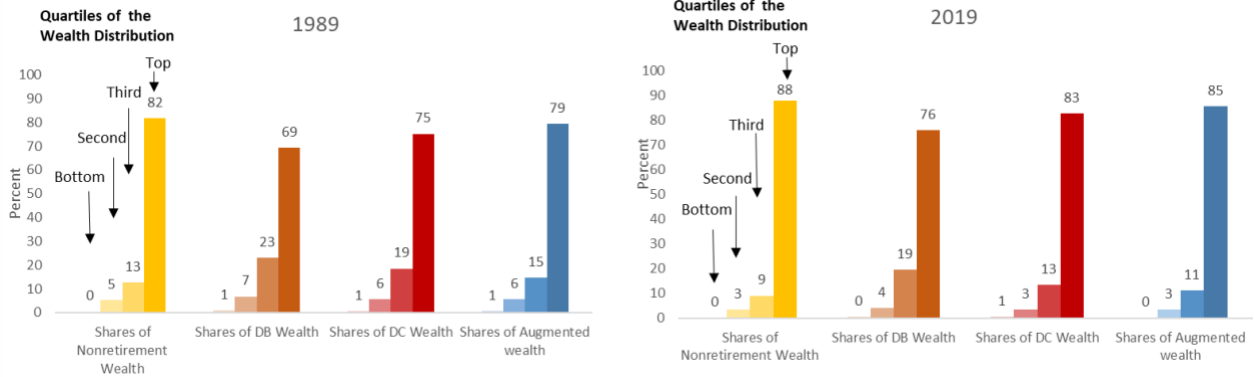
Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. Percentiles are based on augmented wealth.

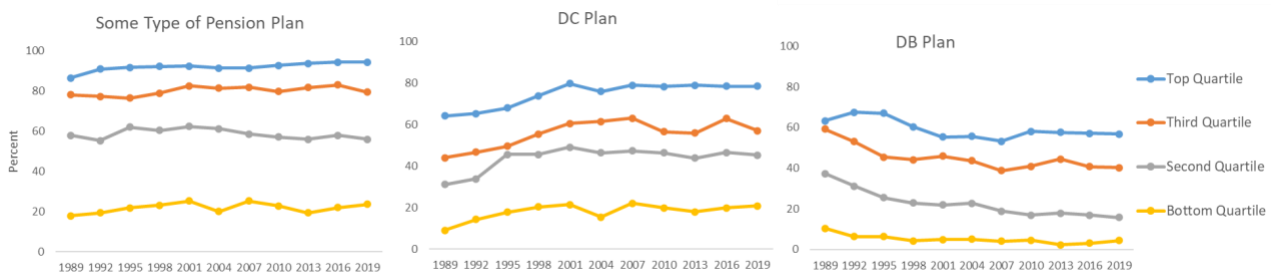
DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Wealth Concentration, by Wealth Quartile

A. Wealth Concentration by Type of Wealth



B. Pension Coverage by Wealth Quartile

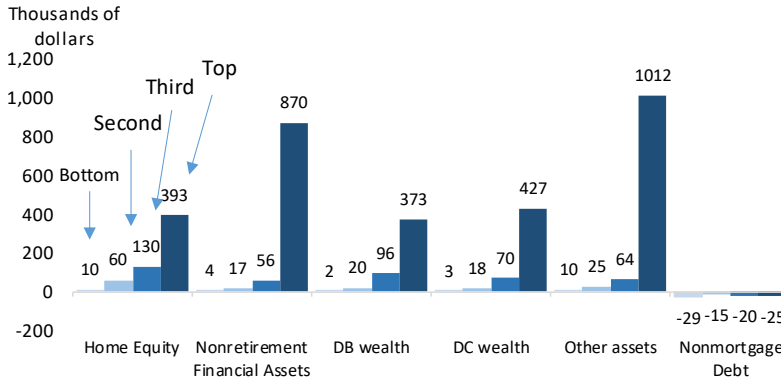


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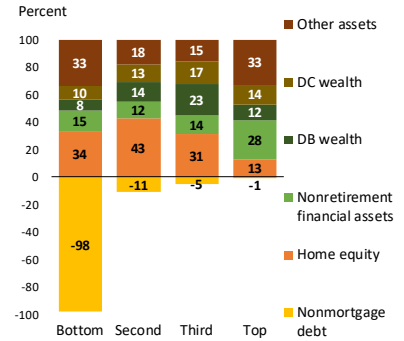
Wealth Concentration, by Wealth Quartile (Continued)

C. Wealth Composition by Wealth Quartile

Average Wealth in 2019 by Category and by Wealth Quartile



Categories of Assets and Debt as a Share of Total Assets in 2019, by Wealth Quartile



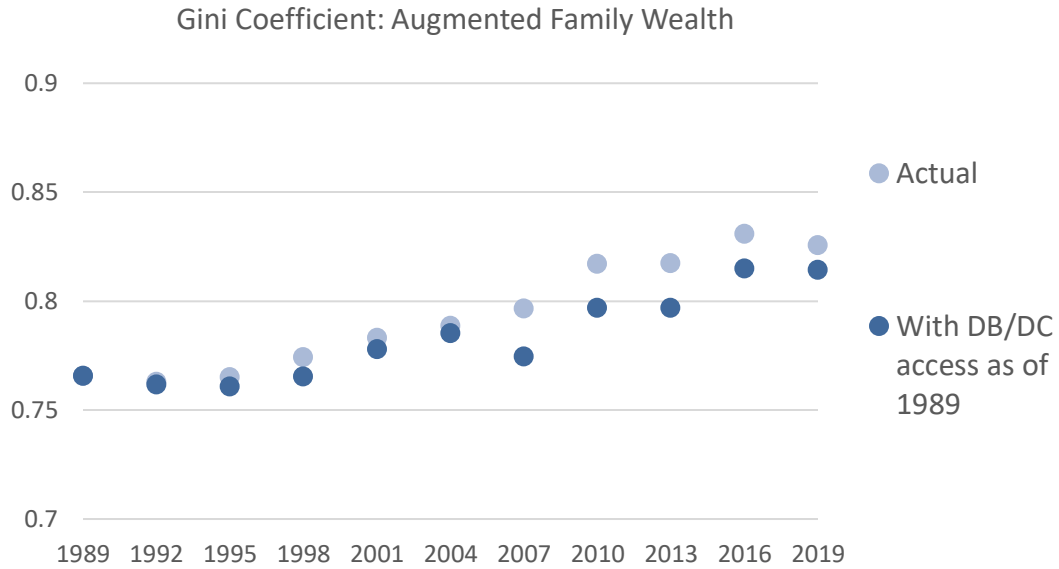
Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Augmented family wealth is a family's nonretirement wealth plus DC wealth plus the accrued value in both spouses' DB accounts through current or past employers. Wealth ranks are based on family augmented wealth that is adjusted for age.

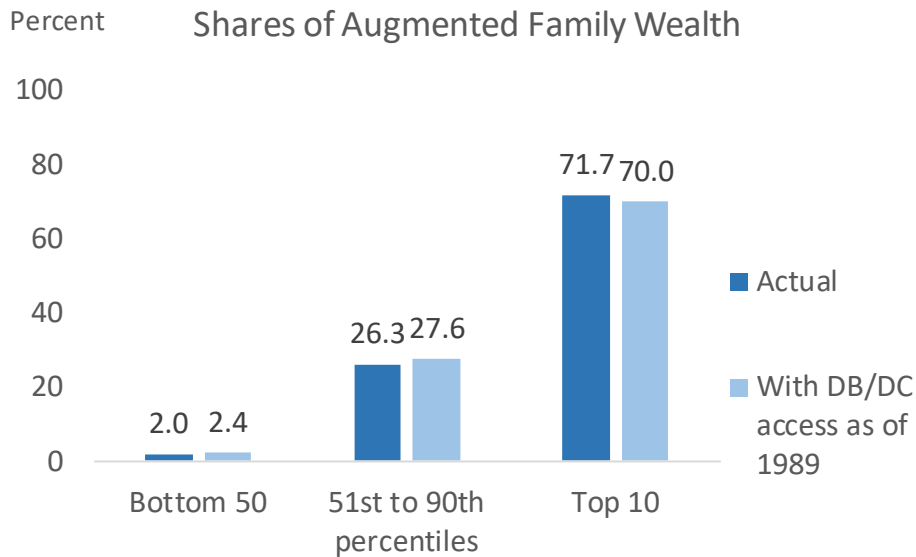
DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Phaseout of Defined Benefit Plans and Wealth Concentration

A. Gini Coefficient



B. Shares of Wealth in 2019



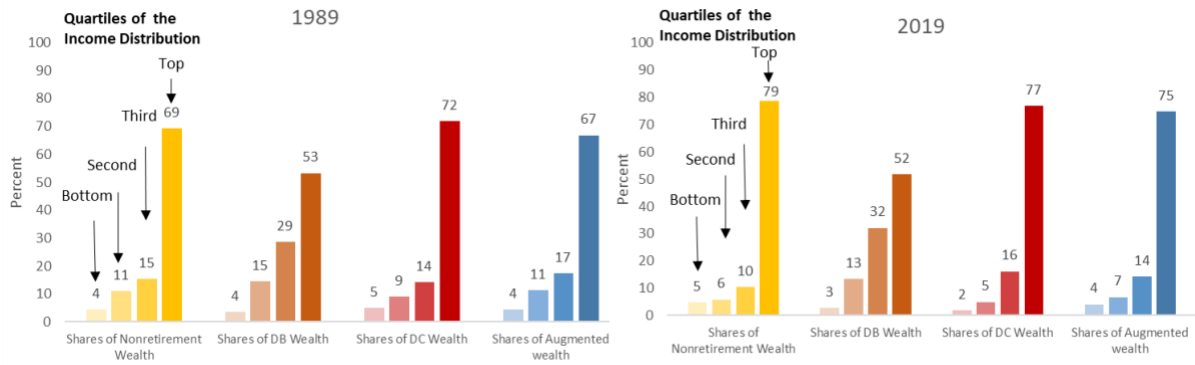
Data source: Authors' calculations, using data from 1989–2019 Survey of Consumer Finances.

Data show counterfactual wealth concentration under constant DB/DC composition. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. Percentiles are based on augmented wealth.

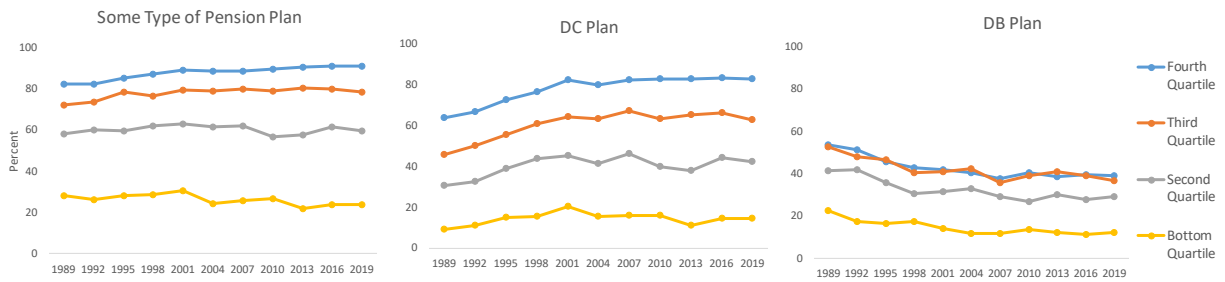
DB = defined benefit; DC = defined contribution.

Wealth Concentration, by Income Quartile

A. Concentration of Wealth Types by Income Quartile



B. Pension Coverage by Income Quartile

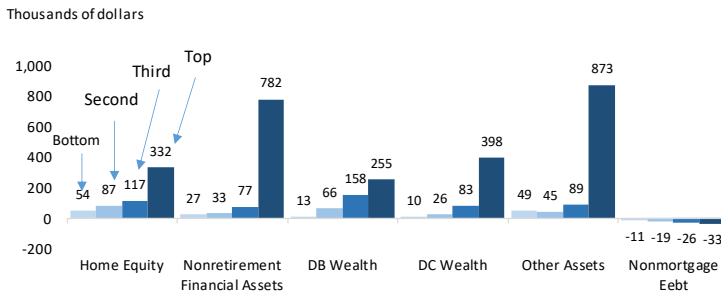


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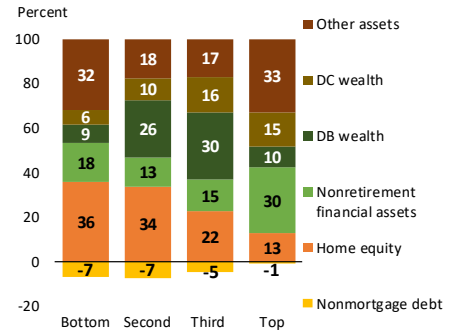
Wealth Concentration, by Income Quartile (Continued)

C. Wealth Composition by Income Quartile

Average Wealth in 2019 by Category and by Income Quartile



Categories of Assets and Debt as a Share of Total Assets in 2019, by Income Quartile



Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. Income ranks are based on family income adjusted for age and family size.

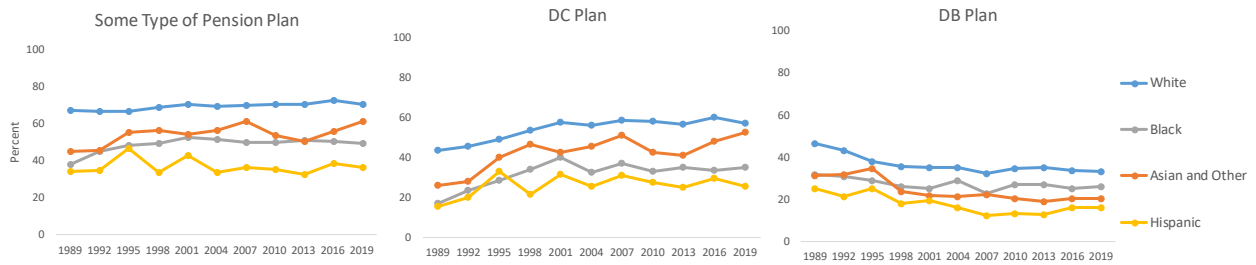
DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Wealth Distribution, by Race and Ethnicity

A. Wealth Gap by Race and Ethnicity

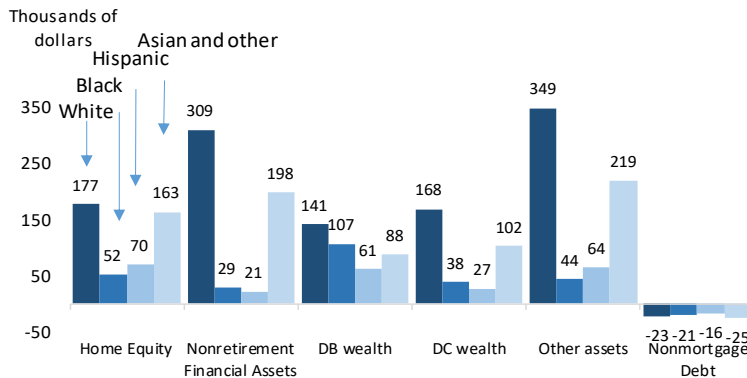


B. Pension Coverage

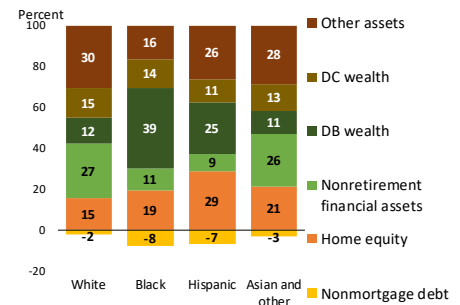


C. Wealth Composition

Average Wealth in 2019 by Category and by Race and Ethnicity



Categories of Assets and Debt as a Share of Total Assets in 2019, by Race and Ethnicity



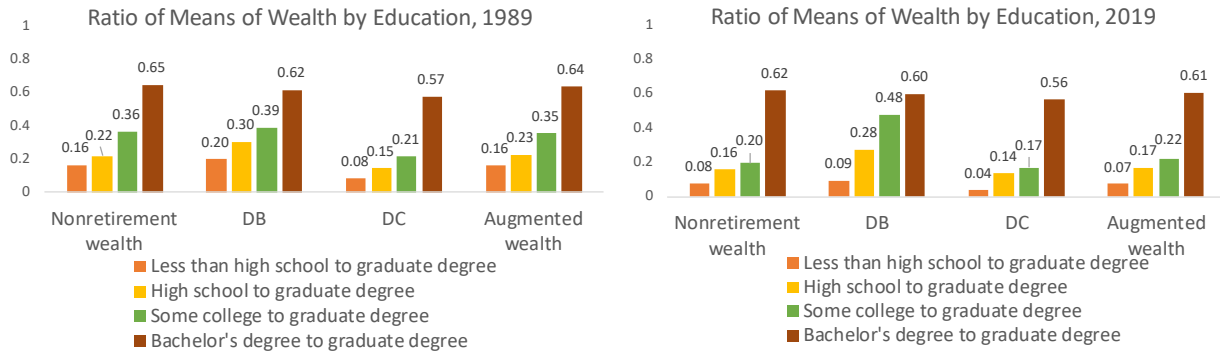
Data source: Authors' calculations, using data from 1989–2019 SCF.

The SCF collects race and ethnicity information only on the respondent, so couples are classified here according to respondents' race and ethnicity.

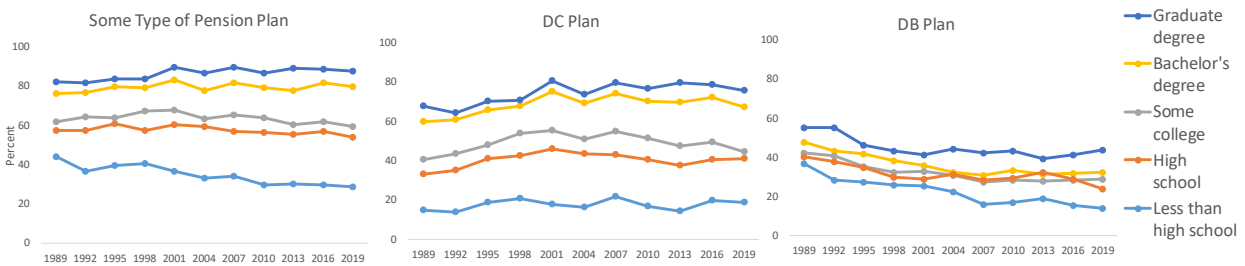
DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Wealth Distribution, by Education

A. Wealth Gap by Education

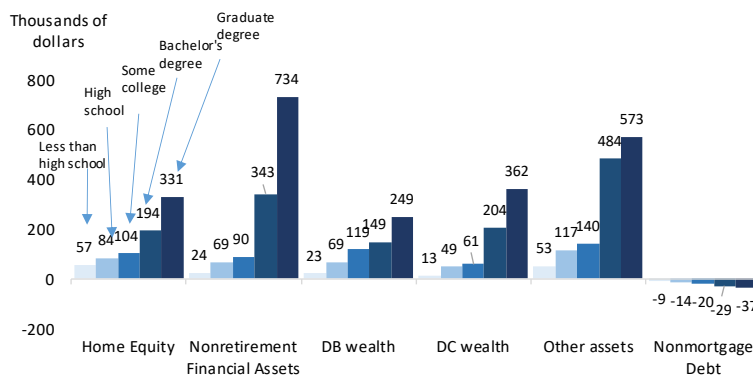


B. Pension Coverage

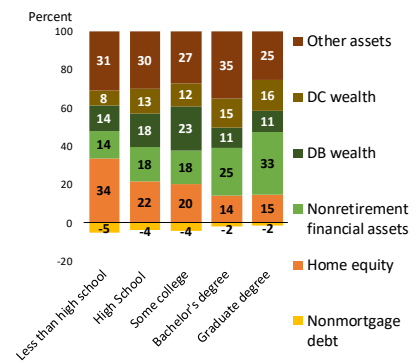


C. Wealth Composition

Average Wealth in 2019 by Category and by Education



Categories of Assets and Debt as a Share of Total Assets in 2019, by Education



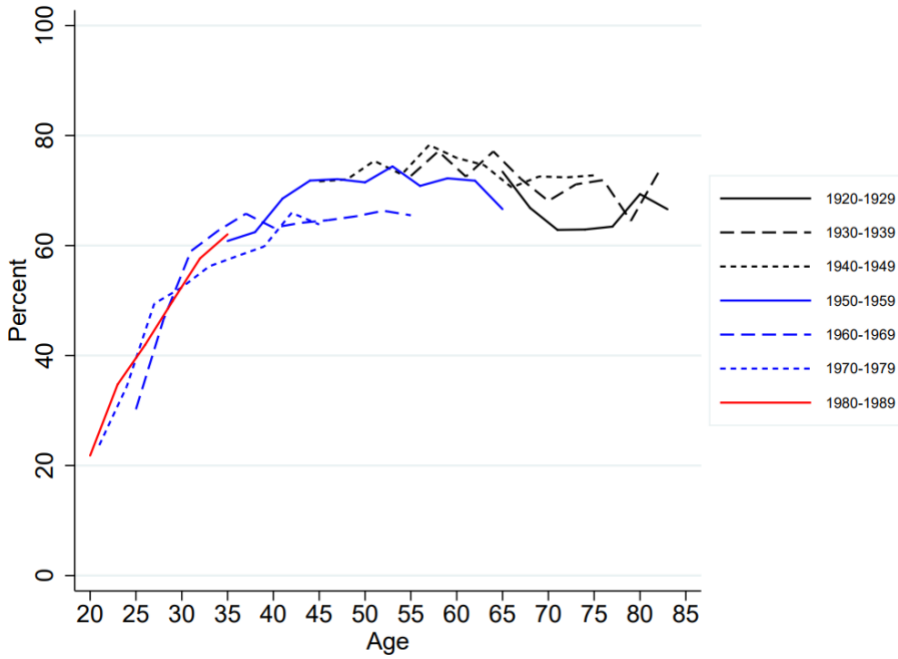
Data source: Authors' calculations, using data from 1989–2019 Survey of Consumer Finances.

Families are classified according to the reference person's education level.

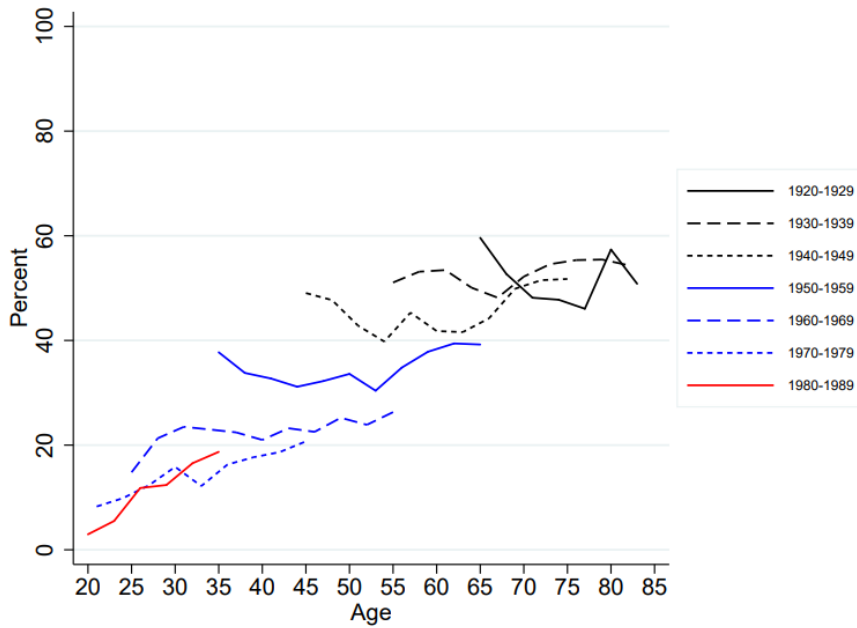
DB = defined benefit; DC = defined contribution.

Pension Coverage, by Cohort

A. Some Type of Pension Plan



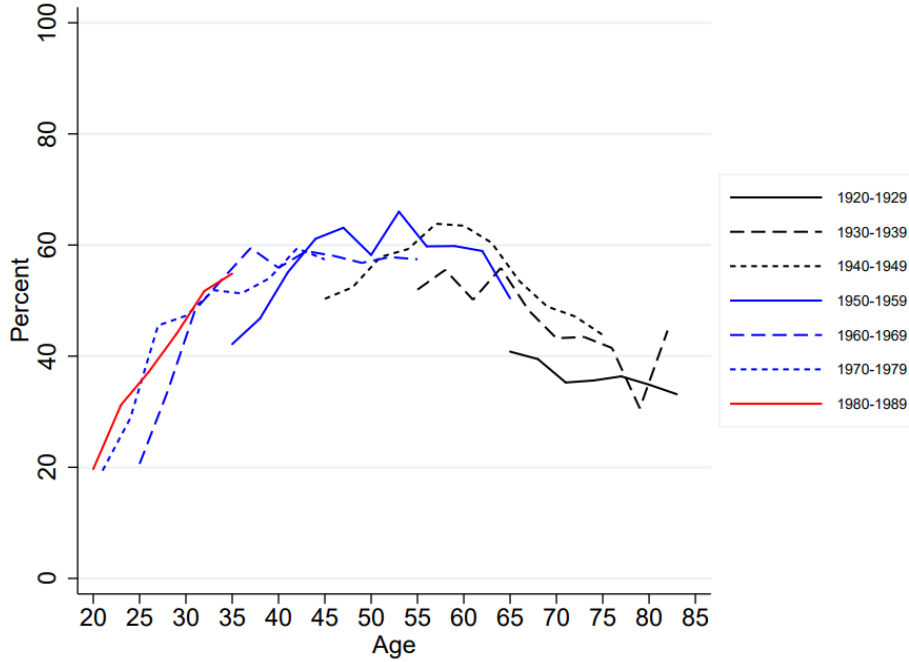
B. DB plan



Continued

Pension Coverage, by Cohort (Continued)

C. DC plan



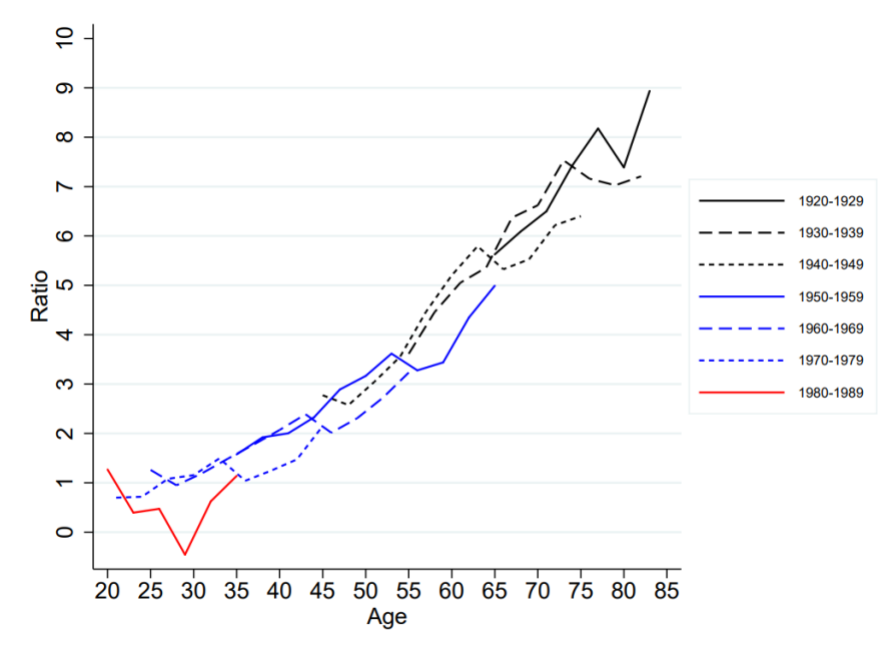
Data source: Authors' calculations, using data from 1989–2019 SCF.

DB coverage is defined as either the respondent or the spouse's having a DB plan from a current or past job. DC coverage is defined as either the respondent or the spouse's having a DC-type account, including individual retirement accounts. Having pension coverage is defined as the respondent or spouse's having DB coverage, DC coverage, or both. Each data point reflects an SCF wave, and data points are positioned at the average age of the cohort in that calendar year.

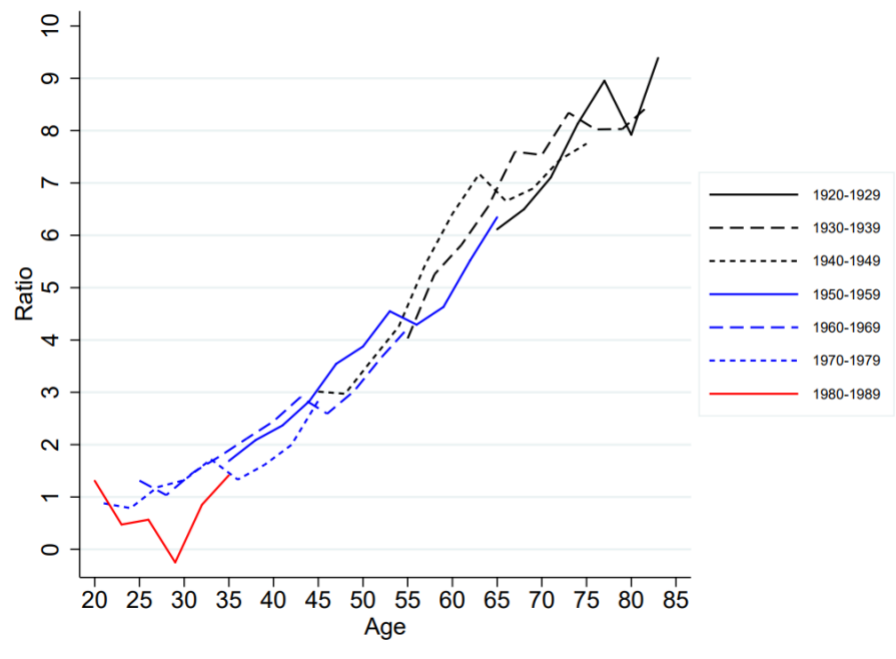
DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Wealth-to-Income Ratios, by Cohort

A. Average Ratios of Nonretirement Wealth to Income



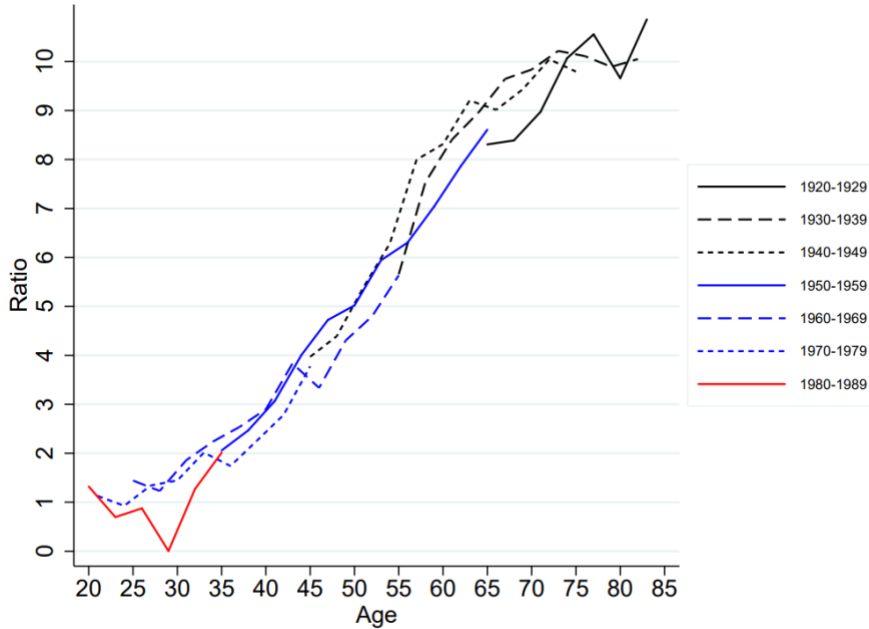
B. Average Ratios of Net Worth to Income



Continued

Wealth-to-Income Ratios, by Cohort (Continued)

C. Average Ratios of Augmented Wealth to Income

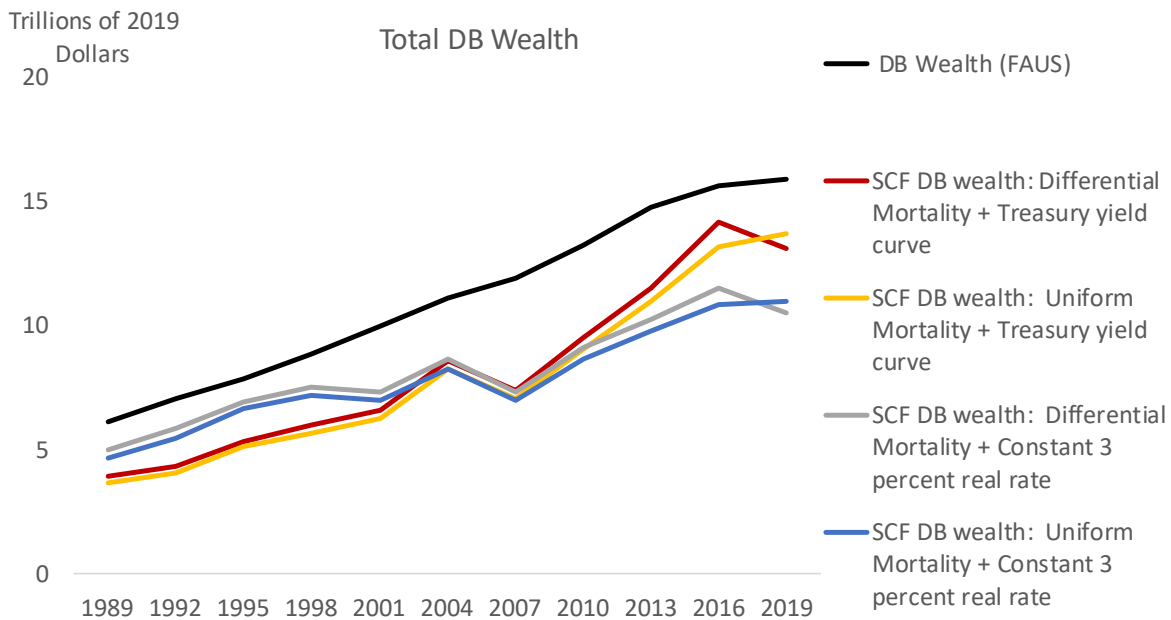
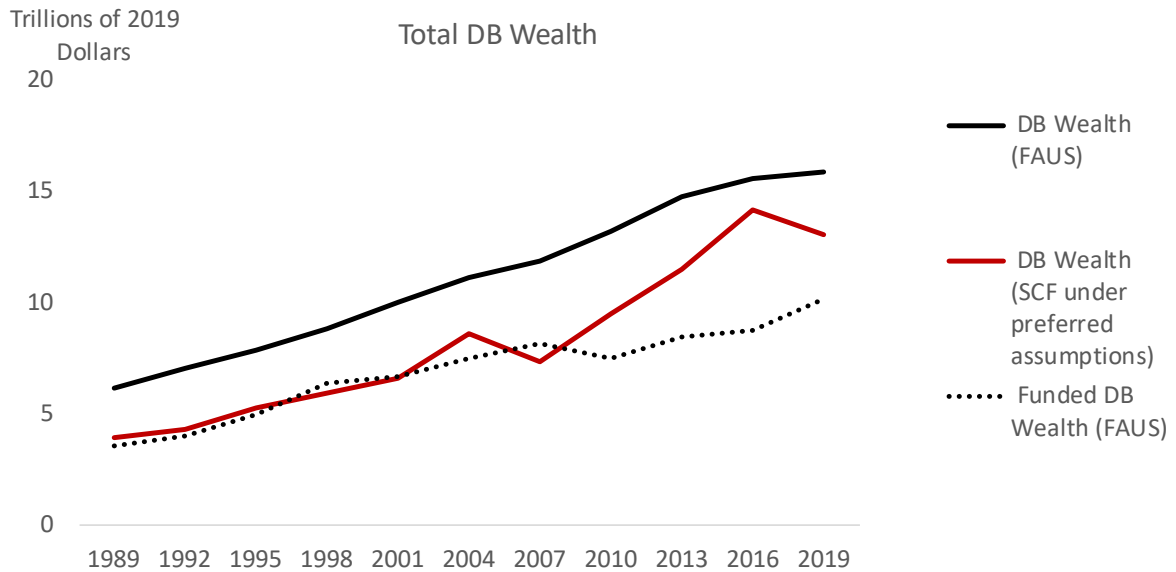


Data source: Authors' calculations, using data from 1989–2019 SCF.

Each data point reflects an SCF wave, and data points are positioned at the average age of the cohort in that calendar year. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. Nonretirement wealth, net worth, augmented wealth, and income are adjusted for family size by dividing by the square root of the number of people in the family. To minimize the effect of outliers, the observations with ratios in the top 1 percent of the distribution are excluded from the calculation of the averages. The sudden decline in wealth of most cohorts reflects losses in wealth during the 2007–2009 recession.

DB = defined benefit; DC = defined contribution; SCF = Survey of Consumer Finances.

Total Defined Benefit Wealth Under Other Modeling Choices

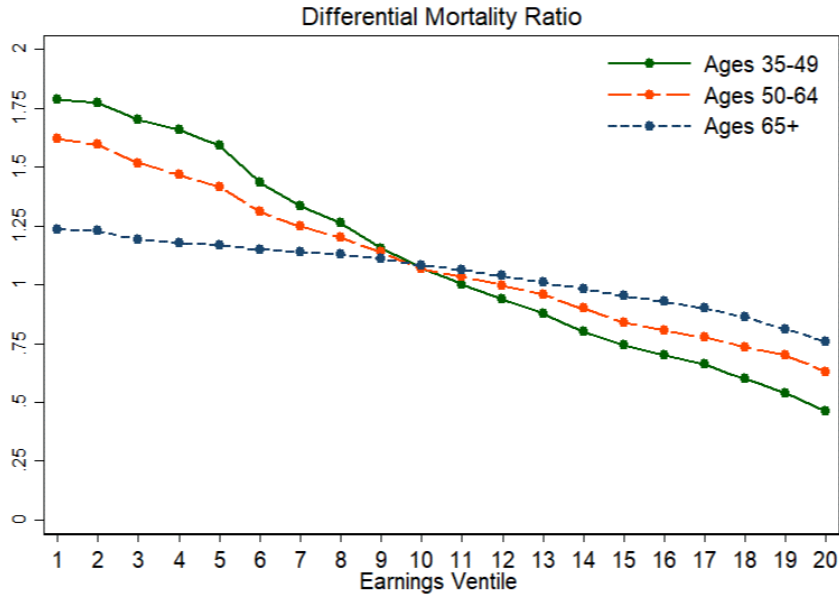


Data source: Authors' calculations, using data from 1989–2019 SCF and from the FAUS. Data released June 19, 2020, and downloaded July 22, 2020.

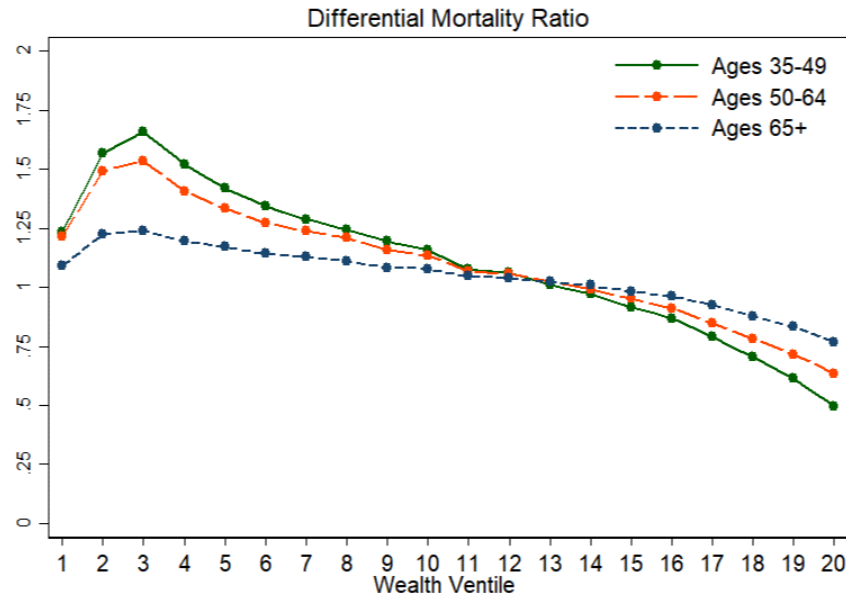
DB = defined benefit; DC = defined contribution; FAUS = Financial Accounts of the United States; SCF = Survey of Consumer Finances.

Estimated Differential Mortality Rates

A. By Family Earnings



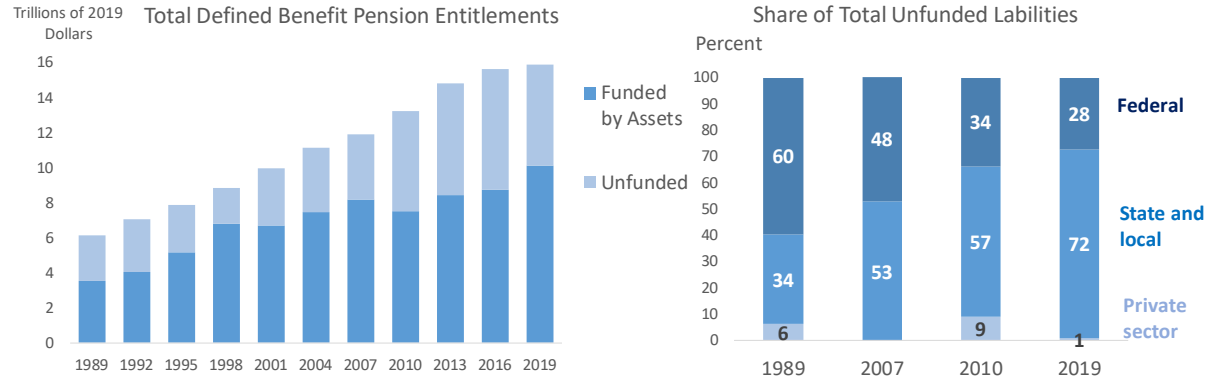
B. By Family Wealth



Data source: Authors' calculations, using data from 1989–2019 Survey of Consumer Finances and differential mortality estimates from Cristia (2007).

In each earnings or wealth ventile, the ratio equals the differential mortality rate divided by the uniform mortality rate. Uniform mortality rates vary by sex and birth cohort. By contrast, the differential mortality rates control for race and ethnicity, education, marital status, and earnings quintiles in addition to sex and birth cohort.

Underfunding of Defined Benefit Plans

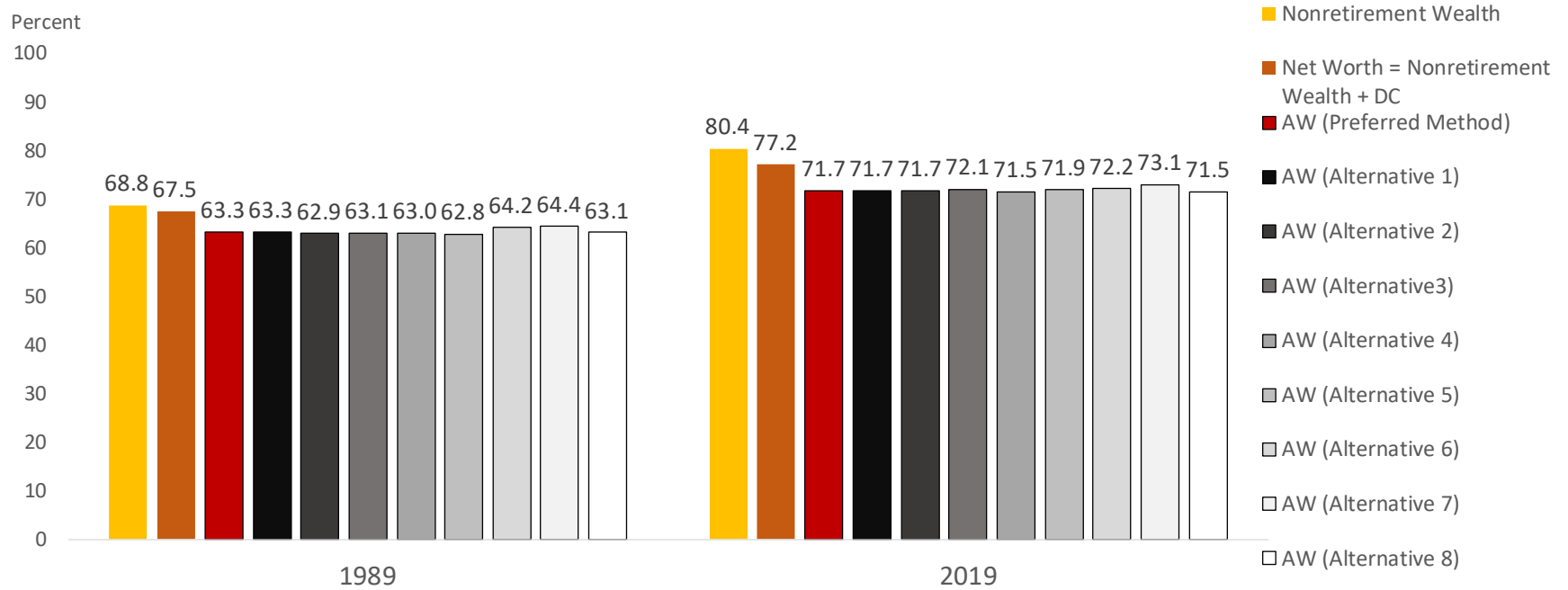


Data source: Authors' calculations, using data from the Financial Accounts of the United States. Data released June 19, 2020, and downloaded July 22, 2020.

Dollar amounts are expressed in 2019 real dollars, adjusted for inflation by using the price index for personal consumption expenditures as calculated by the Bureau of Economic Analysis.

Wealth Concentration's Sensitivity to Modeling Choices

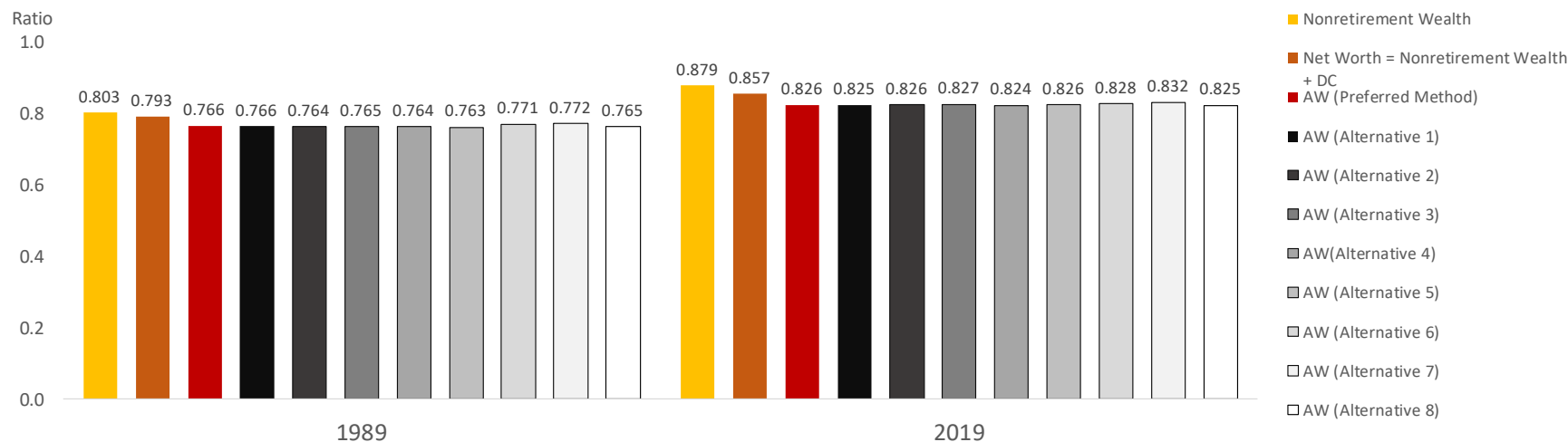
A. Share of Wealth Held by Top 10 Percent of Distribution



Continued

Wealth Concentration's Sensitivity to Modeling Choices (Continued)

B. Gini Coefficient



Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers. The Gini coefficient is a standard measure of inequality that summarizes an entire wealth distribution in a number ranging from zero, the most equal distribution, to one, the least equal distribution.

Alternative Model	Method	Aggregation	Mortality (Ref.)	Discount Rate	Underfunding Risk Adjustment
Preferred method	Prorated	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	Yes
1	Prorated	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
2	Formula	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
3	Prorated	FAUS DB	Differential (Cristia 2007)	Constant 3 percent real rate	No
4	Prorated	FAUS DB	Uniform	Treasury yield curve	No
5	Prorated	FAUS DB	Uniform	Constant 3 percent real rate	No
6	Prorated	None	Differential (Cristia 2007)	Treasury yield curve	No
7	Prorated	Only funded portion of FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
8	Prorated	FAUS DB	Differential (Brown, Liebman, and Pollet 2002)	Treasury yield curve	No

AW = augmented wealth; DB = defined benefit; DC = defined contribution; FAUS = Financial Accounts of the United States; SCF = Survey of Consumer Finances.

Table

Table 1.

[\[Return to Text\]](#)

Percentiles of Augmented Wealth Under Other Modeling Choices

Thousands of 2019 Dollars										
Augmented Family Wealth Under Various DB Methodological Assumptions										
	Preferred Method	AW (Alternative 1)	AW (Alternative 2)	AW (Alternative 3)	AW (Alternative 4)	AW (Alternative 5)	AW (Alternative 6)	AW (Alternative 7)	AW (Alternative 8)	
Median										
1989	\$120	\$121	\$122	\$122	\$123	\$123	\$112	\$110	\$122	
2010	\$128	\$129	\$128	\$129	\$130	\$129	\$123	\$119	\$129	
2019	\$169	\$169	\$167	\$167	\$171	\$168	\$166	\$160	\$170	
75th Percentile										
1989	\$351	\$351	\$351	\$351	\$354	\$355	\$327	\$324	\$354	
2010	\$510	\$512	\$506	\$511	\$517	\$517	\$478	\$455	\$515	
2019	\$601	\$602	\$601	\$592	\$614	\$604	\$583	\$549	\$609	
90th Percentile										
1989	\$876	\$878	\$889	\$867	\$867	\$862	\$792	\$776	\$873	
2010	\$1,486	\$1,490	\$1,457	\$1,483	\$1,482	\$1,479	\$1,377	\$1,316	\$1,480	
2019	\$1,641	\$1,646	\$1,671	\$1,652	\$1,644	\$1,660	\$1,565	\$1,461	\$1,639	

Data source: Authors' calculations, using data from 1989–2019 SCF.

We supplement the SCF with data from *Forbes* magazine's list of the nation's 400 richest people. Nonretirement wealth is total family wealth (or net worth) outside retirement assets such as DB or DC accounts. Net worth is a family's marketable assets minus that family's debt. By definition, net worth includes assets in DC accounts. Augmented family wealth is a family's net worth plus the accrued value in both spouses' DB accounts through current and past employers.

Alternative Model	Method	Aggregation	Mortality (Ref).	Discount Rate	Underfunding Risk Adjustment
Preferred method	Prorated	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	Yes
1	Prorated	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
2	Formula	FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
3	Prorated	FAUS DB	Differential (Cristia 2007)	Constant 3 percent real rate	No
4	Prorated	FAUS DB	Uniform	Treasury yield curve	No
5	Prorated	FAUS DB	Uniform	Constant 3 percent real rate	No
6	Prorated	None	Differential (Cristia 2007)	Treasury yield curve	No
7	Prorated	Only funded portion of FAUS DB	Differential (Cristia 2007)	Treasury yield curve	No
8	Prorated	FAUS DB	Differential (Brown, Liebman, and Pollet 2002)	Treasury yield curve	No

AW = augmented wealth; DB = defined benefit; DC = defined contribution; FAUS = Financial Accounts of the United States; SCF = Survey of Consumer Finances.