Social Security
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Social Security Bulletin

Vol. 70, No. 1, 2010

IN THIS ISSUE:

The *Social Security Bulletin* (ISSN 0037-7910) is published quarterly by the Social Security Administration, 500 E Street, SW, 8th Floor, Washington, DC 20254-0001. First-class and small package carrier postage is paid in Washington, DC, and additional mailing offices.

The *Bulletin* is prepared in the Office of Retirement and Disability Policy, Office of Research, Evaluation, and Statistics. Suggestions or comments concerning the *Bulletin* should be sent to the Office of Research, Evaluation, and Statistics at the above address. Comments may also be made by e-mail at ssb@ssa.gov or by phone at (202) 358-6267.

Paid subscriptions to the *Social Security Bulletin* are available from the Superintendent of Documents, U.S. Government Printing Office. The cost of a copy of the *Annual Statistical Supplement to the Social Security Bulletin* is included in the annual subscription price of the *Bulletin*. The subscription price is $56.00 domestic; $78.40 foreign. The single copy price is $13.00 domestic; $18.20 foreign. The price for single copies of the *Supplement* is $49.00 domestic; $68.60 foreign.

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Vol. 70, No. 1, 2010

Social Security Administration
Office of Retirement and Disability Policy
Office of Research, Evaluation, and Statistics

SOCIAL SECURITY BULLETIN

Volume 70 • Number 1 • 2010

Articles

Other

Low Levels of Retirement Resources in the Near-Elderly Time Period and Future Participation in Means-Tested Programs

by Alexander Strand*

This article describes the de facto *standards of low income and resources reflected in the eligibility standards of the largest means-tested programs that serve the elderly and then applies these standards to a near-elderly cohort. Through juxtaposing retirement resources in the near-elderly time period with program participation in the elderly time period, the author indirectly examines some of the changes between the two time periods that could affect program eligibility, including spend-down of resources and marital dissolution. Retirement resource levels are estimated using the Survey of Income and Program Participation, and subsequent participation in one of the means-tested programs—Supplemental Security Income (SSI)—is examined using matched administrative records. Although spend-down of resources is shown to occur for only 8.7 percent of eventual SSI program participants, it is more common in the part of the near-elderly population that faces the greatest incentive to decrease resource levels.*

Introduction

This article examines the segment of a near-elderly cohort that has low retirement resources to answer three research questions. First, who are the people who have very low levels of retirement resources in the near-elderly time period? These individuals are described in terms of demographics, current financial situation, and lifetime labor force attachment. Second, what is the relationship between having low retirement resources in the near-elderly time period and participation in the Supplemental Security Income (SSI) program upon reaching age 65? Third, what changes in the years just before turning age 65 can affect future eligibility in means-tested programs? Two potential changes are examined: spend-down of resources and marital dissolution.

Rather than using current-period income, a broad measure of retirement resources is used, which includes wealth holdings and the potential Social Security benefit for which the person would be entitled upon claiming. The focus here is on the population whose levels of income and resources would make them eligible for one or more of the means-tested programs that serve the elderly, if they were otherwise eligible.[1]

I establish unified eligibility criteria under which an individual could be financially eligible for any of the three largest means-tested programs. The three programs are considered together because they may create joint behavioral incentives. The unified criteria represent upper-bound eligibility measures for thresholds that vary across the three programs and, in some cases, also across states.

These thresholds are used to examine potential future financial eligibility for means-tested programs among those in a near-elderly cohort. This cohort has generally not reached the age of categorical eligibility for these programs,[2] but financial eligibility is evaluated with an eye toward future eligibility and possible participation. Eligibility in the near-elderly time period

Selected Abbreviations

DI	Disability Insurance
FRA	full retirement age
SIPP	Survey of Income and Program Participation
SNAP	Supplemental Nutrition Assistance Program
SSI	Supplemental Security Income

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is compared with later receipt of benefits from one of the three programs, the SSI program.

I reach several broad conclusions about the near-elderly population with low levels of retirement resources. Individuals in this group have had low labor force attachment over the course of their lifetimes, both in terms of the frequency and level of earnings. For about half, the lifetime earnings patterns were affected by disability. Further, the near-elderly population with low retirement resources has different marital histories than the remaining near-elderly population. This affects well-being in both the near-elderly and elderly time periods. Not only can the presence of a spouse affect family income and poverty status in the near-elderly time period, but the earnings history of a spouse can also increase the potential Social Security benefit.

Among those with low retirement resources in the near-elderly time period, the rate of SSI payment receipt upon reaching age 65 varies by a number of financial factors. Participation rates are far higher for those with very low levels of potential Social Security benefit amounts or low resource level amounts in the current period, even when compared with other people who would be financially eligible for SSI. Participation rates are even higher for people who additionally lack a defined benefit pension. These trends indicate that many people who would be eligible for means-tested programs upon reaching age 65 already have very low levels of retirement resources in the near-elderly time period. In fact, among the group that receives SSI payments upon reaching age 65, the vast majority are already financially eligible in the near-elderly time period.

I examine two kinds of behavioral changes that could occur between the near-elderly time period and age 65 and that may be of interest to policymakers: spend-down of resources, which could affect program eligibility; and divorce, which could affect both program eligibility and the potential Social Security benefit amount. Of these two possible behavioral changes, I demonstrate, using a counterfactual illustration, that the potential reach of changes in marital status is far greater than the potential reach of spend-down of resources in terms of the numbers of near elderly who could gain eligibility through behavioral changes. This is particularly true of near-elderly women. In contrast to this hypothetical result, the findings indicate that gaining eligibility is far more common through spend-down of resources. This occurs about four times as frequently as gaining eligibility through divorce.

Confirming earlier studies, I find that declining resource levels are common among the very narrow part of the near-elderly population that could gain SSI eligibility through a modest reduction in resource levels. This is observed among the near elderly who participate in SSI upon reaching age 65, and it is not observed among people with similar resource levels who do not.

The next section of the article presents background issues that are relevant to the research questions, followed by a description of how the Survey of Income and Program Participation (SIPP) is employed to estimate program eligibility and how the matched administrative data of the Social Security Administration (SSA) are employed to examine SSI participation. Finally, the results are presented.

Background

Three aspects of program eligibility are discussed in this section, including the thresholds that are relevant to means-testing, using the thresholds to estimate eligibility for households in a sample, and the incentives provided by means-testing. Each aspect is discussed in turn.

Program Thresholds

The three largest means-tested programs serving the elderly are Medicaid, the Supplemental Nutrition Assistance Program (SNAP),[3] and SSI. The Medicaid program subjects the largest number of elderly households to means-testing, followed by SNAP and SSI (Chen and Lerman 2005). The maximum income and resource levels that allowed for eligibility in these three programs in 2001 are given in Table 1.[4] Along with the nominal income thresholds, the table also presents the effective income thresholds, which sum the income thresholds and the primary unearned income exclusion.[5, 6]

Table 1 represents a simplified view of program eligibility standards. The primary source of complexity is state variation in eligibility standards. For Medicaid, there is state variation in both the income and resource thresholds. For SSI, variation results from the differing thresholds of state supplemental programs. For SNAP, both the income and resource thresholds are uniform across states.[7] Where there is state variation for any of the three programs, the thresholds are summarized by averaging across states using the number of elderly SSI recipients as weights. Thus, the figures in the table represent the thresholds that are relevant to the average elderly SSI recipient.

Table 1.
Maximum income and resource levels for eligibility for the means-tested programs that serve the elderly, 2001

Program	Individual threshold	Couple threshold	Primary unearned income exclusion	Effective individual threshold [a]	Effective couple threshold	Ratio of couple to single
			Monthly income thresholds			
Medicaid	632	947	[b] 20	652	967	1.48
SNAP [c, d]	716	968	134	850	1,102	1.30
SSI	593	933	20	613	953	1.56
			Monthly resource thresholds			
Medicaid	2,232	3,247	. . .	. . .	. . .	1.45
SNAP [c]	3,000	3,000	. . .	. . .	. . .	1.00
SSI	2,000	3,000	. . .	. . .	. . .	1.50

SOURCES: Bruen, Wiener, and Thomas (2003); Department of Agriculture, Food and Nutrition Service; and the Social Security Administration.

NOTES: See the Technical Appendix for more information.

. . . = not applicable.

a. The effective thresholds are the sum of the income thresholds and the primary unearned income exclusions.

b. The Medicaid income exclusion figure assumes that SSI eligibility is the path to Medicaid eligibility. Variation in income exclusions corresponding to other eligibility paths is not considered here.

c. SNAP was previously called the Food Stamp Program until October 2008. The author uses the term SNAP even though the data used in this analysis refer to the Food Stamp Program.

d. SNAP income and income exclusion figures assume that the individual or couple are the only household members.

Another source of complexity is the links in eligibility across programs. State Medicaid programs are required to cover SSI recipients, and SNAP has automatic eligibility for households that are entirely comprised of beneficiaries of certain other programs. However, some states have Medicaid thresholds that are less restrictive than SSI thresholds, and some have thresholds that are more. Because the goal is to define thresholds under which an applicant could be eligible in *any* of the three programs, the more restrictive thresholds are not considered, while the less restrictive thresholds are included in the averages presented in the table.[8] Thus, the figures represent upper-bound estimates of the thresholds that are relevant to near-elderly individuals.

One salient feature of Table 1 is that the income and resource thresholds have similar orders of magnitude across programs. In this respect, the eligibility requirements are similar for the three programs. Although the thresholds are similar, some differences are notable. The income thresholds are highest for SNAP. Further, the differences are exacerbated when the effect of the primary unearned income exclusions are considered. The SNAP income exclusion is substantially larger than that for the other programs. This leads to the higher effective thresholds shown in the table.

The resource thresholds are more difficult to compare. The SSI thresholds are $2,000 for individuals and $3,000 for couples. This standard is also followed by Medicaid in the majority of states; however, some states have higher "poverty-related" resource thresholds. Of the six states that had higher resource thresholds in 2001, two populous states,[9] Florida and Pennsylvania, used thresholds that were 2.0 or 2.5 times higher (Bruen, Wiener, and Thomas 2003). This has a disproportionate effect on the resource threshold figures given in Table 1, which are weighted averages. By contrast, SNAP uses a resource threshold of $3,000 for households containing an elderly (aged 60 or older in this case) member.

Considering all the thresholds together, SNAP generally provides the highest income and resource levels under which a person could be eligible for benefits in any of the three programs. The exception is the resource threshold for couples for which Medicaid is the highest. Thus, the highest of these levels are used to define low levels of income and resources for

the indicators used in this article: $850 and $1,102 of monthly income for individuals and couples, respectively; and $3,000 and $3,247 of resources for individuals and couples, respectively.[10]

Measurement of Eligibility and Potential Benefits

Several difficulties arise when using a sample survey to estimate program eligibility and potential benefit amounts. One issue arises from the possibility that reported income amounts (and, thus, estimated eligibility and benefit amounts) may not be exogenous with respect to program application. For example, program participation or intent to participate in the future may lead to withdrawal from the labor force or a decline in work hours. Neumark and Powers (2000) find empirical evidence that SSI program rules lead to a decline in labor supply for men aged 60–64. Further, the SSI program requires applicants to file for all other kinds of benefits for which they are potentially eligible, including Social Security and pension benefits. Thus, the event of filing for SSI payments could lead to changes in income and consequent changes in eligibility and benefits for SSI, SNAP, and Medicaid.

Another difficulty when using sample surveys to estimate eligibility arises from the timing of the receipt of earned and unearned income. Variation in income from month to month can lead to changes in program eligibility and benefit amounts. This is partially accounted for by SSI and SNAP rules, which disregard $30 of "irregular" or "infrequent" income per calendar quarter. Still, estimates of program eligibility and benefit amounts depend on the month of observation in the survey and the ability of the researcher to identify irregular income. Farrell and others (2003) examine the relationship between monthly variation in income and participation in SNAP, and Elder and Powers (2007) explore this relationship for the SSI program. In this study, the relationship is complicated by the fact that eligibility is estimated in the near-elderly period, and program participation is observed in a subsequent period.

Elder and Powers (2004) address these difficulties by using only Social Security benefit amounts when measuring income and the corresponding program eligibility among the elderly. They discuss several theoretical advantages of using this measure. First, it minimizes endogeneity problems because Social Security benefit amounts are not affected by the claiming of means-tested benefits. Second, it removes measurement error that is due to irregular or infrequent income. And third, this measure reduces recall biases because Social Security benefits are constant across months except for cost-of-living increases.

In addition, Elder and Powers (2004) present empirical evidence that their measure leads to less measurement error. To accomplish this, they compute SSI payment amounts using all reported income and also using only Social Security income, and then they compare these figures with the reported SSI payment amounts. Using all reported income, the estimated SSI payment differs from the survey-reported amount by $247, on average. When using only Social Security income, by contrast, the difference is only $109.[11] Although this difference is notable, the value of this evidence is diminished by the fact that Elder and Powers use a very imprecise benefit simulator; other authors are able to simulate benefit amounts to within $1 on average (Davies and others 2001/2002).

The issues previously discussed also generally apply to measuring countable resources. As with income, resources may not be exogenous with respect to program participation. Neumark and Powers (1998) find empirical evidence that people who are likely to participate in SSI reduce their savings as they approach age 65. Unfortunately, there is no equivalent solution to the one discussed earlier for income. This highlights the importance of spend-down issues between the near-elderly and elderly time periods.

Program Incentives

The literature about the incentives associated with means-testing has focused on effects on savings behavior and labor force participation. Savings behavior is the greater concern partly because labor force participation is less common among the elderly and near elderly. Also, means-tested programs treat resources more punitively than income. For example, if the resources of the elderly were to be annuitized, Radner (1990) estimates that the ratio of resource holdings to annual annuity income would be about 15 to 1. Thus, a resource holding that is near the thresholds, $3,000, for example, translates into annual annuity income of $200, or $17 per month. This is far less than the comparable income threshold.[12]

Although some research addresses the effects of resource testing on savings behavior over the entire life cycle,[13] the most relevant research focuses on behavior near the ages when people gain categorical eligibility for the programs, that is, near the full retirement age (FRA).[14] For the Medicaid program, Gruber and Yelowitz (1999) find that eligibility has a negative

association with savings. Further, this negative association is exacerbated in states where Medicaid eligibility involved a resource test. For the SSI program, Neumark and Powers (1998) find reduced savings among likely beneficiaries approaching the traditional Social Security FRA. For SNAP, I am unaware of any similar research. In this article, I examine resource spend-down between the near-elderly and elderly time periods for future SSI recipients.

Means-tested programs may also provide incentives related to the forming and dissolution of marriages. For example, in many cases, the SSI program would provide a higher benefit to two unmarried adults than to two otherwise identical adults who are married (Balkus and Wilschke 2003). Also, the methods for determining Social Security benefit amounts have marriage and divorce incentives inherent in them, which will be discussed later.

Methods

This study uses a 1996 SIPP subsample of near-elderly people who have not reached the traditional FRA, and then examines SSI participation behavior in the first 6 months after reaching the traditional FRA. Observation of participation at later ages is not possible for all of this sample. Also, similar matched data for Medicaid and SNAP are not currently available.

The analysis subsample was born from November 1931 through March 1941. Thus, the subsample represents a prewar cohort (at least from the American perspective). As of the reference period in November 1996, this subsample was 55½ to 65 years of age. Correspondingly, the subsample reached age 65 from November 1996 through March 2006. Because categorical eligibility for SSI based on age occurs at age 65, the first payment on this basis could be received the following month. Thus, the window of potential SSI payment receipt, which is referred to here as the first 6 months after reaching age 65, is from December 1996 through May 1997 for the oldest in the subsample and from April 2006 through September 2006 for the youngest in the subsample.

This study defines low retirement resources as income and resources[15] in November 1996 that are less than the highest income and resource thresholds presented in Table 1, that is, the near-elderly time period. I follow Elder and Powers (2004) in counting only potential Social Security income and treating other income as irregular. In this study, there is no way to estimate other income for the elderly time period. The measure of resources follows the concept of "countable resources" used in the SSI program and is defined more precisely below.

Although this is an individual-level analysis, program eligibility is evaluated on a couple basis if a spouse exists. Therefore, the potential Social Security benefit and countable resources of a person's spouse are included in the measures that are compared with the thresholds for couples given in Table 1.[16]

I am also able to improve the income measure used by Elder and Powers (2004) by using Social Security income amounts from administrative data rather than the self-reported amounts the authors used. In addition, I use the Summary Earnings Record of earnings histories to calculate potential Social Security benefit amounts and corresponding SSI payment amounts for the entire sample, rather than just for observed beneficiaries.

The potential Social Security benefit amount is a snapshot as of November 1996. From this time to the time of the start of Social Security benefits, further wage- and/or price-indexing would be applied for 0 to 9 years; however, the potential benefit is measured as of the reference period. As a result of ignoring this additional indexing, there will be some false positive indications of low income, but this will lead to no false negative indications (because the additional indexing can only increase the potential Social Security benefit amount).[17] In other words, the low-income measure represents an upper-bound measure of potential income eligibility.

The assumptions underlying the calculation of the potential Social Security benefit amount are compatible with an upper-bound interpretation of the measure. The calculation assumes that Social Security benefits begin at age 62 and applies the corresponding early retirement reduction.[18] Powers and Neumark (2003) have shown that there is little incentive for people who expect to be eligible for means-tested programs in retirement, particularly SSI, to delay the start of Social Security benefits beyond the earliest possible date. Further, the calculation of the benefit amount is based on the assumption that observed marriages meet the requirements for spousal benefits.[19]

The marital status assumption is relaxed later in the analysis when potential Social Security benefit amounts are also calculated for the case of a hypothetical divorce. The calculation illustrates the effect of a couple becoming two individuals with no other changes. This calculation also assumes that marriages meet the requirements for spousal benefits.

The countable-resources measure is also a snapshot as of November 1996. The means-tested programs generally count liquid resources such as checking account balances, savings bonds, 401(k) and KEOGH accounts, stocks, bonds, money market accounts, vehicles not needed for employment, and the cash value of life insurance policies. These items are included in the low countable-resources measure, except the cash value of life insurance (which is not measured in the 1996 SIPP). The value of the primary residence is not counted as a resource. For the case of a hypothetical divorce, the resources of the couple are divided. Further, liabilities are generally not part of the countable-resource measure. Although resources could be used to pay off liabilities, it is not assumed that this occurs.

Results

This section progresses from a description of the population with low retirement resources in the near-elderly time period to an analysis of the relationship between low retirement resources in the near-elderly time period and participation in the SSI program upon reaching age 65. Subsequently, I examine behavioral changes between the near-elderly and elderly time periods that could affect eligibility for means-tested programs.

Population with Low Retirement Resources

The population with low retirement resources is defined as the group with both low potential Social Security benefits and low countable resources. However, it is also illuminating to separately examine the groups with low potential benefits only and low countable resources only. In this section, I examine the demographic and economic differences across groups based on cross-sectional data from the SIPP. In addition, the analysis is extended by using matched administrative data to examine labor force and program participation[20] over the lifetime.

The proportions of people who have low potential Social Security benefits or low countable resources in November 1996 are shown in the first panel of Table 2. The groups are presented in mutually exclusive categories including low potential benefits only, low countable resources only, both low potential benefits and low countable resources, and neither low potential benefits nor low countable resources (the comparison group). Approximately half of the sample cohort is in the "neither condition" category. Within the remaining sample, low potential benefits are more prevalent than low countable resources. The proportion of people with low potential benefits, including both the first column (low potential benefits only) and the third column (both conditions), is around 45 percent. By comparison, the proportion of people with low countable resources, including both the second column (low resources only) and the third column (both conditions) is around 30 percent. Accordingly, by these measures, the more restrictive measure is low countable resources.

The characteristics of the four analysis groups are given in the remaining panels of Table 2. The central result is that people with low potential Social Security benefit amounts are clearly different from people who do not have low potential benefit amounts. For the demographic characteristics given in Table 2, there is a general pattern that the two columns representing low potential benefit amounts (the first and third columns) are similar to each other, and both are different from the other columns. For example, the low potential benefit category and the both conditions category have the highest proportion of women.[21] Similarly, these two categories have relatively high proportions of persons in the three unmarried categories, including widowed, divorced, and never married.

There are also differences in immigration status. The groups with low potential benefit amounts and the both conditions category have a higher proportion of persons born outside the United States. Immigration is related to earnings patterns through a number of social and economic factors (see Bean, Stevens, and Van Hook (2003) for a discussion). One factor is that the date of immigration has a mechanical effect on the potential benefit amount because it determines the number of potential years of covered earnings in the United States. Only small differences of this sort are observed in this particular sample, however. A measure of the potential years of covered employment is given in Table 2 as the "number of years in the United States." Although the difference between the neither condition and the both conditions categories is statistically significant, the difference is only 2 years.

There are also differences in earnings histories as measured in Social Security's administrative records. This is shown by the differences in the average indexed monthly earnings (AIME), which is a primary input into Social Security's benefit formula.[22] The fact that the two categories with low potential benefits have lower AIMEs is true by definition; however, the composition of the differences is interesting. One question follows: Are the differences the result of

Table 2.
Sample characteristics and means of variables, by category, November 1996

Characteristic	Low potential benefit only	Low resources only	Both conditions	Neither condition
		Sample characteristics		
N (unweighted)	1,209	386	1,361	2,420
Weighted percentage of population	22.4	7.3	22.8	47.4
Population (millions)	4.3	1.4	4.4	9.2
		Demographic variable means		
Age (years)	60.5	60.2	60.1	60.0
	(2.7)	(2.7)	(2.7)	(2.7)
Hispanic (%)	6.0	7.1	14.9	2.8
	(23.8)	(25.4)	(35.7)	(16.6)
Black (%)	7.1	13.9	24.9	3.6
	(25.7)	(34.6)	(43.2)	(18.6)
Women (%)	61.2	38.5	58.8	46.0
	(48.8)	(48.7)	(49.2)	(49.9)
Married (%)	58.6	89.0	34.7	93.1
	(49.3)	(31.3)	(47.6)	(25.3)
Widowed (%)	16.1	a	18.9	1.3
	(36.7)	. . .	(39.1)	(11.3)
Divorced (%)	17.5	7.2	29.4	4.0
	(38.0)	(25.8)	(45.6)	(19.6)
Never married (%)	6.2	a	10.4	1.1
	(24.2)	. . .	(30.5)	(10.4)
Born outside United States (%)	11.0	7.4	18.1	5.1
	(31.3)	(26.2)	(38.5)	(21.9)
Number of years in United States	58.3	58.3	56.8	58.8
	(7.5)	(7.3)	(8.5)	(6.0)
		Earnings variable means		
Average indexed monthly earnings	957	1,924	726	2,064
	(702)	(1,067)	(639)	(1,228)
Number of years with earnings	25.4	33.7	23.2	33.4
	(12.1)	(11.0)	(12.9)	(11.4)
Highest annual earnings (wage-indexed)	27,667	39,107	21,607	41,806
	(13,766)	(16,481)	(12,965)	(17,719)
Earnings above average (years)	6.0	18.2	3.4	18.9
	(7.8)	(13.4)	(6.4)	(14.3)
Earnings above the taxable maximum (years)	1.4	7.3	0.8	9.7
	(3.1)	(8.6)	(2.5)	(11.3)
Total family income (current month)	3,498	3,303	1,857	5,427
	(3,792)	(2,126)	(1,764)	(5,016)
Poverty indicator (current month, %)	9.5	7.3	31.7	2.0
	(29.4)	(26.1)	(46.6)	(14.1)

(Continued)

lower earnings or a greater dispersion of earnings? Further, a greater dispersion of earnings could be due to less frequent employment or less consistent earnings levels.

The means of the earnings variables given in Table 2 show that low potential Social Security benefits are due to a combination of low earnings and low frequency of earnings. The earnings level is illustrated by the highest annual earnings over the lifetime, the number of years with earnings above average, and the number of years with earning above the maximum level that is subject to the Social Security payroll tax. The differences in means for these variables are all statistically significant. For people with low potential Social Security benefits, the most common experience is to have an earnings history where earnings peak in the vicinity of $20,000–$30,000 in 1996 dollars. This is shown in the two panels on the left side of Chart 1.

Table 2.
Sample characteristics and means of variables, by category, November 1996—*Continued*

Characteristic	Low potential benefit only	Low resources only	Both conditions	Neither condition
		Program participation variable means (%)		
SSI participant upon reaching age 65	1.8	0.8	19.8	0.0
	(13.2)	(8.9)	(39.9)	(2.9)
SSI recipient in current month	1.0	0.1	16.6	0.0
	(10.1)	(3.6)	(37.2)	(1.7)
Ever a disability beneficiary—either DI or SSI [b]	13.5	23.4	47.2	9.1
	(34.2)	(42.4)	(43.4)	(28.8)
Ever a DI beneficiary [c]	10.8	22.3	25.3	8.9
	(31.1)	(41.7)	(43.5)	(28.5)
Ever an SSI recipient [d]	4.4	3.8	38.1	0.6
	(20.4)	(19.2)	(48.6)	(8.0)
Social Security beneficiary (current month)	27.0	34.8	35.7	22.2
	(44.4)	(47.7)	(47.9)	(41.6)

SOURCE: 1996 SIPP matched to Social Security administrative records.

NOTES: Sample members are aged 55–64.

Standard deviations are in parentheses; . . . = not applicable.

a. Estimate not shown because of inadequate sample size.

b. Data obtained from the Master Beneficiary Record and Supplemental Security Record.

c. Data obtained from the Master Beneficiary Record.

d. Data obtained from the Supplemental Security Record.

In comparison, for people who do not have low potential earnings, the most common experience is to have an earnings peak around $60,000 or higher (see the two panels on the right side).

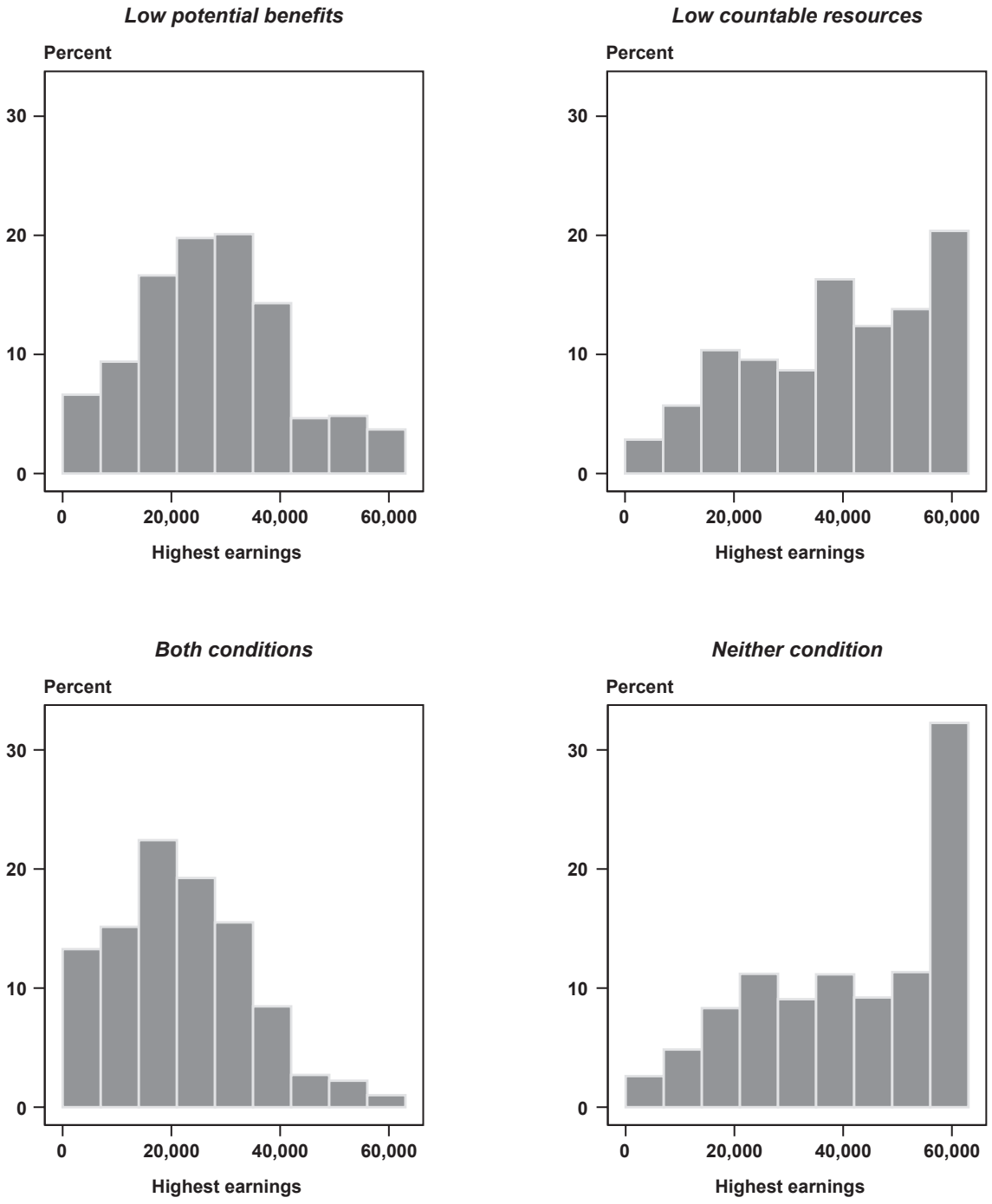
The average frequency of earnings is shown by the number of years with positive earnings (Table 2). This measure is also lower for people with low potential Social Security benefits. Chart 2 shows that there is no typical experience for this group; that is, the distribution of the number of years with positive earnings resembles a uniform distribution (in the two panels on the left side). This is compared with a highly skewed distribution for people who do not have low potential benefits (the two panels on the right side). The most common experience for this group is to have 40 or more years of positive earnings.

The results shown so far illustrate that the group with low potential Social Security benefits differs from the other groups by a number of demographic and earnings history measures. Differences within this group are examined here. Among persons with low potential benefits, what distinguishes those who have low retirement resources in general—that is, those who have low potential benefits and also low countable resources—from those who do not? One can point to disability, marital history, and the income of other family members as major factors.

Disability is a major factor in having low retirement resources in the near-elderly time period, as shown in the last panel of Table 2. Within the group with low potential benefits, there is a notable difference in disability history. Those who also have low countable resources have a much higher rate of having received disability benefits in the past (either from the DI or SSI programs). The 47.2 percent who have received disability benefits from the Social Security Administration breaks down into 25.3 percent who have received DI and 38.1 percent who have received SSI (some have received both). Also, in the current month alone, 16.6 percent received SSI. This is roughly comparable to the percentage that will receive SSI upon reaching age 65 and suggests that disability during the working ages influences participation in SSI after reaching age 65 (when disability is not required for categorical eligibility). In fact, 61.4 percent of those who participate in SSI upon reaching age 65 were previous SSI participants.

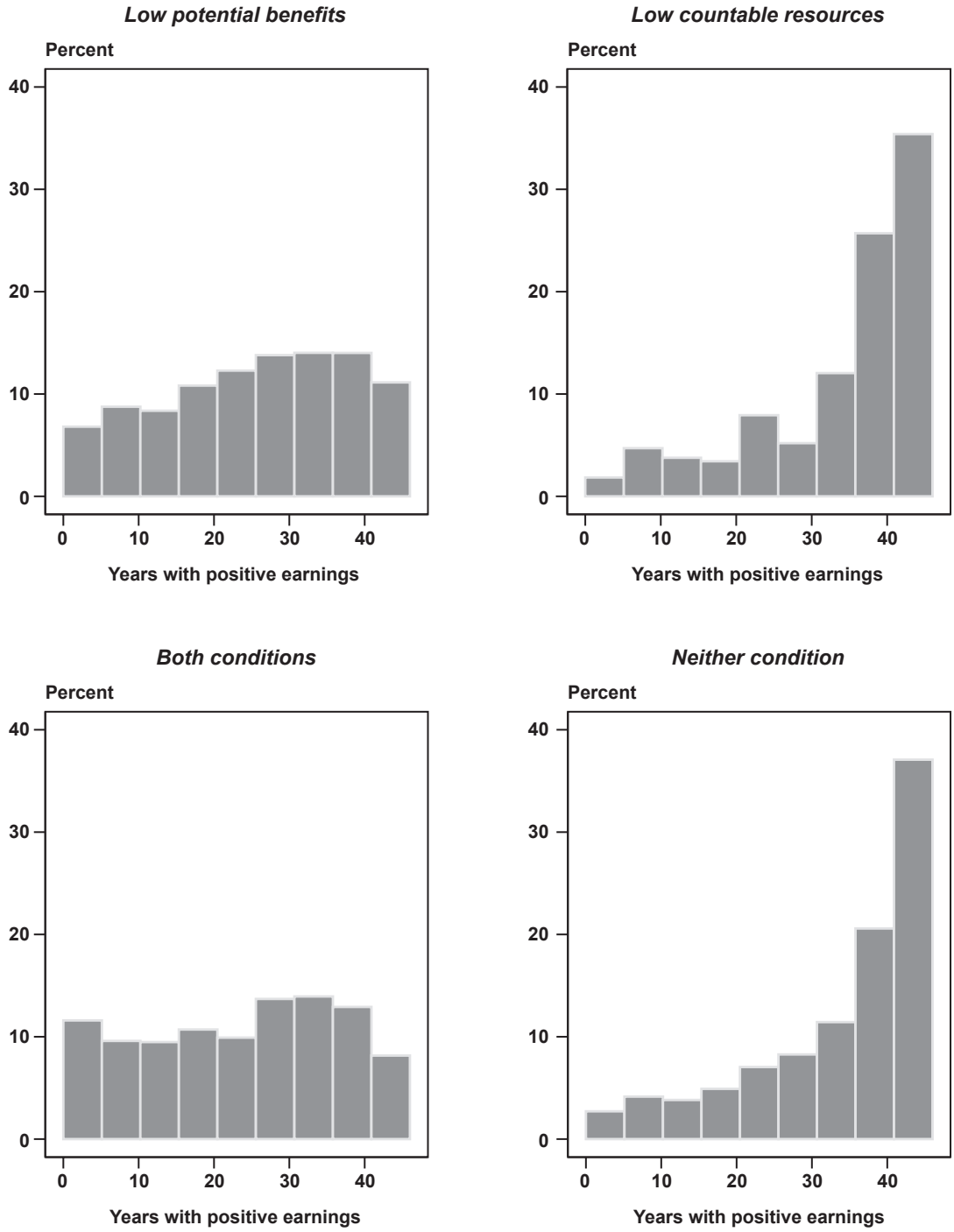
Marital history is also a factor in having low retirement resources in the near-elderly time period. Within the group with low potential benefits, the group that

Chart 1.
Distribution of highest annual earnings over the lifetime for groups with low potential Social Security benefit amounts or low countable resources



SOURCE: 1996 SIPP matched to the Summary Earnings Record.
NOTE: Sample members are aged 55–64. Earnings are wage-indexed to 1996 levels.

Chart 2.
Distribution of number of years with positive earnings for groups with low potential Social Security benefit amounts or low countable resources



SOURCE: 1996 SIPP matched to the Summary Earnings Record.
NOTE: Sample members are aged 55–64.

also has low countable resources is less often currently married and more often divorced or never married.

Other family income is also a factor. Within the group with low potential benefits, the group that also has low countable resources has much lower total family income, which leads to a much higher poverty rate for this group (31.7 percent compared with 9.5 percent for the group with only low potential benefits).

In summary, the group with low potential Social Security benefits in the near-elderly time period differs from the comparison groups by a number of demographic and economic variables. This group's lower potential Social Security benefit is due to both lower levels of earnings as well as lower frequency of earnings. For the group that also has low countable resources in the near-elderly time period, disability, marital history, and other family income are highlighted as contributing factors.

SSI Participation After Age 65

In the near-elderly cohort analyzed in this study, an estimated 972 thousand out of the total cohort of 19.3 million participated in SSI within 6 months of reaching age 65.[23] Of these eventual participants, 98.1 percent had a low potential benefit at the time of the survey during the preretirement period.[24] Thus, low potential benefits effectively define the universe of possible SSI recipients upon reaching the age for categorical eligibility, but around 2 percentage points of the eventual participants had higher potential benefits as measured in the near-elderly time period. This is due to changes in status between the near-elderly period and the period after reaching the traditional FRA. For countable resources, changes in status are slightly more common; 91.3 percent of eventual participants had low countable resources at the time of the survey during the preretirement period.

The participation rates for the four different population groups are given in Table 2. For the group with both low potential benefits and low countable resources, 19.8 percent are observed to eventually participate in SSI, which is considerably higher than the other categories. These figures are not comparable to other participation rate estimates because the measures used in this study are based on potential eligibility for any of the three largest means-tested programs, and SSI is not the most restrictive of the three, as shown in Table 1. Thus, some people who are ineligible for SSI are included in the denominator of this ratio. Indeed, estimated SSI participation rates for the elderly are considerably higher than the figures given here.[25]

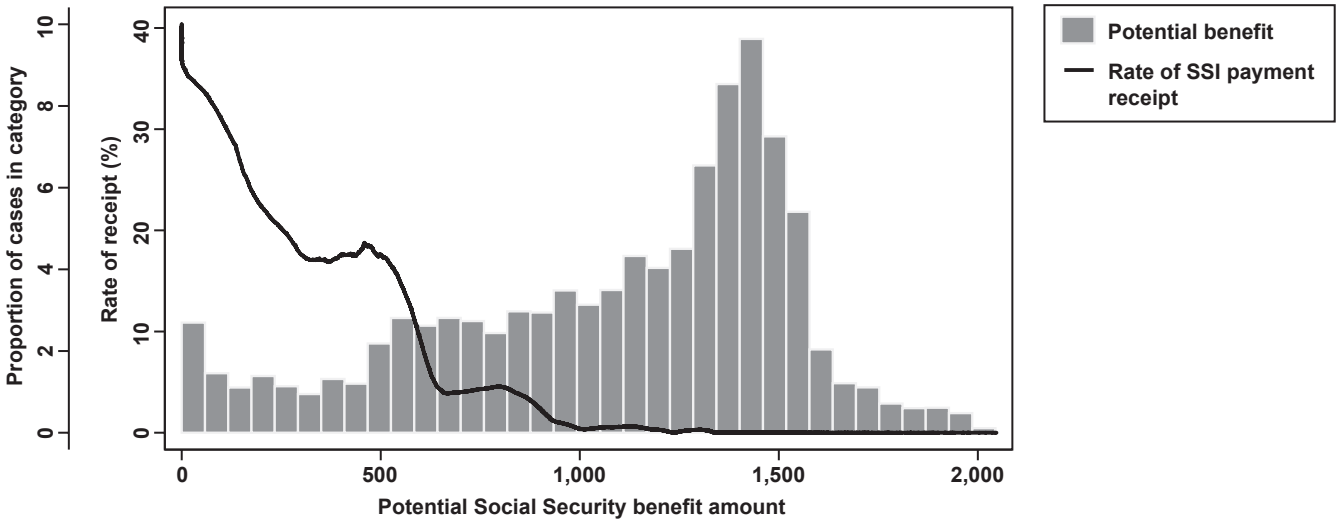
For the groups with either low potential benefits only or low countable resources only, approximately 1–2 percent are observed to participate in SSI upon reaching age 65. These two groups represent different changes in status over the analysis period. The group with low potential benefits only has low potential benefits, but not low countable resources. Thus, there must be spend-down of resources for any members of this group to eventually be eligible for SSI. By contrast, the group with low countable resources only has low countable resources, but not low potential benefits. Thus, the potential benefit must be reduced to attain SSI eligibility, which can only occur through a change in marital status. For the population comparison group (neither low potential benefits nor low countable resources), the percentage that eventually participates in SSI is very low.

More information about specific levels of potential benefits and SSI participation is shown in Chart 3. The chart shows participation rates for SSI at different levels of potential Social Security benefits, while also showing the distribution of those potential benefits as a histogram. Thus, it is possible to view the rate of SSI program participation at each potential benefit level, while simultaneously viewing the prevalence of that potential benefit level in the general population. In Chart 3, the people with zero potential Social Security benefits have a relatively high eventual SSI participation rate, between 35 and 40 percent. The rate drops rapidly as the potential benefit rises. A rising potential Social Security benefit corresponds with a declining expected SSI payment amount; thus, the chart confirms previous research that finds an inverse relationship between SSI participation and the SSI payment amount.[26]

At a potential Social Security benefit level of around $1,000, the SSI participation rate declines to nearly zero. By comparison, the most prevalent potential Social Security benefit amounts are higher than this. As a result, the SSI participation rate among the majority of the distribution and, thus, the population it represents is zero.

As a comparison, the same information is shown for countable resources in Chart 4. Unlike with income, the expected SSI payment amount does not decline as countable resources increase except for a complete loss of eligibility and benefits at the point where the resource threshold is reached. Nevertheless, the participation rate declines as countable resources increase, but the rate of decline is much less steep. Because Chart 4 shows wealth using a logarithmic scale, the full extent of the slower rate of decline is not

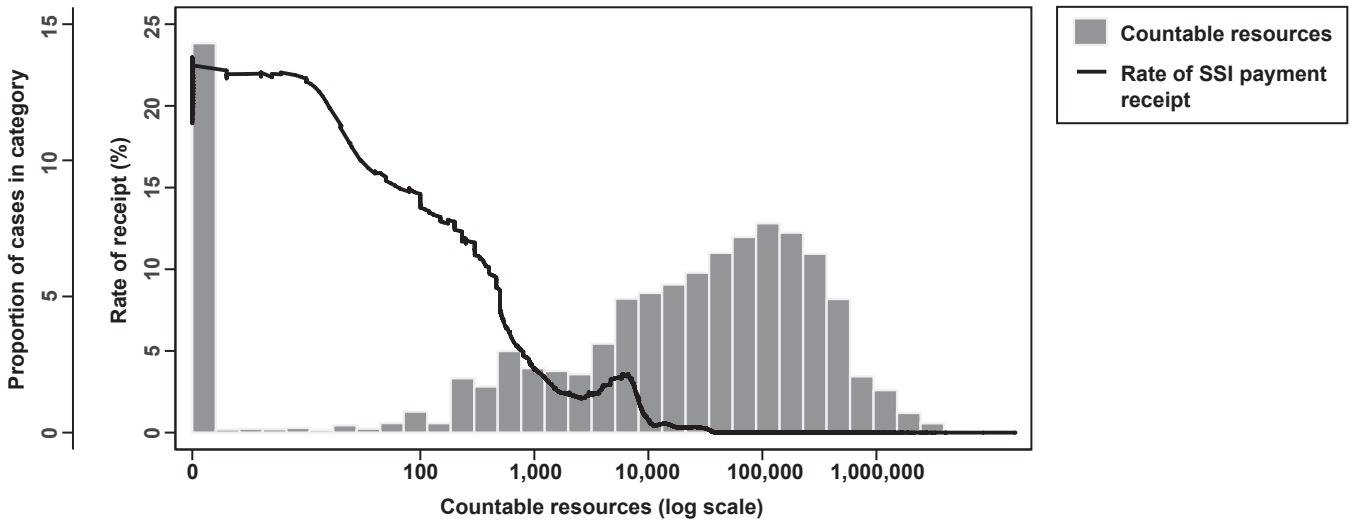
Chart 3.
Rate of receipt of SSI payments upon reaching age 65, by the size and distribution of the potential Social Security benefit amounts for the individual and spouse



SOURCE: 1996 SIPP matched to Social Security administrative records.

NOTE: Lowess smoothing is used to show the mean value of program participation at each value of the potential benefit amount. The procedure calculates a mean at each value using a sampling of other data points where the other data points are weighted by the distance from the point being measured. A bandwidth of 0.1 is used, meaning that 10 percent of other points are used. A low bandwidth forces the graph to closely resemble the data. Also, the lowess procedure is very localized and, thus, minimizes the effects of changes in the tails of the distributions on the localized means. The mean of the presented means is forced to equal the observed overall mean.

Chart 4.
Rate of receipt of SSI payments upon reaching age 65, by the level and distribution of countable resources in the near-elderly time period



SOURCE: 1996 SIPP matched to the Supplemental Security Record.

NOTE: Reported values of wealth of zero are shown as ln(1) or zero in the chart. Lowess smoothing is used to show the mean value of program participation at each value of the log of countable wealth. The procedure calculates a mean at each wealth value using a sampling of other data points where the other data points are weighted by the distance from the point being measured. A bandwidth of 0.1 is used, meaning that 10 percent of other points are used. A low bandwidth forces the graph to closely resemble the data. Also, the lowess procedure is very localized and, thus, minimizes the effects of changes in the tails of the distributions on the localized means. The mean of the presented means is forced to equal the observed overall mean. The line on the far left of the mean line represents uncertainty about the value at the endpoint.

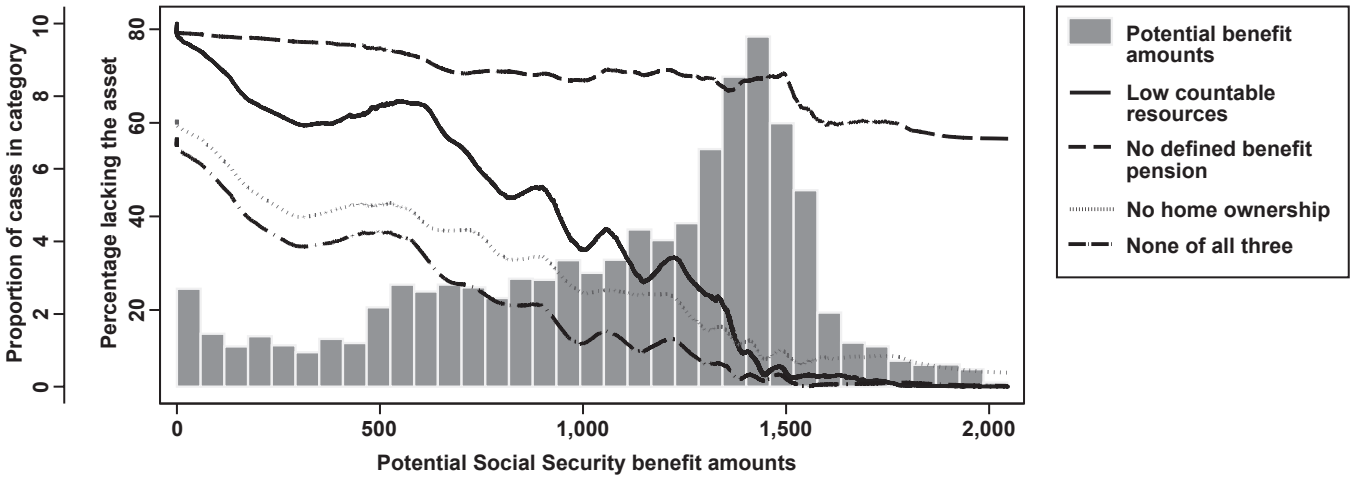
visible. Still, the chart shows results that are similar to the results for the potential Social Security benefit shown in Chart 3: The SSI participation rate declines rapidly at moderate levels of retirement resources. By the level of the applicable programmatic thresholds, the participation rate is very low, in this case less than 5 percent. For the majority of the population, those who have wealth above—and frequently far above—these thresholds, the SSI participation rate is zero.

Although income and countable resources are the criteria for the means-tested programs, certain resources that are generally not countable for means-tested programs could become income sources during retirement. Two potential income sources are also considered here: (1) defined benefit pensions and (2) home ownership—a potentially meaningful source of income for low-income elderly through home sales or reverse mortgages.

Specifically, I examine the group of near-elderly people who have low countable resources, no defined benefit pension, and no home ownership. This group and the prevalence of the lack of components of wealth are shown by potential Social Security benefit level in Chart 5. The solid line represents the percentage of individuals with low levels of countable resources at each potential benefit value. At a potential benefit of zero, around 80 percent of the people also have low countable resources. The proportion gradually drops to zero around the potential benefit levels that are the most common according to the histogram distribution presented in the chart. Thus, a meaningful proportion of the population is subject to some risk of having low countable resources. Chart 5 also shows the percentages of individuals who have no defined benefit pension[27] and no home ownership at various potential benefit levels. All three measures are then combined into the dot and dash line, which represents the proportion of individuals who have low countable resources and neither a defined benefit pension nor home ownership—the other two kinds of resources. At a potential benefit of zero, the proportion that has few resources by this expanded measure is around 60 percent. This proportion drops to 20 percent at a potential benefit of around $800, and then to zero at a potential benefit of around $1,400. Thus, although all the people who have very low retirement resources by this particular definition have potential Social Security benefits of less than $1,400, not all people with potential benefits below this level are without resources.

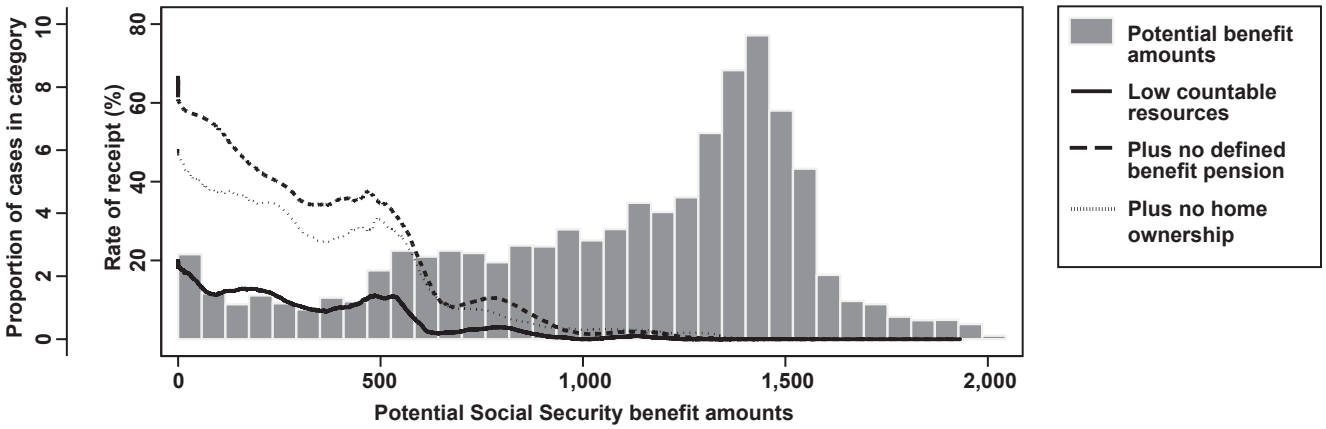
Within the group with very few resources by this expanded definition, a higher percentage eventually participate in SSI than for the group with only a low potential benefit, as shown in Chart 6. The participation rate for the group with low countable resources is shown at differing potential Social Security benefit levels by the solid line. The highest participation rate, corresponding to a potential benefit of zero, is around 20 percent. This jumps to more than 60 percent when the restriction of no defined benefit pension is added. Thus, at a potential benefit of zero, those who also have few resources in savings and pensions have a higher participation rate (around 60 percent)

Chart 5.
Absence of resource holdings of the individual and spouse and distribution of potential Social Security benefit amounts, by type of resource



SOURCE: 1996 SIPP matched to the Summary Earnings Record.

Chart 6.
Rate of receipt of SSI payments upon reaching age 65 for groups with the absence of three types of resource holdings in the near-elderly time period, by the potential Social Security benefit amounts of the individual and spouse and the distribution of those amounts



SOURCE: 1996 SIPP matched to Social Security administrative records.

than those with only a zero potential benefit (around 40 percent; see Chart 3). Adding an additional component of retirement resources—the restriction of no home ownership—does not raise the participation rate further.[28] This corresponds to previous studies that have not found a statistically significant correlation between home ownership and SSI participation.[29]

Changes in Financial Eligibility Status Over Time: Resource Spend-Down and Divorce

The group that has both low potential Social Security benefits and low countable resources in the preretirement period is financially eligible for one or more of the means-tested programs in the current period; however, eligibility during retirement (when members of this group would also have categorical eligibility) is of more interest. Consequently, changes between the current period (the survey reference month, November 1996) and the time of reaching the traditional FRA are also of interest. The focus here is on two kinds of changes that could make people who are not eligible in the current period eligible when elderly. First, resources could be decreased below the applicable resource thresholds; and second, marital dissolution could lead to a reduction in the potential Social Security benefit amount and could bring income below the applicable income thresholds.

Resource spend-down. Previous research has provided limited evidence that the SSI program provides a savings disincentive as people approach the traditional FRA. In this section, I examine what observed program participation reveals about changes in resource levels during the near-elderly years. Specifically, I examine how much resources must have fallen between the current period and the traditional FRA for observed participants in order to obtain SSI eligibility.

One way to address the effects of savings disincentives is by calculating the frequency of the resource spend-down that is implied by comparing the current period with eventual SSI participation. To this end, the distribution of countable resources in the current period for people who eventually participate in SSI, but are not recipients in the current period, is shown in Table 3. The programmatic thresholds, given in Table 1, fall between the 75th percentile ($503) and the 90th percentile ($5,802) of this distribution. More specifically, 13.1 percent of current nonrecipients who eventually participate in SSI have countable resources that are above the thresholds in the current period (not shown). For current-period recipients and nonrecipients together, the comparable figure is 8.7 percent.[30]

Another way to address the effects of savings disincentives is to examine which part of the distribution would face the strongest spend-down incentives. For people below the thresholds in the current period, the SSI program would provide no incentive for further resource reductions. At resource levels higher than the resource thresholds, there would be an incentive for resource spend-down; however, the force of the incentive would decline as resource levels increase. At some point, the value of the reduction in resources

Table 3.
Distribution of countable resources for future SSI recipients compared with future nonrecipients with low potential Social Security benefit amounts, November 1996

Percentile	Future SSI recipients	Future SSI nonrecipients with low potential Social Security benefits
5th	0	0
10th	0	0
25th	0	232
40th	0	1,624
Median	0	6,000
60th	40	13,204
75th	503	48,953
90th	5,802	166,392
95th	13,847	319,252
N	130	2,182

SOURCE: 1996 SIPP matched to Social Security administrative records.

NOTE: Sample members are aged 55–64. Future payment receipt is defined as participating in the SSI program within 6 months of reaching age 65. The sample is restricted to current SSI nonrecipients. The distributions are weighted.

would exceed the present value of the stream of SSI payments. Thus, the strongest savings disincentive, *a priori*, would be faced by people who would need only a small reduction in savings in order to attain program eligibility. The strongest incentive for future participants would be for those somewhat below the 90th percentile of the distribution of countable resources, as shown in Table 3. These people have resource levels a moderate amount above the program thresholds.

Excluding the group that eventually takes up SSI (and the group that is eligible in the current period), the remaining population can be divided into two groups. The first group *could not* become eligible even through resource spend-down and has been referred to as having neither condition (neither low potential benefits nor low resources) in this article. The second group *could* become eligible through resource spend-down and has been referred to as having low potential benefits only. The members of this group serve as a relevant comparison group for the group of eventual participants because their potential Social Security benefits do not disqualify them from future eligibility, but their countable resources in the current period do. Thus, they face a comparable incentive to decrease their resource levels.

This group is used as a comparison group in Table 3. For this group, the strongest incentive is faced by the people around the median of the resource holdings distribution. This level is somewhat above the level of the resource thresholds. At some point of the distribution, perhaps around the 90th percentile, the incentive becomes negligible.

A complementary way to address the effects of savings disincentives is by using this comparison group in a synthetic cohort. Neumark and Powers (1998) look at resource holdings at different ages to infer whether some people are decreasing resources as they approach age 65. Rather than following a cohort over time, this method synthetically creates a cohort from the ages that are observed at one point in time.

Neumark and Powers (1998, Table 2) compare the net worth of people aged 60–62 with those aged 63–64. After isolating a group of likely participants based on a method similar to propensity scoring,[31] the authors examine changes in wealth at various points of the wealth distribution. They note that, at the 75th percentile, wealth decreased from around $13,000 for people aged 60–62 to around $5,000 for people aged 63–64.

The synthetic cohort of Neumark and Powers is reproduced here, but with several improvements. Most importantly, I use data on actual people who eventually participate in SSI rather than relying on estimates of likely future participation. Also, I use all people rather than just male heads of the household. Further, I use resource measures that correspond to the program criteria; that is, countable resources for the SSI unit are used rather than net wealth for the family.[32]

A downward trend is visible for all people who participate in SSI in the future and have positive levels of countable resources (Table 4, top panel). At the point of the strongest disincentive around the 90th percentile, the trend is pronounced and monotonic; countable resources decrease by over 50 percent across the observed age groups. At the 95th percentile, there is also a decrease of over 50 percent, but the reductions do not bring the resource levels down to levels that would attain program eligibility.[33]

These results tentatively confirm previous research that shows that resource spend-down may be occurring in anticipation of program eligibility during retirement. One reason for caution is that these results might reflect general trends for this population rather than trends that are related to means-testing. For example, a general decline in resource levels may be the norm among people with low lifetime earnings (as measured by the potential benefit) in the near-elderly

Table 4.
Distribution of countable resources for future SSI recipients compared with future nonrecipients with low potential Social Security benefit amounts, by age group, November 1996

Percentile	55–57	58–59	60–62	63–64
	Future SSI recipients			
5th	0	0	0	0
10th	0	0	0	0
25th	0	0	0	0
40th	0	0	0	0
Median	0	0	0	0
60th	200	100	100	20
75th	464	1,000	928	300
90th	5,911	5,000	3,500	2,800
95th	14,300	22,232	5,911	6,000
N	35	29	42	24
	Future nonrecipients with low potential Social Security benefits			
5th	0	0	0	0
10th	0	0	0	0
25th	90	232	232	232
40th	1,000	1,860	1,624	4,000
Median	3,249	5,847	6,175	11,292
60th	7,935	11,836	13,994	17,550
75th	39,408	41,167	50,185	60,459
90th	125,997	170,800	153,161	218,393
95th	271,127	382,722	292,352	354,932
N	526	467	688	481

SOURCE: 1996 SIPP matched to Social Security administrative records.

NOTE: Future benefit receipt is defined as receiving SSI payments within 6 months of reaching age 65. The sample is restricted to current SSI nonrecipients. The distributions are weighted.

ages. Alternatively, a general decline may be the norm among people in this age group who also have low levels of resources. Both aspects can be addressed by examining the distribution of the comparison group used earlier.

The distribution of countable resources for the comparison group, people with low potential benefits who do not participate in SSI in the future, is shown in the bottom panel of Table 4. The members of this group are not disqualified from eligibility by their potential benefits and thus could be eligible depending on resource levels. At certain resource levels, members of this group would face the same savings disincentives as those who participate in SSI in the future.

An increase in resource levels is visible at all points of the distribution that have positive resources for the comparison group. This shows that a decline in resources among people in the near-elderly age group with low lifetime earnings is not the norm. For those who also have low levels of countable resources (for example, below the median for the youngest group, aged 55–57), the changes across age groups are generally zero or positive. Thus, declining resource levels are not the norm for this group either. At the point of the distribution that would face the strongest disincentive to save, around the median, there are observed increases in resources across age groups. The end result of the increase is resource levels that are well above the levels of program eligibility shown in Table 1.

The evidence indicates that future SSI recipients tend to decrease resource levels as they approach the age of categorical eligibility. The conclusion is strengthened by comparison with a group that would be eligible, but does not receive payments. This group shows increasing resource levels during the same ages.

The evidence is pronounced at the points of the distribution for which one would expect the savings disincentive to be greatest. However, the evidence is also present at other points in the distribution. For example, future SSI recipients with resource levels well above the program thresholds are also observed to reduce resources, but not to the levels of program eligibility. In addition to the presence of measurement error, this may indicate that other factors are at work. A more comprehensive analysis would control for other factors that would be expected to influence changes in resource levels in the near-elderly age group, particularly health shocks, changes in family status, and changes in employment status; however, this is left to future research.

Divorce. In contrast to resources, the Social Security benefit level can be only indirectly controlled by the individual. Early retirement will reduce the potential benefit amount, but the estimates used in this study use the assumption of universal early retirement among the low-income population. Thus, no further reductions are possible. The only remaining mechanism to change the potential Social Security benefit amount is changes in marital status. Married people whose potential benefit is too high for program eligibility could become eligible through widow(er)hood or divorce.

The Social Security benefit amounts of spouses and widow(er)s are set by specific ratios of the worker's primary insurance amount (PIA). A spousal benefit is one-half of the worker's PIA, and a widow(er) benefit is the full worker's PIA. One simplified example is a

worker with an earnings history and a corresponding PIA who has a spouse who has not worked or is not fully insured. In this case, the couple could receive a benefit based on the worker's full PIA and a spousal benefit based on one-half of the worker's PIA. The sum would count as income and be evaluated against the income thresholds for couples, given in Table 1. In the case of widow(er)hood, there would be one benefit for the surviving spouse based on the full PIA. In the case of divorce, the same spouse would receive a benefit based on one-half of the worker's PIA. For both widow(er)s and divorced people, the benefit would count as income; however, the income thresholds for individuals rather than couples would apply.

In the case of widow(er)hood, the economy of scale implied by Social Security benefit amounts could be as high as 1.5 for couples to 1 for individuals. This is the same economy of scale implied by the SSI program eligibility thresholds, although the ratios for the effective income thresholds are slightly different (after considering income exclusions). Table 1 shows the economies of scale implied by the three programs by showing the ratio of income and resource thresholds for individuals and couples. The ratios for the Medicaid program are very similar to SSI; however, the ratios are lower for SNAP. Thus, there will be few changes in SSI and Medicaid income eligibility status based on changing Social Security benefit amounts that are due to widow(er)hood. For SNAP, widow(er) hood may change income eligibility status because the couple to widow(er) benefit ratio is larger than the couple to individual income threshold ratio.

In the case of divorce, the economy of scale implied by Social Security benefit amounts could be as high as 1.5 for couples to one-half for divorced individuals. This is larger than the couple to individual income threshold ratios for all three of the programs. Thus, divorce could change eligibility status for all three programs.

Actual changes in Social Security benefit amounts and corresponding changes in program eligibility could differ from the examples discussed earlier. As an illustration of the potential reach of the divorce issue across the population, I have recalculated Social Security benefit and SSI payment amounts for the hypothetical case in which all observed couples divorce. The potential Social Security benefit amounts for this hypothetical case are based on observed earnings histories. Correspondingly, I have also recalculated countable resource amounts by dividing the resources of couples in half.

The percentages of people who would have low Social Security benefit amounts and low countable resources in the case where all couples in the sample divorce are shown in Table 5. Although divorce rates were very low for this cohort at the time of the survey (Kreider and Fields 2002), estimates for the subpopulations that could become eligible in this hypothetical case are provided in the table.

The impact of potential divorce differs dramatically by sex (Table 5). For women, one-third (33.8 percent) are estimated to be eligible for one or more of the means-tested programs in the case of divorce. This compares with 25.9 percent for the status quo. In addition to the one-third that would be eligible, for somewhat less than two-thirds (61.7 percent), there would be the possibility of spending down resources to become eligible. The extent of spend-down would have to be substantial in many cases because this group of women has high resource holdings by the standards of means-tested programs; the median value is around $70,000, and the 25th percentile is around $20,000. The point is not to assert that SSI program participation is likely for this group, but rather that program eligibility is possible for a much larger group of women than was initially shown in Table 2. In fact, less than 5 percent (4.2 plus 0.4) of women in this cohort are definitively ineligible based on Social Security benefits alone in the case of divorce.

Table 5.
Percentage of people with potential Social Security benefit amounts below the effective programmatic income and resource thresholds: Status quo and hypothetical divorce cases, by sex, November 1996

Circumstance	Low potential benefit only	Low resources only	Both conditions	Neither condition
		Men		
Status quo	18.1	9.4	19.5	53.0
Hypothetical divorce	28.2	6.3	26.5	39.0
		Women		
Status quo	26.5	5.5	25.9	42.1
Hypothetical divorce	61.7	0.4	33.8	4.2

SOURCE: 1996 SIPP matched to Social Security administrative records.

NOTE: Sample members are aged 55–64. See Table 1 for the effective income and resource thresholds. The hypothetical divorce case assumes that all observed couples get a divorce.

In the case of divorce for men, around 45 percent (39.0 plus 6.3) are definitively ineligible based on Social Security benefits alone. Around a quarter (26.5 percent) would be eligible and a bit over another quarter (28.2 percent) could become eligible through spend-down of resources. Both figures are moderate increases from the status quo figures.

Conclusions

Among the near-elderly cohort analyzed in this study, around a quarter are financially eligible for one or more of the three largest means-tested programs that serve the elderly. This group may be eligible for these programs upon reaching the ages of categorical eligibility. Only around a fifth of this group (the financially eligible) is observed receiving SSI payments upon reaching age 65, however. This result leads to the issue of changes in financial eligibility between the near-elderly time period and reaching age 65.

Two components of financial eligibility are low potential Social Security benefits and low liquid resource holdings. This study has shown that low potential Social Security benefits are due to both low frequencies of earnings and also low levels of earnings over the life cycle. Further, those with low potential Social Security benefits are more likely to be women, nonmarried individuals, and immigrants. Low potential Social Security benefits in conjunction with low liquid resources define the group that is estimated to be financially eligible for one or more of the means-tested programs in this study. Distinguishing characteristics of this group are a higher prevalence of disability over the lifetime, a lower prevalence of marriage, and lower total family income.

Within the group that is financially eligible for one or more means-tested programs in the near-elderly time period, the rate of SSI payment receipt upon reaching age 65 varies by the level of potential Social Security benefits and liquid resources. The participation rate is substantially higher at very low levels of both potential benefits and resources, compared with other financially eligible people. The rate is even higher for people who also lack a defined benefit pension. By contrast, a lack of home ownership does not additionally increase the participation rate.

This article concludes with some illustrations of changes in program eligibility status between the near-elderly and elderly time periods. Of the group that is observed to receive SSI payments after reaching age 65, 13.1 percent of current nonrecipients and 8.7 percent of current nonrecipients and recipients combined report that they have resources over the eligibility thresholds at the time of the survey. From this, one can infer that spend-down occurs with moderate frequency. When examining resource levels across age groups leading up to the elderly time period, resource levels decline for future SSI recipients in the part of the resource distribution where the savings disincentive would be the strongest. The opposite trend is observed among a comparable group of people who do not receive SSI payments in the future. This is compatible with the theory that the SSI program induces spend-down of resources, but assessment of causation is left to future research.

Another possible change in eligibility between the near-elderly and elderly time periods could result from a change in the potential Social Security benefit that is due to divorce. Although the incidence of divorce is low during the near-elderly time period, a majority of women would be income-eligible for one or more means-tested programs in the hypothetical divorce scenario examined here. However, only a minority of these women would also have resource levels below the relevant thresholds.

Technical Appendix

The figures in Table 1 are averages when there is variation across states; averages are weighted by the number of elderly SSI recipients in each state. The figures represent the maximum levels of income and resources for which eligibility could be obtained by elderly individuals or couples in some circumstances. Not all applicants at these levels would be eligible in all circumstances because of variation in provisions across states and variation in the methods for counting income across states in the Medicaid and SSI programs.

For SNAP, the thresholds are uniform across states with the exception of different income thresholds for Alaska and Hawaii, which are not considered in this table. The income thresholds follow the Department of Health and Human Services poverty guidelines and assume that the individual or couple are the only household members. The income and resource thresholds are those for households with an elderly member.

Federal SSI thresholds are also uniform across states; however, the availability of state SSI supplements raised the income threshold in some states for the elderly in 2001. The SSI income threshold figures include the federal benefit rate plus the state supplements that are available to aged individuals or couples living independently (see Bruen, Wiener, and Thomas

(2003, Table 5)). Although the federal resource thresholds apply for all states, some states had more restrictive resource thresholds for the state supplement than for the federal benefit in 2001. This variation is not considered here because the federal threshold determines the maximum level of eligibility for any kind of benefit in this case.

Medicaid eligibility is closely tied to SSI eligibility because states are required to provide Medicaid to federal SSI recipients. This requirement does not apply to states that follow section 209(b) of Public Law 92-603. Eleven states followed section 209(b) provisions in 2001, of which six had more restrictive income standards than the federal SSI program and eight had more restrictive resource standards than the federal SSI program (Bruen, Wiener, and Thomas 2003). The effects of these more stringent standards are not addressed in Table 1, which makes the Medicaid figures an upper bound of possible estimates. As opposed to the section 209(b) provisions, other provisions make the Medicaid program more lenient in terms of eligibility. These provisions include the "poverty-related" and "medically needy" programs (see Bruen, Wiener, and Thomas (2003) for exact definitions). The Medicaid figures in Table 1 reflect the weighted averages of thresholds including the poverty-related provisions, but excluding the medically needy provisions because the former expands general program eligibility and the later expands eligibility for a subpopulation that also meets the medically needy criteria. The poverty-related thresholds are given in Bruen, Wiener, and Thomas (2003), and the averages are also weighted by the number of SSI recipients aged 65 and older in each state.

Notes

Acknowledgments: The author is grateful for the helpful comments of numerous colleagues, especially Glenn Springstead and Michael Wiseman.

[1] That is, they were categorically eligible based on age or another criterion.

[2] The cohort is roughly aged 55–64 at the time of the analysis, whereas the age of categorical eligibility is 65 for Medicaid and SSI. For SNAP, different criteria apply to a household with a member older than age 60.

[3] SNAP was called the Food Stamp Program until October 2008. I use the term SNAP even though the data used in this analysis refer to the Food Stamp Program.

[4] 2001 is the midpoint of when the near-elderly cohort used in this study reached the traditional full retirement age (FRA) for Social Security retirement benefits. See the Methods section for more information.

[5] The primary unearned income exclusion is the most commonly applied exclusion. For SNAP and Medicaid, the unearned income exclusion listed in Table 1 does not capture all of the variation by state, family size, and route to eligibility.

[6] The effective income thresholds could also be higher because of the earned income exclusions if the person has earned income.

[7] SNAP thresholds differ for Alaska and Hawaii; however, this variation is not addressed in this table.

[8] Also, there is state variation in the extent to which states must provide Medicaid to SSI recipients. See the Technical Appendix for more information.

[9] Florida and Pennsylvania together had 9.9 percent of SSI recipients aged 65 or older in 2001.

[10] There are also differences in income and resource counting methods between programs and across states, but these differences are difficult to summarize in a table.

[11] Author's calculation based on figures reported in Elder and Powers (2004, Table 6) for calendar year 1997. Those authors report unweighted figures; thus, the comparison represents an average in the sample not accounting for the sample selection probabilities.

[12] Davies, Rupp, and Strand (2004) consider the effects on SSI program eligibility and participation of eliminating the resource test and counting an annuitized value of resources as income.

[13] See Hubbard, Skinner, and Zeldes (1995) and Ziliak (2003) for example.

[14] Elderly people may gain financial eligibility at a different age than when they gain categorical eligibility. For example, Medicaid has procedures for reducing resources in order to obtain long-term care benefits.

[15] No indexing is used to make dollar amounts more comparable across time periods.

[16] Specifically, if the spouse is also categorically eligible for SSI (blind, aged, or disabled), then the spouse's Social Security benefit is treated as income, otherwise the benefit of the spouse is "deemed" as income to the potential beneficiary following SSI program rules.

[17] There could also be additional earnings between the reference period and reaching age 65, which would have a similar effect.

[18] For people observed to be Disability Insurance (DI) beneficiaries in the administrative records, the Social Security benefit is calculated at the time of the first payment and updated using cost-of-living increases.

[19] A spouse is eligible for spouse's benefits if the marriage is valid at the time of claiming, and a divorced spouse is eligible if the divorce occurred after 10 years of marriage.

[20] Analysis of program participation is restricted to programs administered by SSA. It would be useful to

examine other programs, however, the retrospective program participation data in the SIPP is of minimal usefulness. For example, according to matched administrative records, 38.1 percent of those with both low potential Social Security benefits and low countable resources were at some point recipients of the SSI payments. The comparable self-reported value in the SIPP is only 2.2 percent.

[21] The differences mentioned in this section are all statistically significant at the 5 percent level. The standard errors used in statistical tests need to be adjusted in order to account for the complex sample design of the SIPP. I give unadjusted standard errors in the tables; however, I use an approximate adjustment for statistical tests. The Census Bureau (2001) gives design effects (adjustment factors) that account for the effect of the complex sample design on the variances of various survey items. Because the estimated design effect exceeds four only for one item (metro status) and is much smaller for other survey items, I adopt a design effect of four for the variances. This implies true standard errors that are twice as large as the unadjusted standard errors. Assuming a design effect of four provides conservative tests of population differences.

[22] The AIME is calculated based on the benefit formula and administrative earnings records and may differ from the official AIME that would be used by SSA in the benefit calculation.

[23] The phrase "participate in SSI within 6 months of reaching age 65" is not meant to imply that the first SSI payment receipt necessarily occurred within this time period. In fact, the majority (61.4 percent) of people who receive SSI payments during this period also received SSI payments before reaching age 65.

[24] These figures can be derived from the figures given in Table 2, but differ somewhat because of rounding.

[25] See Strand, Rupp, and Davies (2009) for a review of this literature.

[26] See Davies, Rupp, and Strand (2004), for example.

[27] Missing defined benefit pension observations are assumed to indicate lack of a benefit; however, this does not appear to have lead to an overestimate of the proportion of people who lack a defined benefit pension. See Department of Labor (2005) for comparison.

[28] Although adding an additional restriction (no home ownership in addition to no defined benefit pension and low countable resources) creates a smaller subgroup, this smaller subgroup can have a higher or lower rate of SSI payment receipt.

[29] See Davies, Rupp, and Strand (2004), for example.

[30] This figure can also be derived from the information in Table 2, but the derived version differs somewhat because of rounding.

[31] Participation likelihood is based on the characteristics of people who are older than age 65 and report receiving SSI payments in the SIPP. Predictors include the existence and maximum amount of state SSI payments, demographic characteristics, and the history of participation in the Food Stamp Program.

[32] Also, the reference period is November 1996 in this study, compared with reference periods from 1984 through 1986 in Neumark and Powers (1998).

[33] The sample sizes in the top panel of Table 4 are small, but are comparable to Neumark and Powers (1998) who base their analysis on samples of 38 and 30 observations for two groups.

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Assessing the Performance of Life-Cycle Portfolio Allocation Strategies for Retirement Saving: A Simulation Study

by Benjamin Bridges, Robert Gesumaria, and Michael V. Leonesio*

This article examines the performance of four life-cycle portfolio allocation strategies through stochastic simulation based on observed U.S. asset returns during 1926–2008. Annual worker contributions to retirement savings accounts are based on the actual lifetime earnings histories maintained by the Social Security Administration for 12,871 workers born during 1915–1942. Each strategy's performance is evaluated primarily on the basis of the distributions of internal rates of return on investments calculated at the time of retirement. Comparisons are made with the performance of four other investment strategies that vary in terms of their exposure to stock and bond market risk. Life-cycle plans with larger portfolio weights assigned to equities have higher average returns, but those gains come at the cost of increased risk of infrequent bad outcomes.

Introduction

Over the past decade, life-cycle funds have become popular investment vehicles for workers to accumulate assets to finance retirement. Younger investors who have long time horizons are often willing to bear more market risk in pursuit of higher expected returns. As workers age and their anticipated time remaining in the labor force declines, many retirement savers want to reduce risk in their portfolios. Life-cycle mutual funds are a means of achieving this objective at low cost to investors.

A life-cycle fund can be characterized as a pool of investment assets—often a "fund of funds"—that spans a range of underlying asset types representing different risk-return trade-offs. The fund's portfolio is rebalanced frequently to maintain current asset allocation targets, but those targets gradually evolve to ensure that the portfolio composition regularly shifts from more to less risky investments.[1] The life-cycle fund's most conservative allocation is attained at a specified future year, hence the commonly used synonym "target-date fund." These funds have particular appeal for investors who, for whatever reason, do not want to actively manage their portfolios themselves—although it is possible to achieve similar results through active management.

The growing importance of defined-contribution employer pensions and other retirement savings accounts (RSAs) has increased the responsibility of workers to ensure adequate retirement income for themselves.[2] The proliferation of life-cycle funds since the mid-1990s suggests that their combination of diversification, evolving asset allocation targets, automatic portfolio rebalancing, and ease of use has considerable appeal for many investors. Assets held in life-cycle mutual funds increased from $1 billion in 1996 to about $120 billion by the end of 2006 (Viceira 2009) and nearly 40 percent of 401(k) plans now offer a life-cycle option (Poterba and others 2006; Copeland 2009). That growth is likely to continue in part because the Pension Protection Act of 2006 facilitates

Selected Abbreviations

AWI	average wage index
IRR	internal rate of return
PCE	personal consumption expenditures
RSA	retirement savings account
S&P	Standard and Poor's
TIPS	Treasury Inflation-Protected Securities
TSP	Thrift Savings Plan

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the automatic enrollment in 401(k) plans of newly hired workers by sponsoring firms and designates life-cycle funds as an acceptable "default" option for new participants.[3] In addition, President Obama's fiscal year 2010 budget proposes that at a yet-unspecified future date, employers who do not currently offer retirement plans be required to automatically enroll employees in direct-deposit individual retirement accounts (IRAs). The budget document suggests this will increase the savings participation rate for low- and middle-income workers from 15 to 80 percent (OMB 2009).

The popularity of life-cycle funds raises a number of questions about their performance relative to alternative approaches. In this article we simulate the performance of four life-cycle investment portfolio allocation strategies that vary in terms of risk exposure at any specific age. Simulations are conducted in a historical setting; that is, the results demonstrate what might have occurred had the investment strategies been pursued by workers during 1937–2003. Social Security Administration earnings histories for 12,871 workers born during 1915–1942 are used to generate annual contribution amounts that are invested in RSAs. The article's main results are generated by a series of stochastic simulations in which the joint distribution of historical annual asset returns during 1926–2008 is used to produce 1,000 alternative account accumulation paths for each sample member. Because the historical U.S. equity premium may be higher than future premiums, further simulations incorporate lower mean equity returns.

One distinctive aspect of the simulations is that annual contributions to investment accounts are determined by the worker's earnings each year. Actual lifetime earnings histories are more diverse and exhibit substantially more variability over the work life than the stylized versions that are often the basis for investment simulations. Final account accumulations depend not only on the sequence of investment returns, but on the flow of new contributions into the account. Our simulations produce distributions of accumulated real RSA balances and of associated internal rates of return (IRRs) calculated on the basis of the nonstochastic contribution streams. Because the sample of earnings histories is drawn from 28 birth cohorts, the distribution of simulated final real account balances is influenced to some extent by growth in average real earnings in the economy over time; that is, later cohorts tend to have higher earnings and, therefore, greater account contributions than earlier ones and are more likely to be found in the upper tail of the distribution of real final account balances. Although the article presents some information on simulated accumulations, RSA performance is more often assessed from a personal financial perspective that focuses on the IRR earned on the individual's RSA investments.

The article's analysis does not explicitly incorporate individual attitudes toward financial risk, which are critical in choosing an investment strategy. Thus, the results do not evaluate the relative attractiveness of alternative investment strategies that offer different risk-return tradeoffs. The article simply compares the performance (as measured by the distributions of IRRs) of alternative investment strategies with a set of benchmark returns. In reality, risk-averse investors would require the expected IRR on the account to fully compensate for any perceived risk associated with adopting a given strategy.

One of the main findings is that even if the favorable historical levels of U.S. equity returns are used in stochastic simulations of RSA performance, there is a substantial probability, varying from 8 percent to 14 percent, that the four life-cycle strategies examined will fail to achieve a 2.0 percent real IRR. As the benchmark rate increases from 2.0 to 2.9 percent, the probabilities that the four simulated life-cycle strategies will fail to reach the benchmark increase to values that range from 15 percent to 28 percent. Finally, if average future U.S. stock returns are lower than the historical experience, simulation results based on past returns will overstate the expected performance of life-cycle funds in future years. To address this point, the article includes results that assume that the real historical equity premium on U.S. stocks is reduced by 2.5 percentage points. In these simulations, the probability that life-cycle RSAs fail to attain a real IRR of 2.0 percent are found to be at least 22 percent for all four strategies; the 2.9 percent benchmark increases the probability of failure to at least 36 percent.

The article's results are relevant for a broad set of retirement savings plans including tax-advantaged IRAs and employer-provided 401(k) and 403(b) plans, as well as the types of private accounts that have sometimes been proposed as part of Social Security reform.

Simulating Life-Cycle Accounts

This section describes the four life-cycle accounts examined in this article, describes four alternative investment plans used for comparison purposes,

summarizes the data used in the simulations, and explains the methods used to generate the results.

Accounts Simulated

Three of the four life-cycle plans are described in Shiller (2005). The three Shiller funds—conservative, baseline, and aggressive—allocate account balances between stocks and bonds. The stock component is a U.S. equity index fund that tracks the Standard & Poor's (S&P) 500 index, and the bond fund comprises half long-term federal Treasury bonds and half 6-month private sector money market instruments (commercial paper and certificates of deposit). The three funds allocate RSA balances as follows:

- *Baseline life-cycle plan.* Through age 29, this portfolio invests 85 percent of total value in equities, with the equity share declining linearly until it reaches 15 percent at age 60, where it remains thereafter. The remainder of the portfolio is invested in the bond fund.
- *Conservative life-cycle plan*. This plan is similar to the baseline strategy, but the equity percentage begins at 70 percent through age 29, and linearly declines to 10 percent at age 60.
- *Aggressive life-cycle plan*. Also similar to the baseline strategy, this plan's equity percentage begins at 90 percent through age 29 and declines linearly to 40 percent at age 60.

The fourth life-cycle strategy, the L plan, is a simplified version of the federal Thrift Savings Plan (TSP) life-cycle funds that were introduced in 2005.[4] Each "L Fund" is a portfolio of investments in five core TSP funds that existed before 2005: the G Fund (U.S. government securities), F Fund (bond fund), C Fund (indexed large-cap equities), S Fund (indexed small- and medium-cap equities), and I Fund (indexed international equities from developed foreign countries). Each L Fund shifts the portfolio composition away from riskier equities toward safer bonds as the investor ages. The Income Fund is the most conservative of the L Funds and is the terminal allocation to which the other L Funds evolve. This article examines a modified version of the TSP approach, one that offers a new 40-year fund each year—in contrast with one every decade—which permits investors to choose a fund with a target date that exactly matches their expected year of retirement.[5] The portfolio allocation of a 40-year L plan fund among the five core funds is shown in Table 1.[6] Table rows show the portfolio allocation at the fund's start date and at the end of each designated period,[7] and the annual percentage-point change in L plan allocations to each underlying fund during the ensuing 5 years. The initial allocation at inception is predominantly in equities, both domestic and foreign, with a combined share of 90 percent (that is, the combined total of C, S, and I Fund shares), with the remaining 10 percent in bonds (F Fund). During

Table 1.
L plan allocations among underlying funds (in percent) at 5-year intervals

	G Fund [a]		F Fund [a]		C Fund [b]		S Fund [b]		I Fund [b]	
Period	Allocation	Prospective percentage point change per year	Allocation	Prospective percentage point change per year	Allocation	Prospective percentage point change per year	Allocation	Prospective percentage point change per year	Allocation	Prospective percentage point change per year
Startup	0.0	1.0	10.0	0.0	44.0	-0.4	19.0	-0.2	27.0	-0.4
Year 5	5.0	1.1	10.0	-0.1	42.0	-0.4	18.0	-0.2	25.0	-0.4
Year 10	10.5	1.1	9.5	-0.1	40.0	-0.4	17.0	-0.2	23.0	-0.4
Year 15	16.0	1.1	9.0	-0.1	38.0	-0.4	16.0	-0.4	21.0	-0.2
Year 20	21.5	1.1	8.5	-0.1	36.0	-0.4	14.0	-0.4	20.0	-0.2
Year 25	27.0	1.6	8.0	-0.1	34.0	-0.7	12.0	-0.4	19.0	-0.4
Year 30	35.0	1.6	7.5	-0.1	30.5	-0.7	10.0	-0.4	17.0	-0.4
Year 35	43.0	6.2	7.0	-0.2	27.0	-3.0	8.0	-1.0	15.0	-2.0
Year 40	74.0	. . .	6.0	. . .	12.0	. . .	3.0	. . .	5.0	. . .

SOURCES: Federal Retirement Thrift Investment Board and authors' assumptions.

NOTE: . . . = not applicable.

a. Bond fund.

b. Stock fund.

the first 5 years, the percentage of the portfolio in the G Fund increases by 1.0 percentage point per year, and the F Fund remains at 10 percent, while there are small annual declines in the holdings of the three stock funds. Note that in the final 15 years of the life of any L plan fund, the shift in allocation shares from equities to the low-risk G Fund accelerates.[8]

Four other investment strategies are simulated for the purpose of comparison with the life-cycle portfolios:

- *All stocks*. This plan consists of an "all stocks, all of the time" approach. The portfolio is entirely invested in an indexed fund that tracks the S&P 500 Index.
- *All bonds*. This plan implements an "all bonds, all of the time" approach. To facilitate comparison with other strategies, the investment is assumed to be identical to that used in the bond component of the three Shiller plans: a fund consisting of one-half long-term federal Treasury bonds and one-half 6-month private sector money market instruments (commercial paper and certificates of deposit).
- *50-50 stock-bond*. This strategy allocates 50 percent of the RSA's value to an indexed stock fund tracking the S&P 500 Index and 50 percent to Shiller's bond fund, with annual rebalancing.
- *No-lose*. As proposed by Martin Feldstein (2005), each year's RSA contribution is divided between U.S. Treasury Inflation-Protected Securities (TIPS) and an indexed stock fund that tracks the S&P 500. The TIPS fraction is determined by the amount that is necessary to preserve the real value of that year's RSA contribution up to age 62, allowing for administrative expenses charged to the account each year. The remainder of the annual contribution is invested in equities. Therefore, even in the event that the equity investments are worthless by age 62, the RSA balance will equal the real value of all contributions made during ages 22–61.

All eight of the accounts—four life-cycle and four comparison strategies—are assumed to entail annual administrative expenses equal to 0.3 percent of the account balance. That expense ratio is used by Shiller (2005) in his recent analysis of life-cycle strategies in the management of a personal retirement account option within a revised Social Security program. Feldstein (2005) uses a 0.4 percent expense ratio. Poterba and others (2006) use life-cycle fund expense ratios that are somewhat higher, with baseline, mid-expense, and high-expense ratios equal to 0.4, 0.74, and 1.20 percent of assets, respectively.

Data

The RSA simulations require two types of data: detailed earnings histories that generate the contribution flows into the accounts, and information on the rates of return for the investment assets.

Earnings histories. The simulations use a sample of 12,871 actual earnings histories for people born during 1915–1942 (that is, 28 birth cohorts). Cases are drawn from exact-matched versions of the Census Bureau's 1992 and 1993 panels of the Survey of Income and Program Participation (SIPP). Under a simple retirement savings scheme, workers' RSA contributions would be determined by their total labor market earnings, and ideally the simulations would use such data. This study uses Social Security taxable earnings for the years 1937–2003.[9] Attention is restricted to earnings and hypothetical RSA contributions during ages 22–61, facilitating comparison of terminal account accumulations and IRRs at age 62, Social Security's earliest age of entitlement for retired-worker benefits. This restriction removes the potential effect of differences in timing of retirement on final account accumulations. The choice of cohorts is dictated by the decision to use earnings histories that are completed for ages 22–61; the oldest cohort attains age 22 in 1937, while the youngest cohort attains age 61 in 2003.

Among the 1915–1942 birth cohorts, there are many people with little or no Social Security taxable earnings. Low lifetime Social Security taxable earnings can result either from nonparticipation in the labor force or from employment in jobs that were not covered by the Social Security program. In either case, any simulated RSA accumulation would likely be small due to contribution streams with modest or zero value. Consequently, the study restricts the simulation sample to workers who are fully insured for their own Old-Age and Survivors Insurance (OASI) retired-worker benefits at age 62.[10] Recipients of Social Security Disability Insurance benefits are also excluded from the sample because program rules strictly limit their earnings, in turn restricting the extent to which new RSA contributions can occur. These sample selection criteria, along with exclusion of the institutionalized population, the requirement that individuals survive at least until age 62, and the failure to match administrative data for some survey respondents, imply that the final simulation data set should not be considered generally representative of

the population born 1915–1942. We claim simply that the RSA simulations are based on a large sample of earnings histories that exhibit realistic interperson variability for people who have had at least some moderate lifetime attachment to the work force.

Because RSA contributions in this study are mechanically determined by annual earnings, it is important to recognize that the earnings data are subject to censoring at OASI's annual maximum taxable earnings amount. In the current study, censored earnings amounts reduce RSA contributions relative to values that would be calculated in the absence of censoring. The extent to which annual earnings values are censored has changed over time as the amount of worker earnings subject to OASI payroll taxes has increased. This point is confirmed by both the increase in the ratio of the annual maximum taxable earnings to the Social Security Administration's Average Wage Index (AWI)[11]—which ranged from 1.0 to 1.7 during 1951–1978, then rose to about 2.5 during 1990–2003—and the decrease in the proportion of earners who reach the taxable maximum each year.[12] To bring pre-1990 values of the ratio closer to the more recent values, we create alternative hypothetical maximum taxable earnings amounts for years prior to 1990 that are equal to about 2.5 times the AWI for each year. Any annual earnings figures that were censored at the historical taxable maximum amounts before 1990 are replaced by estimated values from the interval bounded by the actual historical taxable maximum and the estimated alternative taxable maximum.[13] These adjustments to earlier censored earnings amounts reduce, but do not eliminate, a downward bias in estimated account contributions by higher earners. Although the RSA accumulations of high earners remain smaller than would be calculated if uncensored total earnings amounts were available for all years, the effect on IRR distributions would likely be small and less important than the annual administrative charges levied against the accounts. Summary sample statistics given in Table 2 convey information about the distribution of average annual (adjusted) real taxable earnings during ages 22–61 for the 28 cohorts used in the simulations.[14]

Investment returns and the equity premium. The simulations use historical annual return data for 1926–2008. Returns data for the specific assets held in the RSAs are sometimes unavailable for some years of the 83-year period, in which case it is necessary to splice together similar data. Details are given in the Appendix.

The three Shiller life-cycle plans hold alternative mixes of a large-cap U.S. stock fund (S&P Composite Index), long-term Treasury bonds, and money market funds (6-month commercial paper and certificates of deposit). The L plan holds large-cap (S&P Composite Index) and small- and medium-cap (Dow Jones Wilshire 4500 Completion Index) U.S. stock funds, an international stock fund (Morgan Stanley Capital Investment EAFE [Europe, Australasia, Far East] Index), U.S. bond market securities with maturities of more than 1 year (Barclays Capital—formerly Lehman Brothers—U.S. Aggregate [LBA] Index), and 1-month Treasury bonds. Nominal returns are converted to real returns using the implicit price deflator for Personal Consumption Expenditures (PCE).[15] Summary statistics for real annual rates of return on investment assets are shown in Table 3.

The no-lose comparison strategy uses TIPS, which were first issued in 1997, and are currently issued in 5-, 7-, 10-, and 20-year maturities. As of August 14, 2009, the respective real yields for the four maturities were measured as 1.18, 1.52, 2.03, and 2.25 percent (Department of the Treasury 2009).[16] Because the history of TIPS market returns is too short to provide a sufficient basis for simulations, all simulations in this article assume that the TIPS annual real rate of interest equals 2.2 percent throughout 1926–2008.[17]

A critical determinant of the performance of the various life-cycle investment strategies is the return on the equity components of the portfolios. There has long been a substantial equity premium[18] for U.S. stock investors. In a widely cited paper, Mehra and Prescott (2003) note that the real equity premium's arithmetic mean was 6.9 percent during 1889–2000, considerably larger than those observed in the United Kingdom, France, Germany, or Japan during the later decades of the 20th century. The study notes that the U.S. equity premium has increased over time, averaging roughly 4.5 percent during the first half of the 20th century, but reaching 7.6 percent in the latter half. For our purposes, the main question is whether historical U.S. equity returns for 1926–2008 are indicative of future returns. Professional opinion is divided on this point. Two recent studies of life-cycle investment accounts have simulated pessimistic views of likely future stock market performance. In the first, Shiller (2005) notes that the median geometric real return on U.S. stocks during 1900–2000 was 7.0 percent, while a weighted average for 15 countries (including the U.S.) over the same period was 4.8 percent, and suggests that international experience may be a better guide

Table 2.
Average annual real earnings during ages 22–61, by birth cohort

Cohort	Counts (unweighted)		Real earnings (2004 dollars)						
	Men	Women	Mean	Median	Standard deviation	Minimum	5th percentile	95th percentile	Maximum
1915	122	112	15,155	11,844	10,735	1,144	2,633	36,889	42,788
1916	141	139	15,468	12,511	10,696	930	2,294	34,539	43,299
1917	160	128	16,352	15,340	10,731	853	2,088	36,036	43,047
1918	177	147	17,530	16,008	11,737	738	2,278	38,348	44,487
1919	177	168	16,590	13,670	11,948	974	2,473	37,475	46,319
1920	209	196	16,037	12,230	11,803	903	2,277	38,001	46,468
1921	186	191	16,938	13,407	12,389	1,123	2,644	39,980	47,166
1922	202	171	18,404	16,326	12,986	1,048	2,331	41,136	47,945
1923	224	202	18,264	16,426	12,577	628	2,443	39,817	48,584
1924	253	206	19,325	17,106	12,682	1,149	2,880	41,897	50,300
1925	251	204	20,272	18,352	13,367	1,260	2,774	43,321	52,192
1926	248	215	19,779	15,940	14,205	773	2,493	45,834	52,513
1927	253	191	19,895	17,150	13,915	785	2,596	44,368	51,773
1928	251	195	21,355	18,342	14,829	1,088	2,487	49,142	55,727
1929	228	203	20,566	17,819	13,730	575	2,872	45,233	54,076
1930	242	194	21,396	18,129	15,055	831	2,392	47,687	58,222
1931	230	233	21,208	19,135	14,549	941	2,507	46,969	56,711
1932	276	216	21,685	19,186	14,695	1,181	3,049	48,228	57,053
1933	259	213	21,973	19,375	14,809	1,024	2,772	48,105	58,525
1934	271	246	21,173	18,334	14,866	939	2,489	49,316	56,991
1935	262	229	22,362	18,356	15,498	1,088	3,331	50,738	59,202
1936	291	222	23,884	21,979	15,670	1,119	3,049	51,596	59,131
1937	276	292	22,726	19,829	15,630	1,222	2,935	52,138	62,315
1938	263	273	22,488	18,606	15,306	1,200	3,288	51,711	60,641
1939	298	266	23,549	20,684	15,567	1,178	3,371	52,160	61,968
1940	317	291	23,056	19,783	15,648	911	3,352	52,248	61,587
1941	351	319	24,450	21,731	16,532	1,022	3,084	55,281	63,863
1942	408	383	24,660	21,381	16,685	1,047	3,233	55,601	64,335
All cohorts	6,826	6,045	20,861	18,002	14,614	575	2,748	48,112	64,335

SOURCE: Authors' calculations using Social Security Administration earnings records.

NOTE: A person's average annual real earnings is the 40-year arithmetic mean of all Social Security taxable earnings during ages 22–61. Pre-1990 earnings are subject to the study's alternative taxable maximum. Each year's earnings amount is indexed using the Personal Consumption Expenditures (PCE) price index.

to the future. Accordingly, Shiller adjusts the U.S. historical returns downward by 2.2 percentage points to 4.8 percent. Shiller then subtracts the geometric mean return on bonds, equal to 1.5 percent, resulting in an implied equity premium of 3.3 percent. In the other study, Poterba and others (2006) note that *Ibbotson SBBI Classic Yearbook* returns data on large-cap equities for 1926–2003 reflect an average annual equity premium of 6.4 percent. For some simulations they reduce the historical rates by 3.0 percentage points, lowering the equity premium to 3.4 percent.

Accordingly, we discuss results from stochastic simulations under two equity premium scenarios: simulations based on the historical real rates of return on equities—with an arithmetic mean approximately equal to 9.3 percent (and a geometric mean of 6.6 percent) in the 1926–2008 returns data for large-cap stocks—and simulations that reduce the real equity premium by 2.5 percentage points. The reduction is implemented by subtracting 2.5 percentage points from each annual return figure for both large- and small-cap U.S. equities.

Simulation Procedures

Annual contributions to accounts are assumed to equal to 9 percent of Social Security taxable earnings

Table 3.
Summary statistics for real annual rates of return on investments, 1926–2008 (in percent)

Asset	Arithmetic mean	Standard deviation	Minimum	Maximum	Geometric mean
C Fund (Standard & Poor's 500)	8.6	20.2	-37.5	53.3	6.6
S Fund	9.9	24.6	-42.4	102.1	7.2
I Fund	7.1	21.8	-43.5	76.9	4.9
F Fund	2.8	6.7	-8.1	26.6	2.6
G Fund	0.9	3.8	-9.4	13.9	0.9
Shiller combined bond-money market fund	2.5	6.3	-8.7	21.7	2.3
Shiller bond	3.3	10.1	-13.0	34.0	2.8
Shiller money market	1.8	4.2	-9.1	15.4	1.7

SOURCES: Ibbotson Associates; Shiller (2005); Global Financial Data; and authors' calculations using Federal Reserve Board data. See article Appendix for details.

NOTE: Return statistics do not reflect administrative expenses.

during ages 22–61.[19] There are no preretirement withdrawals. The basis for assessing investment performance is the total account accumulation at retirement onset, which is assumed to occur at age 62 for all workers.[20] Because final account accumulations are strongly influenced by lifetime real earnings that tend to increase from earlier to later birth cohorts, the discussion of results focuses on the investment account IRRs. The percentage of earnings contributed to RSAs will not affect the rate of return for accounts if that percentage is the same for all workers in all years.

This article presents results of three simulations based on annual rates of return on the assets held in the RSAs. The first (and main) simulation is stochastic and uses randomly selected sequences of returns drawn from the historical returns for 1926–2008. The second is a nonstochastic simulation that uses the actual historical sequence of asset returns during 1937–2003, the period represented by the earnings histories that generate the account contributions. The third is a stochastic simulation in which the real historical equity premium on U.S. stocks is reduced by 2.5 percentage points.

The simulation results are based on workers' earnings that incorporate all upward adjustments of censored pre-1990s earnings amounts. Contribution amounts are those made from earnings during ages 22–61, ignoring any earnings outside that age interval.[21] For each of the 12,871 earners in the sample, 1,000 simulations are run for each investment strategy. The sequence of investment returns for each simulation is drawn from 1926–2008 investment returns data. To preserve any contemporaneous correlations in asset performance, a draw of a specific year's data includes all return figures for that year. Each simulation requires a sequence of 67 years of returns corresponding to the period 1937–2003, during which all of the 40-year earnings histories occur. The sequence is constructed by repeatedly drawing (with replacement) from 1 to 5 adjacent consecutive years of returns, with the exact number of years in each draw determined randomly. The process continues until the sequence of 67 years of returns is complete. This method was chosen to preserve at least some of any intertemporal correlations in asset performance. Results differ little from simulations in which the return sequences were constructed with single-year draws.

Results

Results for each of the three simulations are discussed below.

Main Simulation

Statistics for the main stochastic simulation are presented in Table 4 and Chart 1, which summarize the distributions of real IRRs for the four life-cycle investment strategies and the four comparison plans (all bonds, a 50-50 mix of stocks and bonds, all stocks, and no-lose).[22] Note that the "mean IRR" herein is an arithmetic mean of 12.9 million geometric means. The bottom four rows of the upper panel of Table 4 show, for each investment strategy, the percentage of nearly 13 million simulated paths where the IRR fails to attain four benchmark rates. The easiest benchmark to meet is 0 percent: The investor avoids an outright loss of any of the lifetime real contributions to the account. Two other benchmarks (2.0 percent and 2.5 percent)

Table 4.
Real internal rates of return (IRRs) for stochastically simulated retirement savings accounts using 1926–2008 investment returns, 1915–1942 birth cohorts

IRR statistic	Life-cycle plans				Comparison plans			
	Conservative	Baseline	Aggressive	L plan	All bonds	50-50	All stocks	No-lose
	Selected values for the frequency distribution (in percent)							
Arithmetic mean	3.9	4.3	5.1	4.6	2.1	4.8	6.5	4.5
Minimum value	-5.6	-5.8	-9.5	-7.2	-6.6	-11.2	-24.1	0.2
1st percentile	-0.2	-0.1	-0.2	-0.4	-1.6	-0.2	-3.2	0.9
10th percentile	1.7	1.9	2.3	1.9	0.1	2.2	1.8	1.9
25th percentile	2.8	3.1	3.7	3.3	1.0	3.4	4.1	2.8
Median	3.9	4.3	5.2	4.7	2.1	4.8	6.6	4.2
75th percentile	5.0	5.5	6.6	6.0	3.2	6.1	9.0	5.9
90th percentile	6.0	6.6	7.9	7.2	4.1	7.3	11.2	7.7
99th percentile	7.6	8.5	10.2	9.2	5.8	9.4	14.8	10.8
Maximum value	13.2	13.7	17.8	13.9	12.3	19.5	32.0	15.0
IRR < 0	1	1	1	2	9	1	4	0
IRR < 2.0	14	11	8	11	48	9	11	11
IRR < 2.5	21	16	11	15	60	13	14	20
IRR < 2.9	28	22	15	20	69	17	16	27
	Distribution shape statistics							
Standard deviation	1.7	1.8	2.2	2.1	1.6	2.0	3.7	2.3
Interquartile range	2.3	2.5	2.9	2.8	2.2	2.7	4.9	3.1
Coefficient of variation	43.58	42.58	42.79	44.73	76.07	42.57	57.66	50.05
Coefficient of skewness	-0.13	-0.09	-0.08	-0.13	0.04	-0.09	-0.27	0.75
Coefficient of kurtosis	0.11	0.10	0.12	0.05	0.08	0.35	0.62	0.31

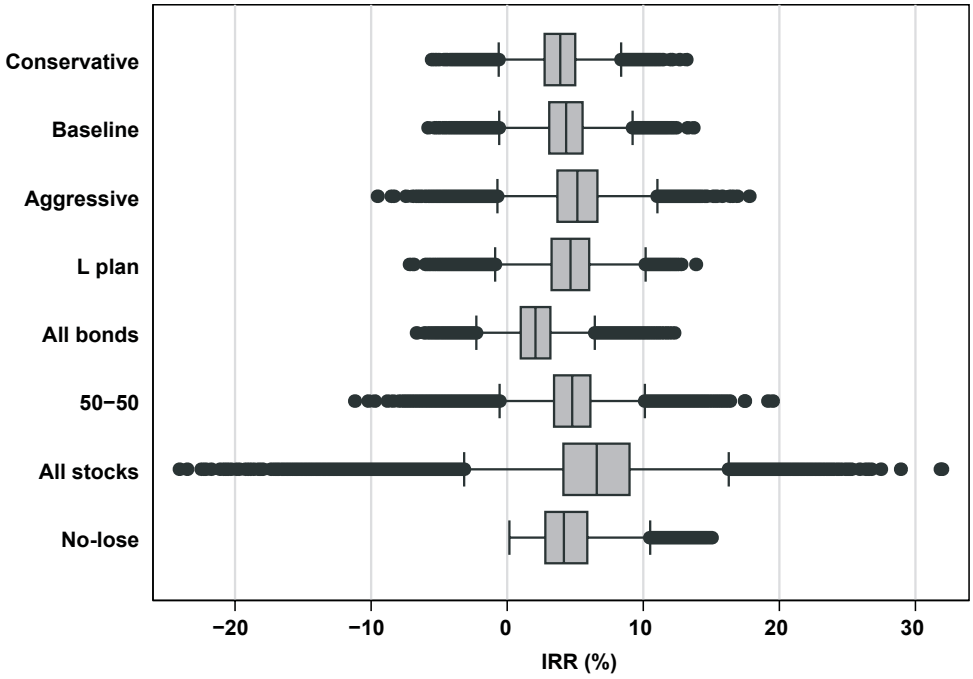
SOURCE: Authors' calculations using Social Security Administration earnings records.

NOTES: Sample size = 12,871. Simulations per person = 1,000.

were specified in the final report of the President's Commission to Strengthen Social Security (2001) as the offset rates for voluntary personal retirement account contributions funded by payroll taxes. The 2.9 percent figure is the 2009 Social Security Trustees' best projection (intermediate assumption) for the long-run real rate of interest (Board of Trustees 2009). The lower panel of Table 4 shows measures of spread, skewness, and kurtosis for the simulated IRR distributions.

Among the four life-cycle investment strategies, both mean and median IRRs indicate that the aggressive plan generates the highest real returns (mean = 5.1 percent), followed by the L plan (mean = 4.6 percent), baseline plan (mean = 4.3 percent), and conservative plan (mean = 3.9 percent). This ordering of mean IRRs is associated with decreasing variability of returns as measured by their standard deviations. The distributions of outcomes for each strategy are displayed in Chart 1's box and whiskers plots.[23, 24] Differences in the distributions of IRRs for the four life-cycle strategies reflect differences in the exposure to higher-yielding but riskier assets (stocks) during ages 22–61. In some instances, the time path of the percentage of portfolio value invested in equities is always higher in one strategy than another (Chart 2). At any given age, the aggressive plan has more equity exposure than the baseline plan, which, in turn, is more equity-intensive than the conservative plan. Although the L plan also always contains a higher fraction of equities than the conservative plan, its time path intersects those of the aggressive and baseline plans, as well as those for the no-lose and 50-50 strategies (the 50-50 plan's path is the 50 percent gridline).

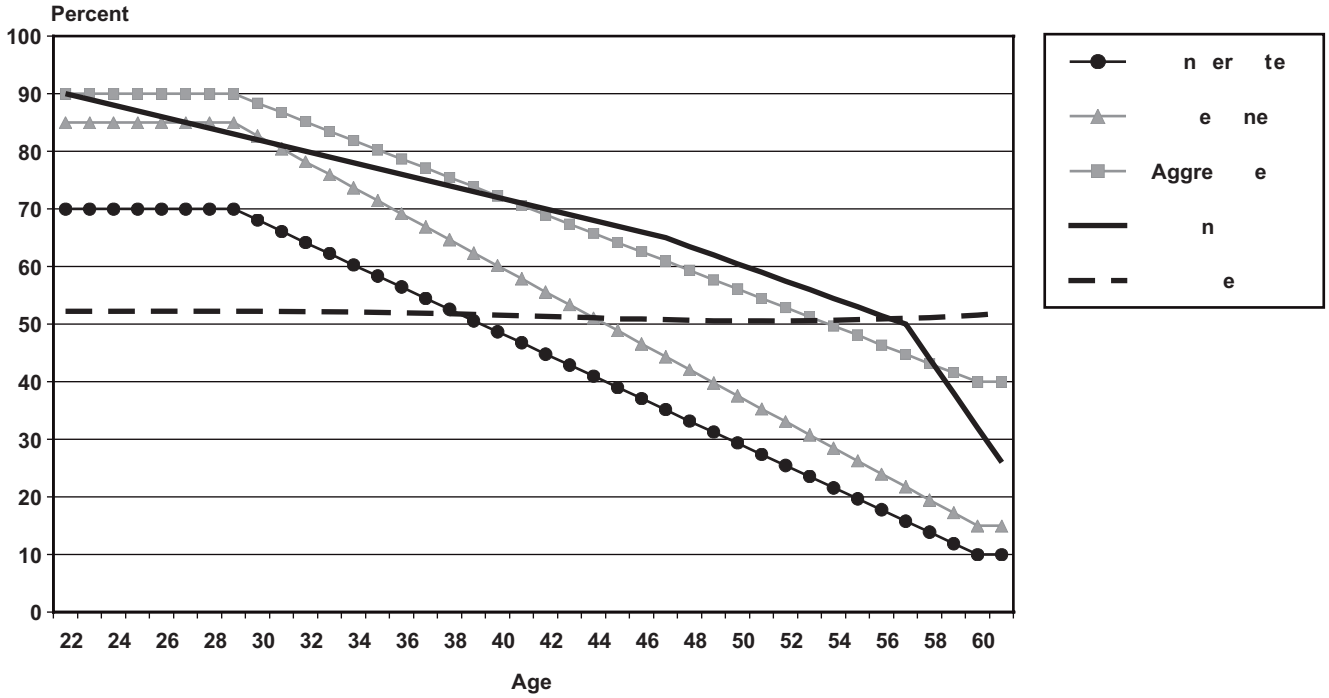
Chart 1.
Distributions of real internal rates of return (IRRs) for stochastically simulated retirement savings accounts using 1926–2008 investment returns for 1915–1942 birth cohorts



SOURCE: Authors' calculations using Social Security Administration earnings records.

NOTE: Sample size = 12,871.

Chart 2.
Hypothetical portfolios: Percentage of contributions invested in stocks at ages 22–61



SOURCES: Shiller (2005); Federal Retirement Thrift Investment Board; and authors' calculations.

NOTE: The 50-50 plan is represented by the 50 percent horizontal gridline.

Intersections of the time paths of two strategies can make it difficult to judge their relative equity exposure. For example, the L plan's equity exposure is most similar to the aggressive plan's but is actually a little lower during ages 23–40, higher during ages 41–58, and lower for ages 59–61.

Differences in the distributions of IRRs between the L plan (mean = 4.6 percent, standard deviation = 2.1 percent) and the aggressive allocation plan (mean = 5.1 percent, standard deviation = 2.2 percent) reflect the types of stocks and bonds held by each plan. The large-cap stocks (C Fund) held by the aggressive plan have a slightly higher geometric mean rate of return (6.6 percent; see Table 3) than the L plan's mixture of C Fund, S Fund (small- and medium-cap), and I Fund (international) stocks, which is attributable to the lower (4.9 percent) geometric mean rate of return for the I Fund. The mix of long-term Treasury bonds and 6-month private sector money market instruments held by the conservative, baseline, and aggressive plans (shown as the Shiller combined bond-money market fund in Table 3) also exhibits both a higher geometric mean rate of return (2.3 percent) and a higher standard deviation (6.3 percent) than the L plan's mix of long-term bonds (F Fund) and 1-month Treasury bills (G Fund).

The aggressive portfolio, which loses money for investors in 1 percent of the simulations, exceeds the other three benchmark IRR values with greater frequency than the other life-cycle strategies. When percentile values are compared for the distributions of simulated IRRs for the four life-cycle plans, the conservative plan, with its relatively greater emphasis on bonds, is almost always the worst performer.[25]

Among the four comparison plans, the simple all-stocks strategy produces a substantially higher mean IRR (6.5 percent) than any of the four life-cycle plans. In 17 percent of simulations, IRRs equal or exceed 10 percent, but there is a small probability (less than 3.5 percent) of generating the worst outcomes. The all-stocks portfolio has the highest variability (standard deviation) of outcomes, and generates a negative IRR in 4 percent of simulations, but attains the 2.0 percent, 2.5 percent, and 2.9 percent benchmarks more frequently than the life-cycle strategies, excepting the aggressive plan. The all-bonds portfolio generates the lowest mean IRR of the eight comparison and life-cycle strategies, and most frequently fails to generate returns that exceed all benchmarks.

The 50-50 plan has a mean IRR equal to 4.8 percent, which exceeds the mean IRRs of the life-cycle plans except the aggressive plan's 5.1 percent. The average equity exposure (Chart 2) during ages 22–61 is usually higher for the aggressive plan than for the 50-50 plan. The no-lose plan has a mean IRR equal to 4.5 percent, which exceeds those of the conservative and baseline plans and is about the same as the L plan's 4.6 percent. For the no-lose plan all persons have positive IRRs.

In general, the Table 4 results point to the importance of the benchmark rate of return chosen to evaluate an investment strategy. For the four life-cycle plans, between 8 and 14 percent of simulations fail to meet the 2.0 percent benchmark. If the benchmark is increased to 2.9 percent, the likelihood of a plan's IRR falling short is approximately doubled. Among the comparison plans, the IRR for the all-bonds strategy—by most criteria, the worst performer of all eight allocation strategies—fails to attain the 2.9 percent benchmark in 69 percent of the simulations.

The four life-cycle strategies and the 50-50 plan entail annual rebalancing of accounts. Rebalancing can increase or decrease account accumulations depending on the size of the difference in mean returns on assets held in the portfolio and the correlations among asset returns. Large differences in rates of return can result in markedly lower accumulations as funds are diverted from higher- to lower-return investments. When the correlation between returns is negative, rebalancing can increase accumulations. The stochastic simulation finds large penalties for the strategies that entail rebalancing. In the baseline and conservative strategies, mean IRRs are 25 percent lower when rebalancing occurs, with somewhat lower penalties for the L (22 percent), aggressive (15 percent), and 50-50 (8 percent) plans.[26] The associated gains from rebalancing for these five strategies come via reductions in standard deviations of the distributions of IRRs of 23–40 percent.

A potential shortcoming of the stochastic simulation merits attention. It is possible that the simulation procedures somehow fail to construct return sequences that capture all the important statistical properties of the process that generates actual returns during 1926–2008 (for example, mean reversion). The procedure for constructing return sequences for the stochastic simulation ignores any correlation that may exist between equity returns and aggregate labor earnings growth. Geanakoplos and Zeldes (2009) argue that there is likely to be a long-run positive correlation

between average wage levels and equity returns, yet there is currently no compelling empirical evidence on this point.

Nonstochastic Simulation with the Historical Sequence of Returns

In reality, some birth cohorts are more fortunate than others regarding asset returns during ages 22–61. In the stochastic simulation the large number of simulated return sequences for each investor effectively eliminates this phenomenon; draws of less favorable sequences tend to be offset by draws that reflect higher returns. To check the magnitude of this phenomenon, we divide the sample into seven cohort groups, each consisting of four consecutive birth years (1915–1918, 1919–1922, and so on through 1939–1942). We examine intercohort differences by conducting a nonstochastic simulation of seven of the portfolio allocation strategies using the actual historical sequence of investment returns for 1937–2003. (The no-lose strategy is omitted because there are no historical returns data for TIPS for nearly all of that period.) Although the probability of recurrence of this specific sequence of returns is effectively zero, the exercise offers the advantage that, by definition, it captures any cross-year correlations in returns, mean reversion, or other subtle statistical properties of asset returns imbedded in the historical returns data that may be omitted in the stochastic analysis.

The arithmetic mean IRRs and median final accumulations of the seven allocation strategies are shown for the seven cohort groups (separately and combined) in Table 5. There is wide variation in RSA performance across cohorts, irrespective of investment strategy. Relative differences in median accumulations across cohorts greatly exceed the differences in average real earnings reported in Table 2. The earliest two cohort groups (1915–1918 and 1919–1922) achieve considerably lower mean IRRs than do later groups, while the last two groups (1935–1938 and 1939–1942) fare notably better than the others. These intercohort differences in investment performance result in large differences in the probabilities that IRRs for specific strategies will attain the four benchmark returns. For example, probabilities that the 1919–1922 cohort group fails to meet the 2.0 percent return benchmark range from 6 percent (L plan) to 52 percent (conservative plan) to 100 percent for the all-bonds strategy. In contrast, the 1935–1938 and 1939–1942 cohorts always meet the 2.9 percent benchmark. The historical simulation confirms that some cohorts clearly fare worse in accumulating retirement savings irrespective of portfolio allocation strategy.

Stochastic Simulation with Reduced Equity Returns

A second set of stochastic simulation results, in which the real equity return for domestic stocks is lowered by 2.5 percentage points, is presented in Table 6. As expected, all distributions of simulated IRRs for the four life-cycle strategies and the three comparison plans that contain equity investments are substantially lower. The reduced equity premium results in standard deviations that are the same for the four life-cycle strategies, slightly larger for the all-stocks plan (by 0.2 percentage points) and the 50-50 plan (by 0.1 percentage points), and clearly smaller (by 0.5 percentage points) for the no-lose strategy. The mean IRR of the no-lose strategy declines relative to the mean IRRs of all other allocations except for all stocks, because equity exposure in the no-lose plan depends on the level of stock returns. In the no-lose strategy, the portfolio is not rebalanced and the reduced equity returns result in lower equity balances in subsequent years. Regardless of the portfolio strategy, investors fail to achieve returns of 2.0 percent on their RSAs at least 22 percent of the time. For six of the seven strategies that involve equities, the reduced equity premium at least doubles the percentage of simulated IRRs that fall short of 2.0 percent, with the percentage for the seventh (the conservative plan) increasing by 86 percent. Finally, the percentage of simulated IRRs that fall below 2.9 percent exceeds 40 percent for three of the seven strategies that involve stocks, and ranges from 36 percent to 45 percent for the four life-cycle funds.

Reconciliation with Other Research

Our results are generally consistent with those in several recent studies that have explicitly considered the variability of investor returns on stocks and bonds. The two most relevant comparison studies are Shiller (2005), the source of three of our simulated life-cycle allocation strategies, and Poterba and others (2006).[27]

Shiller (2005) reports on the life-cycle strategies that we designate conservative, baseline, and aggressive plans, along with three comparison strategies (all stocks, all bonds, and a 50-50 plan). In Shiller's simulations, workers contribute to RSAs during ages 21–64. The investment returns used in the central results are 91 sets of consecutive 44-year sequences of the historical returns from 1871–2004, a considerably longer period than ours. As in our simulations, administrative charges for RSAs are assumed to be 0.3 percent of annual account balances.

Table 5.
Real accumulation and internal rates of return (IRRs) for historical retirement savings account simulation, by cohort group

Cohorts	Life-cycle plans				Comparison plans		
	Conservative	Baseline	Aggressive	L Plan	All bonds	50-50	All stocks
1915–1918							
Median accumulation ($)	66,274	72,054	78,676	79,920	48,870	66,755	92,023
Mean IRR (%)	1.9	2.4	3.0	3.1	-0.2	1.9	3.8
IRR standard deviation (%)	1.0	1.3	1.4	1.1	0.4	1.0	2.0
1919–1922							
Median accumulation ($)	71,354	79,281	89,928	97,328	48,510	73,793	111,292
Mean IRR (%)	1.8	2.4	3.1	3.6	-0.3	2.1	4.2
IRR standard deviation (%)	1.1	1.3	1.3	0.9	0.8	0.8	1.4
1923–1926							
Median accumulation ($)	113,200	125,465	141,905	146,651	83,412	118,773	172,514
Mean IRR (%)	3.6	4.0	4.6	4.8	2.0	3.9	5.5
IRR standard deviation (%)	0.8	0.8	0.9	0.7	0.9	0.8	1.0
1927–1930							
Median accumulation ($)	134,838	146,079	165,654	179,345	104,315	150,516	212,987
Mean IRR (%)	4.2	4.5	5.1	5.5	2.8	4.8	6.4
IRR standard deviation (%)	0.6	0.6	0.7	0.6	0.7	0.8	1.0
1931–1934							
Median accumulation ($)	156,971	165,735	188,631	186,921	127,476	182,759	246,339
Mean IRR (%)	4.6	4.9	5.5	5.4	3.5	5.4	6.8
IRR standard deviation (%)	0.6	0.7	0.8	0.5	0.7	0.8	1.0
1935–1938							
Median accumulation ($)	199,953	216,043	278,282	246,719	151,936	281,882	479,565
Mean IRR (%)	5.3	5.7	6.9	6.3	4.0	6.9	9.3
IRR standard deviation (%)	0.7	0.7	1.0	0.7	0.6	1.2	1.7
1939–1942							
Median accumulation ($)	233,064	251,847	299,063	270,855	174,137	282,677	408,782
Mean IRR (%)	5.7	6.0	6.7	6.2	4.3	6.5	8.1
IRR standard deviation (%)	0.5	0.6	0.7	0.5	0.5	0.8	1.3
All cohorts							
Median accumulation ($)	136,463	149,193	173,036	172,530	101,684	155,507	229,788
Mean IRR (%)	4.2	4.6	5.3	5.2	2.7	4.9	6.7
IRR standard deviation (%)	1.6	1.5	1.7	1.3	1.8	2.0	2.2

SOURCE: Authors' calculations using Social Security Administration earnings records.

All results presented in the previous section are based on the actual earnings histories, with minor adjustments, of 12,871 workers. In contrast, the Shiller simulations use a single hypothetical earnings history for a "scaled medium worker" developed by Social Security's Office of the Chief Actuary.[28] The scaled medium worker's earnings history represents a hypothetical worker whose earnings during ages 21–64 are about equal to average earnings in the economy (measured by AWI) for the relevant years, with adjustments to reflect the worker's age. The worker's annual earnings relative to AWI increase until the worker's age reaches the late 40s, and then gradually decline. Shiller's hypothetical worker is born in 1990 and retires at age 65. As a consequence of using a single hypothetical worker's earnings history, any differences in account performance across simulation runs in the Shiller analysis cannot be due to variability in contribution streams and must stem from differences in the sequences of investment returns that are used. We return to this point below.

Several of the key statistics from our stochastic simulations based on historical returns are compared with Shiller's results in Table 7. There are a number of common findings: For example, the studies find the same rankings by size of mean IRR for the six

Table 6.
Real internal rates of return (IRRs) for stochastically simulated retirement savings accounts using 1926–2008 investment returns with reduced equity premium, 1915–1942 birth cohorts

IRR statistic	Life-cycle plans				Comparison plans			
	Conservative	Baseline	Aggressive	L plan	All bonds	50-50	All stocks	No-lose
Selected values for the frequency distribution (in percent)								
Arithmetic mean	3.1	3.3	3.7	3.6	2.1	3.5	4.0	3.1
Minimum value	-5.9	-6.3	-10.7	-7.9	-6.6	-12.6	-27.0	0.1
1st percentile	-0.9	-1.0	-1.6	-1.4	-1.6	-1.6	-6.3	0.5
10th percentile	0.9	0.9	0.9	0.9	0.1	0.9	-0.9	1.2
25th percentile	2.0	2.1	2.2	2.2	1.0	2.2	1.5	1.8
Median	3.1	3.3	3.7	3.6	2.1	3.5	4.1	2.8
75th percentile	4.2	4.5	5.1	5.0	3.2	4.9	6.6	4.1
90th percentile	5.1	5.5	6.4	6.2	4.1	6.1	8.8	5.6
99th percentile	6.8	7.4	8.7	8.1	5.8	8.2	12.4	8.4
Maximum value	12.8	13.2	16.7	13.2	12.3	18.3	29.6	12.6
IRR < 0	4	4	5	5	9	5	14	0
IRR < 2.0	26	24	22	22	48	22	29	31
IRR < 2.5	36	33	29	30	60	30	33	44
IRR < 2.9	45	41	36	37	69	38	37	54
Distribution shape statistics								
Standard deviation	1.7	1.8	2.2	2.1	1.6	2.1	3.9	1.8
Interquartile range	2.2	2.4	2.9	2.7	2.2	2.7	5.0	2.3
Coefficient of variation	54.17	54.76	59.61	57.72	76.07	58.75	97.85	56.96
Coefficient of skewness	-0.10	-0.07	-0.06	-0.12	0.04	-0.10	-0.34	1.03
Coefficient of kurtosis	0.09	0.08	0.12	0.03	0.08	0.35	0.74	1.03

SOURCE: Authors' calculations using Social Security Administration earnings records.

NOTES: Sample size = 12,871. Simulations per person = 1,000.

allocation plans common to both analyses, and both studies find that the all-bonds plan performs worst in attaining IRR benchmarks. However, the stochastic simulation in our work produces a substantially wider distribution of outcomes for the six common strategies, as can be verified by comparing the 10th, 25th, 75th, and 90th percentile IRR values. For each of the six plans the mean IRR is higher in our study than in the Shiller study.

We investigated the source of these differences. Historical real stock returns exhibit a geometric mean of 6.8 percent during the 1871–2004 reference period for the Shiller study and a geometric mean of 6.6 percent during the 1926–2008 reference period for our study. There is a modest difference in bond returns in the two studies, with Shiller reporting a geometric mean equal to 2.6 percent compared with 2.3 percent for this study. Our simulation procedures cause the arithmetic means of the distributions of the stochastically generated stock and bond returns to approximate their historical geometric means, but Shiller's simulations undersample years at both ends of his reference period.[29] The uneven sampling of annual returns for 1871–2004, along with assumed administrative charges, lead to a reported mean IRR for Shiller's all-bonds strategy equal to 1.2 percent—considerably lower than the reported historical geometric mean would suggest—while the mean IRR for the all-stocks strategy is 6.1 percent, also lower than the geometric mean for the historical period.

Shiller also presents simulation results with an equity return reduced by 2.2 percentage points, analogous to our stochastic simulation based on an equity premium reduction of 2.5 percentage points (Table 6). In these simulations, findings common to both studies parallel the similarities mentioned above

Table 7.
Comparison of real internal rate of return (IRR) results of this study with results in Shiller (2005): Historical equity returns (in percent)

	Life-cycle plans						Comparison plans					
	Conservative		Baseline		Aggressive		All bonds		50-50		All stocks	
IRR statistic	This study	Shiller	This study	Shiller	This study	Shiller	This study	Shiller	This study	Shiller	This study	Shiller
Mean	3.9	2.9	4.3	3.4	5.1	4.4	2.1	1.2	4.8	4.0	6.5	6.1
10th percentile	1.7	1.9	1.9	2.4	2.3	3.2	0.1	-0.3	2.2	2.4	1.8	4.1
25th percentile	2.8	2.3	3.1	2.9	3.7	3.8	1.0	-0.1	3.4	3.4	4.1	5.0
Median	3.9	2.7	4.3	3.4	5.2	4.6	2.1	1.1	4.8	4.2	6.6	5.9
75th percentile	5.0	4.1	5.5	4.4	6.6	5.2	3.2	2.8	6.1	5.0	9.0	8.3
90th percentile	6.0	4.2	6.6	4.5	7.9	5.3	4.1	3.0	7.3	5.2	11.2	8.6
IRR < 2.0	14	13	11	2	8	1	48	68	9	4	11	0
IRR < 2.9 [a] or 3.0 [b]	28	56	22	32	15	8	69	89	17	20	16	2

SOURCES: Authors' calculations using Social Security Administration earnings data (see Table 4) and Shiller (2005).

a. Benchmark used in this study.

b. Benchmark used in Shiller (2005).

for the simulations without equity premium reductions. Again, both studies rank the six plans identically in terms of mean IRR and find that the all-bonds plan performs worst compared to the benchmark rates of return, and our stochastic simulation produces a markedly wider distribution of outcomes for all portfolio strategies.

In their main simulations, Poterba and others (2006) present results for eight asset allocation strategies, several of which bear some resemblance to ours. However, numerous differences in respective approaches render a comparison of their results with ours problematic. Their analysis is focused on accumulated balances and the utility levels attained by 1,400 married couples when alternative investment strategies are chosen for RSAs. Asset accumulation statistics are displayed only by education level, which roughly stratifies the sample by wealth levels.[30] Their portfolio allocation strategies include all-stocks, all-bonds (nominal long-term), and all-TIPS plans; four life-cycle strategies; and Feldstein's no-lose plan.[31] Of their four life-cycle plans, two represent a mix of large-cap indexed stock funds and TIPS, and two combine large-cap indexed stock funds with traditional long-term government bonds. The four life-cycle funds are differentiated by two factors: the rule for deciding the percentage of the portfolio in equities, and whether the remainder of the portfolio is invested in TIPS or government bonds. Regarding the portfolio's equity share, the rule is either "heuristic" (*share = 110 – age*) or "empirical" (the share at given ages is determined by the average value used by a set of leading investment firms that offer these types of funds). The empirical rule dictates a higher proportion of stock in the portfolio until a person is in his or her mid-50s, ranging from 88 percent at age 26 to 30 percent at age 63; the corresponding shares for the heuristic rule are 84 percent and 47 percent. In the 1926–2003 period used to generate the stochastic sequences of investment returns, the arithmetic mean real return is 9.2 percent for equities and 2.8 percent for bonds. A constant real return of 2.0 percent is assumed for TIPS.

Using historical rates of return in the stochastic simulations, Poterba and others (2006) report that at all education levels, the highest mean account accumulation is earned by the all-stocks strategy, which also displays the highest variability in outcomes. The no-lose strategy provides the next best mean accumulation and eliminates the possibility of the worst outcomes from the all-stocks plan. The no-lose strategy outperforms all four life-cycle plans, of which the best performer is empirical-bonds, followed by empirical-TIPS, heuristic-bonds, and heuristic-TIPS. The ranking of the performance of the four life-cycle plans is easy to explain. Plans that are more equity-reliant generate higher mean returns at the cost of more risk exposure, and the mean real bond return exceeds the assumed TIPS return of 2.0 percent.

Poterba and others (2006) also examine the effects of a 3.0 percentage point reduction in the equity premium, obtaining results that are consistent with ours.

Mean all-stocks accumulations are approximately halved and the more an allocation strategy relies on equity investments, the greater the reduction in simulated account accumulations.

Simulation studies that compare the effectiveness of alternative investment strategies are sometimes based on the earnings of one or more stylized workers that are intended to represent some larger group's experience. The studies by Shiller (2005) and Brady (2009) are examples of that approach. In reality, the distribution of outcomes for an investment strategy depends both on the return sequences faced by investors and the stream of contributions to the accounts. We conducted a number of experiments to determine the effect of using earnings microdata on the stochastic simulation results. This involved substituting stylized earnings histories (for scaled medium workers) for the 12,871 actual earnings histories that determine account contributions in the simulations. Comparisons of results show that the earnings microdata have modest effects on the distributions of IRRs for life-cycle plans, reducing mean values and increasing standard deviations. In the earliest (1915) cohort, the mean IRRs of the four life-cycle strategies are 0.3 to 0.4 percentage points lower when actual earnings histories are used; later birth cohorts show smaller differences (about 0.1 percentage point). The standard deviations for the distributions of IRRs are usually 5 percent to 15 percent larger than for the stylized worker approach (except for the no-lose plan) and outcomes fail to meet the 2.9 percent return benchmark with slightly greater frequency (except for the all-bonds plan).

The use of earnings microdata has substantially larger effects on the distributions of total accumulations, producing smaller means and greater variability. Accumulations are 26 to 36 percent lower for the earliest cohort (1915), and are 7 to 16 percent lower for later cohorts. Differences are smallest for the all-bonds strategy and highest for all stocks. Dispersion in the distributions is substantially higher, with standard deviations ranging from 7 percent to 141 percent higher when microdata are used.

Much of the discrepancy in results for simulations that use earnings microdata versus those for stylized workers is associated with the prevalence of zero-earnings years. The four life-cycle strategies allocate smaller percentages of their portfolios to stock as age increases. The prevalence of zero-earnings years at younger ages means that final RSA accumulations do not benefit from early exposure to assets with higher expected returns, albeit with greater risk. The relative frequency of zero-earnings years and the importance of their effect on accumulations decline from earlier to later birth cohorts.[32]

Concluding Remarks

The stochastic simulation results presented in this article indicate that the four life-cycle portfolio allocation strategies offer investors mean real IRRs on the order of 4–5 percent, but entail probabilities ranging from 8 percent (aggressive) to 14 percent (conservative) that returns net of administrative expenses will fail to attain 2.0 percent. Only the extreme tails of the distributions of outcomes contain double digit returns; for three of the life-cycle strategies, they occur above the 99.5th percentile; for the fourth, the aggressive strategy, they occur above the 98.5th percentile. Life-cycle plans with larger portfolio weights assigned to stocks have higher average returns, but those gains come at the cost of increased risk of infrequent but very bad outcomes. By comparison, a portfolio invested entirely in stocks has a higher mean IRR than is found for any of the life-cycle plans—1.4 percentage points higher than the aggressive portfolio—but comes with the greatest variability in returns. The all-stocks simulations show double-digit IRRs in 17 percent of outcomes, but also have negative IRRs 4 percent of the time.

The relative attractiveness of the various RSA allocation strategies very much depends on whether historical returns on U.S. equities indicate what may be expected in the future. Professional opinion is divided on this point but at present appears to lean toward a reduced equity premium. A downward adjustment of 2.5 percent (real) in the equity return for U.S. stocks substantially lowers the mean IRR of simulated RSAs for the seven investment strategies that contain equity components. The relative risk (measured by the proportional change in the coefficient of variation) of the all-stocks strategy increases by 70 percent when the historical equity premium is reduced.

The Feldstein no-lose strategy performs quite well in comparison with the conservative and baseline life-cycle plans and has a mean IRR only 0.1 percentage point lower than that of the L plan. The no-lose plan generates lower IRRs than the aggressive plan in all except the lowest 10 percent of outcomes, but would appear to have considerable appeal for investors willing to accept a lower expected return (by about 0.6 percentage points compared with the aggressive plan) to avoid a low-probability loss. Whether this would become a popular investment strategy would

very much depend on the real rate of interest paid by TIPS and the administrative costs that would be charged to investors. The TIPS market is still relatively new and evolving so there is not yet a great deal of evidence available.

This study's results do not lead to any sweeping conclusion about the desirability of adopting a life-cycle approach to manage retirement savings accounts. The rapid rise in the use of life-cycle funds over the past two decades suggests that the concept has considerable appeal for many workers. Nonetheless, the performance of equity investments in 2007–2008 and, more generally, over much of the past decade has raised concerns about whether investors understand the extent of risk to which their retirement savings can be exposed during their later working years. In this article, two of the four life-cycle plans (aggressive and L plan) have at least 50 percent of the RSA value allocated to equities after age 50. Bodie and Treussard (2007) note the popularity of life-cycle funds that more or less implement the simple rule that the proportion of equities held in a portfolio is equal to *100 – age*. They conclude that workers who are more risk-averse and those with more uncertain future earnings potential are better served by RSA strategies that are less risky than the typical life-cycle plan (for example, the purchase of deferred real annuities). Thus, although life-cycle funds may constitute an improvement on the often inappropriate retirement saving strategies currently used by many workers, they may not be the best choice in many cases.

Appendix: Returns Data Used in Retirement Savings Account Simulations

Data sources are provided below for each type of RSA simulated in this article.

L Plan

For the indexed stock funds (C, S, and I) and the bond funds (F and G) held by the L plan, annual nominal rates of total return were used. Total return consists of income return (dividends in the case of stocks, interest in the case of bonds) and its reinvestment, as well as capital appreciation. Thus, assume a dollar invested at the beginning of year t grows to x dollars by the end of year t. In that instance, the rate of total return for year t is $100(x–1)$ percent.

Annual returns data for some of the underlying funds were not available for the entire 1926–2008 period. We approximate the annual returns (gross of administrative expenses) for each fund as follows:

C Fund. The C Fund holds a broadly diversified portfolio of stocks of large and medium-size U.S. firms. The objective of the fund is to match the total return performance of the S&P 500 Index.

For rates of return on C Fund assets for 1926–2008, we use annual total returns (in percent) on large company stocks from Table 2-5 of *Ibbotson SBBI 2009 Classic Yearbook* published by Morningstar, Incorporated (Ibbotson Associates 2009). For 1990–2004, the average of these rates of return (about 12.4 percent) was about 30 basis points (about 3 percent) higher than the average rate of return net of administrative costs on TSP's C Fund. Total returns are given in nominal (not real) terms. The Ibbotson large company stock return index is based on the S&P Composite Index. Currently, the S&P Composite Index includes 500 of the largest stocks (in terms of stock market capitalization value) in the United States; prior to March 1957 it consisted of 90 of the largest stocks. The total return index reflects the effect of reinvesting dividends in the S&P Composite Index basket of stocks.

I Fund. The I Fund holds a diversified portfolio of stocks of companies in developed countries outside the U.S. and Canada. The objective of the I Fund is to match the total return performance of the Morgan Stanley Capital International EAFE (Europe, Australasia, Far East) Index, a broad international market index made up of stocks of large companies in 21 developed countries.

For rates of return on I Fund assets for 1970–2008, the study uses annual total returns on the EAFE index from Table 13-6 of the 2009 *Ibbotson Yearbook;* this rate of return series begins with 1970. For 2002–2004, the average of the EAFE rates of return was about 75 basis points (about 5 percent) higher than the average rate of return net of administrative costs on the TSP I Fund. For 1926–1969, annual total returns on a proxy EAFE index constructed by Global Financial Data (GFD) are used. The countries included in the GFD index are mostly the same as those included in the EAFE index; however, the weighting system is quite different.

S Fund. The S Fund holds a diversified portfolio of stocks of small- and medium-size U.S. companies. The objective of the S Fund is to match the total return performance of the Dow Jones Wilshire 4500 Completion Index (DJW 4500), a broad market index made up of stocks of U.S. companies not included in the S&P 500 Index.

For rates of return on S Fund assets for 1984–2008, we use annual total returns on the DJW 4500 Index; this rate of return series begins with 1984. The data come from Ibbotson Associates. For 2002–2004 the average of the DJW 4500 rates of return was about 60 basis points (about 4 percent) higher than the average rate of return net of administrative costs on the TSP S Fund.

For S Fund rates of return for 1926–1983, annual total returns on mid-cap stocks were used after statistical analysis showed that for 1984–2004, mid-cap rates of return were good predictors of the DJW 4500 total rates of return. In fact, the mid-cap rates of return were at least as good as predictors as any of the individual decile rates of return, and substantially better than low-cap rates of return.[33]

G Fund. The TSP's G Fund is invested exclusively in short-term U.S. government securities (with maturities ranging from 1 day to 4 days over holiday weekends), but the securities earn a long-term interest rate. Because the long-term rate usually exceeds short-term rates, the TSP G Fund in effect receives an interest rate subsidy.

To generate an unsubsidized rate that may be more realistic for RSAs designed for the general public as contrasted with a fringe benefit for federal workers, we use annual total returns (in percent) on 1-month U.S. Treasury bills from Table 2-5 in the 2009 *Ibbotson Yearbook*.

Despite the use of an unsubsidized interest rate for the G Fund, all simulations use current TSP portfolio allocation percentages for the L Funds. Those allocations imply that a somewhat larger share of our account balances is in the unsubsidized G Fund than probably would have been chosen by TSP administrators.

F Fund. The F Fund holds a diversified portfolio of bonds from the various sectors of the U.S. bond market. The objective of the F Fund is to match the total return performance of the Barclays Capital (formerly Lehman Brothers) U.S. Aggregate (LBA) index, a broad index representing the U.S. bond market. The LBA index consists of high quality fixed-income securities with maturities of more than one year. The index includes U.S. government bonds, mortgage-backed securities (Fannie Mae and others), corporate bonds, and foreign government bonds denominated in U.S. dollars.

For rates of return on the F Fund for 1976–2008, we use annual total returns data for the LBA index as reported by Ibbotson Associates; this rate of return series begins with 1976. For rates of return on the F Fund for 1926–1975, we use annual total returns on intermediate-term government bonds from Table 2-5 in the 2009 *Ibbotson Yearbook*. Statistical analyses we conducted show that for 1976–2004, intermediate-term government bond rates of return are good predictors of the LBA rates of return and are clearly superior to alternatives evaluated.

Other life-cycle and comparison plans

Stocks. The rates of return used by Shiller (2005) for his equities are based on S&P data on stock prices and dividends. To simulate our other stock-holding plans, we use the same Ibbotson series (based on the S&P 500 Index) that we use to simulate C Fund returns. The Ibbotson series is better documented and more widely used than the Shiller alternative, and using the same series improves comparability between results for the L plan and those of the other stock-holding plans (conservative, baseline, aggressive, 50-50, all-stocks, and no-lose).

Bonds (long term). The rates of return used by Shiller for the bond portion (50 percent) of his bond-money market fund are those on long-term U.S. government bonds. For the bond portion of our bond-money market fund we use rates of return on long-term government bonds from Table 2-5 of the 2009 *Ibbotson Yearbook*. This Ibbotson series is better documented and more widely used than the Shiller series.

Money market. The rates of return used by Shiller for years through 2004 for the other 50 percent of his bond-money market fund are those on 4–6 month commercial paper until 1997 and then on 6-month certificates of deposit. His rates of return for years after 1936 are based on data from the Federal Reserve. His annual rates of return are total returns to investing for 6 months in January at the January money market rate and for another 6 months in July at the July money market rate. Using Shiller's method we extend the money market rate of return series through 2008. For the money market portion of our bond-money market fund we use the Shiller rates of return for 1926–2004 and our Shiller-method estimates for 2005–2008.

Bond-money market fund. For the conservative, baseline, aggressive, all-bonds, and 50-50 plans, we use the rates of return specified above for bonds (long-term) and money market investments.

Treasury Inflation-Protected Securities (TIPS). The annual real rate of return for TIPS is assumed to be a constant 2.2 percent in all simulations of the no-lose investment strategy. Feldstein (2005) and Poterba and others (2006) assume that the TIPS real rate of return is a constant 2.0 percent, but those studies as well as the U.S. Treasury determine TIPS nominal returns using the Consumer Price Index for all Urban Consumers (CPI-U) to measure inflation. All annual real rates of return in our research are determined by published nominal values and a PCE-based measure of inflation. For 1926–2008, the average annual rate of increase of the CPI-U exceeds that of the PCE price index by about 0.2 percentage points (3.0 versus 2.8 percent); thus our lower measured inflation rate generates a real rate of return higher by 0.2 percentage points. Because the difference between annual CPI-U inflation rates and annual PCE inflation rates is not constant over time, it follows that our constant rate assumption does not produce a constant TIPS real rate of return as calculated using the CPI-U.

Inflation

For 1930–2008, real asset returns are derived by adjusting nominal values for inflation as measured by the implicit price deflator for PCE. For 1926–1929, inflation rates are computed using the Consumer Price Index. Monthly PCE data are available from the Bureau of Economic Analysis (BEA) starting in 1959. Quarterly data are available from 1947, and annual values from 1929. For 1960–2009, the price level (P_t) at the start of year t is calculated as the arithmetic mean of the December PCE value for year $t–1$ and the January value for year t. For 1948–1959, an analogous calculation is made using the fourth-quarter value for year $t–1$ and the first-quarter value for year t. For 1930–1947, the calculation for year t is the mean of the annual PCE values for years $t–1$ and t. The PCE data were the values available from the BEA Web site on April 1, 2009. The decimal value of the inflation rate for year t is computed as $(P_{t+1}/P_t)–1$.

Notes

Acknowledgments: The authors thank Linda Del Bene for help in producing the article's tables and charts and Andrew Biggs, Clark Burdick, Sharmila Choudhury, Chris Chaplain, Jason Fichtner, Susan Grad, Dale Kintzel, Dean Leimer, Joyce Manchester, David Pattison, and Robert Triest for helpful comments at various stages of the work. Earlier versions of the article were presented at the annual meetings of the Southern Economic Association (November 2007) and the National Tax Association (November 2008).

[1] The view that the equity share of the total value of the portfolio should decline with age was challenged in a celebrated article by Samuelson (1969), who argued for a constant share over the life cycle determined solely by the investor's risk tolerance. More elaborate models that incorporate earnings risk and labor supply decisions can reestablish a basis for decreasing the share of risky assets as one grows older (for example, Bodie, Merton, and Samuelson 1992).

[2] RSAs include defined-contribution plans, Keogh accounts, and traditional and Roth Individual Retirement Accounts. Defined-contribution plans include 401(k) and 403(b) plans, employee stock ownership plans, and profit-sharing plans.

[3] Employers are permitted to enroll new workers automatically unless the worker actively opts out. Qualified default investment alternatives direct contributions into diversified portfolios that contain a mix of equities and fixed-income assets. Contributions to the plan can be automatically invested in a life-cycle fund if the worker fails to choose an alternative option. Recent research shows the strong effects that pension plan default options have on both worker participation and portfolio investment choices (Beshears and others 2010). TIAA-CREF (2008) projects that life-cycle fund assets will reach $325 billion by 2010.

[4] The TSP is the equivalent of a 401(k) plan for federal workers.

[5] The TSP offers five life-cycle funds, four of which are dated (L 2010, L 2020, L 2030, and L 2040), as well as the L Income Fund. The undated L Income Fund offers investors a static conservative portfolio allocation, rebalanced daily to maintain the target investment mix. Prospective investors are advised to choose the dated fund whose expiration date falls closest to the anticipated year of retirement. Except for the initial start-up phase when the duration of all dated L Funds (but not the L Income Fund) is abbreviated, the basic design is that each dated fund's risk exposure declines over 40 years, with the portfolio composition gradually evolving from the most aggressive to the most conservative allocation. Every 10 years (in calendar years ending in zero) one fund is retired and a new one begins. For example, in 2010, the L Fund 2010 will end (participant portfolios are transferred into the conservative Income Fund), and the L Fund 2050 will commence. Thus, there are always four evolving L Funds plus the static Income Fund. With a single L Fund maturing once each decade, even potential investors who like the dynamics of the L Fund portfolio reallocation strategy may find that no fund fits their own retirement plans as closely as they would prefer.

[6] At present, the L 2040 Fund has the longest duration (35 years) with specified allocations for each year. Allocations for the first 5 years of a 40-year L Fund are the authors' guesses.

[7] Allocation targets for the simulated dated L Funds are updated on the first day of each year. The allocations

shown in the table reflect the scheduled updating that occurs on the first day of the following year. In reality, the TSP L Fund targets are reset quarterly and accounts are rebalanced daily.

[8] In reality, TSP's G Fund invests in short-term U.S. government securities, but those securities earn long-term interest rates. Because long-run interest rates usually exceed short-run rates, the G Fund effectively receives an interest rate subsidy, a subsidy that is probably not relevant for most RSAs. The simulations described in this article use unsubsidized G Fund returns but retain L Fund portfolio allocation rules. That inconsistency causes the G Fund portfolio share to exceed target allocations that would have been chosen had L Fund designers assumed unsubsidized short-run interest rates.

[9] To be more precise, the matched SIPP data contain annual taxable earnings amounts only for years 1951 and later. The administrative earnings data provide a single total nominal taxable earnings figure for the period 1937–1950. For sample members born prior to 1929, part of their age 22–61 earnings fall within the 1937–1950 period. In those cases, 1937–1950 total earnings were allocated to specific years based on age, Social Security credits earned prior to 1951, and the growth rate in average earnings in the economy during that period.

[10] Fully-insured status requires the accumulation of a specified number of Social Security credits, the rules for which have changed over time. For example, current law indicates that the 1915 birth cohort needs 26 credits, the 1916 cohort needs 27 credits, and so on, up to the 1929 cohort and all ensuing cohorts, who need 40 credits. Credits are now awarded for earning a specified amount that is adjusted annually for average earnings growth in the economy. The 2009 figure is $1,090 per credit. A maximum of 4 credits can be earned each year.

[11] The AWI is the nationwide average earnings each year in the economy and includes earnings amounts that exceed the annual maximum taxable earnings.

[12] During the 1950s, about 40 percent of male workers reached the taxable maximum each year; during 1990–2003, that figure was 9 percent. The comparable figures for women are much lower: 6 percent during the 1950s and 2 percent more recently.

[13] Prior to 1978, the administrative earnings data used in this study do not record earnings above the annual taxable maximum paid by an employer. Since 1978, Social Security Administration (SSA) records give total earnings in covered employment. Thus, for 1978–1989 it is straightforward to estimate taxable earnings subject to the higher alternative taxable maximums. For years prior to 1978 when only taxable earnings were recorded, we first estimate total covered earnings by using SSA data on quarters of coverage and Current Population Survey earnings data, and then apply the higher taxable maximum. The quarters of coverage data for 1951–1977 allow us to determine the quarter of the calendar year during which the taxable maximum was attained. With an assumption of steady earnings throughout the year, upper and lower bounds can be established for total earnings in covered employment if the maximum is attained during quarters 2–4. Each person is assigned the mean for that earnings interval as derived from the Current Population Survey annual earnings data. For workers who reach the taxable maximum during the first quarter, only a lower bound can be determined, in which case total annual earnings are imputed based on annual earnings above the lower bound as reported in the 1965, 1970, and 1975 Current Population Surveys.

[14] Average annual real earnings are the arithmetic mean of a person's annual earnings during ages 22–61, with all earnings amounts converted to 2004 dollars using the implicit price deflator for Personal Consumption Expenditures (PCE).

[15] Because spending patterns evolve over time, the PCE price index is a better measure of change in the cost of living than the Consumer Price Index for Urban Consumers (CPI-U). A full explanation of the inflation calculation is provided in the Appendix.

[16] TIPS real interest rates measured monthly for 10-year and 30-year bonds averaged 2.11 percent and 2.28 percent, respectively, for the period June 2002 through September 2007.

[17] Recent research by Feldstein (2005) and Poterba and others (2006) assumes a TIPS real rate of return of 2.0 percent. The 2.2 percent assumption is consistent with their figure in light of the PCE-based inflation calculation used in this article to derive real rates of asset returns from published nominal values. See Appendix for further information.

[18] As defined by Mehra and Prescott (2003), the equity premium can be thought of as the return earned by (risky) stocks in excess of the rate earned by a relatively riskless Treasury bond.

[19] Average contribution rates for private sector RSAs are estimated to be 8.3 percent to 9.9 percent (Poterba and others 2007).

[20] This assumption is based on the fact that 60 percent of fully insured workers begin receiving Social Security benefits at age 62. The imposition of a common retirement age for all workers means that any variations in preretirement RSA accumulations and IRRs are not attributable to differences in contribution periods associated with varying retirement ages.

[21] Account accumulations assume that half of the year's contribution is made at the start of the year and is subject to that year's investment returns. The remaining half is deposited at the end of the year, after which the year's administrative expenses on the account are subtracted.

[22] The positive trend in mean real earnings during ages 22–61 for the sample's 28 birth cohorts (Table 2)

reflects the growth in average annual earnings in the economy that occurred during 1937–2003; the average (geometric mean) growth rate was 1.5 percent. Because annual earnings determine RSA contribution amounts, later birth cohorts have larger final account accumulations, on average, simply because they invest larger sums of money. In the stochastic simulations, the mean IRR for each allocation strategy is nearly identical for every cohort. To evaluate the effectiveness of alternative allocation strategies, this article focuses on IRRs rather than account accumulations.

[23] The dark midline within the shaded rectangles represents the distribution's median value. The left and right edges of the shaded rectangle respectively represent the 25th and 75th percentile values; vertical lines at the end of the whiskers (known as lower and upper adjacent values) are 1.5 times the interquartile range beyond the 25th and 75th percentile values. Outlier values—data points lying outside the lower and upper adjacent values—are plotted individually in the figures.

[24] The maximum and minimum simulated IRR values reported in Tables 4 and 6 and Chart 1 depend on the numbers of simulations conducted (1,000). Because larger numbers of simulations would generate more extreme values, the reader should note that the maximum and minimum values are simply the reported results of a specific experiment.

[25] The conservative plan has the lowest IRR of the four life-cycle plans except for the lowest 3 percent of the distributions of returns.

[26] The corresponding percentage reductions in final accumulations are somewhat higher: 38–39 percent (baseline and conservative plans), 36 percent (L plan), 30 percent (aggressive plan), and 18 percent (50-50 plan).

[27] Other recent studies of life-cycle investment strategies (for example, Soto and others (2008) and Gomes, Kotlikoff, and Viceira (2008)) focus on an investor's choice of the optimal (utility-maximizing) allocation of assets over the lifespan. The solution depends on the individual's age, risk aversion, human capital, labor supply, earnings uncertainty, and the distributions of returns for financial assets.

[28] For details about the construction of the scaled-worker earnings histories, see Clingman and Nichols (2008).

[29] Shiller's first simulation uses returns for 1871–1914, the second uses 1872–1915 returns, and so on, eventually ending with the 91st simulation using 1961–2004 returns. Thus, returns for 1871 and 2004 are used in only one simulation, returns for 1872 and 2003 are used in two simulations, and so on, with only the middle years (1914–1961) used in 44 simulations.

[30] Their utility analysis focuses on total wealth (both retirement account and nonretirement account) at retirement, taking into account how the risk aversion of each household affects their valuation of alternative retirement account investment strategies. Annual account contributions are assumed to equal 9 percent of total household earnings in Social Security–covered employment when husbands are aged 28–63.

[31] The authors also simulate the performance of two "optimized portfolio strategies" in which the time path of the portfolio composition depends on the assumed level of risk aversion. Those results are difficult to compare with our own and are not discussed here.

[32] Experiments with stochastic simulations on hypothetical workers with various patterns of zero-earnings years (multiyear sequences of varying lengths at the beginning or end of the 22–61 age interval) indicate that more zeros at the beginning substantially reduce the mean IRRs in life-cycle plans and increase their standard deviation. For example, in the baseline plan, a 25-year worker (no earnings during ages 22–36) has a mean IRR that is 12 percent lower than that of a 40-year worker while the standard deviation is 6 percent larger. More zeros at the end of earnings histories result in slightly higher mean IRRs for the life-cycle plans but have little effect on dispersion. For instance, in the baseline plan, the mean IRR was 2 percent higher for the 25-year worker than for the 40-year worker. The number and location of zero-earnings years has little effect on mean IRRs for the all-stocks, all-bonds, and 50-50 plans, but substantially increases the standard deviations of the IRR distributions when positioned at the beginning of the earnings history. The influence of zero-earnings years on the no-lose plan's mean IRR is similar to that for the life-cycle plans.

[33] The Center for Research in Security Prices (CRSP) at the University of Chicago computes total annual rates of return for a number of stock-size categories for years since 1925. All companies on the New York Stock Exchange (NYSE) are ranked by the combined market capitalization of all their eligible equity securities. The companies are then split into 10 equally populated groups or deciles. Eligible companies traded on the American Stock Exchange and the NASDAQ National Market are then assigned to the appropriate deciles according to their capitalization in relation to the NYSE breakpoints. The number of companies per decile increases as the NYSE breakpoint decreases. In addition to its 10 decile rate of return series, CRSP also has rate of return series for mid-cap stocks (deciles 3–5 combined), low-cap stocks (deciles 6–8), and micro-cap stocks (deciles 9–10); these series are given in Tables 7-2 and 7-4 of the 2009 *Ibbotson Yearbook*.

The coverage of the DJW 4500 index is roughly comparable to that of CRSP's deciles 4–10. The average market value for CRSP decile 4–10 stocks is similar to that for CRSP decile 8 stocks and a bit smaller than that for CRSP low-cap stocks and much smaller than that for CRSP mid-cap stocks (Table 7-5 of 2009 *Ibbotson Yearbook*). For a possible rate of return series for S Fund assets for 1926–1983 we statistically examined CRSP rate of return series for low-cap stocks, mid-cap stocks, and for each of decile 2-8 stocks.

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The Impact of Response Error on Participation Rates and Contributions to Defined Contribution Pension Plans

by Irena Dushi and Howard M. Iams*

The accuracy of information about coverage and contributions to defined contribution (DC) pension plans is important in understanding the economic well-being of future retirees because these plans are an increasingly important part of retirement income security. Using data from the 1996 and 2004 panels of the Survey of Income and Program Participation (SIPP) merged with information from W-2 tax records, we examine the extent to which estimated participation rates and contribution amounts to DC plans derived from SIPP reports differ from estimates obtained from tax-deferred contributions in the W-2 tax records. Findings indicate that the participation rate in DC plans is about 11 percentage-points higher when using W-2 tax records rather than survey reports. The analysis of possible sources of reporting error regarding plan participation indicates that an error is more likely to occur when missing data are imputed by the Census Bureau than in actual reports by respondents.

Introduction

It is a well-known fact that employer-provided pension plans have shifted from traditional defined benefit (DB) plans, where the employer bears most of the risks of providing retirement benefits, toward defined contribution (DC) plans, where the employee bears all the risks (Munnell and Sunden 2004).[1] DB pensions provide retirement benefits based on a formula typically involving the final salary, age, and years of service. In contrast, DC pensions are tax-deferred savings accounts where employer and employee contributions into the account are invested, and retirement income depends on the account balance at retirement. The shift from DB to DC pensions has been identified with different data sources such as the Bureau of Labor Statistics' National Compensation Survey (Costo 2006); Form 5500 employer submissions to the Department of Labor (Kruse 1995; Turner and Beller 1989, 1992; Gustman and Steinmeier 1992; Employee Benefit Research Institute 1993; Rajnes 2002; Buessing and Soto 2006); and household surveys (Gustman, Steinmeier, and Tabatabai 2009; Dushi and Iams 2008; Purcell 2005, 2009; Copeland 2005, 2009; Verma 2006).

Many studies have used household survey data, in particular the Census Bureau's Survey of Income and Program Participation (SIPP), to assess participation in and contributions to DC plans for the entire labor force. Purcell (2005, 2009) and Copeland (2005, 2009), for example, use SIPP data to examine both DC plan participation and contributions. An advantage of SIPP data is the availability of pension plan coverage by type of plan for the entire labor force, which allows one to study its relationship with several

Selected Abbreviations

DB	defined benefit
DC	defined contribution
SIPP	Survey of Income and Program Participation
SPD	summary plan description
SSA	Social Security Administration

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SSA's Title 13 Disclosure Review Board reviewed this article and approved it for public release.

socioeconomic and job characteristics. However, as is the case with many household survey data, there is the issue of reporting error. If SIPP-reported information about DC pension plans is incorrect, then trends in participation and contributions may be measured inaccurately and thus projections about future coverage and account balances in such plans may also be incorrect. Furthermore, parameter estimates of the determinants of participation and contributions to DC plans may as well be biased or inconsistent.

One approach used to assess the validity of respondents' reports regarding their pension type is to merge survey reports with employers' pension information. Previous research (Mitchell 1988; Gustman and Steinmeier 1989, 2004) has shown that a respondent's reports of plan type and plan characteristics often differ from those obtained from the employer's pension summary plan description (SPD).[2] Those analyses assume correct matching of employer plans to survey respondents and accuracy of the employer plans in representing the respondent's retirement plan. Rohwedder (2003) argues that inconsistencies may arise from errors with employer-reported data and the process of matching employer data to a particular respondent. Alternatively, one can rely on pension reports of those reaching retirement because the respondent report on pensions would be more salient when people are about to retire or have recently retired (Chan and Stevens 2004; Hurd and Rohwedder 2007).

In support of their hypothesis, Gustman, Steinmeier, and Tabatabai (2009) examine whether the differences between employer and respondent reports are due to lack of knowledge from respondents, due to survey questions and design, or due to the matching of survey and employer data. Their findings from Watson-Wyatt payroll data, which contain both employee and employer information, suggest that the problems associated with matching of SPDs to respondents are not the main reason for the mismatch in reported pension type. In addition, data from the 2004 pension module to the Health and Retirement Study (HRS) indicate that respondents, when asked about the name of their plan, did well in identifying 401(k) and DC plans, but less so with DB plans, suggesting that some of the reporting error is due to the failure of the question wording to clearly identify the plan type. Thus, the authors conclude that the respondents misreport pension plan types mainly because they do not understand their pension well, and employer-provided data are more accurate than respondent-reported data.

In the case of DC plans, the assumption that plan characteristics obtained from employers are more accurate than those reported by respondents is particularly problematic with respect to DC account balances. It is common that DC pension account holders receive an annual statement of the account balance, which suggests that respondents' reports would be more accurate than inferences from an SPD (Scholz 2004; Cunningham, Englehardt, and Kumar 2007).

Another approach in identifying DC pension participation, but not DB pensions, other than from survey self-reports, is to use information from Internal Revenue Service (IRS) W-2 tax records. Turner, Muller, and Verma (2003) use information reported from private-sector workers in SIPP (1993 and 1996 panels) combined with information from W-2 records on tax-deferred contributions to examine participation in DC plans. The authors find a 31 percent discrepancy rate between respondents' report of participation in DC plans and W-2 records, and they suggest that such a difference could be due to lack of knowledge and inaccurate reporting in SIPP by respondents.[3] The authors, however, do not address whether imputations by the Census Bureau contribute to their findings. Dushi and Honig (2008), using data from the HRS matched with IRS W-2 tax records, examine reporting error of participation and contribution amounts among respondents aged 51–61 in 1992 and 2004 who at the time of interview were employed in the private sector. The authors find that respondents in 2004 (the younger cohort) were more likely to report correctly whether they were included in DC plans, but they were no more accurate in reporting whether they contributed to their plans. Furthermore, their findings indicate that respondents in both cohorts significantly overestimate their annual contributions. Unfortunately, given that HRS data are available only for the population aged 51 or older, the authors' results may not apply to younger workers and those in the public sector.

In this article, using information from SIPP reports linked to W-2 tax records, we examine the response error with respect to reported DC plan coverage and tax-deferred contribution amounts among full-time workers.[4] This study contributes to the literature, by investigating in particular the extent of the error that is due to imputations of nonresponse questions by the Census Bureau, a common practice in SIPP. This is particularly important for both users of SIPP pension data and policymakers interested in income security of future retirees. If for example the distribution of

DC pension coverage among the imputed observations is not similar to that of nonimputed (self-reported) observations, then the imputation may alter the overall distribution of DC pension coverage. If that is the case, then estimates of pension coverage and consequently estimates of income security of future retirees will be erroneous. Another contribution of this study is the inclusion of public-sector workers in the analysis, who were often omitted in previous research. We stratify our analysis by private- and public-sector workers because it is plausible that public-sector employees, who are more likely to have both a DB and DC plan through their employer, may exhibit a different degree of reporting error regarding their DC plans than private-sector employees.

We find that both the offer rate and participation rate of full-time private- and public-sector workers aged 21–64 are substantially higher when using W-2 tax records than from survey reports. Moreover, findings indicate that reporting errors regarding DC plan participation are more prevalent in imputed records (imputations by the Census Bureau) than in actual responses. A false-positive (type 1) error is a typical error among respondents with imputed information, whereas the false-zero (type 2) error is more likely among respondents with self-reported information. We also find that the probability of a type-1 (false positive) error increases with W-2 annual earnings, whereas the probability of a type-2 (false zero) error decreases with annual earnings. With regard to tax-deferred contribution amounts, we find that while at the median, respondents' reported contributions to DC plans were only slightly lower than those in their W-2 tax records, substantial misreporting is present at the 10th and 90th percentiles of the distribution of the difference between SIPP reports and W-2 records. Finally, at the median the absolute difference between individuals' self-reported and W-2 record contribution amounts comprises 29 percent and 35 percent of W-2 contributions in 1998 and 2006, respectively; but it is substantially greater at the upper part of the distribution. Also, the absolute error relative to W-2 contributions is significantly larger among respondents with imputed information than among those with reported (nonimputed) information.

The following section describes the information available in SIPP reports and W-2 records and alternative definitions of DC plan participation used in this article. Our findings and conclusions are then discussed.

Data

This study uses data from two panels of the Survey of Income and Program Participation—the 1996 and 2004 panels. We use data from two different panels because, given the changes in pension environment over the past decade, the extent of reporting error may differ in the two samples. Consequently, trends in DC pension participation will be subject to measurement error. SIPP collects information about pension coverage and contribution amounts of current workers in the seventh interview (in the topical module questions to wave 7), conducted from April through July 1998 (for the 1996 panel) and from February through May 2006 (for the 2004 panel). This analysis focuses on pension participation separately for full-time, private- and public-sector workers aged 21–64.

Respondents in SIPP are asked whether the employer offers a plan based on a formula that takes into account earnings and years on the job,[5] an individual account plan where contributions are made to an account by the employee and his or her employer,[6] or a cash balance plan with only the employer contributing to the account. Next, SIPP asks whether the employee is included in the plan. It is responses to these two questions that are typically used in the literature to measure offers and participation in DC plans.[7]

Then SIPP asks respondents if they currently make any tax-deferred contributions to the plan. An employee's tax-deferred contribution is a distinguishing feature of 401(k)-type plans. Respondents who said that either their employer did not offer a plan, their contributions were not tax deferred, or they did not make contributions to a retirement or pension plan are then asked a "follow-up" question about the availability of tax-deferred plans:

"I would like to make sure about a particular type of retirement plan that allows workers to make tax-deferred contributions. For example, you might choose to have your employer put part of your salary into a retirement savings account and you do not have to pay taxes on this money until you take it out or retire. These plans are called different names, including 401(k) plans, pre-tax plans, salary reduction plans, and 403(b) plans. Does your job offer a plan like this to anyone in your company?"

If the respondent indicates that this type of plan is offered, then SIPP asks if the respondent participates in the plan. Then, conditional on participation,

respondents are asked whether contributions were made to the plan either by themselves or their employer and the respective amounts of contributions.

We use SIPP respondent's linked IRS W-2 tax records to assess the accuracy of survey-reported participation and tax-deferred contributions. Based on agreements between the Social Security Administration (SSA) and the Census Bureau, Social Security administrative records are linked to SIPP panels and are available to analysts for research on approved projects at restricted data sites. SIPP respondent reports are matched with the respondent's W-2 tax records including information on tax-deferred contributions to retirement plans. About 83 percent of adult respondents in the 1996 panel and 79 percent in the 2004 panel have their survey reports matched to their actual W-2 records. Analysis by Czajka, Mabli, and Cody (2008) find little selectivity bias from nonmatched data in SIPP.

Our analysis of linked tax records draws from SSA's Detailed Earnings Record (DER) file.[8] Starting in 1990, the W-2 records available in the DER contain a variable that indicates the amount of tax-deferred contributions made to retirement plans and to health savings accounts (HSA) for each job a worker held in a given year. The 2006 W-2 record separately identifies contributions made to HSAs from contributions made to retirement accounts (such as 401(k), 403(b), 408, 457, and 501 accounts), but the 1998 W-2 record does not separately identify these two different types of deferred compensation. However, this discrepancy is not likely to affect our analysis because the HSA legislation took effect in 1997 (Committee on Ways and Means 2004, 23–24), which means that HSA participation was quite modest in 1998, and the bulk of W-2 deferred compensation reflects contributions made to retirement accounts.

We assess the response error in survey-reported information about DC plan participation rates and contributions by comparing SIPP respondents' tax-deferred contributions as recorded in their W-2 tax records with those that are reported by survey respondents. We examine several measures of pension participation. One definition of participation in a DC plan, typically used in the literature, is a respondent's self-report of being included in a retirement plan where contributions are made to an account by the employee and his or her employer. An alternative definition of participation in a DC plan that we use is a respondent's self-report of making tax-deferred contributions to the account (referred to as active participation).[9] We also measure active participation by the presence of a positive tax-deferred contribution amount in the W-2 record either in the survey year or in the previous year.[10]

A standard practice in SIPP is that when respondents do not answer a question, the Census Bureau statistically imputes a response and flags the imputation. The Census Bureau usually imputes nonresponse questions with a hot-deck procedure.[11] The National Research Council briefly reviews this hot-deck procedure and concludes that it is inadequate because it is not "carefully tailored to the variable imputed" (Citro and Scholz 2009). The tax-deferred contribution question we use in classifying self-reported active participation in DC plans has been imputed by the Census Bureau for about 13–14 percent of SIPP respondents. Therefore, given that SIPP identifies observations for which the tax-deferred contribution variable is imputed, in this analysis we stratify respondents who self-reported tax-deferred contributions to a retirement plan from those for whom the values were imputed by the Census Bureau.

We examine two types of response errors in survey-reported pension information. The first type of error in self-reports is a false positive (or type-1 error) in which the W-2 record contains zero tax-deferred contributions, whereas the SIPP respondent reports a positive tax-deferred contribution to a DC account. Another type of error is a false zero (or type-2 error) in which the W-2 record contains a positive deferred contribution, whereas the SIPP respondent reports zero tax-deferred contributions to a DC plan. In addition to reporting the proportion of each type of error by sector of employment separately for imputed and nonimputed observations, we also estimate the probability of each type of error as a function of the imputation variable and several control variables. Finally, we compare the amount of tax-deferred contributions made in the survey year as reported by respondents in SIPP with the contribution amounts in the W-2 tax record for the same year. We assume that tax-deferred contributions to retirement plans in the W-2 records are accurate; however, because of possible errors in W-2 records, our findings should be considered suggestive.[12] We also estimate the impact of imputation on the magnitude of the error measured either as the difference between SIPP and W-2 record contributions or as the absolute difference of contribution amounts (in SIPP and W-2) relative to W-2 record contribution amounts. The multivariate analysis controls for sex, race and ethnicity, education, marital status, sector

of employment, and W-2 annual earnings and tax-deferred contributions.

For all percentage estimates provided in the results section, we calculate standard errors using SUDAAN to account for the complex sampling procedure in the SIPP panels. We also perform significance tests of the differences between the estimates in the two panels, and because of large sample sizes, percentage differences that are greater than 1 percentage point are usually statistically significant at the 5 percent level. We do not perform parametric statistical significance tests for differences between the two different measures within a given year (such as between SIPP reports versus SIPP supplemented with W-2 records) because the estimates are for the same sample of respondents and the two measures are different only for a subset of the sample. In the latter case, interpretation of differences in estimates must rely on whether or not the percentage differences seem substantially important.

DC Pension Plan Offer and Participation

Offer and participation rates in DC plans, as reported by respondents in SIPP and as calculated from the W-2 record, are shown separately for private- and public-sector workers in 1998 and 2006 (Table 1).[13] Fifty percent of full-time workers in 2006 reported that their employer offered an individual account pension plan (Table 1, row 1).[14] Private-sector workers are about as likely as public-sector workers to report being offered a DC plan from their employer. The offer rate would be even lower if respondents in SIPP were not asked the follow up question. We find that about a 10th of respondents who initially reported not being offered a plan, then reported being offered a tax-deferred plan in the follow-up question. This suggests that these respondents know what type of plan they are offered, but are confused by the wording in the survey question. When we supplement the respondent's report with information in the W-2 record that indicates having a positive tax-deferred

Table 1.
Percentage of full-time workers aged 21–64 offered and included in a DC pension plan under alternative definitions, by sector of employment, 1998 and 2006

	1998			2006		
		Full time			Full time	
Pension status	Total	Private	Public	Total	Private	Public
Employer offered a DC plan						
SIPP reports[a]	49	49	47	50	50	52*
SIPP reports or W-2 records[b]	65	65	66	67*	66	72*
Included in a DC plan						
SIPP reports of inclusion[c]	34	33	34	35	34	40*
SIPP reports of contribution[d]	38	40	32	39	40	37*
W-2 records of contribution[e]	46	46	46	46	46	49*

SOURCE: 1996 and 2004 panels of SIPP matched to SSA W-2 records.

NOTES: Authors' calculations using data from SIPP topical module to wave 7 and SSA W-2 records. Full-time employment is defined as working 35 or more hours per week.

* Denotes that the difference between 1998 and 2006 is significant at the 0.05 percent level, using a two-tail test estimated with SUDAAN.

a. Respondents are classified as being offered a DC plan if they report being included in an individual account plan type. In addition, respondents who reported in the "follow-up" question that their employer offered a retirement savings account plan are also considered being offered a DC plan.

b. In addition to respondents being offered a DC plan, as defined in the preceding note, respondents for whom W-2 records indicate that they have made a tax-deferred contribution in the survey year are also classified as being offered a DC plan.

c. In this definition, respondents who report being included in an individual account plan type and respondents who in the "follow-up" question reported participating in a retirement savings account are defined as being included in a DC plan.

d. In this definition, respondents in the private sector who report making a tax-deferred contribution to an investment account in the interview year and respondents in the public sector who report both being included in an investment account plan and making a tax-deferred contribution are defined as being included in a DC plan.

e. In this definition, a respondent is considered being included in a DC plan if the W-2 record indicates a positive tax-deferred contribution either in the survey year or in the previous year.

contribution amount (Table 1, row 2), we find that overall 67 percent of employees in 2006 were offered a DC plan from their employer—a 17 percentage-point increase in the offer rate compared with the self-reported rate.[15] In addition, the offer rate of public-sector workers is about 6 percentage-points higher than that of private-sector workers. These findings suggest that some respondents do not understand the typical survey questions, whereas others do not know their plan type.

As noted earlier, SIPP respondents who report being offered a pension plan from their employer are asked whether they are included in the plan (often referred to in the literature as participation) and whether the plan is an individual account plan.[16] Using this definition (Table 1, row 3), we find that about 35 percent of full-time workers reported being included (that is, participating) in a DC plan in 2006. In the same year, public-sector workers were more likely to report participating in a DC plan compared with private-sector workers (40 percent versus 34 percent).

Often employees included in a DC plan may select not to contribute to the account in a given year. Therefore, an alternative definition of participation in a DC plan, referred to as active participation, is whether or not the employee is making a tax-deferred contribution to the DC account in a given year (Honig and Dushi 2003; Turner, Muller, and Verma 2003). Using this second definition of DC participation, measured by whether or not the respondent reports making tax-deferred contributions to an individual account, we find that overall 39 percent of full-time workers actively participated in a DC plan in 2006 (Table 1, row 4). About 6 percentage-points more private-sector workers report making tax-deferred contributions to a DC plan than report being included in a DC plan (40 percent versus 34 percent).[17] In contrast, a similar percentage of public-sector workers report making tax-deferred contributions to a DC plan and also report being included in a DC plan (37 percent versus 40 percent).[18]

Using this second definition of DC participation, but measured more precisely by whether or not the W-2 tax record indicates a positive tax-deferred contribution either in the interview year or in the previous year, we find that in 2006 about 46 percent and 49 percent of private- and public-sector workers, respectively, had contributed to a DC plan as indicated by their W-2 record. These participation rates are 12 and 9 percentage-points higher, respectively, for private- and public-sector workers, compared with the self-reported inclusion in a DC plan and 6 and 12 percentage-points higher than the self-reports of tax-deferred contributions. In sum, the traditional survey definition of participation in an individual account plan substantially underestimates DC plan participation rates compared with W-2 records of positive tax-deferred amounts, which we consider as the benchmark.[19]

Among private-sector workers, there were no significant differences in SIPP-reported offer or participation rates in DC plans between 1998 and 2006 (Table 1). Among public-sector workers, offer and participation rates, despite the definition used, were significantly higher in 2006 than in 1998, although the difference regarding active participation is smaller when using W-2 records. Contrary to our expectations, the active participation rate based on the information in W-2 records is similar between 1998 and 2006, even though automatic enrollment of workers into DC plans became more common after 1998.[20] Finally, it is worth noting here that, although DC plans have become more common particularly in the past decade, the extent of response error is quite similar in both the 1996 and 2004 SIPP panels.

Types of Errors: Active Participation

In order to assess the types of errors of respondents' reports, we now compare the self-reported active participation in a DC plan (whether respondent reported making a tax-deferred contribution at the time of interview) with information from the W-2 tax record (as defined in Table 1). About a quarter of private-sector workers (9 percent + 15 percent) and over one-third of public-sector workers (12 percent + 24 percent) misreported whether they made a tax-deferred contribution to a plan in 2006 (Table 2). In the same year, 9 percent and 12 percent of private- and public-sector workers, respectively, had a false-positive (type 1) error, that is, self-reporting making a contribution to the plan when in fact there was zero tax-deferred contribution in the W-2 tax record. An additional 15 percent and 24 percent of private- and public-sector workers, respectively, had a false-zero (type 2) error, that is, self-reporting zero tax-deferred contribution when in fact there was a positive amount deferred in the W-2 tax record. The proportions of respondents with these types of errors were almost the same in 1998.

Table 2 indicates that SIPP misreporting of making tax-deferred contributions in DC plans is larger among respondents for whom the amount of contribution has been imputed compared with those with self-reported

Table 2.
Percentage of full-time workers aged 21–64, by type of reporting error of DC plans and sector of employment, 1998 and 2006

	1998				2006			
	Private sector		Public sector		Private sector		Public sector	
Imputation status	False + (Type 1)	False 0 (Type 2)	False + (Type 1)	False 0 (Type 2)	False + (Type 1)	False 0 (Type 2)	False + (Type 1)	False 0 (Type 2)
Total	9	15	10	24	9	15	12*	24
Imputed	33	9	22	20	33	9	28*	18
Not imputed	6	16	8	25	6	16	9	25

SOURCE: 1996 and 2004 panels of SIPP matched to SSA W-2 records.

NOTES: Authors' calculations using data from SIPP topical module to wave 7 and SSA W-2 records. Full-time employment is defined as working 35 or more hours per week. A false-positive error indicates that respondent reports in SIPP a positive tax-deferred contribution, when in fact there is no tax-deferred contribution amount in the W-2 record (neither in the survey year nor in the previous year). A false-zero error indicates that the respondent reports in SIPP zero tax-deferred contribution, when in fact there is a positive tax-deferred contribution amount in the W-2 record (either in the survey year or in the previous year). The sample for public-sector employees is comprised of those who report being included in an investment account type of plan and making tax-deferred contributions; for private-sector employees, the sample is comprised of those who report making tax-deferred contributions.

* Denotes that the difference between 1998 and 2006 is significant at the 0.05 percent level, using a two-tail test estimated with SUDAAN.

(nonimputed) information. This suggests that an error is much more likely to occur when missing data are imputed rather than in respondent reports. Imputations in 2006 were incorrect as either a type-1 or a type-2 error for about 42 percent and 46 percent of private- and of public-sector workers, respectively (Table 2, row 2). A type-1 error was the typical error among those with imputed information—33 percent and 28 percent in the private and public sector, respectively. In contrast, respondents who self-reported the amount of contribution, and thus have no imputed information, have a much lower rate of type-1 errors—6 percent and 9 percent in the private and public sector, respectively (Table 2, row 3). Respondents with nonimputed information in 2006 were more likely to report zero contribution when in fact the W-2 record indicates a positive contribution, and therefore type-2 error is more common (16 percent and 25 percent in the private and public sector, respectively). Furthermore, type-2 errors were about 7 percentage-points more common among respondents with nonimputed information compared with respondents with imputed information. Similar patterns regarding participation error are evident in 1998. Taken together, these findings suggest that researchers should be cautious when using SIPP data to estimate DC pension plan participation, and the validity of their results would improve by using W-2 records. Similarly, the Census Bureau would improve its imputations of respondents' reports by using information in the W-2 records.

Multivariate Analysis of the Probability of Reporting Error of Active Participation

We now turn to multivariate analysis of the effect of imputation on the probability of reporting error. Table 3 reports *probit* estimates, separately for 1998 and 2006, of the relationship between each type of reporting error and the imputation variable of interest, while controlling for several socioeconomic characteristics.[21] The dependent variable in columns 1 and 3, respectively for each year, equals one if respondents report making a contribution when there is no contribution in the W-2 record (type-1 error) and zero otherwise. The dependent variable in columns 2 and 4 is equal to one if respondents report making no contribution when the W-2 record indicates that a positive contribution was made (type-2 error) and zero otherwise. The independent variable of interest is defined as equal to one if the response regarding tax-deferred contributions is imputed, and zero otherwise.

For both 1998 and 2006, respondents with imputed tax-deferred contribution amounts are significantly more likely, by 50 percent, to have a type-1 error than those without imputed information (Table 3, columns 1 and 3). In addition, the probability of type-1 reporting error significantly increases with the amount of the W-2 annual earnings.

Estimates regarding the probability of having a type-2 error are shown in Table 3 (columns 2 and 4). For both 1998 and 2006, results indicate that, in

Table 3.
Probit estimates of the probability of reporting error of participation in a DC plan, by type of error, 1998 and 2006

	1998		2006	
Independent variable	Type-1 error[a] (1)	Type-2 error[b] (2)	Type-1 error[a] (3)	Type-2 error[b] (4)
Tax-deferred contribution amount is imputed	1.494*	-0.283*	1.519*	-0.355*
	(0.039)	(0.035)	(0.037)	(0.032)
W-2 contribution amount/1,000	---	0.099*	---	0.046*
		(0.005)		(0.003)
W-2 annual earnings/1,000	0.008*	-0.002*	0.005*	-0.001*
	(0.001)	(0.000)	(0.000)	(0.000)
Pseudo R^2	0.168	0.039	0.166	0.032
Number of observations	11,942	20,894	12,778	24,317

SOURCE: 1996 and 2004 panels of SIPP matched to SSA W-2 records.

NOTES: Authors' calculations using data from SIPP topical module to wave 7 and SSA W-2 records. Full-time employment is defined as working 35 or more hours per week. We report estimated coefficients with standard errors in parentheses. The estimates control for sex, marital status, race, education, and sector of employment. The sample for public-sector employees is comprised of those who report being included in an investment account type of plan and making tax-deferred contributions; for private-sector employees, the sample is comprised of those who report making tax-deferred contributions.

* Denotes significance at the 1 percent level; --- denotes variable not included.

a. The dependent variable is equal to 1 if the respondent reports making a contribution, when in fact the W-2 record indicates zero contribution (type-1 error) and 0 otherwise.

b. The dependent variable is equal to 1 if the respondent reports making zero contribution, when in fact the W-2 record indicates that a contribution was made (type-2 error) and 0 otherwise.

contrast to a type-1 error, respondents with imputed information are significantly less likely (by 6 percent and 8 percent, respectively) to have a type-2 error than those without imputed information, a finding consistent with results in Table 2. Similarly in both years, the probability of a type-2 error significantly increases with the amount of W-2 tax-deferred contributions and decreases with the amount of W-2 annual earnings, but the magnitudes of these effects are negligible.

Amount of Tax-Deferred Contributions

The amount of tax-deferred contributions reported in SIPP will now be compared with the amount in the W-2 tax record for the same year, among respondents with positive contributions in both SIPP reports and W-2 records. The following three questions will also be addressed.

1. Is the distribution of tax-deferred contribution amounts in SIPP comparable with the distribution in the W-2 record?
2. Is an individual's contribution amount higher or lower than the amount in the W-2 record?
3. At the individual level, what is the extent of the relative difference of contribution amounts in SIPP and W-2 records?

The SIPP-reported contribution amount is for the reference period at the time of the survey, and it is assumed that this applies throughout the survey year. For one set of respondents, there is information on the amount contributed and the frequency of contributions made during the survey year from which an annual contribution amount is calculated. For another set of respondents, the percentage of salary contributed to the plan is obtained,[22] and the contribution amount using this reported percentage is calculated by applying it to annual earnings in the highest paid job in the W-2 tax record for the survey year.[23]

The first question is whether the distributions of tax-deferred contributions in the SIPP data and the W-2 data are comparable. If they are, either source can be used to estimate the amount of money contributed to DC plans among workers covered by DC plans. Table 4 reports, separately for each year, contribution amounts from SIPP (columns 1 and 5) and from the W-2 record (columns 2 and 6) at selected percentiles

Table 4.
Distribution of tax-deferred contributions among respondents with positive contribution amounts in both SIPP-reported and W-2 records (in 2006 dollars)

Percentile	1998				2006			
	SIPP-reported contributions (1)	W-2 record contributions (2)	Difference[a] (3)	Absolute difference[b] as a percent of W-2 (4)	SIPP-reported contributions (5)	W-2 record contributions (6)	Difference[a] (7)	Absolute difference[b] as a percent of W-2 (8)
Panel A: All workers								
10th	794	744	-2,740	1	690	640	-4,320	2
25th	1,488	1,476	-769	7	1,300	1,300	-1,200	9
50th	2,889	2,877	0	29	2,780	2,930	-50	35
75th	5,543	5,580	868	70	6,000	6,630	760	75
90th	9,573	9,672	2,778	165	11,840	13,340	3,000	196
Number of observations		5,753				8,125		
Panel B: Private-sector workers								
10th	769	744	-2,616	1	680	650	-4,090	2
25th	1,488	1,463	-732	7	1,300	1,330	-1,080	8
50th	2,902	2,877	0	28	2,710	2,940	-60	32
75th	5,754	5,716	831	68	6,000	6,580	670	71
90th	9,684	9,833	2,840	153	12,000	13,530	2,850	165
Number of observations		4,634				6,466		
Panel C: Public-sector workers								
10th	918	744	-3,100	1	705	600	-5,320	2
25th	1,550	1,488	-918	8	1,320	1,260	-1,590	13
50th	2,840	5,146	0	36	3,000	2,900	0	45
75th	4,910	5,146	1,017	78	6,000	6,840	1,080	89
90th	8,382	9,040	2,492	220	10,930	13,000	3,510	285
Number of observations		1,119				1,659		

SOURCE: 1996 and 2004 panels of SIPP matched to SSA W-2 records.

NOTES: Authors' calculations using data from SIPP topical module to wave 7 and data from W-2 records for the survey year. The samples are comprised of respondents with positive contributions in both the SIPP report and W-2 record.

a. The difference in contributions is calculated for each individual as the SIPP-reported contribution amount minus the W-2 record contribution amount.

b. The absolute difference (SIPP-reported contribution minus the W-2 record contribution) as a percent of the W-2 contribution amount is calculated for each individual.

in each of the two distributions. Panel A reports results for the overall sample, whereas panels B and C report results separately for private- and public-sector workers. In 1998, contribution amounts in SIPP were 7 percent higher than contribution amounts in the W-2 record at the 10th percentile and within 1 percent of each other at the 25th percentile and above. In contrast, in 2006, contribution amounts in SIPP were 8 percent higher than W-2 contribution amounts at the 10th percentile, the same at the 25th percentile, and 5–11 percent lower at the median and above (panel A).[24] These findings suggest that the SIPP amounts of tax-deferred contributions are a close estimate of the true (W-2 record) contribution amounts for respondents in the 1998 sample, but they are an underestimate for the 2006 respondents.

The second question is whether the contribution amount for an individual is higher or lower in the SIPP data than in the W-2 data. This would provide an indication of whether SIPP data overestimate or underestimate the true retirement savings by individuals

participating in DC plans. Table 4 (columns 3 and 7) reports the distribution of the difference between SIPP and W-2 record contribution amounts calculated for each individual. A negative (positive) value for the difference indicates that the SIPP contribution amount is smaller (larger) than the value in the W-2 record. In 2006, at the 10th percentile the underreporting of contributions was substantial (a difference of -$4,320) decreasing to -$50 at the median. In the upper half of the distribution, SIPP contribution amounts are higher than those in the W-2 record, by $760 and $3,000 at the 75th and 90th percentile, respectively. Thus, the difference between SIPP and W-2 record contributions is substantial at the tails of the distribution of differences. Furthermore, the magnitude of the error (underreporting) in the 10th and 25th percentiles is larger than corresponding values (overreporting) in the 75th and 90th percentile. Although overall similar patterns are evident in 1998, the differences between SIPP and W-2 record amounts are much lower at the 10th and 90th percentile in 1998 than in 2006. These findings suggest that SIPP data may not provide a good base for estimating the extent that individuals save for retirement.

The third question addressed is the extent of the relative difference between the contribution amounts in SIPP and W-2 records. Another measure of reporting accuracy is the absolute difference between SIPP and W-2 record amounts as a percentage of the W-2 contribution amount measured at the individual level. Table 4 (columns 4 and 8) reports this measure of discrepancy at selected percentiles. In 2006, the ratio of the absolute difference to the W-2 amount was about 2 percent and 9 percent at the 10th and 25th percentile, respectively. The ratio increases to 35 percent at the median, 75 percent at the 75th percentile, and 196 percent at the 90th percentile, which suggests that there are substantial errors in reported tax-deferred contributions. The same pattern is evident in 1998, with the ratios only slightly lower compared with those in 2006.

The same pattern as observed earlier in Table 4 (panel A) is evident as well among private- and public-sector workers (panels B and C). The main difference between private- and public-sector workers is that the difference between SIPP and W-2 record amounts measured at the individual level (columns 3 and 7) is generally higher among workers in the public sector than those in the private sector, particularly in 2006, suggesting that public-sector workers are less accurate than private-sector workers. The same is true for the absolute difference as a percentage of the W-2 record (columns 4 and 8); the error is generally higher among workers in the public sector than their counterparts in the private sector and substantially higher in the upper tail of the distribution.

Multivariate Analysis of Reporting Error of Contribution Amounts

We estimate the relationship between reporting error of contribution amounts and several socioeconomic characteristics, using ordinary least squares separately for each year (Table 5).[25] Two measures of respondents reporting error are used as the dependent variable: the difference between SIPP and W-2 amounts (columns 1 and 3) and the absolute difference (between SIPP and W-2 amounts) as a percentage of the amount in the W-2 record (columns 2 and 4).[26]

Regression estimates in Table 5 (columns 1 and 3) indicate that the difference in contributions (between SIPP and W-2) is not significantly different between respondents with imputed and nonimputed information, whereas the reporting error is significantly related to the two variables in the W-2 record: the amount of tax-deferred contributions and the annual earnings. The magnitude of the difference between self-reported and W-2 contributions decreases significantly as the amount of the W-2 record contribution increases. In other words, reporting error decreases as the true (W-2) value of contribution amount increases. Conversely, reporting error is significantly larger for high-income earners.

Estimates in columns 2 and 4 indicate that the reporting error measured as the absolute difference between SIPP and W-2 record contributions relative to the W-2 record contribution is significantly higher among respondents with imputed contributions than for those with nonimputed (that is, self-reported) contributions. Similar to results in columns 1 and 3, the absolute error relative to the true value of W-2 record contributions decreases significantly as the amount of W-2 contributions increases.

Conclusion

Pension income traditionally has been one of the pillars of retirement income. During the past three decades, as the type of pension plans available to employees has been shifting from traditional defined benefit plans toward defined contribution plans, the risk associated with these plans has also been shifting from employers to employees. Given the implications

Table 5.
Regression estimates of reporting error of contribution amounts, 1998 and 2006

Independent variable	1998		2006	
	Difference in contributions between the SIPP report and W-2 record[a] (1)	Absolute difference relative to W-2[b] (2)	Difference in contributions between the SIPP report and W-2 record[a] (3)	Absolute difference relative to W-2[b] (4)
Tax-deferred contribution amount is imputed	-24.56	28.63*	-151.78	28.53*
	(55.9)	(0.956)	(80.0)	(0.830)
W-2 contribution amount/1,000	-432*	-2.98*	-463*	-1.07*
	(0.017)	(0.184)	(8.43)	(0.087)
W-2 annual earnings/1,000	4.32*	0.005	1.15*	0.002
	(0.457)	(0.008)	(0.216)	(0.002)
Mean value of dependent variable	-54	39	-370	43
Adjusted R^2	0.230	0.178	0.293	0.161
Number of observations	5,666	5,666	7,716	7,716

SOURCE: 1996 and 2004 panels of SIPP matched to SSA W-2 records.

NOTES: Authors' calculations using data from SIPP topical module to wave 7 and SSA W-2 records. The estimated coefficients and standard errors are in parentheses. The estimates control for sex, marital status, race, education, and sector of employment. The samples are comprised of respondents with positive contributions in both the SIPP report and W-2 record.

* Denotes significance at the 1 percent level.

a. The dependent variable in columns 1 and 3 is measured as the difference in contribution amounts, as reported in SIPP and the W-2 records.

b. The dependent variable in columns 2 and 4 is measured as the absolute difference in contributions (SIPP minus W-2), as a percentage of the W-2 amount.

of this shift, trends in levels of pension participation by type of pension plan and the accuracy of such information—particularly regarding DC plans, which are becoming an increasing part of retirement income—are important to understanding economic well-being of future retirees. If survey data are reported with substantial error, then this understanding is compromised.

Using data from the Census Bureau's Survey of Income and Program Participation, a major survey data source containing information on DC pension plan offering and participation, linked to Social Security administrative data, we examine the extent of reporting error regarding participation in and contributions to DC plans.

Our findings indicate that the offer rate of DC plans is about 17 percentage-points higher when the survey data are supplemented by data in the W-2 tax records. Furthermore, evidence indicates that the question used in SIPP about pension plan type confuses a nontrivial proportion of respondents. The participation rate is underestimated by 4 percentage points when using SIPP reports of inclusion in a DC plan compared with SIPP reports of tax-deferred contributions (active participation) to such plans. Furthermore, using SIPP-reported tax-deferred contributions underestimates by 7 percentage points the active participation rate compared with that indicated by the W-2 records. Thus, reliance on survey reports of tax-deferred contributions only partially closes the gap between survey-defined and W-2 record–defined participation rates.

Our analysis of possible sources of reporting errors of participation in DC plans finds that the imputation process conducted by the Census Bureau creates substantial errors. About 42–46 percent of imputations on tax-deferred contributions to DC plans are in error compared with W-2 contribution amounts. Moreover, controlling for several socioeconomic characteristics, the probability of having a false-positive error is about 50 percent higher among respondents with imputed rather than nonimputed information, whereas the probability of a false-zero error is only about 8 percent higher.

Finally, by comparing SIPP tax-deferred contribution amounts with those in the W-2 record we find that, while the median difference between the two is minor, substantial error is present at the upper and lower quartiles of the distribution. Furthermore, we find that, at the median, the absolute difference (between SIPP and W-2 amounts) is about 29–35 percent of the W-2 contribution amounts, increasing substantially at the upper part of the distribution. These relative differences were higher in 2006 than in 1998 and are also higher among workers in the public sector than those in the private sector. In addition, regression results reveal that this relative error is significantly higher among respondents with imputed contribution amounts than among those who self-reported them.

These findings suggest that the Census Bureau's procedures would benefit from using W-2 record information on tax-deferred compensations to retirement plans for both imputations and editing of respondents' reports. Analysts should use caution when using SIPP data on pension coverage and should consider using SIPP data linked with W-2 records of tax-deferred contributions. Furthermore, the findings in this study, although derived from the SIPP data, have implications for other surveys that collect pension information (such as the Survey of Consumer Finances, the Panel Study of Income Dynamics, and the Health and Retirement Study) because it is plausible that these types of measurement errors may potentially be present in other surveys as well. Questions about pension type, participation, and contributions are complex with concepts that the layperson may not use. Consequently, respondents may be inclined to nonresponse and therefore missing data are generated. Although SIPP gets somewhat around this problem by using the follow-up question, the implication for other surveys would be to modify the wording to the question about pension type. In addition, imputations to replace missing data can also generate measurement errors. Thus, any analysis should consider carefully the form of imputations and the possible use of better information about DC plans from W-2 tax records.

Notes

Acknowledgments: We would like to thank Gary Engelhardt, Alan Gustman, Olivia Mitchell, David Johnson, Patsy Fisher, and Anja Decressin for their helpful comments on an earlier draft of this article; Paul Davies, Michael Compson, Susan Grad, Gayle Reznik, and Chris Tamborini at SSA for their suggestions and comments; and seminar participants at the 2009 Joint U.S.-Canadian RDC Conference at Cornell University.

[1] See Gale, Papke, and VanDerhei (2005) for a discussion of the shifting structure of private pensions, the causes of such shift, and risks and opportunities for workers and firms; see also Clark and McDermed (1990), Gustman and Steinmeier (1992), Kruse (1995), and Ippolito (1995) for reasons for the shift in pension types. Employees in DB plans are also subject to risks, although the risks they face vary from those of employees in DC plans. Employees in DB plans are penalized in the event of a job change (Kotlikoff and Wise 1989, Samwick and Skinner 2004) because their benefits are substantially diminished or even lost if the turnover happened before entitlement to receive benefits. In addition, workers face risks if the employer changes plan features, such as plan freezes, or because of bankruptcy. If the employer freezes the plan, potential benefits from additional work with that employer are lost. In the event of employer bankruptcy, the government's Pension Benefit Guarantee Corporation (PBGC) is responsible for DB plan payments. However, the benefits paid by PBGC are substantially lower than those promised by the employer DB plan. Even workers in DB plans who at retirement age typically receive annuities face inflation risk because annuities are almost always specified in nominal terms.

[2] Summary plan descriptions contain information about pension plan characteristics that employers offer to their employees. The Employee Retirement Income Security Act (ERISA) requires that plan administrators give plan participants a copy of their plan's SPD as well as a copy of the plan's summary annual report, which provides a description of the Form 5500. Only Form 5500 is filed annually to the Department of Labor (DOL). Note that, according to our conversation with colleagues at the Employee Benefits Security Administration at DOL, participants do not necessarily receive SPDs every year, unless they request them. Furthermore, plans must provide participants with a copy of their plan's SPD no later than 90 days after they become a participant in the plan, and they must receive an updated version of the plan every fifth year, which incorporates new plan amendments made during the 5-year period. Thus, the SPD is not necessarily an accurate description of the current plan rules.

[3] Turner, Muller, and Verma (2003) study private-sector employees where tax-deferred contributions to DB plans are less common.

[4] Because survey reporting error is the main goal of this article we focus on pension coverage in current job(s), a common practice in analysis of pension participation, and therefore do not examine pension coverage from previous job(s).

[5] These plans are commonly referred to as defined benefit (DB) plans.

[6] These plans are commonly referred to as defined contribution (DC) plans. Although this terminology is not implicitly used in SIPP, for brevity, we used it interchangeably in the text. Note that the 1996 SIPP panel does not

identify cash balance plans separately from DB plans. Our classification assumes that respondents can distinguish between the individual account retirement-type plans from the formula-type plans. However, it is possible that the wording of the question may be confusing to respondents.

[7] See Turner, Muller, and Verma (2003) for different definitions used in the literature.

[8] See Olsen and Hudson (2009) and Pattison and Waldron (2008) for a discussion of W-2 tax-record data available in SSA's Detailed Earnings Record.

[9] Three-quarters of state and local government workers are required to contribute to their DB retirement plan (Wiatroski 2009). While these mandatory employee contributions to DB plans for state and local government workers are tax deferred (IRS code provision 414(h)), they do not appear in the W-2 form as earnings deferred for retirement plans. Consequently, a self-report of tax-deferred contributions by state and local government workers may not necessarily indicate that such contributions were made to a DC plan and thus one cannot infer DC participation. Therefore, our definition of participation in a DC plan by public-sector employees requires that the respondent reports both participating in an individual account plan type where contributions are made from the employer and/or the employee and making tax-deferred contributions to the plan. Our investigation indicates that without such a correction the DC participation rate among public-sector workers would be substantially overestimated.

[10] There are two reasons why we use information from both the survey year and the previous year to determine the presence of tax-deferred contributions in the W-2 record. First, respondents in SIPP who in the topical module report being included in an investment account are asked "How much do you contribute toward this plan," and "how often such payments are made." While the reference period for the pension-related questions in SIPP is the month preceding the interview month, it is unclear from the wording of this question whether the respondent would report current year contributions or previous year contributions. Second, the topical module questions are asked after the core questions, where respondents provide information about their employment and program participation for each of the four months prior to the interview month. Thus, the reference period for the prior 4 months would differ for people who are interviewed in February of 2006 (the first month of the wave 7 topical module in 2004 SIPP panel) and those interviewed in May of 2006 (the last month of the wave 7 topical module). This sequence may create ambiguity about the reference period in the contribution question. To the extent that such ambiguity is present, the estimates assuming the reported contributions are for the survey year would be biased. Our measure, thus, accounts for this type of error. More specifically, the presence of a positive contribution in W-2 records is based on whether a contribution was made either in 1997 or in 1998 for the earlier panel and either in 2005 or 2006 for the later panel. Results using this measure do not differ from those (available by request from the authors) obtained when using W-2 information for the survey year only.

[11] The imputation procedures used in SIPP are based on the assumption that the data are missing at random within subgroups of the population. Missing data in topical modules are imputed using hot-deck procedure, which assigns a value based on a respondent with similar sociodemographic characteristics. See Chapter 4 of SIPP User's Guide, available at http://www.census.gov/sipp/editing.html, for a discussion of the data editing and imputation procedure used by the Census Bureau (2001).

[12] See Kapteyn and Ypma (2007) for an overview of previous research using administrative records and for a discussion of measurement error when the administrative data are noisy. Also see Olsen and Hudson (2009) for a discussion of limitations and complexities of Social Security administrative data.

[13] Both offer and participation rates are estimated for the sample of full-time workers.

[14] Respondents who reported being included in an individual account plan are defined as being offered a DC plan. Also, respondents who were asked the "follow-up" question, as discussed earlier, and said that their employer offered a retirement savings account, are also defined as being offered a DC plan.

[15] Thus, these respondents misreport being offered an individual account plan even though they are currently contributing to such a plan. Note that for SIPP data we have information neither from the survey respondent nor their employers on the characteristics of the retirement plan the respondent is offered or is participating in. Rather, we consider the presence of tax-deferred contributions in the W-2 record as evidence of an offer and participation in a DC plan. We cannot identify whether the respondent is offered or participates in a DC plan if their W-2 records indicate zero tax-deferred contributions and they report not being offered or participating.

[16] We define a respondent as being included in a DC plan if, conditional on being offered a DC plan (defined in the above note), he or she reports being included in such a plan. We also include respondents who in the "follow-up" question said that they were participating in a retirement savings account plan.

[17] It is plausible that some respondents may not understand that an individual account plan type is the same as tax-deferred contributions to retirement accounts and thus provide conflicting answers to the two questions.

[18] If participation in a DC plan for public-sector workers was defined in the same way as for private-sector workers (that is, only reporting making a tax-deferred contribution rather than reporting both being included in an investment account plan and making a tax-deferred contribution), then their DC participation rate would be overestimated

(at 57 percent in 2006 and 53 percent in 1998; figures not reported in Table 1).

[19] It is common in 401(k)-type plans that the employer does not contribute to the account unless the employee makes a contribution. However, there are other types of DC plans where the employer may make a contribution even when the employee is not contributing to the account. Thus, it is plausible that a respondent, who is in fact not contributing to an account, reports making a contribution because his or her employer is making a contribution to the account. To address this possibility, we looked at respondent-reported information on employer contributions and found that only 0.7 percent and 3 percent of respondents in 1998 and 2006, respectively, who reported making zero tax-deferred contribution to their individual account worked for an employer who made contributions to their account.

[20] Automatic enrollment of new employees in DC plans increased after 1996. According to the Profit Sharing/401(k) Council of America (2007), only 16.9 percent of employers in 2005 and 23.6 percent of employers in 2006 automatically enrolled new employees to a plan. We cannot, however, measure automatic enrollment from the W-2 records.

[21] The multivariate estimates in Tables 3 and 5 control for sex, race, education, marital status, and sector of employment. The estimates for these control variables are available from the authors by request.

[22] SIPP identifies whether contribution amounts are imputed, but it does not identify whether the percentage of salary contributed is imputed. Thus, for the latter group of respondents we assume that if the response to the question regarding participation in tax-deferred retirement plans is imputed, the same is true for the variable regarding percentage of salary contributed. Because of the mix of observations with imputed and nonimputed contribution amounts, we do not refer in our discussion to contribution amounts in SIPP as respondent-reported amounts, but rather SIPP amounts.

[23] The W-2 annual earnings include the annual W-2 tax-deferred contribution amount in the same year.

[24] Note that the percentiles are estimated separately for each column. Thus, respondents in a given percentile in a given column are different from respondents in the same percentile in another column.

[25] As previously stated in note 22, SIPP identifies whether the reported contribution amount is imputed, but it does not identify whether the percentage of salary contributed is imputed. For nearly half of respondents who reported contributions as a percent of salary, we derive the imputation variable based on whether the question regarding participation in tax-deferred retirement plans is imputed or not.

[26] See Table 4, columns 3 and 7 for the distribution of the first measure and columns 4 and 8 for the distribution of the second measure.

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Permanent Disability Social Insurance Programs in Japan

by David Rajnes*

This article examines Japan's permanent disability social insurance programs. Because there is limited information available about these programs in the literature outside Japan, this analysis helps to further international disability research. Primary public pension systems and their corresponding programs for permanently disabled workers and their families are described, including trends in the number of beneficiaries and benefit expenditures. Importantly, the article analyzes the determination and appeals processes in Japan for claiming permanent social insurance disability pensions.

The study also references the Social Security Disability Insurance program operating in the United States and offers comparisons with the system in Japan, which provides insights about operational procedures to researchers and policymakers in both countries. Permanent disability programs in Japan and the United States share similar characteristics, including aspects of their benefit determination and appeals procedures. However, these country program experiences diverge markedly in several areas, making the comparison worthwhile from a policy perspective.

Introduction

Social insurance *permanent disability* programs cover over 70 million workers and their dependents from loss of income that is due to accident or illness. These contributory programs serve the permanently disabled population in Japan. Although similar in some respects to the U.S. Social Security Disability Insurance (DI) program, public pension provisions covering the permanently disabled population in Japan and the United States differ significantly in many ways, including eligibility rules, benefit calculation, claims and appeals procedures, and access to short-term disability benefits. These differences span two disability insurance systems that share a common social insurance design. Notwithstanding the common design, data analyzed in this article show that these systems yield quite different outcomes relative to recipiency, claims, appeals, and benefit expenditures.

The primary objective of this study is to examine the experience of Japan's permanent disability programs. There is very little information available about these programs in the disability literature outside Japan, so this research serves to further international disability research. From a U.S. policy perspective, some commentators have noted that much can be learned from cross-national analyses of disability systems in other developed countries (Social Security Advisory Board 1997; U.S. General Accounting Office 2001). Although the focus resides primarily with permanent disability programs in Japan, the article refers to the disability system operating in the United States with the expectation that comparisons with the Japanese system can provide insights about operational procedures to researchers and policymakers in both countries. Such differences cannot be fully understood without reference to sociopolitical factors—which are

Selected Abbreviations

DI	Disability Insurance
EPI	Employees' Pension Insurance
GDP	gross domestic product
JPS	Japan Pension Service
MHLW	Japan Ministry of Health, Labor, and Welfare

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Selected Abbreviations—*Continued*

NP	National Pension
OECD	Organisation for Economic Co-operation and Development
SGA	substantial gainful activity
SIA	Social Insurance Agency
SSA	U.S. Social Security Administration
SSI	Supplemental Security Income

beyond the scope of this study. However, evidence in this article indicates that certain factors may help to explain some distinctions between disability systems in the United States and Japan.

This article:

- Describes the two primary public pension systems in Japan and their corresponding programs serving permanently disabled workers and their families;
- Outlines trends in the number of Japanese disability program beneficiaries and benefit expenditures;
- Examines the determination and appeals processes in Japan for claiming permanent social insurance disability pensions; and
- Compares permanent disability pension procedures in Japan with the DI program under Social Security in the United States in order to highlight potential lessons for U.S. policy.

Pension Provision under Social Insurance in Japan

Pension benefits under social insurance are provided by a two-tier system in Japan. Any resident in Japan who is aged 20–59, including non-Japanese nationals, is required to enroll in the National Pension (NP) program, which provides flat-rate basic pension benefits and collects flat-rate contributions from the self-employed and nonworking spouses and students. In addition to NP, employees in Japan are further covered by occupational programs—either the Employees' Pension Insurance (EPI) program for general employees in the private sector or the mutual aid associations for employees in the public sector. These occupational programs provide earnings-related benefits and collect earnings-related contributions.

Public Pension System

A brief historical overview of public pension (old-age, disability, and survivor) programs in Japan is presented in this section (see Clark 1991). Because disability pension amounts are linked to the old-age benefit calculation for each program, it is critical to examine old-age pension programs in Japan before discussing details about permanent disability pensions.

Historical background. Pension (including disability) coverage under Japan's social insurance system began in 1942 with the implementation of the EPI program for workers in firms with 10 or more employees, which was soon after extended to firms with 5 or more employees in 1944. Initially, beneficiaries received only earnings-related benefits. A 1954 reform of the public pension system transformed the EPI program design into one consisting of a flat-rate portion and another consisting of an earnings-related portion. Coverage was broadened in 1961 with the introduction of the NP program, designed for self-employed workers, farmers, and others not considered employees (for example, unemployed, nonworking spouses, and so forth). At that time, the public pension system included only the EPI program for private-sector workers, and several smaller mutual aid programs operated for public-sector employees and specific occupations (such as private school employees). The original NP program provided only flat-rate benefits financed by flat-rate contributions. The level of those benefits was determined identically to the flat-rate portion of the EPI program, although the NP and EPI programs were operated separately.

As the economy expanded in the 1960s, the importance of agriculture declined in Japan. Farmers, who initially comprised a substantial portion of the NP-covered population, declined in number, which negatively impacted the long-term solvency of the NP program. By the early 1980s, it was decided to extend coverage of the NP program to the entire population, including employees, and to transform EPI into an earnings-related program by eliminating the flat-rate portion. These modifications were introduced in the 1985 social security reform law, which represents historically the most fundamental change to the public pension system affecting coverage and benefits. In the 1985 reform, a basic flat-rate pension was established, and all public pension systems were financially and statutorily integrated into this first tier (Kabe 2007). Since that time, NP has covered nearly all residents with flat-rate pension (including disability) benefits, and employees have been covered under *both* the flat-rate NP program as well as the earnings-related EPI program, or another occupational (mutual aid) program for earnings-related benefits. The 1985

reform also allowed young adult dependents to qualify for disability benefits at age 20—even though they had never contributed to the system—if they had been disabled before age 20 (the age at which contributions to NP begin).[1]

Current coverage. Today, the multitiered public pension system provides virtually universal coverage to Japanese residents under old-age, disability, and survivor social insurance programs. Participation and benefits are based on the following categories:

- Category 1 includes persons who are self–employed, farmers, and students who pay a fixed contribution each month. These individuals can be exempted from paying contributions based on their status, but will receive reduced benefits as a result;
- Category 2 includes employees of the private and public sectors. Contributions are earnings-related and shared evenly with the employer; and
- Category 3 includes spouses of insured category 2 participants who do not directly contribute to the system; their benefits are financed through spousal contributions.

The first category covers persons contributing only to the NP program, and the second and third categories apply to EPI participants and their spouses, respectively. The Japanese government previously financed one-third of the NP program—a share that rose to one-half in April 2009—while EPI program financing still relies totally on contributions.

National Pension program. NP, a partially funded program, covers full-time employees, but also the self-employed, farmers, and others aged 20–60 who are not full-time employees (Rajnes 2007; SSA 2009b). These individuals are required to make a flat-rate monthly contribution, which was 14,690 yen (US$139) in 2008.[2] Two categories of individuals are exempt from paying NP contributions: (1) individuals who qualify for social assistance and (2) persons with disabilities who already receive disability benefits (Honeycutt, Terashima, and Kohyama 2005). NP provides a pension benefit proportional to the number of years of contributions. The full benefit, available after 40 years of contributions, amounted to 66,008 yen (US$625) each month, or 792,100 yen (US$7,502) per year in 2008. Benefits are adjusted annually according to changes in the cost of living. The eligible age for full NP benefits is 65, with a minimum of 25 years of contributions. All NP administrative costs and, as mentioned earlier, one-half of NP benefits are subsidized by the government.

Employees' Pension Insurance program. For full-time, private-sector employees in Japan, there is a two-tiered EPI program. EPI includes a flat-rate first tier, with contribution and benefit features corresponding to the NP program, *and* an earnings-related second tier. The overall EPI contribution rate (combined employer and employee) is 15.35 percent of employee pretax earnings (as of January 2009). Since 2004, this contribution rate has been rising in increments of 0.354 percent each year and will reach 18.30 percent in 2017. Contributions are levied and benefits are calculated based on monthly earnings ranging in 2008 from a minimum of 98,000 yen (US$928) to a maximum of 620,000 yen (US$5,872).

The EPI old-age pension is based on earnings and length of time contributing. It is calculated on the basis of the person's average monthly wage over the full career, multiplied by a coefficient determined by the insured person's date of birth, times the number of months of coverage. The average replacement rate for a retired male employee with a contribution record of 40 years (taking into account the flat-rate first tier and the earnings-related second tier and assuming average earnings during that time) is approximately 43 percent.[3] The average EPI household replacement rate for a retired male employee with the same earnings profile, but with a nonworking spouse, is approximately 59 percent.[4] As with the NP program, EPI benefits are adjusted annually according to changes in the cost of living. All EPI administrative costs are covered by the government. The current eligible age to receive full EPI benefits will rise gradually from age 60 to age 65 in the coming decades.[5]

The NP and EPI programs are administered nationally by the Japan Pension Service (JPS) under the general supervision of the Ministry of Health, Labor, and Welfare's (MHLW) Pension Bureau. Japan's 47 regional Social Insurance Bureaus and 265 Social Insurance Offices and their supplemental 71 Pension Consultation Centers administer contributions and benefits for both programs at the local level (SSA 2009b).[6]

Pensions for the Permanently Disabled Population

Two social insurance programs in Japan provide long-term disability benefits to the self-employed and nonworkers (for example, spouses and students) under the NP program in which everyone is enrolled and to full-time employees under the EPI programs.[7] Other long-term social insurance disability programs in

Japan cover teachers, civil servants, and the military. Short-term disability benefits are also provided to employees through the Employee Health Insurance system for workers in companies with five or more employees *and* through unemployment benefits from the Labor Insurance program for individuals who become ill or sustain a nonwork-related injury leaving them unable to work (Honeycutt, Terashima, and Kohyama 2005).

Eligibility

To qualify for a disability pension under the NP or EPI programs, individuals must have contributed to either program for at least two-thirds of the period between age 20 and the onset of a disability.[8] They also must be covered by the respective program from the day before the medical examination that documents the sickness or injury causing the disability. The provisions of NP and EPI laws provide impairment tables that indicate specific physical and mental conditions for three groups of disabled individuals, ranging from group I (the most severe disabilities) to group III (SSA 2009b). There are 11 conditions listed for group I, 17 for group II, and 14 for group III, as shown in Box 1, according to the following categories (Honeycutt, Terashima, and Kohyama 2005):

- Group I includes persons with a disability that prevents them from conducting their daily activities and requires constant attendance;
- Group II includes persons who have or require significant restrictions in daily life that severely impair their ability to live independently; and
- Group III includes persons who have some restrictions in daily or social life that impair their ability to work.

Permanent disability programs in Japan, versus those in other developed countries such as the United States, appear unique in that the incapacity for work or reduced earnings is largely absent from eligibility criteria, which stress long-term physical, intellectual, or mental impairment (Honeycutt, Terashima, and Kohyama 2005).[9] Thus, for covered individuals to receive permanent disability benefits in Japan, they must only establish that they have a long-term impairment and limitations in daily living, not a limitation in their ability to work. Besides these severity and impairment criteria, another aspect is the required length of contribution period in Japan, which is at least two-thirds of the period between age 20 and the onset of a disability. Somewhat different criteria apply in the United States' DI program, where the corresponding required contributory period to satisfy eligibility is potentially shorter: one-half of the quarters over the prior 10 years, as detailed next.

Eligibility criteria in Japan also differ in other ways from the DI program under the U.S. Social Security system. Under the U.S. system, "disability" is defined as an inability to engage in any "substantial gainful activity" (SGA) that is the result of a physical or mental condition (Table 1).[10] Although the severity of impairment is considered in the United States—and there is a duration requirement that the impairment be expected to last 12 months or longer or result in death—the DI program benefit, in addition, is limited to those whose disability is sufficient to preclude SGA (those working above that level are not eligible). As a prerequisite, U.S. applicants must also have worked for a certain period of time, or have a specified amount of covered earnings in a year as measured in quarters of coverage, depending on age. At least 1 quarter of coverage for each elapsed year from age 22 to the age of disability onset (a minimum of 6 credited periods up to a maximum of 40 quarters) is required for fully insured status. In addition, there is a recency of work test in the Unites States; the applicants must have 20 quarters of coverage in the last 40 quarters or, if aged 32 or younger, one-half of the quarters must have elapsed since attaining age 22.

Benefits

The degree of disability impairment recorded is important in Japan because NP and EPI eligibility and benefit amounts are determined accordingly with respect to the three major groupings detailed earlier. By comparison, disability benefits in the DI program under the U.S. Social Security system are based on the insured individual's average covered earnings. The Japanese approach is indicated in Box 2; disability beneficiaries covered by the NP program receive benefits corresponding to group I or group II, while employees covered under the EPI program receive the basic flat-rate pension benefit from the NP program *in addition to* an earnings-related disability benefit from the EPI program. If an employee is considered to have a degree of impairment corresponding to group III, he or she does not receive any flat-rate benefit from the NP program, but only the disability pension from the EPI program.

Under the NP program, group I individuals receive 125 percent of the maximum old-age NP benefit per year, which was 990,100 yen in 2008 (US$9,378).

Box 1.
Specific physical and mental conditions for disabled individuals in Japan, by disability group

Group I: Persons with a disability that prevents them from conducting daily activities and requires constant attendance

- Total visual acuity in both eyes is no more than 0.04
- Hearing level in both ears is 100 decibels or higher
- Significant functional impairment of both upper limbs
- Loss of all fingers on both upper limbs
- Significant functional impairment of all fingers on both upper limbs
- Significant functional impairment of both lower limbs
- Loss of both lower limbs from an ankle joint or above
- Difficulty in maintaining a seated position or standing up because of functional impairment of the trunk
- Inability to perform everyday personal tasks because of the functional impairment or conditions with long-time bed rest, which is considered to be equivalent to or more severe than the conditions cited above
- Mental disabilities equivalent to or more severe than the conditions cited above
- Two or more functional impairments, physical conditions, or mental disabilities, which are considered to be equivalent to or more severe than the conditions cited above

Group II: Persons who have/require significant restrictions in daily life that severely impair their ability to live independently

- The total visual acuity in both eyes is from 0.05 to 0.8
- The hearing level in both ears is 90 decibels or higher
- Significant functional impairment in equilibrium
- Loss of chewing function
- Significant impairment of vocal or speech functions
- Loss of the thumbs and forefingers or middle fingers of both upper limbs
- Significant functional impairment of thumbs and forefingers or middle fingers of both upper limbs
- Significant functional impairment of an upper limb
- Loss of all fingers of an upper limb
- Significant functional impairment of all fingers of an upper limb
- Loss of all toes of both lower limbs
- Significant functional impairment of a lower limb
- Loss of a lower limb from an ankle joint or above
- Difficulty in walking because of functional impairment of the trunk
- Daily activities are significantly limited because of the functional impairment or conditions requiring long-time bed rest, which is considered to be equivalent to or more severe than the conditions cited above
- Mental disabilities equivalent to or more severe than the conditions cited above
- Two or more functional impairments, physical conditions, or mental disabilities, which are considered to be equivalent to or more severe than the conditions cited above

Group III: Persons who have some restrictions in daily or social life that impair their ability to work

- The total visual acuity in both eyes is no more than 0.1
- Inability to understand words spoken at a distance of 40 centimeters away or more
- Significant functional impairment in chewing or speaking
- Significant functional impairment of backbone
- Functional loss of the two important joints in an upper limb
- Functional loss of the two important joints in a lower limb
- Significant motor functional impairment caused by a false joint in long bone(s)
- Loss of a thumb and a forefinger of an upper limb, or three fingers including a thumb or a forefinger
- Functional loss of four fingers including a thumb and a forefinger in an upper limb
- Loss of one lower limb at the lisfranc joint or above
- Functional loss of all toes of both lower limbs
- Significant limitation should be given to work, or work is significantly limited because of the physical impairment
- Significant limitation should be given to work, or work is significantly limited because of the mental condition or nervous system impairment
- Limitation should be given to work, or work is limited because of the physical function, mental condition, or nervous system impairment that is caused by incurable injury or illness, which is specified by the Minister of Health, Labor, and Welfare

SOURCE: Adapted by the author from Appendix Table B of Honeycutt, Terashima, and Kohyama (2005).

Table 1.
Selected characteristics of permanent disability programs: Comparison of Systems in Japan and the United States, 2005

Characteristic	Japan	United States
Definition of disability to qualify	Daily life is substantially limited over the long-term because of physical, intellectual, or mental disability. Work incapacity or reduced earnings is not a requirement for eligibility.	Inability to engage in substantial gainful activity (SGA) because of medically determinable impairment expected to last 12 months or longer or result in death
Eligibility	Eligibility is based on contributions, although low earners may be exempt from contributing, but receive reduced benefits.	Insured status is based on length and recency of employment.
Work criterion	Generally no limitation in ability to work required; EPI group III is defined as persons with restrictions on ability to work.	Recency of work test
Age criterion	NP—aged 20 to 60 EPI—all ages for employees of covered firms	Up to age 66
Financing	EPI—total (employer/employee) tax of 15.35 percent of earnings, scheduled to rise to 18.3 percent by 2017 (includes a proportional amount for NP benefits); the maximum monthly earnings for contribution and benefit purposes in 2008 was 620,000 yen (US$5,872) NP—monthly flat rate of 14,690 yen (US$139), with the government financing one-half of NP since the end of fiscal year 2009	Total (employee/employer) tax of 12.4 percent is paid on earnings: equal contributions from worker and employer (including 1.8 percent dedicated to disability). The maximum monthly earnings for contribution and benefit purposes in 2008 was US$8,500.
Benefit amounts	Pensions are calculated as a percentage of the old-age pension for EPI and NP and rise with severity of impairment, starting at 100 percent of the old-age pension.	Pension is based on insured's average covered earnings since 1950 and is indexed for past wage inflation, up to onset of disability, excluding up to 5 years of lowest earnings.
Cost-of-living adjustment	Yes	Yes
Treatment of work while disabled	Work has no impact on benefits except among those disabled before age 20 in the NP program.	Program has incentives to encourage work. Successful return to SGA will result in benefit suspension after a trial work period and termination after an extended period of eligibility.
Dependent coverage	Automatically eligible under EPI, but not under NP	Yes—automatically eligible based on worker's coverage

SOURCES: *Social Security Programs Throughout the World, Asia and the Pacific: 2008* (SSA 2009b) and the International Social Security Association (2009).

NOTE: Permanent disability programs under the public pension system in Japan are the National Pension (NP) and Employees' Pension Insurance (EPI); the corresponding permanent disability program in the United States is the Disability Insurance (DI) program under Social Security.

Box 2.
Permanent disability benefit programs under Japan's social insurance system, 2008

National Pension (NP)	
Eligibility requirements	
NP pays benefits to two classes of disability beneficiaries and a dependent's supplement	
Group I	Total disability requiring constant attendance
Group II	Degree of disability severely restricting the ability to live independently
Dependent's supplement	May be paid for children up to the end of the fiscal year in which they reach age 18 (20, if disabled)
Insured must satisfy qualifying conditions for the NP old-age pension at the onset of disability or have paid credited contributions during two-thirds of the period between age 20 and the onset of disability [a]	
Disability benefit (paid every 2 months and annually adjusted to cost of living)	
Group I	125 percent of NP old-age pension plus additional benefits for dependent(s) 990,100 yen (US$9,378) each year
Group II	100 percent of NP old-age pension plus additional benefits for dependent(s) 792,100 yen (US$7,502) each year
Dependent supplement	227,900 yen (US$2,159) each year for each of the first two children and 75,900 yen (US$719) for each subsequent child paid up to the end of the fiscal year in which the child(ren) reach age 18 (20, if disabled)
Employees' Pension Insurance (EPI)	
Eligibility requirements	
EPI pays benefits to three classes of disability beneficiaries, a dependent's supplement, and a disability grant	
Group I	Total disability requiring constant attendance
Group II	Degree of disability that severely restricts a person's ability to live independently
Group III	Degree of disability that severely restricts a person's ability to work
Dependent supplements for children (as in NP) as well as dependent spouses up to age 65	Insured must satisfy qualifying conditions for the NP old-age pension at the onset of disability or have paid credited contributions during two-thirds of the period between age 20 and the onset of disability [a]
Disability grant	Degree of disability deemed less severe than group III
Disability benefit (paid every 2 months and annually adjusted to cost of living)	
Group I	125 percent of EPI old-age pension plus additional benefits for dependent(s)
Group II	100 percent of EPI old-age pension plus additional benefits for dependent(s)
Group III	100 percent of EPI old-age pension
Minimum benefit	594,200 yen (US$5,628) a year
Dependent's supplement	227,900 yen (US$2,159) per year for a spouse; additional supplements for children as indicated above in NP
Disability grant	Lump sum equal to 200 percent of EPI old-age pension Minimum lump sum is 1,168,000 yen (US$11,062)

SOURCES: *Social Security Programs Throughout the World: Asia and the Pacific, 2008* (SSA 2009b); and the Japan International Cooperation Agency and the Japanese Society for Rehabilitation of Persons with Disabilities (2007).

NOTES: Yen to US$ conversion rates reflect those in mid-2008.

a. Low-income, disabled persons or those receiving public aid may be awarded credit for contribution periods. The pension amount is reduced for credited contribution periods.

Group II individuals receive 100 percent of the maximum old-age NP benefit per year, or 792,100 yen in 2008 (US$7,502). These benefits correspond approximately to 22 percent and 17 percent of the average monthly wage in Japan, respectively, for the group I and group II benefit categories listed in Box 2.[11] There are additional benefits for dependent children until they reach age 18 (age 20 if disabled). Both NP and EPI benefits are adjusted annually to reflect changes in the disposable income per worker before age 65 and in the cost of living for those aged 65 or older.

The EPI program offers benefits for a wider range of disabilities (less severe impairments) than is available under the NP program, including a group III disability benefit category and various other supplements, as shown in Box 2. Individuals covered under the EPI program receive *both* the NP and the EPI disability pension if the disability category is equivalent to group I or group II. The EPI program pays group I (125 percent) and group II (100 percent) disability benefits based on the EPI earnings-related old-age pension.[12] To qualify, the claimant must meet the same minimum coverage requirements that apply to NP disability benefits. For 2006 (the most recent data available), average monthly benefits were 157,445 yen (US$1,340) for group I beneficiaries and 121,077 yen (US$1,030) for group II beneficiaries. Also, if an EPI disability claimant has been covered for less than 25 years (300 months), then 300 months is used in the computation to guarantee a higher benefit amount. Dependent supplements (not available to group III) include benefits for dependent children as well as benefits paid to persons having a dependent spouse younger than age 65.[13] Unlike the EPI program, which allows disability benefits to be paid to the disabled spouse of a covered worker, the U.S. system does not extend disability coverage to a spouse unless the spouse is disabled and a widow(er) older than age 50.[14]

Additional allowances are available to individuals covered under the EPI program. For example, there is a group III disability benefit (100 percent of the EPI old-age pension) for individuals with a partial disability that does not entirely prevent them from working. Because these individuals cannot qualify for a group I or group II disability benefit, they are guaranteed a minimum annual benefit. Also, a one-time, lump-sum benefit can be granted when the degree of disability is less than what is described for group III.[15] That allowance is twice the annual amount of the group III disability benefit.[16]

Treatment of Work

The treatment of earned income differs by program in Japan (Honeycutt, Terashima, and Kohyama 2005). For example, the number of hours worked or level of earnings received by EPI beneficiaries who work typically has no impact on benefits received, which has not been the case under the NP program. Since the inception of the NP program in 1961, earned income restrictions have been applied to NP beneficiaries whose disability began before they reached age 20 because the disabled person never contributed (Japan MHLW 2005).[17] In such cases, NP benefits may be cut by 50 percent or even 100 percent. For persons with dependents, the earnings thresholds are higher.[18]

In an effort to encourage greater employment, working NP beneficiaries since April 2006 are eligible to also receive the earnings-related component of the old-age, EPI pension (Takayama 2004b). Before that time, disabled individuals who worked for employers under the EPI program were allowed to choose between an NP disability pension or the combination of the NP old-age pension plus the EPI old-age pension, the latter of which was usually smaller because of the limited time they contributed to the EPI program.

These work-related rules under EPI and the recent relaxation in rules governing working NP beneficiaries are quite different from those that apply in the United States. As noted earlier, the U.S. DI program under Social Security has an earnings test based on the concept of SGA, and individuals whose work exceeds this level are not eligible to collect benefits. The DI program does encourage beneficiaries to return to work and offers several incentives for doing so, such as a trial work period during which benefits are not affected by work, extended Medicare benefits, and so forth. Ultimately, a successful return to work at SGA level results in disability benefits being terminated.

Readers should also be aware that a second disability program is available in the United States. The Supplemental Security Income (SSI) program provides those persons with little or no work history with disability coverage. The SSI program is means-tested with very strict income and resource tests and is noncontributory. The SSI program shares some similarities with the NP program in Japan, but is different in other ways.[19] On one hand, both the SSI and the NP programs pay a flat-rate benefit that is indexed to the cost of living. On the other hand, the NP program is contributory for all but those persons on social

assistance—young adults who have no work history or those persons already receiving disability benefits. The SSI program requires no contributions, but has more strict income and resource criteria than the NP program. By covering disabled adults with little or no work history, the SSI program in the United States reduces some of the difference in disability coverage between the two countries.[20]

Individuals entitled to the permanent disability pension under either the NP or EPI programs may also be eligible to receive other nonpension benefits. There is no reduction in the benefit amount if that person receives another type of benefit, such as long-term care assistance.

Prevalence of Disability

There are approximately 6.5 million persons with disabilities in Japan, out of a population of approximately 127 million, according to national survey data. Within this affected population, three general categories of disability can be identified, as indicated in Box 3: 3.5 million physically disabled individuals; 2.6 million with mental disabilities (schizophrenia or psychotic orders); and 459 thousand with intellectual disabilities (low IQ). Among the 78 million working-age (20–64) population, there were approximately 1.35 million physically disabled individuals; 1.75 million with mental disabilities; and 350 thousand with intellectual disabilities. This means there is a self-reported disability prevalence rate of approximately 4.4 percent with respect to the working-age population. That 4.4 percent figure for Japan is relatively low when compared with the United States, where survey estimates show higher rates of self-reported disability among its 181 million working-age population—ranging from 6.3–18.4 percent depending on the survey and how disability is defined, as indicated in Table 2 (SSA 2006).[21]

Not only is the self-reported prevalence of disability relatively low for Japan's population, but disability program recipiency rates for individuals who receive a disability benefit as a percentage of all persons aged 20–64 are quite low in Japan as well. Data in a recent Organisation for Economic Co-operation and Development (OECD) report indicate an unweighted mean recipiency rate across 28 OECD countries of nearly 6 percent, which is more than twice the rate for Japan (OECD 2009). Table 2 includes a comparison of recipiency rates for Japan and the United States in 2005. Permanently disabled beneficiaries in Japan for both the EPI and NP programs totaled 2.2 million, or about 2.8 percent of the working-age population.

In the United States, there were 6.5 million disabled workers in the DI program, representing 3.6 percent of the U.S. working-age population.[22] Including other disabled Social Security beneficiaries (220 thousand disabled widow(er)s and 770 thousand disabled adult children), there were a total of 7.5 million disabled Social Security beneficiaries, or 4.2 percent of the working-age population receiving Social Security benefits that were due to a disability. Using this broader count of disability beneficiaries, rates of benefit receipt were roughly 50 percent higher in the United States than in Japan.

Trends in Permanent Disability Programs

Trends in the number of beneficiaries, expenditures, and claims for social insurance permanent disability benefits can indicate how these programs change over time. This section serves that purpose for these programs in Japan.

Box 3.
Self-reported disability in the Japanese population, by disability category, 2001

Physical disabilities: 3.5 million
—of whom 90 thousand are younger than age 18
—of whom 3.4 million are aged 18 years or older (60.2 percent are aged 65 or older)

Mental disabilities: 2.6 million with schizophrenia or psychotic orders
—of whom 142 thousand are younger than age 20
—of whom 2.4 million are aged 20 or older (27.2 percent are aged 65 or older)

Intellectual disabilities: 459 thousand individuals with low IQs
—of whom 103 thousand are younger than age 18
—of whom 342 thousand are aged 18 or older (2.8 percent are aged 65 or older)
—of whom an additional 14 thousand are of unknown age

SOURCE: Japan International Cooperation Agency and the Japanese Society for Rehabilitation of Persons with Disabilities (2007) and the Japan Cabinet Office (2005).

Table 2.
Selected demographic and expenditure characteristics of permanent disability programs: Comparison of systems in Japan and the United States, 2005

Characteristic	Japan	United States
Working-age (20–64) population (millions)	77.9	180.5
Self-reported disability rates (as a percentage of the working-age population) [a]	4.4	[b] 6.3–18.4
Number of disability beneficiaries (millions)		
NP	1.7	--
EPI	0.5	--
DI [c]	--	6.5
Disability beneficiaries (as a percentage of the working-age population)		
NP	2.2	--
EPI	0.6	--
DI	--	3.6
New disability pensions awarded		
NP	78,997	--
EPI	29,173	--
DI [d]	--	821,000 adults and 88,000 widow(er)s and adult children
Annual program costs of cash benefits		
NP and EPI combined—		
As a percentage of gross domestic product (GDP)	0.38	--
As a percentage of public pension costs	2.17	--
DI		
As a percentage of GDP	--	0.68
As a percentage of public pension costs	--	16.40

SOURCES: Population figures come from the United Nations (2009), *World Population Prospects: The 2008 Revision Population Database;* U.S. percentages of self-reported disability range from the lower rate of 6.3 percent reported by the U.S. Census Bureau's Current Population Survey, which used a definition of severe work disability, to the much higher rate of 18.4 percent reported by the Decennial Census of 2000 (SSA 2006), which counted individuals with some type of long-lasting condition. The Decennial Census included impairments involving vision or hearing, certain physical limitations, and difficulty performing certain activities because of a physical, mental, or emotional condition (U.S. Census Bureau 2003). Pension program costs for the United States are based on the *Annual Statistical Supplement to the Social Security Bulletin, 2007* (SSA 2008a). Japanese sources of self-reported disability are taken from the 2005 *Annual Report on Government Measures for Persons with Disabilities (Summary)* issued by the Japan Cabinet Office (2005).

NOTES: Permanent disability programs under the public pension system in Japan are the National Pension (NP) and Employees' Pension Insurance (EPI); the corresponding permanent disability program in the United States is the Disability Insurance (DI) program under Social Security.

-- denotes not applicable.

a. Self-reporting of disability differs by age across countries; in Japan, the persons reporting disability included those aged 18 or older for those with physical and intellectual disabilities and for all ages with respect to mental disorders; in the United States, self-reported individuals included those aged 16–64.

b. Variability depends on the definition of disability and the source. The definition yielding the smallest estimate of the disabled population, using the definition of severe work disability, was included in the Current Population Survey, but was absent from the Decennial Census of 2000.

c. In 2005, there were 6.5 million disabled-worker beneficiaries in the DI program. In addition, the program paid benefits to 1.7 million dependents of disabled workers, 220 thousand disabled widow(er)s, and 770 thousand disabled adult children. Beneficiary data for Japan include all categories (workers, dependents, and so forth). No similar categorical breakout is available for Japan.

d. Widow(er)s and disabled adult children are not paid from the DI Trust Fund, so technically, they are not included under DI expenditures. Medicare and administrative costs are not included in DI figures. Administrative costs would bring the total up to approximately US$530 billion.

Beneficiaries and expenditures. Table 3 contains figures for permanent disability beneficiaries and expenditures (including benefits to dependents) as a percentage of gross domestic product (GDP) and as a percentage of public pension (old-age, survivors, and disability insurance) expenditures under the two major programs from 1986 through 2005—the years since Japan's landmark public pension system reform was implemented.

These data indicate slow and steady growth for both programs in terms of permanent disability beneficiaries over the observed period. EPI beneficiaries represent roughly 21–22 percent of all disability beneficiaries throughout the entire period. Program expenditure data relative to GDP indicate a relatively fixed share for EPI expenditures of slightly below 0.1 percent (0.07–0.09), while the percentage of GDP represented by NP expenditures actually grew from roughly 0.2 percent to nearly 0.3 percent (0.23–0.29) from 1986 through 2005. The combined share of GDP for both programs grew slightly over time, from 0.32 percent to 0.38 percent, solely because of the growth in NP expenditures. With respect to their share of overall expenditures in public pensions (old-age, survivors, and disability insurance), these programs declined from 5.75 percent in 1986 to 4.12 percent in 2005.

Disability pensions under the NP and EPI programs have represented a relatively small share of

Table 3.
Permanent disability in social insurance programs in Japan: Number of beneficiaries and percentage of benefit expenditures, by major program, 1986–2005

	Employees' Pension Insurance (EPI)			National Pension (NP)		
Fiscal year	Number of beneficiaries	Expenditures as a percentage of OASDI expenditures	Expenditures as a percentage of GDP	Number of beneficiaries	Expenditures as a percentage of OASDI expenditures	Expenditures as a percentage of GDP
1986	287,155	1.61	0.09	1,044,338	4.14	0.23
1987	298,916	1.53	0.09	1,084,815	4.05	0.23
1988	307,012	1.45	0.08	1,112,627	3.93	0.22
1989	319,587	1.42	0.08	1,144,880	3.99	0.22
1990	326,906	1.36	0.08	1,172,693	3.90	0.22
1991	335,523	1.32	0.07	1,198,620	3.84	0.21
1992	343,644	1.28	0.07	1,225,099	3.78	0.22
1993	352,645	1.23	0.08	1,252,059	3.69	0.23
1994	362,676	1.22	0.08	1,278,172	3.72	0.24
1995	372,202	1.14	0.08	1,308,998	3.54	0.25
1996	380,160	1.09	0.08	1,338,488	3.46	0.24
1997	393,135	1.07	0.08	1,369,835	3.39	0.24
1998	403,719	1.04	0.08	1,401,606	3.34	0.25
1999	414,960	1.02	0.08	1,437,480	3.31	0.27
2000	425,113	0.99	0.08	1,473,300	3.28	0.27
2001	435,653	0.97	0.08	1,507,799	3.24	0.28
2002	452,420	0.95	0.09	1,542,879	3.17	0.29
2003	463,057	0.94	0.09	1,580,171	3.18	0.29
2004	475,986	0.94	0.09	1,619,493	3.19	0.29
2005	486,728	0.93	0.09	1,655,001	3.19	0.29

SOURCES: Personal communication, via e-mail, between the author and Ministry of Health, Labor, and Welfare officials (August 27, 2008) for data on participants and beneficiaries; *International Monetary Fund (IMF) Financial Statistics Yearbook and IMF International Statistics* (various years) for gross domestic product (GDP) data; and the National Institute of Population and Social Security Research (various years) for figures on old-age, survivors, and disability insurance (OASDI) expenditures.

NOTES: Data herein reflect the end of each fiscal year. The fiscal year in Japan begins on April 1 of the previous calendar year and ends on March 31 of the year with which it is numbered.

Beneficiaries refer to the number of individuals receiving benefits under each program. Individuals covered under NP receive only those benefits, whereas those covered under EPI are eligible to receive benefits (expenditures) from both the NP and EPI programs in most cases.

overall expenditure on public pensions over time in Japan: 5.3 percent in 1990, 4.3 percent in 2000, and 4.1 percent in 2005. One possible explanation offered by Japanese actuaries for this trend is that the number of old-age beneficiaries has been increasingly rapidly—a reflection of population aging—while the total number of persons of working age in the population, which generates disability beneficiaries at a fairly constant rate, is decreasing.[23] According to Japan's MHLW, the per capita benefit of the old-age pension has increased with longer contribution periods of participating workers, reflecting the maturing of the old-age pension system. According to data in Table 2, the DI program under Social Security in the United States accounted for 0.68 percent of GDP (nearly twice the share in Japan) and 16.4 percent of public pension expenditures (roughly eight times the portion in Japan)—a percentage that has been rising in recent decades from 11.1 percent in 1990 to 15.6 percent in 2000 to 16.4 percent in 2005.

Disability claims and *inflow* of new beneficiaries. In Japan, data on the number of disability claims filed or the number of disability pensions granted by type of disability are not available on a regular basis. However, a Disability Research Institute study funded by the U.S. Social Security Administration (SSA) was able to obtain 2001 data on the number of new beneficiaries by pension type and disability grouping (Honeycutt, Terashima, and Kohyama 2005). The study found that—

- Of the over 100,000 disability pensions granted, only one-quarter of individuals qualified under the EPI program (a 3:1 ratio of NP versus EPI awards). Persons with a group III disability, who are not eligible for an NP pension, comprised the largest portion (47 percent) of all EPI pensions awarded; 14 percent of new EPI beneficiaries qualified under the group I classification. Regarding the NP program, the majority of pensions were awarded for group II disabling conditions.
- NP program beneficiary totals were split evenly between group I and group II disability classifications; relatively few individuals (14 percent) had a group I disability under the EPI program; and the majority of EPI beneficiaries fell under either a group III (47 percent) or group II (40 percent) disability.

Table 4 contains the most recent government figures on the number of new benefits granted under the NP and EPI programs for permanent disability pensions from 2000 through 2005. These data show a gradual increase overall in the number of permanent disability pensions granted under these programs during the period under study. However, although grants for these programs rose after 2000, both programs experienced a slight decline from 2004 to 2005.[24] In general, the share of new EPI disability recipients has remained steady at around 27 percent throughout the observed period. Of interest, is the bottom row of Table 4, which shows that the percentage of new beneficiaries has remained virtually unchanged at around 5 percent from 2000 through 2005.

Stable inflows of new permanent disability beneficiaries observed in Japan are uncommon across most disability systems in OECD countries. According to a 2009 OECD report, only 7 other countries (besides

Table 4.
Number and percent of new permanent disability pension beneficiaries in Japan granted by major program, 2000–2005

Program	2000	2001	2002	2003	2004	2005
Employees' Pension Insurance (EPI)	26,728	27,241	28,517	28,261	31,247	29,173
National Pension (NP)	72,724	73,606	74,902	78,110	80,541	78,997
Total	99,452	100,847	103,419	106,371	111,788	108,170
New pension beneficiaries (as a percentage of all permanent disability pension beneficiaries) [a]	5.24	5.19	5.18	5.21	5.33	5.05

SOURCE: Personal communication, via e-mail, between the author and Ministry of Health, Labor, and Welfare officials (July 9, 2008).

NOTES: Data herein reflect the end of the fiscal year. The fiscal year in Japan begins on April 1 of the previous calendar year and ends on March 31 of the year with which it is numbered.

Individuals covered by EPI also receive a benefit under NP in most cases.

a. Percentage calculation based on the combined total of EPI and NP permanent disability beneficiaries listed in Table 3, from 2000 through 2005.

Japan)—out of a total 28 OECD countries studied—had similarly flat profiles for the number of new disability beneficiaries as a percentage of the working-age population, and only 1 other country (Mexico) recorded a lower rate of new beneficiaries (OECD 2009). Besides the 2 percent and 1 percent recorded for Japan and Mexico, respectively, rates for the other five stable systems ranged from around 3–7 percent.[25] By contrast, the United States, which was classified in the OECD study as among countries with increasing disability recipiency (take-up) rates, showed steady growth from slightly less than 4 percent in 1990 to nearly 6 percent in 2006.

Another contributing factor to the stable rate of new disability beneficiaries may lie, at least for Japan, with the low level of new applicants. According to an SSA-funded study, one of the more striking observations in Japan was the low recipiency rate of disability pensions despite economic difficulties and high unemployment in recent years (Honeycutt, Terashima, and Kohyama 2005). In 2005, new disability pensions granted for the NP and EPI programs in Japan accounted for slightly more than 108,000, or 5.05 percent of all beneficiaries in those programs—quite different from the experience of the United States, where the disability rolls in the DI program were over 900,000, or nearly 14 percent of all beneficiaries in that program.

Honeycutt, Terashima, and Kohyama (2005) offer two reasons for the relatively low number of disability beneficiaries in Japan. First, the disability determination system in that country does not emphasize the ability to work, but instead focuses on specific functional conditions unrelated to the employment situation of the person. Such an approach may involve less discretion in the decision-making process, resulting in a lower approval rate for disability claims. Moreover, such a narrow (functional) view of disability appears to have allowed Japan to avoid experiencing what the OECD calls the "medicalisation of labour market problems," an OECD-wide trend toward accepting large numbers on disability payments in exchange for lower unemployment insurance benefit rates (OECD 2009). Second, the customary employment contract—the implicit or explicit agreement between an employer and employee—in Japan may have a dampening effect on disability insurance application rates to the extent that it creates an obligation on the part of many employers to support their employees for as long as possible after the onset of a disabling condition.[26]

Medical Consultation and Benefit Determination Process

Covered individuals in the NP and EPI programs are eligible to receive a permanent disability pension once they are assessed with a certain level of disability as specified by the appropriate law: Article 30(2) of the National Pension Act for the NP program or Article 47 (2) of the Employees' Pension Insurance Act for the EPI program. To apply for a permanent disability benefit under either program, individuals advance through three stages. They must first consult with a physician and then complete two more stages that comprise the multistep determination process (Honeycutt, Terashima, and Kohyama 2005; Westat 1998). These three stages are detailed below and further in Box 4.

Stage I

Once an individual experiences a disabling condition (for example, physical injury or other illness covered under the NP and EPI disability programs) and sees a physician for treatment, the initial visit establishes what is referred to as the "first day of medical consultation".[27] The importance of this action is two-fold:

- First, the "day of disability decision" is established. This is the determining date for which the disabling condition must be evaluated. The overall period from the first day of medical consultation until this date may last no longer than 1½ years (18 months), but can occur sooner if the applicant's physical or mental condition becomes stabilized.[28] For example, in the case where an individual loses his or her legs or arms, it will probably not take the full 1½ years for the injuries to stabilize; thus the length of time for this period could be much shorter. If 1½ years elapse following the first day of medical consultation and the patient's condition is still not stabilized (that is, the physician expects it may change in the future), then the disabling condition will nevertheless be evaluated at that time.
- Second, the individual may be able to claim cash benefits from the health insurance system during the waiting period for a benefit determination if he or she is unable to work. The Employees Health Insurance, for firms with more than five employees, provides a monthly benefit equal to two-thirds of the monthly income that the worker had earned before his or her first day of medical consultation. Temporary cash benefits are also available to employees through unemployment benefits from Labor Insurance. By contrast, those covered by the

Box 4.
Stages involved in applying for a permanent disability pension in Japan: Initial medical treatment and multistep determination process

Stage I **Medical consultation resulting from the onset of a disabling condition**

- Establishment of "first day of medical consultation"
- Establishment of "day of disability decision" by when benefit decision must be rendered—maximum period of 1½ years (18 months) unless condition stabilizes
- Access to health insurance benefits may be possible if unable to work

Stage II **Gathering the necessary paperwork to file a claim for a permanent disability pension**

Step 1: Obtain a "Claim for Disability Benefits" form from the Social Insurance Office (EPI program) or municipal Pension Consultation Center (NP program)

Step 2: Have the claimant's doctor issue a certificate diagnosing the disability

Stage III **Filing a claim for a permanent disability benefit and evaluation (3½ month limit on processing)**

Step 3: File a claim form for disability benefits along with the doctor's certificate of diagnosis at the Social Insurance Office or Pension Consultation Center; claimants must also provide additional documentation

Step 4: A Japan Pension Service (JPS) clerk examines the claim form and accompanying documents

Step 5: An outside doctor, appointed by JPS, evaluates the claim

Step 6: A JPS clerk renders a decision whether or not to provide the disability pension to the claimant

SOURCE: Honeycutt, Terashima, and Kohyama (2005) and compiled by the author.

NP permanent disability program, primarily the self-employed and farmers, do not have access to short-term disability benefits through their National Health Insurance coverage. Their situation resembles that in the United States, where many workers would not have access to temporary cash sickness benefits.

Stage II

Preliminary steps to obtain proper documentation and medical certification precede a formal filing of the claim for a permanent disability pension. These are indicated by steps 1 and 2 below and are further detailed in Box 4:

1. Individuals must obtain a "Claim for Disability Benefits" form and file it with the appropriate office—NP applicants at their municipal Pension Consultation Center and EPI applicants at their nearest Social Insurance Office. In general, individuals whose initial examination for the disability condition took place before age 20 or at ages 60–65 file their claim at the Pension Consultation Center instead of the Social Insurance Office.[29]
2. Applicants must obtain a physician's certificate of diagnosis evaluating the disabling condition.

Stage III

This final stage involves filing the claim and following the steps to complete the determination process for a disability pension. JPS has its own self-imposed standard for processing disability claims for stage III, not to exceed 3½ months, which was adopted in April 2005. This period covers steps 3 through 6 (below)—from the date the disability claim is actually received by JPS until a final decision is issued by the agency.

3. Applicants need to file the claim form along with the certificate of diagnosis issued by their doctor at the Social Insurance Office or Pension Consultation Center. Insured claimants must also submit proof of their prior contributions, a certified copy of family registry,[30] a report on medical history, and a justification of how the disability affects their livelihood/work. Required documentation may vary depending on the disability condition.
4. A JPS clerk formally examines the claim form and supporting documentation to verify the claimant's eligibility for a disability pension before the claim is sent to the central office for review.
5. An outside doctor appointed by JPS evaluates the claim regarding the level of disability and/or how

the disability affects the individual's daily life, according to standards in published tables.[31]

6. The JPS clerk renders a final decision on whether or not to approve the disability claim.

How does the medical consultation and benefit determination process in Japan compare with that in the United States? Table 5 (first row) lists the major characteristics of this decision process for both countries.

In the United States, eligible applicants can file their claim for disability benefits at any time, but they must complete a 5-month waiting period before being eligible for benefits, and the impairment must be expected to last a minimum of 12 months.[32] Although relatively shorter in duration, the U.S. waiting period resembles the 18-month time interval in Japan; the U.S. waiting period ensures that benefits are provided only to claimants with long-term disabilities—much like the opportunity given to Japanese disability insurance providers to see how their applicants' conditions stabilize over time. This interval also allows other disability programs in the United States, both public (six states have temporary disability programs) and private, to provide protection during the initial disability period—not unlike how EPI participants may obtain short-term health insurance benefits in Japan. Cost containment is another justification for this waiting period in the United States (also implied by the 18-month waiting period in Japan).

In both Japan and the United States, applicants must submit medical evidence and other documentation to support their claim. The United States uses a five-step sequential evaluation process that determines whether (1) the impairment is severe; (2) the individual is engaging in SGA; (3) the impairments meets, or is equivalent to, an entry in SSA's Listing of Impairments; (4) the individual has the residual functional capacity to do his or her prior job; and (5) the individual has the residual functional capacity to do any job that exists in the national economy. Although both countries consider both medical and functional factors in the disability decision, Japan relies solely on the impairment tables, while the United States goes beyond the standardized tables (Listing of Impairments) and undertakes a separate evaluation of the individual's residual functional capacity and vocational prospects. Whereas the U.S. system must establish that the individual is unable to do any SGA, the Japanese system only requires the demonstration of significant impairment and/or functional limitation and not whether it is specifically related to the ability to work.

Postadjudicative Review

In Japan, a yearly review is required of beneficiaries of disability pensions in the month of their birthday (Honeycutt, Terashima, and Kohyama 2005). Beyond notifying the authorities that they are alive, beneficiaries who are permanently disabled are not required to do anything more. However, beneficiaries who may not be totally disabled, such as group III beneficiaries under the EPI program or recipients of temporary disability benefits (for example, those awaiting a decision on their application to receive a permanent disability benefit and the waiting period extends beyond a year, but capped at 18 months), must submit documentation, including updates on their condition, or be subject to the loss of benefits. Depending on the disabling condition, beneficiaries may be asked to submit a medical certificate from their own doctor along with this annual report every 3 to 5 years.[33] Although vocational services are provided by the government through the Japan Organization for Employment of the Elderly and Persons with Disabilities, permanent disability beneficiaries are not required to use them. Generally, a more intensive review is demanded in the United States, as indicated in the final row of Table 5; SSA conducts continuing disability reviews on a schedule established by law with nonpermanent impairments requiring review at least once every 3 years. Cases where medical improvement is expected are scheduled for an earlier review. DI cases under Social Security are also reviewed once an individual has returned to work, generally at completion of a trial work period. Cases of permanent disability are reviewed every 7 years.

Appeals Procedure

In Japan, when a claim for disability benefits is rejected, the individual is given an opportunity to appeal that decision through an independent administrative appeals procedure designed to resolve disputes under the EPI, NP, and other social insurance programs (Japan MHLW 2008; Skoler and Zeitzer 1982).[34] Disputed claims involving benefits for insured persons or beneficiaries are first brought before an appeals examining officer of the regional Social Insurance Bureau.[35] Examining officers are appointed by the MHLW separately for each region.

This request (written or oral) may be made directly to a regional examining officer within 60 days of notification of the Ministry's decision. After receiving

Table 5.
Claims and appeals procedures for permanent disability programs: Comparison of system characteristics in Japan and the United States

Characteristic	Japan	United States
Decision process	After establishing that a disabling condition exists in a medical consultation, the individual files a claim at appropriate office. Certificate of diagnosis from a doctor shows level of disability (group I, II, or III). The claimant submits proof of contribution, reports on medical history, and impact of disability on his or her life. A clerk examines the claim and evidence to verify eligibility. A doctor appointed by the Japan Pension Service (JPS) evaluates the claim and level of disability according to impairment standards in published tables. A JPS clerk renders the final decision.	The individual files an application with the Social Security Administration (SSA); the claim is forwarded to a state disability determination service office, which collects existing medical evidence and/or sends the applicant to a physician for a consultative exam; the disability examiner, with support from a doctor, reviews medical evidence and makes a determination based upon a five-step sequential evaluation process considering medical conditions under a listing of impairments or based on residual functional capacity and vocational considerations.
Appeals process	A denied claim can be disputed with a regional examining officer reviewing the claim. If the claimant is unsuccessful, the next level of appeal is to the Social Insurance Appeals Committee, a committee of six members appointed by the prime minister and approved by the legislature. Three committee members generally hear an appeal and render a majority decision. Final appeals are handled by the judicial system, although this is rare.	If a claim is denied there are several appeals steps: (1) reconsideration, where the claim is reviewed by a different disability examiner in the same state agency; (2) a hearing in front of a federal administrative law judge, where the individual has the opportunity to appear in person with witnesses; (3) appeal to the Appeals Council; and (4) appeal to the federal court system.
Appeals rates	With an average annual back-log of approximately 700 or more cases, the total number of claims under review by appeals examiners exceeds 5,000, which represents slightly more than 4 percent of the flow of new disability pensions awarded in recent years. Of disability claims actually processed, only about 9–11 percent were granted by appeals examiners. Remaining claims processed in any given year are either dismissed or denied about 67–74 percent of the time; claimants withdraw their claim 16–21 percent of the time.	Over 2.1 million claims were filed for disability benefits in 2006, and nearly a third of those did not meet nonmedical eligibility standards (technical denials). Of 1.5 million individuals who received medical decisions, 35 percent were allowed at the initial decision. Of the 65 percent denied, more than half appealed to the reconsideration level, where 9 percent were allowed. Decisions at the hearings level are not yet complete for this cohort of individuals, but generally about 80 percent of those are denied at reconsideration appeal to the hearings level, where over 70 percent are awarded disability benefits.
Time frames	Japan has timeframes for rendering disability decisions at each step in the process: 1½ years for determining an application following the initial medical consultation; 3½ months at the initial level once an application is filed; and 60 days at the disputed claim level.	There is a 5-month waiting period. Otherwise, SSA does not have established time frames for rendering a decision. In 2006, average processing times at each level of the appeals process were 88 days at the initial level, 483 days at the hearing level, and 203 days at the Appeals Council level.
Postadjudicative review	A yearly review is made in the month of the beneficiaries' birthday, which may require the submission of documentation updating the condition. Most permanent beneficiaries need not undergo this process. A medical certificate may be required every 3–5 years, depending on condition.	SSA must conduct continuing disability reviews on a schedule established by law with nonpermanent impairments requiring review at least once every 3 years. Cases where medical improvement is expected are scheduled for an earlier review, and cases of permanent disability are reviewed every 7 years. DI cases are also reviewed once an individual has returned to work, generally at the completion of a trial work period.

SOURCE: Compiled by the author and SSA staff.

the request, the examining officer notifies interested parties (for example, claimant, employer, and so forth) that a request for review has been filed and invites them to comment orally or in writing about the claim. The conduct and content of the appeal hearing—including requirements that witnesses and interested parties appear and share their opinions, information, or documentation concerning the claim—are subject to the discretion of the examining officer. The examining officer may accept or reject the claimant's request, either totally or partially, in writing. If an examining officer does not render a decision within 60 days from the date of the original request for review, the request is considered denied.

When a claim is dismissed by the regional examining officer, the claimant may file another appeal of the decision to the Social Insurance Appeals Committee within 60 days' notice of the decision. This committee consists of a chairman and five members appointed by the prime minister and approved by Japan's legislature. It has appellate jurisdiction over benefit claims submitted to regional examining officers and original jurisdiction over appeals regarding social security contributions and related issues. Usually, only three members of the committee sit to hear an appeal, and their decision is rendered by majority vote. For the deliberation, the MHLW appoints senior counselors, who are allowed to argue on behalf of the plaintiff (individual claimant or employer) whom they represent. A decision in favor of the claimant returns the case to the examining officer for a new decision. Should this two-tiered administrative procedure become exhausted, a claimant can bring a dispute into the regular judicial system, although such cases are extremely rare.

The volume of disputed claims under the MHLW's two-tier appeals procedure is relatively small. It was noted earlier in Table 4 that roughly 100,000 disability pensions are granted each year. Data in Table 6 indicate that the number of claims submitted in the first round to regional appeals examiners rose from 3,813 to 4,314 during the 2004–2006 period. Because of an average annual backlog of approximately 700 or more cases, the total number of claims under review by appeals examiners during that time increased from 4,500 to over 5,000, representing slightly more than 4 percent of the flow of new disability pensions awarded in recent years. Of the disability claims actually processed at this initial appeals level from 2004 through 2006, only about 9–12 percent were granted by appeals examiners. Remaining claims processed in any given year were either dismissed or denied about 67–74 percent of the time; claimants withdrew their claims 16–21 percent of the time.

Table 6.
Number and percent of disputed claims (tier one) submitted to regional appeals examiners for permanent disability pensions in Japan, under the appeals procedure of the Ministry of Health, Labor, and Welfare, 2004–2006

	Received			Processed				
Fiscal year	Carryover [a]	Receipt	Total	Withdrawal	Granted	Dismissed [b]	Denied [c]	Total
2004								
Number	688	3,813	4,501	771	**347**	2,516	119	3,753
Percent	15.3	84.7	100.0	20.5	**9.2**	67.0	3.2	100.0
2005								
Number	748	3,955	4,703	828	**470**	2,542	101	3,941
Percent	15.9	84.1	100.0	21.0	**11.9**	64.5	2.6	100.0
2006								
Number	762	4,314	5,076	693	**424**	2,984	134	4,235
Percent	15.0	85.0	100.0	16.4	**10.0**	70.5	3.2	100.0

SOURCE: Personal communication, via e-mail, between the author and Ministry of Health, Labor, and Welfare officials (December 19, 2008).

NOTES: Data herein reflect the end of the fiscal year. The fiscal year in Japan begins on April 1 of the previous calendar year and ends on March 31 of the year with which it is numbered.

a. Reflects disputed claims that remain unprocessed from the previous year.

b. Dismissed means rejection because of substantive reasons (for example, qualifying medical condition).

c. Denied means rejection because of lack of qualification (for example, qualifying contribution).

Based on data shown in Table 7 for processed claims appealed at the next level, the Social Insurance Appeals Committee received roughly 29–36 percent of those claims either dismissed (for substantive reasons, such as failure to satisfy medical condition(s)) or denied (failure to qualify, for example, as in meeting the required contributory period) by appeals examiners during the 2004–2007 period. At this secondary level of review, several hundred cases per year were usually carried over from the previous year, so the Social Insurance Appeals Committee generally dealt with less than 1,200 appeals in 2004 to nearly 1,400 appeals in 2007, and it processed anywhere from 50–80 percent of the overall caseload available in any given year. Among cases processed at this secondary level of review during that 4-year time period, 16–22 percent of claimants withdrew their claim; 5–14 percent received a favorable decision; and 65–79 percent had their cases either dismissed or denied. There are no data available on the number of denied appeals brought into the regular judicial system.

How does the appeals procedure in Japan compare with that in the United States? An appeals procedure is available in both countries for claimants who are dissatisfied with the initial decision and want to request further review. A multistep review process can involve a case review followed by a hearing at ever higher levels of adjudication, which may conclude with a final appeal handled by the judicial system. Such reviews must be requested within a specified interval at each step along the way—for example, 60 days following an adverse decision in both Japan and the United States.

In the United States, there are four levels of appeal as indicated in the second row of Table 5. The first level involves reconsideration by the disability determination services—state-run agencies tasked with making disability determinations for the federal DI program, which makes the initial determination. If the claim is again denied, the individual may request a hearing before an administrative law judge (ALJ), who draws on the evidence on file and any new evidence submitted for consideration. This is the first opportunity the claimant has to meet face to face with the decision-maker and to present witnesses. Next, the Appeals Council, consisting of ALJs, may grant or deny a review based on the evidence on file, any additional evidence submitted by the claimant, and

Table 7.
Number and percent of claims submitted (tier two) to the Social Insurance Appeals Committee for permanent disability pensions in Japan, under the appeals procedure of the Ministry of Health, Labor, and Welfare, 2004–2007

	Received			Processed				
Fiscal year	Carryover [a]	Receipt	Total	Withdrawal	Granted	Dismissed [b]	Denied [c]	Total
2004								
Number	460	728	1,188	127	**83**	322	61	593
Percent	38.7	61.3	100.0	21.4	**14.0**	54.3	10.3	100.0
2005								
Number	595	768	1,363	172	**61**	586	77	896
Percent	43.7	56.3	100.0	19.2	**6.8**	65.4	8.6	100.0
2006								
Number	467	882	1,349	169	**57**	739	104	1,069
Percent	34.6	65.4	100.0	15.8	**5.3**	69.1	9.7	100.0
2007								
Number	280	1,111	1,391	245	**80**	641	146	1,112
Percent	20.1	79.9	100.0	22.03	**7.2**	57.6	13.1	100.0

SOURCE: Personal communication, via e-mail, between the author and Ministry of Health, Labor, and Welfare officials (December 19, 2008).

NOTES: Data herein reflect the end of the fiscal year. The fiscal year in Japan begins on April 1 of the previous calendar year and ends on March 31 of the year with which it is numbered.

a. Reflects disputed claims that remain unprocessed from the previous year.

b. Dismissed means rejection because of substantive reasons (for example, qualifying medical condition).

c. Denied means rejection because of lack of qualification (for example, qualifying contribution).

the original ALJ's findings and conclusions. Finally, the U.S. federal court system allows claimants to file suit regarding a disputed decision, which may then be upheld, reversed, or remanded back to SSA for a new decision.

Figures for appeals rates also differ substantially between the two countries as indicated in Table 5. Japan's average annual backlog of roughly 700 cases, 5,000 claims reviewed annually (slightly more than 4 percent of new disability pensions granted), and the 9–11 percent of successful appeals in any given year reflects a much smaller scale with distinctly different results. In the United States, there were over 2.1 million claims for disability benefits filed in 2006. Nearly a third of these resulted in technical denials that did not meet nonmedical eligibility standards. Of the 1.5 million individuals receiving medical decisions, 35 percent were allowed at the initial decision. Of the 65 percent denied, more than half appealed to the reconsideration level, where 9 percent were allowed. Although decisions at the hearings level are not yet complete for this cohort of individuals, we can expect that about 80 percent of those denied at reconsideration will appeal to the hearings level, where over 70 percent will be awarded disability benefits.[36]

Conclusion

Permanent disability programs under social insurance in Japan protect citizens from the loss of income as the result of an accident or illness. First introduced for workers in the 1940s, these programs have expanded their coverage, and they now protect over 70 million workers and their dependents who may become disabled. Eligibility criteria remain quite strict in that covered individuals may receive benefits only when they experience long-term impairment and limitations in daily living. The actual population receiving benefits remains relatively small when compared with the United States and other developed countries. Program provisions have changed little since 1986, when the flat-rate NP program was integrated with the earnings-related EPI program in a major reform of the public pension system.

As the pension system has matured in Japan, the numbers of beneficiaries and expenditures for permanent disability programs have grown modestly and with little significant variation over time.[37] Beneficiaries of permanent disability programs currently represent 2.2 million persons, or 2.8 percent of the working-age population. EPI beneficiaries have remained at roughly 21–22 percent of all permanent disability beneficiaries throughout the period. Expenditure data show some movement from 1986 through 2005 in terms of GDP (the NP program increased from about 0.2 percent to 0.3 percent), but a decline in the two programs' combined (NP and EPI) percentage of public pensions (a decrease from 5.75 percent to 4.12 percent) may be due to higher spending on old-age pensions for an aging population. The share of overall disability pension expenditures devoted to the EPI program fell from about 28 percent in 1986 to 23 percent in 2005. According to government officials, there are no immediate plans for any major change to these programs in the future.

The disability determination process in Japan has multiple steps to establish that the applicant's disabling condition is truly long term and limits his or her daily living experience. Of significance are the time limits imposed on the determination process. First, there is an 18-month restriction imposed from the time the applicant consults with a doctor issuing a certificate of diagnosis until a decision is rendered to the applicant. Another significant feature of this process (since 2005) is the fact that JPS limits the duration for processing disability claims to 3½ months—from the time a disability claim is formally submitted until the decision must be issued.

A multitier appeals procedure operates in Japan to resolve disputes when questions arise from the disability determination process. This process occurs first at a regional level; next, rejected appeals may be submitted to a higher national forum; finally, disputed claims, after exhausting all administrative venues for appeal, may be brought before the judicial system. Time limits for appealing an adverse decision amount to 60 days following the issuance of a negative pronouncement. Recent data suggest that a minor percentage of rejected claimants utilize the appeals process; few claimants are successful and even fewer lodge such a claim with the judicial system.

Permanent disability programs in Japan and the United States share a number of similar characteristics, including—

- broad coverage that requires adults to contribute to a program for a certain period of time,
- benefits claimed before the applicant reaches retirement age,
- coverage for dependents, and
- annual benefit adjustments based on changes in the cost of living.

The benefit determination and appeals procedures are comparable in terms of the overall approach—the medical consultation anchoring a determination process and a multilevel appeals framework.

However, program experiences in Japan and the United States diverge markedly in several areas, making the comparison worthwhile from a policy perspective:

- *General system features*—The two-tier (since 1986) public pension framework in Japan is more complicated than the single-tier, earnings-related DI program covering all workers, with earnings-related benefits provided to beneficiaries covered under the EPI program and flat-rate NP benefits partially subsidized by the government.
- *Criteria for eligibility*—The focus of eligibility criteria in Japan (severity of impairment) is quite different from the U.S. approach, which includes not only a medical condition but also the ability to engage in SGA. The narrower focus in Japan may serve to dampen the rate of incoming beneficiaries.
- *Calculation of benefits*—The benefit calculation in the U.S. system, based on SGA and loss of earnings, differs substantially from the severity of impairment in Japan as the primary determinant, which can result in the granting of 100 percent or more of old-age pensions to those receiving permanent disability pensions in that country.
- *Treatment of work*—Programs in Japan generally permit most disability beneficiaries to work as much as they wish without affecting their benefit eligibility, while the U.S. system provides work incentives, but terminates benefit eligibility after a successful return to SGA.
- *Duration of application procedures*—Time markers are initiated once the applicant reaches a certain point in the application process for programs in both countries, but these markers have rather different features and rationales—18 months from the initial medical consultation in Japan versus a 5-month waiting period and a 12-month duration of disability requirement in the United States and a rigid 3½ month processing deadline in Japan versus no processing deadlines in the U.S. system.
- *Processing of applications*—In Japan, data on the average processing times for benefit determination (although there is a 3½ month limitation) and appeals procedures are not readily available. In the United States, average processing times in 2006 were 88 days at the initial level, 483 days at the hearing level, and 203 days at the Appeals Council level.[38]
- *Access to temporary cash assistance*—Access to temporary cash disability benefits under health insurance or other employer-funded protection in Japan may allow employees with access to such programs to buy time while awaiting the determination of an application for a permanent disability pension—an opportunity not available to those covered under Japan's NP program or to many applicants in the U.S. program.
- *Outcome of claims and appeals*—The level of benefit applications and appeals in Japan is on a much smaller scale than in the United States. Successful appeals in the Japanese system, at the rate of 9–11 percent, is much lower than in the American system.

The stability of Japan's permanent disability programs is uncommon. Although the NP and EPI programs address separate population groups, they are characterized by relatively small beneficiary pools (vis-á-vis international comparisons), an emphasis on functional impairment over incapacity for work (that is, reduced earnings) in the eligibility criteria, and liberal work rules for the vast majority of beneficiaries. The long-term stability in terms of both the stock and flow of beneficiaries relative to other countries, as documented in a recent OECD (2009) study, indicates that Japan's permanent disability programs are somewhat exceptional from both a recipiency and cost perspective. Take-up rates for these programs are not high nor do expenditures on these programs appear likely to escalate. The availability of other government or employer-provided programs, which might compete with long-term disability programs such as National Health Insurance, is not unusual among OECD countries. However, the lack of a test for loss of earnings in the eligibility criteria in Japan is unique.

Further analysis to help understand some of the more distinctive features found in Japan's permanent disability programs in comparison with other countries, such as the United States, could include cultural and/or socioeconomic norms and their impact on how the population views permanent disability programs. This could explain how potential applicants (and even employers) approach these programs and provide insight into the outcomes documented in this article for benefit decision and appeal processes in Japan.

Notes

Acknowledgments: The author gratefully acknowledges the invaluable assistance from many individuals while preparing this article: Koji Maruyama and Toshinobu Tsuboi (Japan Ministry of Health, Labor, and Welfare) and Junichi Sakamoto (Nomura Research Institute) for providing and confirming details about the operation of Japan's disability programs; L. Scott Muller (Office of Research, Evaluation, and Statistics, SSA) for suggesting the comparison of disability programs in Japan and the United States and then helping to validate details; and Masako Osako (executive director, International Longevity Center) for her many suggestions. Finally, this article benefited greatly from the feedback provided for the several preliminary versions from John Campbell (University of Michigan), John Turner (Pension Policy Center), and numerous SSA staff reviewers, including Eli Donkar, Susan Grad, Dalmer Hoskins, John Kearney, Barbara Kritzer, and Robert Pfaff.

[1] Before age 20, certain welfare benefits are also provided (Murakami 1985).

[2] This monthly amount will increase annually by 280 yen (US$2.79) until it reaches 16,900 yen (US$168.29) each month in 2017 (Honeycutt, Terashima, and Kohyama 2005). It should be noted that amounts are expressed in terms of 2004 yen and will be indexed to increases in the rate of gross salary per worker.

[3] The denominator of the replacement ratio is the average annual disposable income of active male workers. The corresponding calculation for the household replacement rate assumes that the husband has earned the average salary his entire life (Sakamoto 2005).

[4] These replacement rates are projected to decline gradually to 36 percent by 2023 for male employees and to about 50 percent for households by 2023 (Sakamoto 2005).

[5] For men, the earliest age to receive retirement benefits will increase by 1 year every 3 years starting in 2013 until it reaches age 65 in 2025; for women, the earliest age to receive benefits will rise by 1 year every 3 years starting in 2018 until it reaches age 65 in 2030 (Kabe 2007).

[6] The Social Insurance Agency was dissolved on January 1, 2010, and became the Japan Pension Service on that day. SIA's original role as administrator to programs for social insurance pensions and health insurance was reviewed following a series of administrative scandals. In 2005, it was decided to split the SIA into two organizations, and laws were then passed in 2007 to achieve that objective. As a consequence, those SIA departments dealing with health insurance were separated from SIA on October 1, 2008 (eWeekly Japan 2010).

[7] In 2003, 70.5 million individuals were covered under these two programs, including 32.2 million workers under the EPI, 11.2 million spouses of EPI-insured workers, and 22.4 million persons under the NP program who were self-employed, farmers, students, or others ineligible for the EPI program (Honeycutt, Terashima, and Kohyama 2005).

[8] If the person is in a disabled condition listed in the NP law at age 20, he or she can start receiving a disability pension without contributing.

[9] Cross-country comparisons of disability provisions that include Japan are indeed rare. One 12-country study (Bolderson and Gains 1993) from the United Kingdom in the early 1990s observed that Japan's eligibility criteria to receive permanent disability benefits are based almost entirely on severity of impairment.

[10] Also, the low-earner exemption from contributing into the NP program in Japan, which results in a lower benefit, does not have a corresponding category in the DI program under Social Security in the United States.

[11] This calculation uses the average monthly industrial earnings for an employee, as reported in Table G of the Japan Monthly Statistics (Japan Statistics Bureau 2009).

[12] The EPI old-age benefit formula depends on the total months of participation and the average indexed monthly earnings and bonuses. For more information see Honeycutt, Terashima, and Kohyama (2005). A very detailed presentation of the formulas involved are available from the Japan Pension Service at http://www.sia.go.jp/e/epi.html for the EPI program and at http://www.sia.go.jp/e/np.html for the NP program.

[13] When a dependent spouse reaches age 65 and receives a pension in her or his own right under the NP program, the supplement ceases (SSA 2009b).

[14] More specifically, the U.S. system offers dependents' benefits to spouses of disabled workers if they are dependent on the worker (that is, aged or have a child in care), but that is not disability coverage as understood for the EPI program in Japan. In the United States, the only Social Security disability coverage offered to spouses is for disabled widow(er)s and is paid through the Old-Age and Survivors Insurance Trust Fund, not the Disability Insurance Trust Fund.

[15] To qualify for this grant under the EPI program, eligible individuals must be evaluated for mental and intellectual disabilities to see if their impairment(s) meets the definition of 1 of 22 disability conditions (Honeycutt, Terashima, and Kohyama 2005).

[16] Receipt of a disability pension also exempts beneficiaries from paying contributions for social insurance, including pensions, health insurance, and long-term care (Honeycutt, Terashima, and Kohyama 2005).

[17] The 2004 social security reform relaxed these restrictions slightly by lifting them for those beneficiaries whose disability began before they reached age 20 and are currently detained in jail awaiting a court judgment. Such cases are unusual, however.

[18] As of August 2004, if annual income was higher than 3,984 million yen (US$36,678) for a two-person household, then benefits were reduced by 50 percent; if annual income was more than 5,001 million yen (US$46,041), then the entire benefit was suspended (Japan MHLW 2005).

[19] States may supplement the federal SSI payment, which is currently (2009) $674 for an individual and $1,011 for a couple (the spouse must also be disabled or aged 65 or older to be eligible). At present, 45 states and the District of Columbia offer state supplemental payments to at least some of their SSI recipients.

[20] The SSI program uses the same earnings-based definition of disability as the DI program.

[21] As indicated in Table 2 (note a), the Japanese and American sample differ somewhat. Self-reporting individuals in U.S. surveys are persons aged 16–64, whereas the Japanese sample includes persons aged 18 or older who reported a physical or intellectual disability and those aged 20 or older who reported a mental disability.

[22] In 2005, besides 6.5 million disabled-worker beneficiaries, 220 thousand disabled widow(er)s, and 770 thousand disabled adult children in the Unites States, the DI program also paid benefits to 1.7 million dependents of disabled workers.

[23] The proportion of the NP disability pension as a share of total NP pension expenditures is also fairly small, representing about 8 percent in 2007.

[24] Income restrictions imposed on those who became disabled before reaching age 20, as a result of the 2004 social security reform, appear to be the primary cause for the decline—at least for the NP program.

[25] In ascending order, these countries include Italy, Canada, Germany, Austria, and Denmark (OECD 2009).

[26] Traditionally, Japanese employees who enter old age (with lower productivity) formally leave their jobs, but then take a new position (often with lower pay and status) either with their original employer, a subsidiary, a new company, or they become self-employed. As a consequence, the national employment rate for persons older than age 64 in Japan is one of the highest in the world.

[27] It is assumed that the applicant has satisfied the basic eligibility requirements at this time for either the NP or EPI program, whichever is appropriate.

[28] The period in which applicants with a disability condition were required to have their application for a disability benefit determined was 2 years until 1953. This period was increased to 3 years until 1977 and then reduced to the current 1½ years at that time.

[29] Among Japan's 47 regions, there are 71 Pension Consultation Centers and 265 Social Insurance Offices.

[30] Japanese law requires all households in the country to report a variety of life events—including births, deaths, marriages, and divorces—to their local authority, which compiles such records encompassing all Japanese citizens within their jurisdiction (Japan Children's Rights Network 2007).

[31] According to Takayama (2004a), this medical check for disability qualification is usually quite strict, and cases of fraud are not usual.

[32] The waiting period starts with the first full month of disability, which is the month after the month of onset of the disabling condition, unless it occurs on the first day of the month. With few exceptions, no recipient can start to receive benefits before the completion of this waiting period.

[33] According to MHLW officials, there are no data on the number of beneficiaries who are denied benefits as a result of this medical review.

[34] This section draws exclusively on information from an unpublished document by Japan's MHLW (2008) and the article by Skoler and Zeitzer (1982).

[35] Appeals by employers or insured persons regarding the collection of contributions bypass the regional examining officer review. Instead, those appeals go directly to the Social Insurance Appeals Committee if they are made within 60 days of the original rejection notice from the MHLW. We focus on benefit appeals in this section.

[36] For more details on allowance rates at all levels of appeal, the reader should consult the Annual Statistical Report (SSA 2009a, Tables 59–64).

[37] A slight decline in the number of NP beneficiaries since 2004 appears to reflect tighter program eligibility, while the reason for a similar decline in the EPI program is not evident.

[38] For more details about the processing time involved for each level of the appeals process in the United States, see the Audit Report issued by SSA's Office of the Inspector General (SSA 2008b).

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OASDI and SSI Snapshot and SSI Monthly Statistics

Each month, the Social Security Administration's Office of Retirement and Disability Policy posts key statistics about various aspects of the Supplemental Security Income (SSI) program at http://www.socialsecurity.gov/policy. The statistics include the number of people who receive benefits, eligibility category, and average monthly payment. This issue presents SSI data for December 2008–December 2009.

The Monthly Statistical Snapshot summarizes information about Social Security and the SSI programs and provides a summary table on the trust funds. Data for December 2009 are given on pages 86–87. Trust Fund data for December 2009 are given on page 87. The more detailed SSI tables begin on page 88. Persons wanting detailed monthly OASDI information should visit the Office of the Actuary's Web site at http://www.socialsecurity.gov/OACT/ProgData/beniesQuery.html.

Monthly Statistical Snapshot

The most current edition of Tables 1–3 will always be available at http://www.socialsecurity.gov/policy/docs/quickfacts/stat_snapshot. The most current data for the trust funds (Table 4) are available at http://www.socialsecurity.gov/OACT/ProgData/funds.html.

Table 1.
Number of people receiving Social Security, Supplemental Security Income, or both, December 2009 (in thousands)

Type of beneficiary	Total	Social Security only	SSI only	Both Social Security and SSI
All beneficiaries	57,578	49,901	5,055	2,622
Aged 65 or older	37,485	35,459	891	1,135
Disabled, under age 65 [a]	12,698	7,047	4,165	1,487
Other [b]	7,395	7,395	. . .	. . .

SOURCE: Social Security Administration, Master Beneficiary Record, 100 percent data. Social Security Administration, Supplemental Security Record, 100 percent data.

NOTES: Data are for the end of the specified month. Only Social Security beneficiaries in current-payment status are included.

. . . = not applicable.

a. Includes children receiving SSI on the basis of their own disability.

b. Social Security beneficiaries who are neither aged nor disabled (for example, early retirees, young survivors).

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 2.
Social Security benefits, December 2009

Type of beneficiary	Beneficiaries		Total monthly benefits (millions of dollars)	Average monthly benefit (dollars)
	Number (thousands)	Percent		
All beneficiaries	52,523	100.0	55,906	1,064.40
Old-Age Insurance				
Retired workers	33,513	63.8	39,020	1,164.30
Spouses	2,343	4.5	1,345	574.20
Children	561	1.1	320	570.30
Survivors Insurance				
Widow(er)s and parents [a]	4,329	8.2	4,759	1,099.40
Widowed mothers and fathers [b]	160	0.3	135	841.60
Children	1,921	3.7	1,436	747.40
Disability Insurance				
Disabled workers	7,789	14.8	8,290	1,064.30
Spouses	159	0.3	46	287.10
Children	1,749	3.3	556	318.00

SOURCE: Social Security Administration, Master Beneficiary Record, 100 percent data.

NOTES: Data are for the end of the specified month. Only beneficiaries in current-payment status are included.

Some Social Security beneficiaries are entitled to more than one type of benefit. In most cases, they are dually entitled to a worker benefit and a higher spouse or widow(er) benefit. If both benefits are financed from the same trust fund, the beneficiary is usually counted only once in the statistics, as a retired-worker or a disabled-worker beneficiary, and the benefit amount recorded is the larger amount associated with the auxiliary benefit. If the benefits are paid from different trust funds the beneficiary is counted twice, and the respective benefit amounts are recorded for each type of benefit.

a. Includes nondisabled widow(er)s aged 60 or older, disabled widow(er)s aged 50 or older, and dependent parents of deceased workers aged 62 or older.

b. A widow(er) or surviving divorced parent caring for the entitled child of a deceased worker who is under age 16 or is disabled.

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Table 3.
Supplemental Security Income recipients, December 2009

Age	Recipients		Total payments [a] (millions of dollars)	Average monthly payment [b] (dollars)
	Number (thousands)	Percent		
All recipients	7,677	100.0	4,120	498.80
Under 18	1,200	15.6	749	593.10
18–64	4,451	58.0	2,549	516.50
65 or older	2,026	26.4	822	404.00

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

a. Includes retroactive payments.

b. Excludes retroactive payments.

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Table 4.
Operations of the Old-Age and Survivors Insurance and Disability Insurance Trust Funds, December 2009 (in millions of dollars)

Component	OASI	DI	Combined OASI and DI
		Receipts	
Total	$93,770	$11,705	$105,475
Net contributions	40,135	6,813	46,947
Income from taxation of benefits	13	0	13
Net interest	53,622	4,892	58,514
Payments from the general fund	0	0	0
		Expenditures	
Total	47,848	10,420	58,268
Benefit payments	47,595	10,171	57,766
Administrative expenses	253	249	502
Transfers to Railroad Retirement	0	0	0
		Assets	
At start of month	2,290,877	202,265	2,493,141
Net increase during month	45,921	1,285	47,206
At end of month	2,336,798	203,550	2,540,348

SOURCE: Data on the trust funds were accessed on February 2, 2010, on the Social Security Administration's Office of the Actuary's web site: http://www.socialsecurity.gov/OACT/ProgData/funds.html.

NOTE: Totals may not equal the sum of the components because of rounding.

Supplemental Security Income, December 2008–December 2009

The SSI Monthly Statistics are also available at http://www.socialsecurity.gov/policy/docs/statcomps/ssi_monthly/index.html.

SSI Federally Administered Payments

Awards of SSI Federally Administered Payments

Table 1.
Recipients (by type of payment), total payments, and average monthly payment, December 2008–December 2009

Month	Number of recipients				Total payments [a] (thousands of dollars)	Average monthly payment [b] (dollars)
	Total	Federal payment only	Federal payment and state supplementation	State supplementation only		
2008						
December	7,520,501	5,176,902	2,042,110	301,489	3,880,433	477.80
2009						
January	7,533,922	5,192,985	2,047,850	293,087	4,009,142	504.10
February	7,566,208	5,217,483	2,055,832	292,893	4,044,694	502.80
March	7,599,464	5,243,129	2,063,657	292,678	4,162,308	503.70
April	7,607,994	5,248,781	2,066,071	293,142	4,126,381	505.10
May	7,596,745	5,253,853	2,067,978	274,914	4,077,881	500.80
June	7,638,836	5,287,256	2,076,756	274,824	4,157,154	500.20
July	7,618,848	5,281,432	2,074,422	262,994	4,049,965	497.80
August	7,651,360	5,307,020	2,081,537	262,803	4,098,660	498.50
September	7,691,602	5,337,606	2,090,610	263,386	4,182,914	497.50
October	7,682,338	5,330,233	2,088,580	263,525	4,113,205	499.40
November	7,721,905	5,368,216	2,099,323	254,366	4,170,583	498.10
December	7,676,686	5,337,340	2,085,539	253,807	4,120,127	498.80

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

a. Includes retroactive payments.

b. Excludes retroactive payments.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 2.
Recipients, by eligibility category and age, December 2008–December 2009

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2008						
December	7,520,501	1,203,256	6,317,245	1,153,844	4,333,096	2,033,561
2009						
January	7,533,922	1,203,955	6,329,967	1,153,684	4,344,951	2,035,287
February	7,566,208	1,204,781	6,361,427	1,165,415	4,362,970	2,037,823
March	7,599,464	1,204,671	6,394,793	1,172,224	4,388,753	2,038,487
April	7,607,994	1,205,349	6,402,645	1,173,714	4,393,945	2,040,335
May	7,596,745	1,199,665	6,397,080	1,173,700	4,389,985	2,033,060
June	7,638,836	1,200,922	6,437,914	1,185,753	4,416,687	2,036,396
July	7,618,848	1,196,190	6,422,658	1,178,932	4,408,897	2,031,019
August	7,651,360	1,198,038	6,453,322	1,189,283	4,426,845	2,035,232
September	7,691,602	1,199,576	6,492,026	1,195,708	4,457,046	2,038,848
October	7,682,338	1,199,260	6,483,078	1,189,467	4,453,509	2,039,362
November	7,721,905	1,196,845	6,525,060	1,204,089	4,479,991	2,037,825
December	7,676,686	1,185,959	6,490,727	1,199,788	4,451,288	2,025,610

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 3.
Recipients of federal payment only, by eligibility category and age, December 2008–December 2009

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2008						
December	5,176,902	602,347	4,574,555	920,836	3,135,122	1,120,944
2009						
January	5,192,985	604,209	4,588,776	920,828	3,148,016	1,124,141
February	5,217,483	604,285	4,613,198	930,292	3,162,043	1,125,148
March	5,243,129	603,315	4,639,814	936,012	3,182,658	1,124,459
April	5,248,781	603,076	4,645,705	937,186	3,186,808	1,124,787
May	5,253,853	602,826	4,651,027	937,302	3,191,392	1,125,159
June	5,287,256	603,148	4,684,108	947,230	3,213,216	1,126,810
July	5,281,432	602,563	4,678,869	941,735	3,212,379	1,127,318
August	5,307,020	603,370	4,703,650	950,076	3,227,252	1,129,692
September	5,337,606	603,879	4,733,727	954,863	3,251,286	1,131,457
October	5,330,233	603,483	4,726,750	949,858	3,248,892	1,131,483
November	5,368,216	604,365	4,763,851	961,696	3,272,730	1,133,790
December	5,337,340	598,193	4,739,147	958,456	3,252,098	1,126,786

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 4.
Recipients of federal payment and state supplementation, by eligibility category and age, December 2008–December 2009

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2008						
December	2,042,110	497,841	1,544,269	230,458	1,048,077	763,575
2009						
January	2,047,850	500,080	1,547,770	230,668	1,050,539	766,643
February	2,055,832	500,584	1,555,248	233,092	1,054,940	767,800
March	2,063,657	501,483	1,562,174	234,221	1,060,209	769,227
April	2,066,071	502,230	1,563,841	234,559	1,061,010	770,502
May	2,067,978	502,842	1,565,136	234,659	1,061,666	771,653
June	2,076,756	503,900	1,572,856	236,848	1,066,521	773,387
July	2,074,422	503,892	1,570,530	235,596	1,065,209	773,617
August	2,081,537	504,927	1,576,610	237,710	1,068,414	775,413
September	2,090,610	505,832	1,584,778	239,266	1,074,273	777,071
October	2,088,580	506,003	1,582,577	238,030	1,072,970	777,580
November	2,099,323	507,214	1,592,109	240,914	1,078,682	779,727
December	2,085,539	502,433	1,583,106	239,746	1,071,361	774,432

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 5.
Recipients of state supplementation only, by eligibility category and age, December 2008–December 2009

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2008						
December	301,489	103,068	198,421	2,550	149,897	149,042
2009						
January	293,087	99,666	193,421	2,188	146,396	144,503
February	292,893	99,912	192,981	2,031	145,987	144,875
March	292,678	99,873	192,805	1,991	145,886	144,801
April	293,142	100,043	193,099	1,969	146,127	145,046
May	274,914	93,997	180,917	1,739	136,927	136,248
June	274,824	93,874	180,950	1,675	136,950	136,199
July	262,994	89,735	173,259	1,601	131,309	130,084
August	262,803	89,741	173,062	1,497	131,179	130,127
September	263,386	89,865	173,521	1,579	131,487	130,320
October	263,525	89,774	173,751	1,579	131,647	130,299
November	254,366	85,266	169,100	1,479	128,579	124,308
December	253,807	85,333	168,474	1,586	127,829	124,392

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 6.
Total payments, by eligibility category, age, and source of payment, December 2008–December 2009 (in thousands of dollars)

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			All sources			
2008						
December	3,880,433	475,880	3,404,553	684,552	2,386,554	809,328
2009						
January	4,009,142	496,179	3,512,964	718,597	2,445,116	845,429
February	4,044,694	496,670	3,548,024	727,249	2,470,398	847,048
March	4,162,308	499,779	3,662,529	747,164	2,563,702	851,443
April	4,126,381	500,346	3,626,035	741,838	2,531,720	852,824
May	4,077,881	488,153	3,589,728	738,370	2,504,478	835,033
June	4,157,154	490,264	3,666,889	752,909	2,565,843	838,401
July	4,049,965	481,411	3,568,554	734,333	2,489,436	826,197
August	4,098,660	482,682	3,615,978	747,253	2,522,549	828,858
September	4,182,914	483,759	3,699,155	756,658	2,595,105	831,151
October	4,113,205	482,769	3,630,436	746,096	2,537,059	830,051
November	4,170,583	478,621	3,691,962	761,639	2,584,118	824,826
December	4,120,127	475,505	3,644,622	749,310	2,548,839	821,978
			Federal payments			
2008						
December	3,497,759	371,512	3,126,247	665,678	2,181,608	650,473
2009						
January	3,630,829	392,284	3,238,545	699,999	2,243,606	687,225
February	3,664,119	392,537	3,271,582	708,369	2,267,299	688,451
March	3,775,713	394,882	3,380,831	727,912	2,355,990	691,811
April	3,741,381	395,105	3,346,276	722,880	2,325,840	692,660
May	3,735,175	394,849	3,340,327	723,168	2,319,309	692,698
June	3,810,543	396,524	3,414,018	737,431	2,377,672	695,440
July	3,730,693	394,870	3,335,823	720,964	2,315,836	693,893
August	3,777,800	395,886	3,381,914	733,759	2,347,927	696,114
September	3,857,447	396,737	3,460,709	742,811	2,416,630	698,005
October	3,791,682	395,942	3,395,740	732,647	2,361,874	697,160
November	3,859,618	397,861	3,461,757	748,119	2,411,145	700,355
December	3,812,757	395,498	3,417,259	736,024	2,378,352	698,381

(Continued)

Table 6.
Total payments, by eligibility category, age, and source of payment, December 2008–December 2009 (in thousands of dollars)—*Continued*

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			State supplementation			
2008						
December	382,674	104,368	278,306	18,875	204,946	158,854
2009						
January	378,313	103,895	274,418	18,599	201,511	158,204
February	380,575	104,133	276,442	18,880	203,098	158,597
March	386,595	104,897	281,698	19,252	207,711	159,632
April	385,001	105,242	279,759	18,958	205,879	160,163
May	342,706	93,305	249,401	15,202	185,169	142,335
June	346,611	93,740	252,871	15,478	188,172	142,961
July	319,272	86,541	232,731	13,369	173,600	132,303
August	320,860	86,796	234,064	13,494	174,622	132,744
September	325,467	87,022	238,445	13,847	178,474	133,146
October	321,524	86,827	234,697	13,448	175,185	132,891
November	310,965	80,760	230,205	13,520	172,973	124,471
December	307,370	80,008	227,363	13,286	170,488	123,597

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month and include retroactive payments.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 7.
Average monthly payment, by eligibility category, age, and source of payment, December 2008–December 2009 (in dollars)

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			All sources			
2008						
December	477.80	393.50	493.90	561.30	494.00	396.00
2009						
January	504.10	411.10	521.80	603.00	519.90	414.30
February	502.80	410.60	520.30	597.90	518.80	413.90
March	503.70	411.60	521.00	599.40	519.40	414.70
April	505.10	412.20	522.60	605.40	520.10	415.30
May	500.80	404.80	518.80	601.40	516.60	408.70
June	500.20	405.10	517.90	598.10	516.00	408.90
July	497.80	400.80	515.90	596.20	514.20	405.20
August	498.50	400.90	516.60	598.10	514.60	405.30
September	497.50	401.10	515.30	592.50	514.20	405.40
October	499.40	401.30	517.50	600.70	515.30	405.60
November	498.10	397.70	516.50	597.80	514.70	402.60
December	498.80	399.10	517.00	593.10	516.50	404.00
			Federal payments			
2008						
December	447.00	336.00	467.00	547.10	466.10	343.60
2009						
January	473.90	354.40	495.40	588.60	492.60	362.60
February	472.60	353.80	493.90	583.60	491.50	362.20
March	473.50	354.80	494.70	585.10	492.10	362.90
April	475.00	355.20	496.30	591.20	492.80	363.40
May	474.80	355.40	496.10	590.20	492.80	363.60
June	474.20	355.60	495.30	587.00	492.20	363.80
July	474.00	355.50	495.10	586.50	492.20	363.70
August	474.80	355.60	495.90	588.40	492.70	363.90
September	473.80	355.80	494.60	582.70	492.30	363.90
October	475.70	355.90	496.80	591.00	493.40	364.10
November	475.60	356.20	496.50	588.20	493.40	364.30
December	476.30	357.90	497.00	583.60	495.30	365.80

(Continued)

Table 7.
Average monthly payment, by eligibility category, age, and source of payment, December 2008–December 2009 (in dollars)—*Continued*

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			State supplementation			
2008						
December	156.20	172.30	150.70	76.10	159.30	172.70
2009						
January	156.00	172.20	150.40	76.00	159.00	172.50
February	155.80	172.10	150.20	75.80	158.80	172.50
March	155.90	172.30	150.20	75.80	158.80	172.60
April	155.90	172.40	150.20	75.80	158.80	172.70
May	139.50	154.80	134.30	59.80	143.40	155.20
June	139.40	154.70	134.10	59.70	143.20	155.10
July	130.40	144.50	125.60	52.30	134.80	145.10
August	130.30	144.50	125.50	52.30	134.80	145.10
September	130.20	144.40	125.40	52.30	134.60	145.10
October	130.30	144.50	125.50	52.30	134.70	145.10
November	124.90	134.80	121.60	51.30	131.30	136.20
December	125.00	135.00	121.60	51.30	131.30	136.30

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for the end of the specified month and exclude retroactive payments.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Table 8.
All awards, by eligibility category and age of awardee, December 2008–December 2009

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2008						
December	77,917	8,074	69,843	15,287	54,422	8,208
2009						
January	67,577	8,475	59,102	13,239	45,743	8,595
February	72,924	8,932	63,992	14,379	49,500	9,045
March	93,218	9,425	83,793	18,985	64,651	9,582
April	80,706	9,748	70,958	15,728	55,101	9,877
May	83,702	9,158	74,544	15,863	58,530	9,309
June	91,533	8,362	83,171	18,824	64,212	8,497
July	80,922	8,933	71,989	16,259	55,607	9,056
August	81,089	8,977	72,112	15,960	56,026	9,103
September	97,650	9,128	88,522	19,059	69,326	9,265
October	79,584	8,969	70,615	15,177	55,332	9,075
November [a]	93,420	8,923	84,497	18,253	66,090	9,077
December [a]	78,518	8,000	70,518	15,336	55,054	8,128

SOURCE: Social Security Administration, Supplemental Security Record, 100 percent data.

NOTE: Data are for all awards made during the specified month.

a. Preliminary data. In the first 2 months after their release, numbers may be adjusted to reflect returned checks.

CONTACT: Art Kahn (410) 965-0186 or ssi.monthly@ssa.gov for further information.

Perspectives—Paper Submission Guidelines

The *Social Security Bulletin* is the quarterly research journal of the Social Security Administration. It has a diverse readership of policymakers, government officials, academics, graduate and undergraduate students, business people, and other interested parties.

To promote the discussion of research questions and policy issues related to Social Security and the economic well being of the aged, the *Bulletin* welcomes submissions from researchers and analysts outside the agency for publication in its Perspectives section.

We are particularly interested in papers that:

- assess the Social Security retirement, survivors, and disability programs and the economic security of the aged;
- evaluate changing economic, demographic, health, and social factors affecting work/retirement decisions and retirement savings;
- consider the uncertainties that individuals and households face in preparing for and during retirement and the tools available to manage such uncertainties; and
- measure the changing characteristics and economic circumstances of SSI beneficiaries.

Papers should be factual and analytical, not polemical. Technical or mathematical exposition is welcome, if relevant, but findings and conclusions must be written in an accessible, nontechnical style. In addition, the relevance of the paper's conclusions to public policy should be explicitly stated.

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Authors should submit papers for consideration via e-mail to Michael V. Leonesio, Perspectives Editor, at perspectives@ssa.gov. To send your paper via regular mail, address it to:

Social Security Bulletin
Perspectives Editor
Social Security Administration
Office of Research, Evaluation, and Statistics
500 E Street, SW, 8th Floor
Washington, DC 20254-0001

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To facilitate the editorial process, papers submitted for publication must be prepared in Microsoft Word (**except for tables and charts—see below**) and be formatted as outlined below.

- **Title Page**—Papers must include a title page with the paper's title, name(s) of author(s), affiliation(s), address(es), including the name, postal address, e-mail address, telephone and fax numbers of a contact person. Any Acknowledgments paragraph should also be on this page. In the Acknowledgements, reveal the source of any financial or research support received in connection with the preparation of the paper. Because papers undergo blind review, the title page will be removed from referee copies. Eliminate all other identifying information from the rest of the paper before it is submitted. Once papers are accepted for publication, authors are responsible for reinserting self-identifying citations and references during preparation of the paper for final submission.
- **Synopsis**—For the *Bulletin's* table of contents include a separate synopsis, including the title of the paper along with one to three sentences outlining the research question.
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- **Text**—Papers should average 10,000 words, including the text, the notes, and the references (but excluding the tables and charts). Text is double-spaced, except notes and references, which are double spaced only after each entry. **Do not embed tables or charts into the text. Create separate files (in the formats outlined in "Tables/Charts" below) for the text and statistical material**. Tables should be in one file, with one table per page. Include charts in a separate file, with one chart per page.
- **End Notes**—Number notes consecutively in the text using superscripts. Only use notes for brief substantive comments, not citations. (See the *Chicago Manual of Style* for guidance on the use of citations.) All notes should be grouped together and start on a new page at the end of the paper.
- **References**—Verify each reference carefully; the references must correspond to the citations in the text. The list of references should start on a new page and be listed alphabetically by the last name of the author(s) and then by year, chronologically. Only the first author's name is inverted. List all authors' full names and avoid using *et al*. The name of each author and the title of the citation should be exactly as it appears in the original work.
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should be listed first). The sequence runs from left to right, top to bottom. The order of the notes as they appear below the tables or charts is (1) Source, (2) general notes to the table or chart, if any, and (3) letter notes.

For specific questions on formatting, use the *Chicago Manual of Style* as a guide for notes, citations, references, and table presentation.

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Questions regarding the mechanics of submitting a paper should be sent to our editorial staff via e-mail at ssb@ssa.gov. For other questions regarding submissions, please contact Michael V. Leonesio, Perspectives Editor, at perspectives@ssa.gov.

OASDI and SSI Program Rates and Limits, 2010

Old-Age, Survivors, and Disability Insurance

Tax Rates for Employers and Employees, Each [a] (percent)	
Social Security	
Old-Age and Survivors Insurance	5.30
Disability Insurance	0.90
Subtotal, Social Security	6.20
Medicare (Hospital Insurance)	1.45
Total	7.65
Maximum Taxable Earnings (dollars)	
Social Security	106,800
Medicare (Hospital Insurance)	No limit
Earnings Required for Work Credits (dollars)	
One Work Credit (One Quarter of Coverage)	1,120
Maximum of Four Credits a Year	4,480
Earnings Test Annual Exempt Amount (dollars)	
Under Full Retirement Age for Entire Year	14,160
For Months Before Reaching Full Retirement Age in Given Year	37,680
Beginning with Month Reaching Full Retirement Age	No limit
Maximum Monthly Social Security Benefit for Workers Retiring at Full Retirement Age (dollars)	2,346
Full Retirement Age	66
Cost-of-Living Adjustment (percent)	0.0

a. Self-employed persons pay a total of 15.3 percent—10.6 percent for OASI, 1.8 percent for DI, and 2.9 percent for Medicare.

Supplemental Security Income

Monthly Federal Payment Standard (dollars)	
Individual	674
Couple	1,011
Cost-of-Living Adjustment (percent)	0.0
Resource Limits (dollars)	
Individual	2,000
Couple	3,000
Monthly Income Exclusions (dollars)	
Earned Income [a]	65
Unearned Income	20
Substantial Gainful Activity (SGA) Level for the Nonblind Disabled (dollars)	1,000

a. The earned income exclusion consists of the first $65 of monthly earnings, plus one-half of remaining earnings.

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SSA Publication No. 13-11700
February 2010

www.socialsecurity.gov/policy