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Articles

- 1** **The Importance of Social Security Benefits to the Income of the Aged Population**
by Irena Dushi, Howard M. Iams, and Brad Trenkamp

Social Security benefits are the most important source of U.S. retirement income. Over time, however, trends in employer-provided pension offerings, societal changes, and Social Security program rule changes have altered the distribution of income by source among the aged population. In this article, the authors examine the reliance on Social Security benefits of people aged 65 or older using data from the Current Population Survey, the Survey of Income and Program Participation, and the Health and Retirement Study.

- 13** **Contributory Retirement Saving Plans: Differences Across Earnings Groups and Implications for Retirement Security**

by Irena Dushi, Howard M. Iams, and Christopher R. Tamborini

This article examines how savings in defined contribution (DC) retirement plans vary across the earnings distribution. Specifically, the authors investigate the extent of an earnings gradient in access to, participation in, and levels of contribution to DC plans. Using a nationally representative sample of Survey of Income and Program Participation respondents linked to data from their W-2 tax records, the authors find that DC plan access, participation, and contributions increase as earnings increase, even after controlling for key socioeconomic and labor-market covariates. They also find that, despite changing economic conditions, the earnings gradient changed little between 2006 and 2012.

THE IMPORTANCE OF SOCIAL SECURITY BENEFITS TO THE INCOME OF THE AGED POPULATION

by Irena Dushi, Howard M. Iams, and Brad Trenkamp*

Social Security benefits are the most important source of U.S. retirement income. Over time, however, trends in employer-provided pension offerings, societal changes, and Social Security program rule changes have altered the distribution of income by source among the aged population. Some researchers have argued that the Current Population Survey (CPS) does not properly measure income from retirement accounts and thus overstates reliance on Social Security income. To address such concerns, the Census Bureau revised income-related questions for the 2015 CPS. This note examines reliance on Social Security benefits among people aged 65 or older as measured by the 2015 CPS and two other major surveys. All three surveys report that roughly half of the aged population live in households that receive at least 50 percent of total family income from Social Security and about one-quarter of the aged live in households that receive at least 90 percent of family income from Social Security.

Introduction

The traditional major sources of retirement income in the United States—often called the three-legged stool or the three pillars—are Social Security benefits, employer-provided pensions (including retirement accounts), and income from assets or savings. Social Security is a social insurance program that provides an inflation-indexed lifetime annuity to aged beneficiaries. In addition to enjoying the protection provided by indexing, a prospective beneficiary who delays claiming Social Security benefits essentially purchases additional longevity insurance—reducing the risk of “running out of savings”—by raising his or her lifetime monthly benefit (Shu, Payne, and Sagara 2014; Shoven and Slavov 2012). Many observers regard Social Security benefits as the base of retirement income, particularly because benefits are a steady and reliable resource for almost all aged households (Brady, Burham, and Holden 2012; American Council of Life Insurers, American Benefits Council, and Investment Company Institute 2013; Poterba 2014). Because Social Security benefits represent a substantial portion of the income of

Americans aged 65 or older (Social Security Administration [SSA] 2002, 2012, 2014, 2016a, 2016b), accurate measurements of that portion are important to researchers and policymakers (Banerjee 2013; Employee Benefit Research Institute 2013; Miller and Schieber 2013, 2014). Using data from the Current Population Survey (CPS), SSA estimates that in 2014, about 84 percent of people aged 65 or older received Social Security benefits; and among those in the bottom 40 percent of the income distribution, benefits accounted for an average of around 84 percent of total income (SSA 2016b).

Selected Abbreviations

CPS	Current Population Survey
DC	defined contribution
FRA	full retirement age
HRS	Health and Retirement Study
IRA	individual retirement account
SIPP	Survey of Income and Program Participation
SSA	Social Security Administration

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Some analysts have criticized the use of CPS data to underlie such estimates. Research has suggested that the CPS does not adequately measure income from certain sources—in particular, income from retirement accounts, such as individual retirement accounts (IRAs) or defined contribution (DC) plans (Miller and Schieber 2014). Specifically, researchers have argued that estimates based on CPS data were likely to overstate older Americans’ reliance on Social Security benefits and to understate their reliance on income from retirement accounts, particularly among lower-income respondents. In response, the Census Bureau changed the income questions in the 2015 CPS, aiming to account more accurately for income drawn from retirement accounts. In addition, trends in recent decades in employer-provided pension offerings, societal changes, and Social Security program rule changes may have affected the relative importance of different income sources for older Americans, particularly that of Social Security. Thus, it is important for policymakers to have an accurate picture of the composition of retirement income so that any proposed changes to Social Security may better address the needs of the aged.

This article assesses the extent to which Americans aged 65 or older rely on Social Security benefits. We use data from the 2015 CPS, which incorporates the revised income questions and may therefore provide more accurate results than were provided in previous survey years. We compare 2015 CPS results with those from the 2013 CPS to assess the effect of the survey revisions. We also attempt to validate the 2015 CPS results by comparing them with those from the 2008 panel of the Survey of Income and Program Participation (SIPP) and the 2012 wave of the Health and Retirement Study (HRS). Unlike CPS results on Social Security benefit income, which are based solely on the survey reports, data from the latter two surveys can be augmented with verifiably accurate information from Social Security administrative records, which contain data on Social Security benefits that respondents received in a given year. In addition, the latter two surveys provide (or allow us to calculate) information on income from retirement accounts.

To examine the extent to which persons aged 65 or older rely on Social Security, we estimate the proportions of aged Americans for whom Social Security benefits account for (1) at least 50 percent and (2) at least 90 percent of their family income.¹ Interestingly, the estimates are quite similar, despite design differences across the three surveys. We find that about half

of the population aged 65 or older live in households that receive at least 50 percent of their family income from Social Security benefits and about 25 percent of aged households rely on Social Security benefits for at least 90 percent of their family income.

In the next three sections, we discuss findings from previous research, explore possible reasons for changes in recent decades in the relative importance of certain income sources for the aged, and describe the data and methods we use. In the final two sections, we present our findings and conclude with a discussion of policy implications.

Previous Research

SSA has published statistics on the income of the aged population based on CPS data since the 1970s. From 1976 through 2006, about 90 percent of people aged 65 or older lived in households receiving income from Social Security.² Over that period, the average share of income from Social Security was always substantial (between 66 percent and 84 percent in any given year), particularly for households in the bottom half of the income distribution. Poterba (2014, Table 6), using data from the 2013 CPS, also finds wide variation across total-income quartiles in the distribution of income by source for individuals aged 65 or older.

Using data from the redesigned March 2015 CPS, the Federal Interagency Forum on Aging-Related Statistics (2016, Table 9a) reports the percentage distribution of per capita 2014 family income by source, overall and in each total-income quintile for persons aged 65 or older.³ Social Security benefits were the primary income source, accounting for an average of about 49 percent of total family income for aged individuals. Combined income from annuities and pensions (including distributions from retirement accounts) amounted to 16 percent of family income, and income from assets accounted for 6 percent. Beyond the three traditional pillars, earnings—now often considered a fourth pillar of retirement security—accounted for about 24 percent of family income, reflecting an increase in continued employment among the aged or the presence of younger workers in the family, or perhaps both. Public assistance and “other” sources respectively accounted for 2 percent and 3 percent of per capita family income of the aged population.

The table also shows wide variation in income distribution by source across family-income quintiles. Social Security benefits in 2014 accounted for between 54 percent and 72 percent of family income

in the three lowest income quintiles, compared with 18 percent to 34 percent of family income in the two highest quintiles. Furthermore, for aged individuals in the lowest two income quintiles, the share of family income received from private and public pensions was trivial (less than 8 percent), compared with around 25 percent for those in the highest two income quintiles. Similarly, the share of income from earnings was less than 14 percent among aged individuals in the lowest two income quintiles; but for those in the highest income quintile, it was much more important (40 percent). In addition, assets were a minor source of income for aged individuals in all income quintiles except the highest, for whose members they provided on average 13 percent of income. Together, those findings show that aged individuals in the lower income quintiles rely much more on Social Security benefits than their counterparts in the highest quintile do and that pensions, earnings, and assets are not very important income sources for aged persons with lower incomes.

Changes in Retirement Income by Source

The share of income from Social Security among persons aged 65 or older may have changed over time because of trends in pension offerings, societal changes, and program rule changes. We examine each factor in turn.

Pension Offerings

Employer-provided pensions are an important source of U.S. retirement income (Hardy and Shuey 2000; Herd 2009; O’Rand 2011; Poterba 2014; Shuey and O’Rand 2004; Warner, Hayward, and Hardy 2010). Over the last three decades, the dominant pension offering changed dramatically, from the defined benefit (DB) type to the DC type (Costo 2006; Mackenzie 2010; Wiatrowski 2012; Anguelov, Iams, and Purcell 2012). In DB plans, employees are enrolled automatically, and employers fund most or all of the pension plan. Employers also bear the capital-market and longevity risks related to providing income (in the form of an annuity) to retired workers. Because DB plans lack portability of pension accruals across jobs, they are risky for workers with high job turnover. DC plans are more attractive to those workers because DC accrued account balances are portable. However, DC plan participation is voluntary and employees bear all the investment risks.⁴ In addition, their account balances—and consequently the income such accounts generate in retirement—depend not only on the

amounts contributed over time, but also on whether those contributions were subject to earnings and employment shocks during the working years (Dushi and Iams 2015). As Johnson (2016, 63) observes of DC pensions: “These do-it-yourself retirement plans can generate substantial retirement income only if workers choose to make significant contributions to their accounts each pay period, resist the temptation to dip into their accounts before they retire, and manage funds wisely after they retire.”

Predictably, the changing landscape of pension offerings led to a dramatic shift in aggregate asset holdings from traditional DB plans toward tax-advantaged DC plans or IRAs. In 1981, Americans held \$673 billion in DB plan assets, \$174 billion in DC plan assets, and \$38 billion in IRAs. By 2014, traditional retirement plans held \$8.0 trillion in assets, DC retirement plans held \$6.3 trillion, and IRAs held \$7.4 trillion (Federal Interagency Forum on Aging-Related Statistics 2016, Table 11c). Notably, most IRA assets reflect transfers from tax-advantaged DC retirement plans (Holden and Schrass 2016).

Despite the growth in recent decades in aggregate retirement assets and holdings, estimates based on CPS data show that the percentage of income received from public and private pensions (including IRAs) among aged units (single persons aged 65 or older or couples with at least one member aged 65 or older) increased from 18 percent in 2000 to 21 percent in 2014. Over the same period, the share of their total income attributed to assets decreased from 18 percent to 10 percent (SSA 2002, Table 7.1; 2016b, Table 10.1); interest rate changes over that span may have contributed to the latter trend.

Although the above-noted changes in income by source seem muted, the outlook for future retirees seems uncertain as studies continue to document low retirement savings among American workers (Munnell 2014; Ghilarducci 2014; Knoll, Tamborini, and Whitman 2012). Estimates based on the 2013 Survey of Consumer Finances, for example, indicate that 41 percent of American households headed by individuals aged 55–64 have no savings in retirement accounts. Even more striking is the sharp variation by household income. Among households headed by individuals aged 55–64, the proportion with any retirement savings ranges from 9 percent in the lowest income quintile to 68 percent in the middle quintile and to 94 percent in the top income quintile. Among the 59 percent of households that have some retirement savings, the median amount saved is about

\$104,000, and one-quarter of those households have saved less than \$26,000 (Government Accountability Office 2015, Tables 1–3). Such savings may not provide an adequate annuity payment over the period of retirement. In sum, the shift in the dominant type of pension plan offerings and the resulting shift in the income they can generate is likely to have influenced not only the proportion of the retired population that draws pension income but also the composition and importance of such income in retirement.

Societal Changes

Increasing labor force participation among women and among older workers of either sex, particularly during the last decade, has led to an increase in earned income among people aged 65 or older. From 1999 to 2014, the labor-force participation rate of men aged 65–69 increased from 29 percent to 36 percent; for men aged 70 or older, it increased from 12 percent to 16 percent. Over the same period, the labor-force participation rate of women aged 65–69 increased from 18 percent to 28 percent, and for women aged 70 or older it rose from 6 percent to 9 percent (Federal Interagency Forum on Aging-Related Statistics 2016, Table 12). As a result, the percentage of family income derived from earnings among aged households increased from 23 percent in 2000 to 32 percent in 2014 (SSA 2002, Table 7.1; 2016b, Table 10.1).

Facing scarce employment opportunities during the Great Recession of 2007–2009, some older unemployed workers claimed early benefits (Haaga and Johnson 2012). As a result, their monthly Social Security benefit amounts were reduced relative to the benefits they would have received if they had claimed at full retirement age (FRA). Furthermore, the changing marital histories, educational attainment, and patterns of lifetime labor-force attachment of women have generally increased the retired-worker benefits to which they are entitled based on their own earnings while reducing their auxiliary (wife or survivor) benefits (Iams and Tamborini 2012; Butrica and Smith 2012; Iams 2016). These trends have reduced the Social Security benefits of many couples (Sass 2016).

Programmatic Changes

Social Security program changes, such as claiming-age rule changes, can strongly affect the level of Social Security benefits (Shoven and Slavov 2012). The 1983 Amendments to the Social Security Act stipulated that the FRA of 65 for individuals born before 1938 would be adjusted upward for those born in later years. The

FRA increases by 2 months for members of each successive birth cohort from 1938 through 1942, reaching 66 for those born in 1943.⁵ Because monthly benefits are permanently reduced for individuals claiming before reaching their FRA, the increased FRAs for members of later birth cohorts affect their Social Security income. For example, the monthly benefit of a person who claims at age 65 is reduced by 6.7 percent if her or his FRA is 66 (born 1943–1954) versus no reduction for a person whose FRA is 65 (born in 1937 or earlier). Likewise, a person whose FRA is 65 and who claims benefits at age 66 receives a delayed retirement credit of as much as 6.5 percent, versus no upward adjustment for someone whose FRA is 66.⁶

The Senior Citizens' Freedom to Work Act of 2000 instituted another programmatic change by eliminating the retirement earnings test (RET) for working beneficiaries who had reached FRA. Prior to that law's enactment, benefits were reduced for working beneficiaries with earnings above given thresholds. After the RET elimination, retired-worker benefit claims spiked in 2000, particularly among workers who had reached FRA. In addition, increasing shares of claims were delayed in subsequent years among those workers who had not reached their increased FRA (Purcell 2016; Song and Manchester 2007).

In sum, the changes mentioned above led to a decrease in Social Security benefits as a percentage of total family income for aged households, from 38 percent in 2000 to 33 percent in 2014 (SSA 2002, Table 7.1; 2016b, Table 10.1).

Data and Methods

For this analysis, we use data from three nationally representative surveys: the 2015 CPS, sponsored jointly by the Census Bureau and the Bureau of Labor Statistics; wave 11 from the 2008 panel of the Census Bureau's SIPP; and the 2012 wave of the University of Michigan's HRS.⁷ The CPS income questions refer to amounts received in the calendar year preceding the survey year; in the HRS, they refer to income received in the prior month, and respondents' answers are annualized for the survey year; in the SIPP, the questions refer to income in the survey months, and responses likewise are annualized. Hence, our variables measure income in 2014 for the CPS and in 2012 for the SIPP and the HRS. We use the 2012 data for the HRS and the SIPP (and not more recent data) because when this article was written, information on Social Security benefits from administrative records were not available beyond 2012.

Each survey provides information on socioeconomic characteristics (such as sex, marital status, race, Hispanic origin, education, income, and age group) and on income by source (such as Social Security, pensions, assets, earnings, and welfare programs). We estimate the proportion of income that comes from each source. In particular, we examine how reliance on Social Security benefits varies across socioeconomic subgroups.

The sample for this analysis consists of individuals aged 65 or older. For each individual, we define his or her total family or household income as the sum of all income from all members of the family or the household. Similarly, the total income from Social Security is the sum of benefits received by all family members. We then calculate the share of total family or household income received from Social Security and estimate the percentage of the aged population that relies on Social Security benefits as a primary source of income in retirement. We examine two thresholds of reliance on Social Security benefits. Specifically, we calculate the percentage of aged individuals who live in a household that derives (1) at least 50 percent and (2) at least 90 percent of family income from Social Security benefits.

The CPS

We use data collected in the March 2015 CPS Annual Social and Economic Supplement. Respondents from a nationally representative sample of the U.S. population were asked detailed questions about income in the previous year for each person in the household, including whether they received any Social Security income, the amount of any such income, and the benefit type (retired worker, disabled worker, or dependent/survivor). Respondents were also asked if Medicare premiums were deducted from their Social Security benefits and, if so, how much. Based on responses to these questions, the Census Bureau calculated the Social Security income (which includes Medicare premiums) for each family member and then calculated the total family income. Because our sample is restricted to people aged 65 or older, Social Security income mostly comes from retired-worker, spouse, and survivor benefits.

Critics have claimed that the CPS inadequately measures asset income and distributions from tax-advantaged retirement accounts such as 401(k) plans or IRAs (Iams and Purcell 2013; Fisher 2008; Davies and Fisher 2009; Munnell and Chen 2014). Hence, previous research has argued that CPS-based estimates of

the distribution of income of the aged population are likely to overstate reliance on Social Security benefits and understate reliance on retirement accounts (Miller and Schieber 2014). To address those criticisms, the Census Bureau redesigned the CPS for 2015 to improve the collection of data on sources of income received in the reference year (2014 in this case), particularly for the aged population. The redesign sought in part to reduce respondents' query fatigue by omitting questions for which the answer could be determined based on the response to an earlier question. Also, a "dual-pass" approach was implemented by asking first about the sources of income and then about the amount from each reported source. Additionally, the redesigned questionnaire revised the order in which the income questions appear, to better capture accurate information on the most likely sources of income among three types of respondent households: (1) those with a member aged 62 or older, (2) those with low income, and (3) all others. More importantly, for the first time, the 2015 CPS asked separate questions about retirement-account withdrawals and distributions and collected information on property income. The Census Bureau tested the redesign on a randomly selected subsample of $\frac{3}{8}$ of the full 2014 CPS sample; the rest of the 2014 sample replied to the traditional questionnaire (Semega and Welniak 2015).

Among aged households, the estimated real median income among redesign respondents was 4.6 percent greater than that of traditional-questionnaire respondents. Furthermore, estimates based on the redesigned questionnaire of the prevalence and the aggregate value of retirement income from sources other than Social Security were about 50 percent and 22 percent higher, respectively, than estimates based on the traditional questionnaire. By contrast, the estimated prevalence and aggregate value of Social Security income were both only about 2 percent greater under the redesigned survey (Semega and Welniak 2015, Tables 1–2). Nevertheless, even in the redesigned-CPS sample, Social Security "remains the overwhelmingly predominant source of income for those ages 65 and older" and "over 60 percent of individuals in the two lowest-income quartiles received more than 90 percent of their total income from Social Security" (Copeland 2015, 11).

As noted earlier, the 2015 CPS data should provide a more accurate picture of the Social Security share of income for aged individuals. Comparing the 2015 CPS data with those from the other two surveys will provide a validity test of their accuracy.

The SIPP

The 2008 SIPP panel started in late 2008 and continued through 2013, with a new wave of interviews conducted every 4 months. For this analysis, we use the monthly SIPP data collected in 2012. The survey data are routinely matched to Social Security administrative records; 93 percent of respondents in the 2008 SIPP panel were matched to their SSA records.

SIPP respondents were asked detailed questions about the income sources and government program participation of each individual in the family. Starting with the 2015 CPS, the official Census Bureau definition of family income includes distributions from retirement accounts (which the Bureau calls lump sums). Therefore, in our definition of family income for the SIPP data, we include distributions from retirement accounts (as calculated by the Bureau for calendar year 2012). In addition, because SIPP-reported Social Security benefits do not include Medicare premiums (Iams and Purcell 2013), we replace the respondent's reported Social Security benefits with the total amount of Social Security benefits (calculated as the sum of the amounts of benefits paid by check or deposited to a bank account and the amount of Medicare premiums) using data from SSA's Payment History Update System.⁸

The HRS

The HRS is the most comprehensive national longitudinal survey of Americans aged 51 or older. It began in 1992 and follow-up interviews have been conducted every other year since then. The purpose of the HRS is to provide high-quality data to examine "the ways in which older adults' health interacts with social, economic, and psychological factors and retirement decisions." By conducting "unique and in-depth interviews," it also provides a comprehensive inventory of the income and wealth of the population aged 51 or older (National Institute on Aging 2007).

The HRS is more systematic than the CPS and the SIPP in collecting information on retirement-plan account balances and distributions. If income or wealth information is missing, HRS respondents are asked follow-up questions about the dollar amount using an "unfolding brackets" approach to identify the range limits of the missing data item.

Czajka and Denmead (2008) find that HRS-reported household incomes in 2002 for persons aged 51 or older were substantially higher (by 20–30 percent) than those reported in the CPS and the SIPP. The

characteristics of this aged population were largely similar across the three surveys, although HRS respondents were slightly more likely to live with others and less likely to live alone than were their CPS and SIPP counterparts. The authors conclude that "HRS incomes are higher than those of the Census Bureau surveys, but resolving whether this is due to better measurement or over-representation of higher-income families must be left to future research."

In this article, we use household income information obtained from the RAND Corporation's user-friendly HRS data file (version O). Specifically, we focus on variables that correspond to the 2012 wave. The HRS household-income measure includes earnings, private pensions, Social Security benefits, and income from welfare programs, capital, and other sources. For married respondents, total household income combines that of both spouses.

The HRS understates total Social Security benefit amounts because it asks respondents to report the net amount. Specifically, in 2012, question NQ085 asked: "About the Social Security income that you (yourself) receive, how much was the Social Security check or the amount deposited directly into your account last month? We want the amount after any deductions." Note that the amount paid to the respondent as a check or direct deposit does not include the amount of Medicare premiums withheld from the total benefit. Given the wording of this question, it is plausible that respondents report only the amount paid to them rather than the total or gross benefits.

The true Social Security benefit amount (either gross or net) can be determined from Social Security administrative records. For about half of the respondents in the 2012 wave of the HRS, we have matched records containing information on their earnings and Social Security benefit. For those respondents, we update their self-reported benefit amount with administrative information (that is, the sum of benefits paid and of the Medicare premiums).⁹ We use data for 2012 because we do not have matched administrative data beyond 2012. For respondents without matched records we add to their survey-reported benefits an amount of \$1,200, which is the average (and the median) Medicare premium observed in the Payment History Update System records. Thus, for couples, the amount of Social Security benefits is the sum of the corrected Social Security benefits received by both spouses. Then, we correct the total household income variable in the RAND HRS data file with this adjusted measure of Social Security benefits.

Although the HRS household-income measure does not include withdrawals or distributions from IRAs or 401(k)-type accounts, respondents report those account balances in either the survey's wealth module or its employment module. We use respondents' self-reported balances to calculate the stream of annual income one can withdraw from such tax-advantaged retirement accounts. Because people aged 70½ or older are legally required to take annual minimum distributions from their account balances, we assume that they have received such distributions even if they are not reported as income. To estimate the distribution amount, we use the Internal Revenue Service (IRS) required minimum distribution factor, which is based on life expectancy at a given age. Research has shown that few people draw distributions from IRAs (Holden and Schrass 2016) or from 401(k)-type accounts (Poterba, Venti, and Wise 2011a, 2011b) before they are required to do so. Nevertheless, to measure retirement-account income consistently, we extrapolate the distribution factors for persons aged 65–69 from IRS data for persons aged 70½ or older. Then, we add the estimated amount of annual withdrawals to total household income and use the corrected measure to estimate the reliance on Social Security benefits.

Results

To examine the effects of the CPS redesign, we start by comparing estimates from the 2013 CPS (covering income in 2012) with those from the 2015 CPS (covering income in 2014). For both years, Table 1 presents the estimated proportion of respondents aged 65 or older for whom Social Security provided at least 50 percent or at least 90 percent of their family income. In 2014, about half (52 percent) of aged persons lived in families that derived at least half of their total income from Social Security benefits. As expected, that figure is lower than the estimated percentage for 2012 (56 percent), most likely because the redesigned CPS better measured income from other sources. About one-quarter of the aged population lived in families that received 90 percent or more of their family income from Social Security benefits, and the estimated percentage for 2012 (27 percent) was only slightly higher than that for 2014 (25 percent). Although the redesigned CPS income questions resulted in slightly lower estimates of reliance on Social Security benefits, the overall pattern did not change much.

Reliance on income from Social Security varies greatly by socioeconomic characteristics. Women

relied on Social Security benefits more than men did. In 2014, 55 percent of women and 48 percent of men lived in families receiving at least half of their income from Social Security benefits, and the corresponding estimates for the 90 percent threshold are 27 percent and 21 percent. Similarly, nonmarried respondents in 2014 relied on Social Security substantially more than married respondents did: 60 percent versus 46 percent, respectively, at the 50 percent threshold and 33 percent versus 19 percent at the 90 percent threshold. Across race/ethnicity groups, non-Hispanic blacks were more likely to receive at least half of their income (57 percent) and at least 90 percent of their income (33 percent) from Social Security in 2014 than were respondents in other groups. Reliance on Social Security income decreases with higher education levels. Around two-thirds of aged respondents with less than a high school degree or with a high school degree relied on Social Security benefits for at least half of their income in 2014, compared with about one-third of college graduates. Furthermore, a substantial proportion (41 percent) of those who did not complete high school relied on Social Security benefits for at least 90 percent of their family income, compared with 14 percent of college graduates.

Expectedly, reliance on Social Security benefits decreases as family income increases. Differences across the income distribution are substantial: Respondents in the lowest and second-lowest income quintiles in 2014 were much more likely (87 percent and 82 percent, respectively) to receive at least half of their family income from Social Security than were those in the highest income quintile (2 percent). The corresponding estimates for those at the 90 percent threshold of reliance were 64 percent for those in the lowest income quintile and 0 percent for those in the highest income quintile. Finally, reliance on Social Security income increases with age, suggesting that as people get older they may have depleted other income sources, without which Social Security becomes even more important. In 2014, the proportions of persons receiving at least half of their income from Social Security were 42 percent at ages 65–69, 51 percent at ages 70–74, 57 percent at ages 75–79, and 61 percent at ages 80 or older. The respective proportions receiving at least 90 percent of income from Social Security were 18 percent, 23 percent, 27 percent, and 33 percent. For every socioeconomic subgroup except one, the percentages in 2014 were lower than in 2012.

Table 1.
Percentages of the population aged 65 or older for whom Social Security benefits accounted for at least 50 percent and at least 90 percent of family income: By selected characteristics, 2012 and 2014

Characteristic	2013 CPS (2012)		2015 CPS (2014)	
	≥50%	≥90%	≥50%	≥90%
Total	55.9	26.7	51.8	24.7
Sex				
Women	58.9	29.6	55.2	27.4
Men	52.1	23.0	47.5	21.3
Marital status				
Married	51.3	20.0	45.9	18.7
Not married	62.0	35.6	59.6	32.6
Race/ethnicity				
White (non-Hispanic)	56.1	26.5	51.8	24.1
Black (non-Hispanic)	59.3	33.8	56.9	32.5
Other (non-Hispanic)	46.5	23.3	43.7	22.7
Hispanic origin (any race)	56.2	34.9	51.5	31.2
Educational attainment				
Less than high school graduate	69.4	39.0	68.3	41.4
High school graduate	62.6	30.8	57.9	27.6
Some college, no degree	54.5	23.4	50.0	21.0
College graduate or higher	37.3	14.9	34.9	14.1
Income quintile				
First (lowest)	87.5	65.4	86.6	64.1
Second	84.5	49.1	82.3	47.8
Third	69.7	19.2	62.7	13.8
Fourth	32.2	1.5	24.8	1.0
Fifth (highest)	3.9	0.0	2.2	0.0
Age				
65 or older	55.9	26.7	51.8	24.7
65–69	43.6	17.9	41.7	18.3
70–74	55.7	25.7	51.1	23.3
75–79	61.8	30.3	57.0	26.8
80 or older	66.2	35.4	61.4	32.7
Sample size	20,162		20,912	

SOURCE: Authors' calculations based on 2013 and 2015 CPS.

NOTES: Reported estimates are weighted using survey weights.

Samples consist of persons aged 65 or older; sample sizes are unweighted.

Family income is defined according to Census Bureau definitions of family and income (see <https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar15.pdf>).

Table 2 compares estimates of reliance on Social Security benefits based on data from the March 2015 CPS (covering income in 2014) with estimates based on data from the 2012 HRS and the 2008 panel of the SIPP (each covering income in 2012). Despite differences in reference years and methodologies, the three surveys produce very similar estimated percentages of aged persons who live in households that receive at least half of their income from Social Security (around 54 percent in the HRS and the SIPP and 52 percent in the CPS). Estimates of reliance at the 90 percent threshold, however, are more divergent: about one-quarter of the aged population in the HRS and the

CPS, and about one-fifth in the SIPP. It is unclear why the SIPP estimate is lower than those from the other two surveys. Perhaps, because the SIPP was designed to focus on income and program participation of the low-income population, it may better reflect the composition of their income. In any event, the patterns of reliance across socioeconomic subgroups are generally consistent across the surveys. Notably, even though we correct for retirement-account withdrawals and distributions, the proportion of aged persons who rely on Social Security for at least half of their family income is for many subgroups higher in the HRS than it is in the other two surveys. In particular,

Table 2.

Percentages of the population aged 65 or older for whom Social Security benefits accounted for at least 50 percent and at least 90 percent of family income according to three alternative surveys: By selected characteristics, 2012 or 2014

Characteristic	HRS (2012)		SIPP (2012)		CPS (2014)	
	≥50%	≥90%	≥50%	≥90%	≥50%	≥90%
Total	53.5	22.4	53.7	19.6	51.8	24.7
Sex						
Women	56.9	25.4	56.8	21.8	55.2	27.4
Men	49.2	18.5	49.6	16.8	47.5	21.3
Marital status						
Married	46.3	15.7	48.2	13.7	45.9	18.7
Not married	63.9	32.1	60.9	27.4	59.6	32.6
Race/ethnicity						
White (non-Hispanic)	51.1	19.3	55.0	19.8	51.8	24.1
Black (non-Hispanic)	63.7	36.4	52.7	19.1	56.9	32.5
Other (non-Hispanic)	52.5	24.7	46.9	18.6	43.7	22.7
Hispanic origin (any race)	67.7	39.5	44.6	18.3	51.5	31.2
Educational attainment						
Less than high school graduate	70.3	38.5	62.8	27.7	68.3	41.4
High school graduate	61.1	25.3	60.8	22.5	57.9	27.6
Some college, no degree	51.2	19.3	54.1	18.0	50.0	21.0
College graduate or higher	30.6	8.2	34.9	10.6	34.9	14.1
Income quintile						
First (lowest)	84.1	57.5	91.5	61.9	86.6	64.1
Second	83.5	36.4	81.8	29.2	82.3	47.8
Third	70.8	21.6	62.6	6.6	62.7	13.8
Fourth	40.3	5.2	28.3	0.1	24.8	1.0
Fifth (highest)	3.8	0.2	1.8	0.0	2.2	0.0
Age						
65 or older	52.8	22.1	53.7	19.6	51.8	24.7
65–69	39.8	15.4	41.2	14.4	41.7	18.3
70–74	56.0	24.2	53.6	17.8	51.1	23.3
75–79	60.6	25.6	58.6	22.1	57.0	26.8
80 or older	62.4	26.7	64.3	25.5	61.4	32.7
Sample size	10,713		10,416		20,912	

SOURCE: Authors' calculations based on HRS (2012 Wave), SIPP (2008 Panel), and 2015 CPS.

NOTES: Reported estimates are weighted using survey weights.

Samples consist of persons aged 65 or older; sample sizes are unweighted.

Family income is defined according to Census Bureau definitions of family and income (see <https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar15.pdf>).

HRS estimates of reliance are higher for women, the nonmarried, all race/ethnicity groups other than non-Hispanic whites, persons with no postsecondary education, all income quintiles except the lowest, and the 70–74 and 75–79 age groups. These findings suggest that Social Security remains the primary source of retirement income for substantial segments of the aged population and that retirement accounts, despite their increased prevalence, have not changed the importance of Social Security benefits for the majority of the aged population.

Summary and Conclusion

Analysis of three independent surveys—the HRS, the SIPP, and the CPS—reveals that despite their different samples, designs, and approaches to measuring income by source, they yield similar results regarding the importance of Social Security benefits to the income of the aged. They confirm the findings of previous research that Social Security benefits provide the majority of retirement income to persons aged 65 or older. Estimates based on data from the three surveys reveal that about half of the aged population live in

households receiving at least 50 percent of their family income from Social Security benefits and about one-quarter live in households receiving at least 90 percent of their family income from Social Security.

In the CPS, the estimated proportion of persons aged 65 or older who relied on Social Security benefits for at least half of their family income was lower in 2014 (52 percent) than in 2012 (56 percent). Similarly, the estimated proportion receiving 90 percent or more of their family income from Social Security benefits was slightly lower in 2014 (25 percent) than in 2012 (27 percent). These seeming decreases likely reflect better measurement of asset and retirement-account income in the redesigned 2015 CPS, leading to apparent increases in estimated income for 2014 from those sources, although the increases are not substantial enough to affect the reliance on Social Security. Nevertheless, the results of even the redesigned CPS indicate that persons aged 65 or older rely heavily on Social Security benefit income.

Notes

¹ We use “family” and “household” interchangeably in this article because the SIPP uses family-level income variables and the HRS uses household-level income variables. The CPS calculates family income by summing self-reported income amounts across all family members.

² After 2006, the proportion dropped gradually, and by 2014, it had reached 84 percent.

³ March 2015 CPS questions covered income received in 2014.

⁴ Under the Pension Protection Act of 2006, employers can automatically enroll employees in a DC plan at a default contribution rate. Employees can, however, opt out of the plan or change their contribution rate.

⁵ The FRA is 66 for individuals born during 1943–1954. It increases in 2-month increments for members of each successive birth cohort from 1955 through 1959 and is 67 for those born in 1960 or later.

⁶ Delayed retirement credits vary according to FRA and calendar year of claiming. For example, the delayed retirement credit is 8 percent per year for individuals born in 1943 or later. For more information, see the *Social Security Handbook*, Section 720: Delayed Retirement Credit (https://www.socialsecurity.gov/OP_Home/handbook/handbook.07/handbook-0720.html).

⁷ We also use 2013 CPS data, but only to assess the impact of changes to the 2015 CPS income questions.

⁸ Iams and Purcell (2013) established that the Social Security incomes reported in the 2010 CPS closely correspond to the amounts in the Social Security administrative records. By contrast, they find that estimates based on the

2009 SIPP data understated Social Security benefits by about \$1,000 per person on average.

⁹ We compared the HRS respondents’ self-reported Social Security benefits and information from the administrative records in 2012 and found that the difference at the mean was about \$255 when compared to net benefits and about \$1,270 when compared to gross benefits. The latter amount is approximately similar to the difference that Iams and Purcell (2013) found using SIPP data and is almost equal to the median Medicare premiums.

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CONTRIBUTORY RETIREMENT SAVING PLANS: DIFFERENCES ACROSS EARNINGS GROUPS AND IMPLICATIONS FOR RETIREMENT SECURITY

by Irena Dushi, Howard M. Iams, and Christopher R. Tamborini*

This study examines how earnings levels affect workers' access to, participation in, and contributions to defined contribution retirement plans. To what extent do these outcomes improve with higher earnings? Did the relationships change between 2006 and 2012? We match a nationally representative sample of Survey of Income and Program Participation respondents to data from their W-2 tax records. We find that access, participation, and contributions increase as earnings increase, even after controlling for key socioeconomic and labor-market covariates. Low earners are less likely to be offered a plan and to participate when one is offered, and they tend to contribute a smaller share of their earnings when participating. We also find that the earnings gradient changed little between 2006 and 2012, despite changing economic conditions.

Introduction

In the United States, workplace pensions are a primary mode of retirement saving (Hardy and Shuey 2000; Herd 2009; O'Rand 2011; Poterba 2014; Shuey and O'Rand 2004; Warner, Hayward, and Hardy 2010). Because Social Security monthly benefits typically replace around 40 percent of monthly preretirement earnings, workers who wish to maintain their current standard of living after retiring must accumulate resources by other means; yet studies document low retirement saving levels (Fisher and others 2009; Knoll, Tamborini, and Whitman 2012). Estimates based on the 2013 Survey of Consumer Finances indicate that 41 percent of American households headed by individuals aged 55–64 have no savings in retirement accounts. Even more striking is the sharp variation by household income. The proportion of households headed by individuals aged 55–64 that have any retirement savings ranges from 9 percent in the lowest income quintile to 68 percent in the middle quintile and to 94 percent in the top quintile (Government Accountability Office 2015, Tables 1 and 3).

In recent decades, the dominant type of private pension offering shifted from traditional defined benefit (DB) plans to defined contribution (DC) plans such as the familiar 401(k). DC plan contributions today represent the primary means of private retirement saving among American workers. In this context, it has become increasingly important to understand who has access to DC retirement plans, who participates in them, and how much the participants contribute to them (Shuey and O'Rand 2004; Ekerdt 2010; Dushi and Iams 2015; Miller 2015; Tamborini and Purcell 2016).

In this article, we attempt to advance the understanding of how U.S. workers prepare for retirement by examining how DC pension savings vary across the

Selected Abbreviations

DB	defined benefit
DC	defined contribution
OLS	ordinary least squares
SIPP	Survey of Income and Program Participation

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earnings distribution and whether those patterns have changed in recent years. Specifically, we investigate the extent of an earnings gradient in access to, participation in, and levels of contribution to DC retirement plans. Do these three outcomes increase at the upper levels of the earnings distribution? This question is important because the connection between earnings and pension savings is likely to be a key factor influencing retirement resource accumulation during one's working life. Further, the increasing prevalence of DC-type plans is likely to have broadened the relationship between earnings and pension savings. In contrast with DB plans, which are generally mandatory and funded mainly by employers, DC plans are voluntary and require workers to decide what portion of their earnings to contribute; that is, to decide how much of today's consumption to give up for consumption in retirement. Consequently, a worker's earnings level is likely not only to be a major determinant of access to a DC plan but also to influence participation and contribution decisions.

Although a rather extensive literature examines why people save and how saving affects retirement wealth (for example, Poterba, Venti, and Wise 1998, 2000; Venti and Wise 1999), few studies have analyzed the extent of an earnings gradient in contributory retirement plans. Most research has addressed earnings as a control variable (for example, Butrica and Smith 2014; Knoll, Tamborini, and Whitman 2012) rather than as a central pathway to accumulation of retirement resources. In one of the few direct assessments of differential outcomes by earnings level, Dushi, Iams, and Tamborini (2011) find a positive earnings gradient in DC plan participation but pay little attention to the multiple pathways through which the gradient can arise, such as plan access and take-up.¹ Other studies have found that earnings differentials contribute to variations in pension outcomes between women and men (Hardy and Shuey 2000), across educational-attainment groups (Tamborini and Kim 2017), and in retirement timing (Raymo and others 2011).

We also examine whether the relationship between earnings levels and DC pension outcomes changed between 2006 and 2012. The Pension Protection Act of 2006 may have led to increased DC plan participation and contributions because it incorporated automatic enrollment and default contribution rates. However, the Great Recession initiated a countervailing trend, with decreases in participation and contribution rates between 2007 and 2009 (Dushi and Iams 2015). The

economy had largely recovered by 2012; did DC plan participation and contribution patterns change relative to prerecession years?

To explore these questions, we use a unique data set that matches a nationally representative sample of respondents from the 2004 and 2008 panels of the Survey of Income and Program Participation (SIPP) to individual-level earnings and contribution data from Internal Revenue Service Form W-2 tax records. The W-2 linkage reduces the measurement error that is common to self-reported data, especially in terms of DC plan contributions (Dushi and Iams 2011; Dushi and Honig 2015; Kim and Tamborini 2014). These matched data enable us to provide robust estimates of differentials in DC pension access and participation according to workers' position in the earnings distribution. We examine differences at the earnings-decile level of detail to provide a fine-grained analysis.

This study advances the understanding of variation in DC pension outcomes by workers' earnings levels. Our findings also provide insights into the possible significance of increasing earnings dispersion (Autor 2014; Kim and Sakamoto 2008) for the accumulation of retirement resources during working years. Earnings gradients in retirement savings, if sustained over the life course, can compound over time and help explain how and why retirement resources differ from one individual (or family) to another (Crystal, Shea, and Reyes 2016).

Background

U.S. retirement income is often described as a three-legged stool supported by Social Security benefits, employer-provided pensions, and personal savings and assets. After Social Security, employer-provided pensions are the most important source of retirement income (Shuey and O'Rand 2004).

Since the 1980s, employer-provided pensions have undergone a dramatic transition from consisting primarily of DB plans to consisting primarily of DC plans (Ekerdt 2010; O'Rand 2011). In DB plans, employees are enrolled automatically² and the pension is funded mainly by employers. Covered employees do not have to decide whether and how much to contribute; consequently, they may not view the employer's contributions as a deduction from their paycheck. The DB pension benefit formula accounts for years of service and (usually) for earnings in only the last 3 to 5 years of work, which for many workers are the highest-earning years. Benefits are paid as a lifetime annuity.

By contrast, DC plans are generally voluntary and require workers to decide not only whether but also how much to contribute—and where to invest those funds.³ Because these contributions are deducted from gross pay, workers are likely aware of the direct link between retirement contributions and current consumption. In this context, a person's earnings level is likely to affect participation and contribution decisions.

Relating Earnings to DC Pension Outcomes

Our analysis explores three pathways likely to underlie an earnings gradient in DC pension savings. The first pathway is through a positive relationship between earnings level and plan access. To participate in a DC plan, an individual must be offered one by his or her employer. Studies of nonwage labor compensation have noted that employers face a competitive labor market for high-skill workers, making them more likely to offer pension plans—particularly at large firms (Dushi, Iams, and Lichtenstein 2015). Thus, if high earners are more likely to have access to a DC plan, then differential access by earnings level may be one source of the gradient in retirement savings.⁴

The second pathway is a positive relationship between earnings level and retirement plan participation (Butrica and Smith 2014; Copeland 2013). Low earners with tighter budget constraints may find it more difficult to divert current income toward retirement savings. Low earners may also have less incentive to save, in part because Social Security's progressive benefit formula will provide them with higher preretirement-income replacement rates. In addition, earnings level may shape a person's social networks and peer interactions (DiMaggio and Garip 2012), which in turn may influence saving decisions involving DC plans (Koposko and others 2015).

The third pathway in an earnings gradient involves the relationship between earnings level and DC plan contributions (Pattison and Waldron 2008). Among plan participants, both the dollar amounts and the percentages of gross earnings contributed to a DC account (up to the annual contribution limit) rise as earnings levels increase. This may reflect high earners' desire to replace a higher proportion of preretirement earnings, combined with greater budgetary latitude and greater tax benefits. Conversely, low earners may contribute less because of greater budgetary constraints, lower tax benefits, and a higher replacement rate from Social Security benefits. Hence, the marginal

utility of reducing current consumption to fund future consumption is lower among low earners.

Prior research has assessed the determinants of DC retirement plans outcomes, but to date, studies either have examined earnings level as a control variable or have examined its influence on only one outcome. A recent study using representative data highlights the positive relationship between earnings level and DC-plan participation and contributions among U.S. workers in 2004, but it does not examine access or take-up rates (Dushi, Iams, and Tamborini 2011). Studies that examine factors besides earnings level have found evidence linking plan participation to a worker's family structure (Knoll, Tamborini, and Whitman 2012; Tamborini and Purcell 2016), education (Hardy and Shuey 2000; Tamborini and Kim 2017), and race/ethnicity (Kuan, Cullen, and Modrek 2015), as well as to employer firm size (Dushi, Iams, and Lichtenstein 2015). In addition, longitudinal research has shown that earnings and employment shocks influence participation and contribution decisions (Dushi and Iams 2015; Tamborini, Purcell, and Iams 2013).

In this article, we explore the earnings gradient not only in DC plan participation (the most studied dimension to date) but also in plan access, take-up, and contributions based on W-2 data. This attention to multiple outcomes, along with the use of matched administrative data, allows us to capture the earnings-level differentials in workplace retirement savings more fully than in prior research. In addition, our analysis examines the earnings gradient over a span of recent years reflecting different economic conditions and prevailing pension offerings.

Data

The data for this study come from the 2004 and 2008 panels of the SIPP, a nationally representative household survey administered by the Census Bureau, matched to W-2 tax records. In a given panel, two types of questionnaires are administered: Core and Topical Modules. The Core Module collects a common set of demographic and labor-market information, whereas each of a rotating set of Topical Modules covers a given topic in depth.

We focus on the survey waves that include the Topical Module on Retirement and Pension Plan Coverage, which provides information about respondents' employer-sponsored retirement plans. To test for changes in the relationship between earnings levels and DC plan outcomes in 2006 and 2012, we use data from wave 7 of the 2004 panel, with interviews

conducted from February to May 2006; and from wave 11 of the 2008 panel, with interviews conducted from January to April 2012.

We link the SIPP data with respondents' tax records from employer-reported W-2 forms, which are available in SSA's Detailed Earnings Record file. These records provide information on annual wage-and-salary earnings and tax-deferred contributions to DC retirement plans for all jobs since 1990. We use W-2 information for calendar years 2006 and 2012.⁵

Our study population consists of full-time wage and salary workers aged 25–59 at the time of the interview.⁶ From this sample, we remove marginal earners by excluding workers with annual earnings totaling less than the equivalent of four quarters of Social Security coverage (\$3,880 in 2006 and \$4,520 in 2012). The study population is further restricted to SIPP respondents with linked W-2 tax records. For brevity, we refer to this sample as full-time workers (or, simply, workers) hereafter. The W-2 match rate is high: around 80 percent for the 2004 SIPP panel and around 90 percent for the 2008 panel. Potential bias because of nonmatched respondents is minimal (Czajka, Mabli, and Cody 2008; Davis and Mazumder 2011); nevertheless, we adjust the survey weights for nonmatches to preserve the national representativeness of our sample.⁷ We pool the data from both SIPP panels; our final matched sample contains 35,558 persons, of which 20,320 are from the 2004 panel (providing data for 2006) and 15,238 are from the 2008 panel (providing data for 2012).

Analysis

As noted above, we focus on three key indicators related to DC retirement savings plans: (a) access, (b) participation, and (c) contribution levels. A binary measure of access (zero/one) indicates whether the worker was offered a DC retirement plan by her or his employer. We define SIPP respondents who report that their employer offered a DC plan as having access to a plan. In addition, respondents with a positive contribution to a DC plan according to their W-2 tax records for the survey year are defined as having access to a plan, regardless of their SIPP response.

The second indicator is participation in a DC retirement plan. We define a worker as a plan participant if her or his W-2 record shows a tax-deferred contribution to a retirement account. We examine the participation rate among all full-time workers as well as that for the subset of workers who are offered a DC plan and elect to take it up.

The third indicator is annual contributions to a DC retirement plan among participants. Contribution amounts are from the W-2 records; we adjust the contribution amounts in 2006 to 2012 dollars. Based on this information, we calculate the contribution rate, defined as the percentage of total annual wages that a worker contributes to a DC account.⁸

We employ both descriptive and multivariate regression analysis to assess the earnings gradient for each outcome (access, participation, and contributions) while controlling for key covariates as described below. More specifically, we use a standard probit model to estimate the probability of having access to a DC plan and, separately, of participating in a plan.

We note that the estimates from the probit model of participation would not be accurate if the unobserved characteristics that affect the probability of being offered a plan were correlated with the unobserved characteristics that affect the probability of participating in the plan. In other words, the unobservable characteristics of workers whose employers do not offer a plan may differ from those of workers whose employers do offer a plan, and the latter workers may be more likely to participate for reasons unrelated to having received a plan offer (for example, because of their preference for saving). Probit estimates that do not control for that type of selection will likely be biased. To account for that possibility, we also estimate a bivariate probit (or Heckman selection) model. For identification purposes, in the bivariate model, we use two variables as exclusion restrictions in the plan offer equation; those variables measure the proportion of medium- and small-size firms in the respondent's state of residence. The exclusion restrictions are correlated with the probability of being offered a plan but not with the probability of participation. In addition, if the error terms (or unobservable characteristics) in the offer and participation equations are correlated—in technical terms, the *rho* coefficient—and the *rho* is statistically significant, then bivariate probit estimates are more appropriate than standard probit estimates. Finally, we use ordinary least squares (OLS) regression models to estimate contribution amounts and rates.

The main independent variable of interest, total annual earnings, is obtained from the W-2 records. To explore an earnings gradient, we sort workers by decile based on the earnings distribution in each study year. To test whether the earnings gradient changed from 2006 to 2012, the regression analyses use the pooled samples and include interaction variables

between earnings deciles and year. Hence, the coefficients of earnings deciles give estimated effects for the reference year (2012), and the year-dummy and interaction terms give the additional effects for year 2006.

Our models also include controls for socioeconomic and labor market characteristics (based on SIPP data) that are expected to affect access to, participation in, and contributions to DC plans. These explanatory variables include sex, age (25–39, 40–49, 50–59), whether married, educational attainment (less than high school, high school graduate, some college, bachelor’s degree), and race/ethnicity (non-Hispanic white, non-Hispanic black, non-Hispanic other, Hispanic). Dichotomous labor-market variables indicate the respondent’s class of work (private versus public sector), firm size (fewer than 25, 25–99, and 100 or more employees), occupation (five broad categories), industry of employment (seven broad categories), and whether the employer matches DC plan contributions. We also control for household income and homeownership status. All

reported estimates use sample weights adjusted for the probability of match to W-2 records.

Results

In this section, we discuss the results of our analysis. We address each of the three DC plan outcomes in turn.

Access to a DC Plan

Table 1 shows that the overall percentage of full-time workers who were offered a DC plan was 68.8 percent in 2006 and 73.1 percent in 2012. In both years, access differed significantly by earnings decile, increasing monotonically with higher earnings. For example, in 2006, 31.8 percent of workers in the lowest earnings decile were offered a DC plan by their employer, versus 91.5 percent of workers in the highest earnings decile—a statistically significant gap of nearly 60 percentage points. For those in the middle (5th) earnings decile, the offer rate was about twice that of workers in the lowest decile in both 2006 and 2012.

Table 1.
DC retirement plan offer, participation, and take-up rates for full-time wage and salary workers aged 25–59 in 2006 and 2012, by earnings decile

Decile	Offer rate ^a		Participation rate ^b among—			
			All workers		Workers offered a plan (take-up rate)	
	2006	2012	2006	2012	2006	2012
Total	68.8	73.1	49.4	51.9	71.8	71.0
1st (lowest)	31.8	37.5	13.7	17.2	43.0	45.8
2nd	48.8	55.1	26.4	30.9	54.1	56.1
3rd	58.6	64.9	36.2	38.6	61.8	59.5
4th	65.6	71.8	43.1	44.9	65.6	62.6
5th	68.7	74.9	45.8	48.2	66.6	64.4
6th	74.6	78.1	51.7	54.9	69.3	70.3
7th	76.8	82.5	56.9	60.3	74.1	73.1
8th	82.6	84.2	64.3	66.3	77.8	78.7
9th	89.2	89.3	74.1	75.4	83.1	84.4
10th (highest)	91.5	92.6	81.9	81.9	89.5	88.3
Sample size	20,320	15,238	20,320	15,238	14,259	11,253

SOURCE: Authors' calculations using data from SIPP 2004 Panel (wave 7) and 2008 Panel (wave 11) matched to Form W-2 tax records.

NOTES: Samples consist of respondents who were full-time wage and salary workers with matched W-2 records and who had earnings that qualified for four quarters of Social Security coverage (at least \$3,880 in 2006; at least \$4,520 in 2012) and who contributed to (or participated in) a DC plan.

Sample sizes are unweighted. Estimated offer and participation rates are weighted using SIPP complex survey weights, which are adjusted to account for respondents without a match to W-2 records.

- Percentage of sample members who either reported in SIPP being offered or participating in a DC plan or whose W-2 records indicated contribution to a DC plan.
- Percentage of sample members whose W-2 records indicated that they made any tax-deferred DC plan contributions in the given year. The total amount of tax-deferred contributions is recorded in Box 12 in the W-2 record.

Table 1 shows a slight improvement in the share of workers with access to a DC plan over the study period, particularly in the lower half of the earnings distribution. For example, the share of full-time workers in the 2nd decile with access to a DC plan increased from 48.8 percent in 2006 to 55.1 percent in 2012. However, substantial shares of workers still were not offered a DC plan in 2012, particularly in the first three deciles. In the lowest earnings decile, about 62 percent of workers did not have access to a DC plan.

Probit model estimates clearly reveal an earnings gradient in the probability of being offered a DC plan even after controlling for socioeconomic and labor-market characteristics (Table 2). Holding the covariates constant, workers in the highest earnings decile were 27.8 percentage points (or 37 percent relative to the mean) more likely to be offered a plan than were those in the lowest decile (the reference category). Those in middle of the distribution (the 5th decile) were 20.7 percentage points (or 28 percent relative to the mean) more likely to be offered a plan than were those in the lowest decile.

When we account for the covariates, the coefficient of the study-year dummy shows that there was no difference between 2006 and 2012 in the probability of being offered a DC plan. Importantly, the interaction terms were not statistically significant, suggesting that the patterns of differential access by earnings decile were similar in both years.

Participation in a DC Plan

We examine DC plan participation—defined as contributing to a plan, according to W-2 records—by earnings decile, for the entire sample of full-time workers and separately for the subset of workers with access to a DC plan. Table 1 shows that a large fraction of all workers—around half—did not contribute to a DC retirement plan in either year. The gap in participation rates between low and high earners is large, ranging from about 14 percent (in 2006) and 17 percent (in 2012) for workers in the lowest earnings decile to about 82 percent (in both years) for those in the highest decile. This gap is a byproduct of the dual probabilities of whether a worker was offered a DC plan and whether, if receiving such an offer, the worker took up (that is, contributed to) the plan.

Over the study period, the participation rates for all workers increased slightly for every decile except the highest (which did not change). We also see a sharp positive earnings gradient in take-up rates,

but the differences are somewhat attenuated relative to participation rates for all workers. Overall, about 71 percent of workers offered a plan contributed to that plan in each study year. Unsurprisingly, take-up rates increased as earnings levels rose. For instance, in the lowest decile, 43.0 percent of workers offered a plan elected to contribute to it in 2006, compared with 89.5 percent of those in the highest earnings decile. A similar pattern is evident for 2012.

Table 2 presents probit model estimates of the probability of DC plan participation among all workers and among those who were offered one. We find strong evidence of an earnings gradient in participation, even after adjusting for potentially confounding covariates. Among workers overall, those in the 2nd decile were 16.0 percentage points more likely to participate than were those in the 1st decile (the reference category), whereas those in the highest decile were 48.1 percentage points more likely to participate. Among workers with access to a plan, earners in the 2nd decile were only 7.0 percentage points more likely to take up the offer than were workers in the lowest earnings decile, whereas those in the highest earnings decile were 27.0 percentage points more likely to take up the offer. Regression results also reveal that, once we control for other explanatory variables, the earnings gradient in DC participation did not change substantively from 2006 to 2012, as indicated by the interaction terms that are not statistically significant. Furthermore, there were no significant increases between 2006 and 2012 in participation rates.

As noted in the analysis section, we use a Heckman bivariate probit model, which accounts for correlation in the unobserved characteristics, to jointly estimate offer and take-up probabilities. Our estimates indicate that the unobservable characteristics in the offer equation are correlated with the unobservables in the take-up decision and the *rho* coefficient is statistically significant. This finding suggests that workers whose employers offer a DC plan are more likely to participate and that the marginal effects by earnings decile from the standard probit model represent lower-bound estimates. Furthermore, although the overall pattern by earnings decile is the same for the standard and bivariate models, we find that the magnitude of marginal effects in the bivariate model's take-up equation is greater across all earnings deciles, and that the gap between the lowest and the highest deciles (11.4–49.0 percentage points) is larger. One difference worth noting is that workers in 2006 were less likely to participate (by 4.7 percentage points) than workers in

Table 2.
Probit estimates of probability of being offered and of participating in a DC plan among full-time wage and salary workers aged 25–59, 2006 and 2012

Variable	Offer		Participation among—					
			All workers		Workers offered a plan (take-up)			
	Marginal effect	Standard error			Marginal effect	Standard error	Standard probit model	
Marginal effect			Standard error	Marginal effect			Standard error	Marginal effect	Standard error
Earnings decile								
1st (lowest) (omitted)	...	...	...	...	...	...	...	...
2nd	.121**	.013	.160**	.022	.070**	.022	.114**	.021
3rd	.167**	.011	.230**	.020	.105**	.020	.158**	.022
4th	.196**	.010	.277**	.019	.127**	.018	.207**	.023
5th	.207**	.009	.297**	.018	.143**	.017	.223**	.023
6th	.220**	.009	.345**	.017	.180**	.015	.281**	.023
7th	.236**	.008	.374**	.016	.194**	.014	.308**	.024
8th	.240**	.008	.409**	.014	.229**	.013	.370**	.023
9th	.263**	.007	.457**	.012	.258**	.011	.428**	.025
10th (highest)	.278**	.006	.481**	.011	.270**	.011	.490**	.026
Year dummy (if 2006 = 1)	.000	.017	-.019	.024	-.015	.027	-.047*	.021
Interaction terms								
Year × decile 1 (lowest) (omitted)	...	...	...	...	...	...	...	...
Year × decile 2	-.020	.024	-.005	.032	.001	.035	.012	.027
Year × decile 3	-.020	.024	.019	.032	.028	.032	.054	.027
Year × decile 4	-.018	.025	.031	.031	.031	.032	.051	.026
Year × decile 5	-.024	.025	.027	.031	.036	.031	.073	.026
Year × decile 6	-.011	.025	.011	.031	.004	.033	.051*	.026
Year × decile 7	-.035	.026	.011	.031	.020	.032	.067*	.026
Year × decile 8	.014	.025	.027	.031	.005	.033	.054*	.026
Year × decile 9	.026	.026	.027	.032	-.001	.034	.059*	.027
Year × decile 10	.007	.027	.051	.033	.041	.033	.068*	.028
Mean estimated probability	.744		.503		.737		.737	
Pseudo R ²	.192		.165		.105		...	
Rho coefficient	...		...		...		.665** .113	
χ ² (1)=	...		...		...		17.14	
Probability greater than χ ²=	...		...		...		.000	
Sample size	35,558				25,512			

SOURCE: Authors' calculations using data from SIPP 2004 Panel (wave 7) and 2008 Panel (wave 11) matched to Form W-2 tax records.

NOTES: Samples consist of respondents who were full-time wage and salary workers with matched W-2 records and who had earnings that qualified for four quarters of Social Security coverage (at least \$3,880 in 2006; at least \$4,520 in 2012) and who contributed to (or participated in) a DC plan.

Sample sizes are unweighted. Reported estimates are weighted using SIPP complex survey weights, which are adjusted to account for respondents without a match to W-2 records.

Model estimates control for demographic characteristics (sex, age, educational attainment, marital status, race/ethnicity); household characteristics (total income and homeownership); occupation, industry, firm size, and sector (public, private, nonprofit) of employment. The take-up probit model also controls for whether employer matches contributions.

... = not applicable.

* = statistically significant at the 5 percent level.

** = statistically significant at the 1 percent level.

2012 were, as indicated by the year-dummy variable. Although the bivariate model's interaction terms in the top five earnings deciles suggest a positive additional effect on the probability of participation in 2006, the effect becomes small and insignificant when taking the negative year dummy (−4.7 percentage points) into account.

Contribution Rates and Levels

Among all DC plan participants, the median contribution rate was around 5 percent of annual salary in both 2006 and 2012 (Table 3). Contribution rates generally increased by earnings decile, ranging in 2006 from 3.9 percent in the lowest decile to 7.1 percent in the highest decile. In 2012, the pattern of median contribution rates across earnings deciles was largely similar to that for 2006.

In terms of amounts (in 2012 dollars), the median annual contribution dramatically increased with earnings level in both study years. In 2006, the median contribution was \$2,981, but the differential across earnings deciles was substantial, ranging from \$638 in the lowest decile to \$12,368 in the highest one. Interestingly, median contribution amounts in 2012 were slightly lower than those in 2006 for all but the

6th decile. However, the earnings gradient was similar, with the median contribution amount increasing from \$498 in the lowest decile to \$11,902 in the highest one. In both years, for the majority (more than 70 percent) of workers contributing to a DC plan, the annual contribution level was lower than \$3,100, an amount well below annual contribution limits (\$15,000 in 2006 and \$15,500 in 2012, not including additional “catch-up” contributions that older workers are eligible to make).

Table 4 presents the OLS regression estimates of DC plan contribution rates and amounts by earnings decile. The results confirm that a steep earnings gradient exists in both indicators, even after controlling for key socioeconomic and labor-market characteristics. Compared with workers in the lowest earnings decile (the reference group), median annual contribution amounts among workers in the 2nd through 4th earnings deciles were only slightly higher (from \$341 to \$776). Among workers in the 5th through 8th deciles, median contributions exceeded those of workers in the lowest decile by \$1,074 to \$3,039, whereas workers in the highest earnings decile contributed an average of about \$9,864 more than did those in the lowest decile. The earnings gradients in each study year were largely similar, with only one interaction term revealing a

Table 3.
DC retirement plan median contribution rates and amounts among full-time wage and salary workers aged 25–59 who participated in DC plans in 2006 and 2012, by earnings decile

Decile	Median contribution rate ^a		Median contribution amount (2012 \$)	
	2006	2012	2006	2012
Total	5.2	5.0	2,981	2,717
1st (lowest)	3.9	3.2	638	498
2nd	3.3	3.2	827	786
3rd	3.9	3.5	1,192	1,028
4th	3.7	3.9	1,376	1,371
5th	4.2	4.2	1,832	1,769
6th	4.9	5.0	2,385	2,427
7th	5.2	5.0	3,065	2,894
8th	5.8	5.2	4,112	3,781
9th	6.6	6.0	6,039	5,399
10th (highest)	7.1	6.7	12,368	11,902
Sample size	10,280	8,020	10,280	8,020

SOURCE: Authors' calculations using data from SIPP 2004 Panel (wave 7) and 2008 Panel (wave 11) matched to Form W-2 tax records.

NOTES: Samples consist of respondents who were full-time wage and salary workers with matched W-2 records and who had earnings that qualified for four quarters of Social Security coverage (at least \$3,880 in 2006; at least \$4,520 in 2012) and who contributed to (or participated in) a DC plan.

Sample sizes are unweighted. Estimated contribution rates and amounts are weighted using SIPP complex survey weights, which are adjusted to account for respondents without a match to W-2 records.

a. Percentage of total annual wages contributed to a DC plan.

significant difference: Compared with workers in the lowest earnings decile, those in the 8th decile contributed \$630 more in 2006 than did those in the same decile in 2012. The contribution rates of workers in the 8th through 10th deciles were significantly higher than those of participants in the lowest earnings decile. There were no significant differences between 2006 and 2012 in contribution rates by earnings decile.⁹

Discussion

Given the shift from DB plans to voluntary DC retirement saving plans as the dominant type of employer-provided pension, retirement income in the United States increasingly depends on several outcomes pertinent to DC pensions, and earnings level plays an important role in shaping those outcomes. Public policies that seek to improve retirement security

Table 4.
OLS estimates of DC plan contribution rates and amounts among full-time wage and salary workers aged 25–59 who participated in DC plans in 2006 and 2012

Variable	Contribution rate		Contribution amount (2012 \$)	
	Coefficient	Standard error	Coefficient	Standard error
Earnings decile				
1st (lowest) (omitted)	...	...	...	...
2nd	-.405	.422	341**	113
3rd	-.369	.404	583**	117
4th	-.200	.401	776**	117
5th	-.051	.393	1,074**	122
6th	.675	.413	1,721**	141
7th	.672	.403	2,207**	147
8th	.796*	.396	3,039**	157
9th	1.646**	.404	5,175**	196
10th (highest)	1.038**	.395	9,864**	223
Year dummy (if 2006 = 1)	.666	.680	156	119
Interaction terms				
Year × decile 1 (lowest) (omitted)	...	...	...	...
Year × decile 2	-.315	.764	-7	154
Year × decile 3	-.141	.742	47	157
Year × decile 4	-.632	.722	-11	154
Year × decile 5	-.213	.724	146	161
Year × decile 6	-.709	.730	-70	179
Year × decile 7	-.147	.729	209	197
Year × decile 8	.391	.724	630**	212
Year × decile 9	.089	.722	404	250
Year × decile 10	-.206	.704	-125	280
Mean dependent variable		6.370		5,016
R ²		0.124		0.498
Sample size		18,300		

SOURCE: Authors' calculations using data from SIPP 2004 Panel (wave 7) and 2008 Panel (wave 11) matched to Form W-2 tax records.

NOTES: Sample consists of respondents who were full-time wage and salary workers with matched W-2 records and who had earnings that qualified for four quarters of Social Security coverage (at least \$3,880 in 2006; at least \$4,520 in 2012) and who contributed to (or participated in) a DC plan.

Sample size is unweighted. Reported estimates are weighted using SIPP complex survey weights, which are adjusted to account for respondents without a match to W-2 records.

Model estimates control for demographic characteristics (sex, age, educational attainment, marital status, race/ethnicity); household characteristics (total income and homeownership); occupation, industry, firm size, and sector (public, private, nonprofit) of employment; and whether employer matches contributions.

... = not applicable.

* = statistically significant at the 5 percent level.

** = statistically significant at the 1 percent level.

should recognize how DC retirement plan outcomes vary across the earnings distribution. It is important to understand who has access to DC plans, who participates in them, and how much they contribute.

We find clear evidence of a steep earnings gradient in several DC plan outcomes, even after accounting for an array of socioeconomic and labor-market covariates. Access, participation, and contribution levels increase as earnings increase, in most cases monotonically. We find that earners in the bottom half of the earnings distribution are not only less likely to be offered a plan but are also less likely to participate when offered one. According to our estimates using W-2 records, less than 50 percent of all full-time wage and salary workers with earnings below the median participate in a DC plan and a substantial proportion of workers with access to a plan (about 29 percent) elect not to participate.

Our analysis suggests that low earners, and even workers in the middle of the earnings distribution who do participate, save lower dollar amounts and contribute smaller shares of their earnings. Because low earners receive relatively higher preretirement-income replacement rates from their Social Security benefits, one might argue that they have less need to save through DC-type plans. However, low earners are more likely to fall into poverty during retirement (Favreault 2009; Munnell 2004), and Social Security may be the only source of income for many of them.

A worker with low pension savings over long stretches of his or her working life would likely depend primarily on Social Security benefits in retirement and would thus be most sensitive to any future Social Security policy changes. Moreover, even among the majority of workers who save for retirement, the typically low annual contributions, even if sustained for many years, may not yield resource levels in later life that some may expect. For example, the median annual contribution for our sample was around \$3,000. Assuming 30 years of contributions at that level and disregarding compound interest, inflation, and preretirement withdrawals, a worker would accumulate DC plan savings ranging from about \$90,000 (assuming no employer contributions) to \$135,000 (assuming 50 percent employer contributions).¹⁰ If those account balances were drawn down in monthly payments over 20 years, each monthly payment would be between \$375 and \$562.¹¹

We also find consistency in the earnings gradient in DC plan outcomes for 2006 and 2012, despite changes in pension and economic conditions. Regression

analysis reveals no statistically significant differences between study years in plan offer rates, participation rates, and contribution patterns.

Limitations and Future Directions

This study is not without limitations. For instance, our analysis shows the cross-sectional relationship between earnings and DC pension outcomes rather than longitudinal patterns. Workers with higher earnings prospects or those with changing earnings levels might alter their DC plan saving behaviors over time. We estimated a series of sensitivity tests to explore possible differences across age groups (using age-stratified models), which showed results similar to those presented here. In addition, whether the decision on how to invest DC plan savings varies by earnings level is an important issue not addressed in this article. Our analysis also does not explore possible interactions between pension design features (such as employer matching of employee contributions and account withdrawals) and earnings levels. Although we control for important covariates, other unmeasured variables could confound the correlations. The extent to which savings in contributory retirement plans vary by level of household resources (and the role of spousal earnings) is another factor not yet explored.

Notes

¹ Plan take-up refers to participation among workers who have been offered a plan, as opposed to participation among workers overall.

² However, employees generally must satisfy a years-of-service requirement (often as long as 5 years) to be vested in the plan.

³ The 2006 Pension Protection Act enables employers to enroll their employees automatically in a DC plan at a default contribution rate, from which employees can opt out or change the rate. In DC plans, employees bear the risks of investing and managing the account prior to and during retirement; they also bear the longevity risk. In DB plans, employers bear the investment and longevity risks.

⁴ Of course, employees who do not have access to a retirement plan through their employer can save through individual retirement accounts (IRAs). However, workers with lower disposable income are less likely to use a non-workplace saving plan (Holden and Schrass 2017, Figure 5).

⁵ Access to these data is restricted and based on agreements between SSA and the Census Bureau (Davies and Fisher 2009; Olsen and Hudson 2009). The data are accessed at a secured site and undergo disclosure review before they are approved for release.

⁶ SIPP defines full-time work as 35 or more hours per week; we use the same definition here.

⁷ Drawing from previous work (Couch, Tamborini, and Reznik 2015), we use logistic regression to estimate the probability of a successful match, controlling for socioeconomic characteristics such as age, education, marital status, and race/ethnicity; we then multiply SIPP person-weights by the inverse of the match probability.

⁸ Wages in 2006 are also adjusted to 2012 dollars.

⁹ We also used a two-stage Heckman selection model to estimate the probabilities of plan take-up and contribution amount (or contribution rates) using the functional form for identification and exclusion restriction in the first stage and found that the *rho* coefficient (the correlation of the error terms in the two equations) was not statistically significant. Hence, Table 4 presents the standard OLS regression estimates rather than the Heckman selection model estimates.

¹⁰ Assuming 30 years of consistent contributions ignores how employment and earnings shocks affect a person's retirement savings (Dushi and Iams 2015). This example would be consistent with an individual investor whose investment returns keep up only with inflation, which might reflect such common mistakes as buying high and selling low (Malkiel and Ellis 2013, Chapter 4).

¹¹ These amounts are consistent with estimates based on Survey of Consumer Finances data (Government Accountability Office 2015).

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