Social Security

Vol. 67, No. 3
2007

Social Security Bulletin

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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 op.publications@ssa.gov or by phone at [redacted].

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; $78.00 foreign. The single copy price is $13.00 domestic; $18.00 foreign. The price for single copies of the *Supplement* is $49.00 domestic; $68.00 foreign.

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Postmaster: Send address changes to *Social Security Bulletin*, 500 E Street, SW, 8th Floor, Washington, DC 20254-0001.

Social Security Bulletin

Volume 67 • Number 3 • 2007

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Social Security Bulletin

Volume 67 ● Number 3 ● 2007

Articles

Other

Trends in Mortality Differentials and Life Expectancy for Male Social Security–Covered Workers, by Socioeconomic Status

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Summary

This article presents an analysis of trends in mortality differentials and life expectancy by average relative earnings for male Social Security–covered workers aged 60 or older. Because average relative earnings are measured at the peak of the earnings distribution (ages 45–55), it is assumed that they act as a rough proxy for socioeconomic status. The historical literature reviewed in this analysis generally indicates that mortality differentials by socioeconomic status have not been constant over time. For this study, time trends are examined by observing how mortality differentials by average relative earnings have been changing over 29 years of successive birth cohorts that encompass roughly the first third of the 20th century. Deaths for these birth cohorts are observed at ages 60–89 from 1972 through 2001, encompassing roughly the last third of the 20th century. The large size and long span of death observations allow for disaggregation by age and year-of-birth groups in the estimation of mortality differentials by socioeconomic status.

This study finds a difference in both the level and the rate of change in mortality improvement over time by socioeconomic status for male Social Security–covered workers. Average relative earnings (measured as the relative average positive earnings of an individual between ages 45 and 55) are used as a proxy for adult socioeconomic status. In general, for birth cohorts spanning the years 1912–1941 (or deaths spanning the years 1972–2001 at ages 60–89), the top half of the average relative earnings distribution has experienced faster mortality improvement than has the bottom half. Specifically, male Social Security–covered workers born in 1941 who had average relative earnings in the top half of the earnings distribution and who lived to age 60 would be expected to live 5.8 more years than their counterparts in the bottom half. In contrast, among male Social Security–covered workers born in 1912 who survived to age 60, those in the top half of the earnings distribution would be expected to live only 1.2 years more than those in the bottom half.

The life expectancy estimates in this article represent one possible outcome under one set of assumptions. These projections should not be regarded as an accurate depiction of the future. Specifically, this study adopts a simple projection method in which differentials are assumed to follow the pattern observed over the last 30 years of the 20th century for the first 30 years of the 21st century. This assumption lacks theoretical underpinnings because the causes of the widening differentials observed over the past 30 years have not been determined. On the one hand, if the trend

of widening mortality differentials by year of birth observed over the past 30 years does not continue, the projection method used in this analysis could lead to an overestimation of future differences in life expectancy between socioeconomic groups. On the other hand, if mortality differentials do not narrow by age as observed in the past, the projection method used could lead to an underestimation of the differences in life expectancy between socioeconomic groups aged 60 or older.

Introduction

This article analyzes trends in mortality differentials and life expectancy for male Social Security–covered workers aged 60 or older, by average relative earnings group. Average relative earnings are measured as the average relative positive earnings of an individual between ages 45 and 55. Time trends are examined by observing how mortality differentials by average relative earnings have been changing over 29 years of successive birth cohorts of male Social Security–covered workers who encompass roughly the first third of the 20th century. Deaths for these birth cohorts are observed at ages 60–89 from 1972 through 2001, encompassing roughly the last third of the 20th century. Note that the sample is expected to be selectively healthier than the general population because of a requirement that men included in the sample have some positive earnings from ages 45 through 55. This requirement is expected to exclude some of the most at-risk members of the U.S. population because of the strong correlation between labor force participation and health.

A major contribution of this analysis is its use of a large, longitudinal data set in which deaths are observed over a span of 29 years. The large size and long span of death observations allow for disaggregation by age and year-of-birth groupings in the estimation of mortality differentials by socioeconomic status (as proxied by average relative earnings). This method of estimation has the advantage of avoiding linearity assumptions with regard to interactions between age, year of birth, and earnings category. In addition, life expectancy estimates, which do use a linearity assumption, still retain fairly low standard errors, again due to the unusually large size of the data set.[1]

From a Social Security policy perspective, differences in risk of death by socioeconomic status could have implications for the distributional outcome of policies in which longevity is an important variable. Thus, substantial heterogeneity in mortality by socioeconomic status could indicate that microsimulation modelers may wish to include differences in longevity when evaluating the distributional effects of various Social Security policy proposals. Such an inclusion would help policymakers determine whether longevity differences by socioeconomic status are large enough to have a non-negligible impact on the distributional outcome of various Social Security proposals.

Both differences in mortality differentials by socioeconomic status and trends in these differentials over time can be important in evaluating policy proposals. Mortality differentials by socioeconomic status have been documented since at least the 17th century (Antonovsky 1967). Individuals of lower socioeconomic status demonstrate greater risk of death than individuals of higher socioeconomic status. On the one hand, if the risk of death is greater for low-status individuals relative to high-status individuals but is constant across time, then these mortality differentials by socioeconomic status will show no trend over time. On the other hand, if probabilities of death for the longer-lived group decline more rapidly than for the shorter-lived group, then mortality differentials will widen over time. Conversely, if probabilities of death for the shorter-lived group decline more rapidly than for the longer-lived group, then mortality differentials will narrow over time. Mortality differentials could also narrow if probabilities of death increase for the longer-lived group while rates for the shorter-lived group decline or stagnate, or the differentials could widen if probabilities of death increase for the shorter-lived group while declining or stagnating for the longer-lived group.

The historical literature reviewed in this study generally indicates that mortality differentials by socioeconomic status have not been constant over time. If probabilities of death do not decline equally for both groups over time, then trends in average life expectancy over time can be affected by disparate group-specific rates of decline. As Keyfitz and Littman (1979, 333) point out, "In a homogeneous population the reduction [of the death rate] and the extension [of life] are equal: a drop of one per cent in the death rate is equivalent to an increase of one per cent in the expectation of life. In a heterogeneous population, on the other hand, the reduction and the extension can be very different." In addition, if declines in probabilities of death by socioeconomic groups are not constant across time, differences in patterns of heterogeneity within the populations of wealthy developed countries

could complicate models that incorporate international mortality trends into U.S. forecasts.

After a literature review, the data used in this study are described, followed by a section on the methods used to analyze the data. The findings of the study are then described, followed by a brief conclusion. This study builds on many suggestions and insights made by Duleep (1989, 349) in her discussion of the potential uses of Social Security administrative data for the monitoring of mortality differentials over time. Specifically, as recommended by Duleep, this analysis uses the Continuous Work History Sample (CWHS) to measure mortality rates over time and measures mortality rates over time by earnings percentiles.

Literature

In general, the limited evidence available for the first half of the 20th century indicates that mortality differentials by socioeconomic status narrowed sometime between 1900 and the 1930s or 1940s. More recent data covering roughly the second half of the 20th century indicate that mortality differentials by socioeconomic status have generally widened from around the 1950s or 1960s through the 1990s.

For the period covering roughly the first half of the 20th century, several researchers have conducted impressive literature reviews of studies of mortality differentials by socioeconomic status (what these authors frequently refer to as social class). Antonovsky (1967) infers from an extensive review of the available empirical data that a class gap in life expectancy emerged from 1650 to 1850, when the population in the Western world was increasing rapidly. Others argue that gaps in life expectancy existed before the 17th century; most empirical evidence of class differences only goes back to the 17th century. Opinions about when inequalities in death emerged are not in agreement (Whitehead 1997, 11–12). Antonovsky finds that inequalities began to narrow between the late 1800s and 1930, so that by the 1930s and 1940s the differential between the highest- and lowest-class groups had dropped from a 2:1 ratio to 1.4:1 or 1.3:1 (Antonovsky 1967, 38, 67). Kitagawa and Hauser (1973) report that in a Chicago area study, socioeconomic differentials under age 65 narrowed from 1930 to 1940 and then widened from 1940 to 1960. At ages 65 or older, differentials widened from 1930 to 1960. Pamuk (1985, 27) reports that "class inequality in mortality among occupied and retired adult males [in England and Wales] declined in the 1920s and that inequality increased again during the 1950s, so that, by the early 1970s it was greater than it had been in the early part of the century, both in absolute and relative terms."

Several studies in the United States have found socioeconomic mortality differentials widening since the 1960s. Feldman and others (1989, 919) studied mortality differentials by education among men aged 45–64, 65–74, and 75–84. They found that while there was little difference in mortality differentials by education for these age groups in 1960, by 1971–1984 probabilities of death had declined more for the high educated than the low educated, resulting in mortality differentials by education at these ages. Feldman and others attribute this differential decline in probabilities of death by education to differential rates of decline in deaths due to heart disease over that time period. Also of interest was that low-educated men were still at higher risk of death from heart disease than higher-educated men even after controls for cigarette smoking, systolic blood pressure, body mass index, and serum cholesterol (Feldman and others, 927). A study of British male civil servants found a similar result (Feldman and others, 928, citing Rose and Marmot 1981).

Duleep (1989) used Social Security administrative data covering the period 1973–1978 to study the change in the relationship of the mortality risk by income and education level of white men aged 25 to 64 from 1960 to the 1973–1978 period. Duleep's general conclusion was that mortality differentials by education and income had not narrowed from 1960 to the 1973–1978 period. Although Duleep does not discuss this observation in her narrative, results (Table 1, 347) are generally indicative of a slight widening of differentials over this time period. (This observation was first made by Pappas and others (1993, 107).)

Pappas and others (1993) found steeper declines in probabilities of death from 1960 to 1986 among high-educated white men than low-educated white men aged 25–64. Preston and Elo (1995) found that mortality differentials by education for white men widened at ages 25–64 and 65–74 from 1960 to the 1979–1985 period. Their study adjusted for the changing proportions of men in each education category over time. Also adjusting for the changing percentile of the population at each education level, Waldron (2004) found that mortality differentials by education widened from birth cohorts 1908 to 1931 (deaths observed in years 1973–1997) at ages 65–89 for male, retired Social Security–covered worker beneficiaries.

Outside the United States, an examination of mortality trends in socioeconomic differences in mortality from the 1981–1985 time period to the 1991–1995 period found that higher socioeconomic groups in Finland, Sweden, Norway, Denmark, England and Wales, and Italy (city of Turin only) experienced faster mortality declines than lower socioeconomic groups (Mackenbach and others 2003). Excluding the city of Turin, differential declines in cardiovascular disease mortality accounted for about half of the different rates of decline, with the remainder of the difference attributed to other causes including increasing probabilities of death for some causes. Mackenbach and others note that smoking rates have declined faster for upper socioeconomic groups in northern Europe, which may explain some of the widening differential rates of decline.

Martikainen and others (2001) studied trends in Finnish mortality declines by social class from 1971–1995 and concluded that the majority of the increases in inequality occurred in the 1980s. The authors (2001, 498) hypothesize that the introduction of new methods of treatment and prevention of cardiovascular disease benefited the upper classes more than the lower classes. They note that bypass operations were 35 percent more common among male nonmanual workers than manual workers, even though manual workers had higher morbidity (Keskimaki and others (1997), as cited in Martikainen and others (2001)). In a similar vein, White, Galen, and Chow (2003, 35) suggest that a narrowing of the mortality gap between manual and nonmanual male workers in England and Wales observed between the 1993–1996 period and the 1997–1999 period may have been due to "more equitable access to life saving procedures such as revascularization, and the effectiveness of simple treatments such as aspirin, ACE inhibitors and beta blockers given to survivors of myocardial infarction."

Socioeconomic differences in mortality due to ischemic heart disease diminished from 1971 to 1996 for urban neighborhoods in Canada, and the poorest neighborhoods (for men) experienced the greatest declines (Wilkins, Berthelot, and Ng 2002). During roughly the same time period, an area study in the United States found that male deaths attributable to cardiovascular disease declined faster from 1968 to 1998 in counties of higher socioeconomic rank (Singh and Siahpush 2002). Overall, in Canada the gap in life expectancy at birth between neighborhood income quintiles diminished between 1971 and 1996, and the probability of surviving to age 75 by income quintile remained roughly constant from 1970 to 1996.[2]

An area study comparing cancer survival in Toronto, Ontario, to that in Detroit, Michigan (both located on the Great Lakes) found low-income residents of Toronto experiencing greater survival rates than their counterparts in Detroit for 13 of 15 cancer sites, while middle- and high-income groups exhibited no survival difference by city of residence (Gory and others 1997). Within each city, Detroit residents exhibited a significant association between socioeconomic status and survival for 12 of 15 cancer sites, while Toronto residents exhibited no association for 12 of 15 sites. The authors note that both within-country disparities (for the United States) and between-country disparities occurred at the 1-year follow-up and then increased at the 5-year follow-up, which suggests a difference in both prognostic and treatment factors (Gory and others 1997, 1,160).[3]

Overall, the literature reviewed generally indicates that when mortality differentials have widened over time in the past, probabilities of death have usually fallen faster for high-status groups than for low-status groups. Preston (1996, 8–9) discusses how the discovery of the germ theory of disease in the late 1800s led to massive public health campaigns in the early 1900s on the importance of hygiene measures such as hand washing. When he compared childhood mortality by father's occupation in 1905 with that in the 1922–1924 period, the probabilities of death of professionals' children had dropped far more than the probabilities of death of laborers' children from 1905 to the 1922–1924 period. In 1895, physicians' children were very close to the national average in terms of mortality risk and 35 percent below it by 1924 (Preston 1996, 8), highlighting the fact that advancement in health practices did not affect all members of society at the same pace. Also note that mortality declined faster for higher-status individuals in spite of massive public health campaigns that were presumably targeted to all members of society.

This same pattern of public health campaigns having a greater impact on higher-status individuals was repeated in rates of smoking declines by socioeconomic status. Pampel's (2002) work on smoking diffusion describes how smoking tends to be adopted by high-status groups, spreads throughout a population, and then is eventually dropped by high-status groups when health consequences become clear, producing a widening gradient of smoking-related health problems by socioeconomic status over time.

With regard to cardiovascular disease, probabilities of death from 1980 to 2000 have generally fallen for higher-status groups more than for lower-status groups over a time period in which improvements in the treatment of cardiovascular disease occurred, a pattern observed in Finland, Sweden, Norway, Denmark, England and Wales, and the United States. However, this pattern was not observed for Canada, suggesting that these trends are not inevitable.

Given the historical evidence reviewed here, the problem for the forecaster of mortality is twofold:

- over the 20th century we have seen a period of narrowing and a period of widening of socioeconomic differentials, giving us little basis for extrapolating which way the differential will move next; and
- the length of the lags between mortality declines for high socioeconomic classes and low classes can be quite long—certainly long enough to influence mortality rates for some time into the future.

An additional problem for the forecaster is that recent research indicates that socioeconomic status in childhood can have lasting effects on adult health and that the effects of socioeconomic status on health can accumulate over the life course (Singh-Manoux and others 2004; Case, Lubotsky, and Paxson 2001; Currie and Stabile 2002; Smith and others 1997). Influences of childhood status on adult health could imply the existence of a complex cohort model in which changes in socioeconomic status over time (such as differences in real wage growth by education or skill level) could interact with the overall trend of general health improvements over the 20th century to influence the divergence of these trends by socioeconomic status. This study does not attempt to identify or disentangle these possible causal pathways.

The Data

This section discusses the death and earnings data used in the analysis. Changes in Social Security coverage over time, the composition of the sample, and the birth cohorts included in the sample are also discussed.

Death Data

The Social Security Administration's (SSA's) Continuous Work History Sample (CWHS) is a longitudinal 1 percent sample of issued Social Security numbers. The CWHS active file contains annual Social Security taxable wages from 1951 through the most recent year on the file (in this case, 2001).[4] The CWHS data used for this analysis is matched to a 1 percent sample of SSA's Numident (official death) file and a 1 percent sample of SSA's Master Beneficiary Record (MBR) file.[5] All three files provide death information for this study.[6] To be selected for the sample used for this study, an individual must have a CWHS record and a Numident record.[7] The Numident record match is required because the Numident is the primary source of death data for nonbeneficiaries, and most of the MBR's death reports are for Social Security beneficiaries. Because the sample in this study is not limited to Social Security beneficiaries, only the Numident is required for a match to the CWHS and thus inclusion in the sample used for analysis here.

Earnings Data

Earnings from ages 45 through 55 for each individual are measured relative to the national average wage that corresponds to the year the earnings are recorded in the administrative earnings records. The relative earnings are then averaged over the number of years each individual has nonzero earnings from ages 45 through 55. To avoid unintended interactions between year of birth and earnings level, the percentile of the earnings distribution in which an individual falls is based on the distribution of average nonzero relative earnings for that individual's year of birth. Zeroes are not averaged in because, over the time period that earnings are observed, the administrative earnings records do not allow one to distinguish between periods of unemployment and periods of employment with earnings not covered by Social Security. For this reason, men with no positive earnings at ages 45–55 are dropped from the sample. Approximately 15.6 percent (54,557) of men in the sample (N=294,451 or 349,008 minus 54,557) used for the cohort regression analysis are dropped because of the positive earnings requirement. Before an average of earnings from ages 45 through 55 is taken, earnings censored by the Social Security taxable maximum are imputed using a tobit regression.[8]

Changes in Social Security Coverage Over Time

The annual earnings observed for this analysis are Social Security taxable earnings. For earnings to be Social Security taxable they must come from employment that is covered by the Social Security Act. Since the passage of the Social Security Act in 1935, which only covered employees in industry and commerce (other than railroad workers) under age 65 (Myers 1993), coverage has been expanded many times.

Specifically, laws enacted in 1939, 1946, 1950, 1951, 1954, 1956, 1960, 1965, 1967, 1972, 1977, 1983, 1984, 1986, 1987, and 1994 have contained changes to covered employment provisions of the Social Security Act (SSA 2005, Table 2.A1). For changes in Social Security coverage over time to affect the trends observed in this analysis, groups entering the pool of Social Security–covered workers over time would have to be both statistically different from the existing pool of covered workers and large enough to have an impact on observed trends. In terms of size, the biggest extensions of coverage occurred under the 1950, 1954, and 1956 acts (Myers 1993, 234).

For this reason, although annual earnings are first available in a standardized form in 1951 on the CWHS file, they are first observed in 1957 for this analysis. The reason is that jumps in coverage were empirically observed from 1951 through 1956 and are likely to be related to the changes in Social Security law that brought more workers into the Social Security program during this period. Therefore, these years are dropped because of concern that differences in composition of the sample in these years could confuse the interpretation of the mortality trends.

Note, however, that several groups that were still not covered under Social Security after 1957 were then subsequently covered in later years. The biggest of these groups are probably self-employed physicians (covered by the 1965 act), newly hired employees of nonprofit organizations (covered by the 1983 act), and federal employees newly hired after 1983 (covered by the 1983 act).[9] In addition, some categories of workers are only covered if their earnings meet a statutory threshold amount. Because these threshold amounts have generally not been adjusted for wage growth over time, an increasing percentage of the workforce in these categories has moved into compulsory coverage over time. Most notably, the nonfarm self-employed must have earnings of at least $400 to be deemed self-employed and thus covered by Social Security.[10] Because this amount was set in the 1951 act, a rising proportion of the self-employed have become statutorily covered over time. In addition, farm workers and domestic workers are subject to dollar thresholds that have resulted in de facto extensions of coverage over time.[11] A further caveat is that statutory coverage and actual compliance are not always equivalent. Traditionally, compliance has been somewhat lower for domestic workers, farm workers, and the self-employed (Myers 1993, 34). Because this analysis is focused on trends over time, an additional concern could be the potential for changes in compliance in response to changes in enforcement.

A definitive determination of whether these changes in coverage over time are powerful enough to affect this analysis requires an extensive empirical study of the size and characteristics of formerly excluded groups. However, one could speculate that certain excluded groups could be expected to have higher earnings than average and that other groups could be expected to have lower earnings than average. Those with higher earnings would probably include self-employed physicians, and those with lower earnings would probably include self-employed workers with earnings below the $400 threshold, domestic workers, and farm workers. If newly covered high-earning groups have a propensity to have longer lives than those high earners already in the covered worker pool or if newly covered low-earning groups have a propensity to have shorter lives than those low earners already in the pool of covered workers, then trends in mortality differentials over time could be reflecting a shift in the composition of that pool over time. To test this hypothetical possibility, self-employment earnings were set to zero, so that changes in self-employment coverage over time were effectively neutralized. In practice, this adjustment was equivalent to limiting the analysis to wage and salary earnings only and had the effect of eliminating some, but not all, of the potential problem groups. Trends in mortality differentials over time were not found to change with this sample restriction.

Sample Composition

The sample used for this analysis is not representative of the U.S. population. The sample is expected to be selectively healthier than the general population because of the requirement that men have some positive earnings from ages 45 through 55 to be included in the sample.[12] This requirement is expected to exclude some of the most at-risk members of the U.S. population because of the strong correlation between labor force participation and health.[13] For an idea of the magnitude of the correlation between labor force participation and health, note that Rogot and others (1992) found that life expectancy at age 45 was 9 years lower for white men who were not participating in the labor force compared with those who were participating at that age.

In addition, some men may have low observable covered earnings and higher unobservable non–Social Security–covered earnings. These men would be mis-

classified as low earners in the data. It is unclear how many men are in this group, but their presence would push the mortality risk of low earners downward.

For these reasons, the results in this article may underestimate the mortality risk of men in the lowest socioeconomic group, particularly if one attempts to extrapolate these results to the entire U.S. population.

Birth Cohorts

This analysis includes birth cohorts 1912–1941. Year of birth 1912 is the earliest cohort observed because men born in 1912 were aged 45 in 1957, the first year of earnings data used in this analysis. Year of birth 1941 is the latest cohort observed because men born in 1941 were aged 60 in 2001, the last year of death data observed in this analysis. This analysis is focused on trends in mortality at older ages; thus age 60 is selected as the youngest age of death to be observed. Age 89 is the oldest age of death observed because the 1912 birth cohort was aged 89 in 2001. Future work will examine probabilities of death at younger ages.

Methods

This section discusses the methods used to produce the findings presented in this article.

Mortality Differentials, Cohort Life Expectancies, and Period Life Expectancies

The data are used to create three different but related types of estimates. First, estimates of mortality differentials disaggregated by age and year of birth over the period covered by the data are constructed. Similar but less disaggregated estimates are then extrapolated to give estimated cohort life expectancies by birth cohort and earnings. Finally, a set of period life expectancies, more finely divided by earnings than the first estimates, is constructed to allow comparison of U.S. period expectancies with estimates from other countries.

Mortality differentials measure relative differences in the timing of death between different groups. Probabilities of death for persons still alive at each particular age are used to calculate life expectancy. The major difference between the two measures is that differentials measure the mortality risk of one group relative to that of another group, whereas probabilities of death (qx in a life table) measure the level of mortality a particular group has experienced. Probabilities of death are needed to convert mortality differentials into life expectancy differences between groups, because life expectancy is a measure of remaining years of life—that is, the average length (level) of survival a particular group can be expected to experience.

Difference Between Cohort and Period Life Expectancies. This analysis presents cohort and period life expectancy estimates. A period life table is a snapshot of a population's mortality experience at a point in time. For example, a period life table for 2000 would include the probability of death for 1-year-olds in 2000 (who were born in 1999), the probability of death for 45-year-olds in 2000 (who were born in 1955), and the probability of death for 90-year-olds in 2000 (who were born in 1910). In contrast, a cohort life table follows individuals born in the same year over time. For example, a cohort table for the 2000 birth cohort would include the probability of death for 1-year-olds in 2001, the probability of death for 45-year-olds in 2045, and the probability of death for 90-year-olds in 2090. The difference between period and cohort tables is briefly illustrated below.

Age	Year of probability of death (q_x)	Year of birth
	Period table	
1	2000	1999
45	2000	1955
90	2000	1910
	Cohort table	
1	2001	2000
45	2045	2000
90	2090	2000

SOURCE: Author's calculations.

Because of expected improvements in mortality rates over time, the life expectancy estimated for the 2000 birth cohort will be higher than the period life expectancy estimated in 2000. However, the life expectancy estimated for the 2000 birth cohort is more uncertain, because it is almost entirely based on projections rather than on the currently observed data used in constructing the 2000 period life table.

Sample Frailty. Logically, a baby born in 2000 would be expected to have a higher probability of surviving to age 1 than a baby born in 1900 because of improvements in nutrition, medical care, and living conditions over the 20th century. For similar reasons, an individual aged 85 in 2015 (born in 1930) would be expected to have a higher probability of surviving to age 86 than an individual aged 85 in 1985 (born in 1900), because

the individual born later has the potential to have benefited from an additional 30 years of possible improvements in medical care and health practices.

However, the comparison of two 85-years-olds born 30 years apart is more ambiguous than the comparison of infants born 30 years apart because the sample of individuals who survive to age 85 in both cases has been subject to mortality risk from birth to age 85. Because this mortality risk occurred earlier in history for the 1900 birth cohort than for the 1930 birth cohort, the 1900 birth cohort faced higher probabilities of death at the ages between birth and 85. Thus, individuals surviving to age 85 in 1985 may have been more robust than individuals surviving to age 85 in 2015, because it was more difficult to survive to age 85 for the former group. As a result, the proportion of mortality improvement at age 85 for the 1900 birth cohort attributable to the proportion of robust individuals still alive at age 85 may be difficult to separate from the proportion of improvement attributable to other causes. Conversely, higher frailty among the age 85 population in 2015 (due to a greater probability of survival to age 85 for the whole population) could cause probabilities of death to be higher in 2015 than in 1985 for this age group, depending on whether overall mortality improvement at age 85 was large enough to overcome the decreased robustness (increased frailty) of the sample. Vaupel and Yashin (1985, 182) make a similar point.

This analysis makes no attempt to control for changes in the frailty of the sample over time. Therefore, the magnitude of sample frailty as a contributing factor to trends in mortality differentials by average relative earnings is unknown. Because changes in sample frailty are not eliminated as a possible cause of mortality trends by average relative earnings groups in this analysis, the qualitative interpretation of the results reported here is ambiguous. Theoretically, if more frail members of lower-earnings groups are making it into the sample at older ages than in the past, then they could push up mortality differentials relative to the past. Hypothetically, it is possible that widening mortality differentials can indicate improvement for the lower-earnings groups, if such widening is an indication of their survival in greater numbers to ages at which previously only the strongest amongst them survived. Vaupel, Manton, and Stallard (1979) discuss in greater detail the idea that heterogeneity can sometimes lead to underestimates of mortality declines. The authors (1979, 449) also note that because future populations will tend to be frailer than current populations due to reductions in probabilities of death by age, future mortality rates could rise unless future progress in mortality reduction counteracts the greater frailty present in the sample over time.

Regression Model

The model used to estimate mortality risk in this analysis is a discrete-time logistic regression, which is a type of survival model. Because survival time is measured in years for this analysis, the data include a large number of ties (that is, two or more events appearing to happen at the same time).[14] The discrete-time logistic regression model is equivalent to the discrete-time proportional odds model proposed by Cox when there are many ties in the data (Allison 1995, 212). The model employs the simplifying assumption that events (deaths) occur at discrete times.[15] The discrete-time logistic regression model allows for the incorporation of time-dependent variables, which for this analysis means that both age and year of birth can be included in the same regression, with age being measured as a time-dependent variable measured from the point of initial measurement until death or censoring.

Waldron (2002) compared the discrete-time logistic regression survival model used here with a complementary log-log model for continuous time. The complementary log-log model estimates an underlying Cox proportional hazards model for continuous time (Allison 1995, 212).[16] The parameter estimates and standard errors were found to be very similar between the computationally complex complementary log-log model and the more computationally efficient discrete-time logit model.

The data are set up similarly for the estimates of mortality differentials and cohort life expectancies produced in this study. The data for the estimates of period life expectancies are set up somewhat differently and are discussed when the period estimates are presented.

Specifically, for estimates of mortality differentials that are used to calculate cohort life expectancies, observations begin in the year the individual turns age 60 and end in the earlier of the year of death or the end of the observation period (2001). The dependent variable is equal to 1 in the year the worker dies and 0 in every year the worker survives. Counting all annual observations for the 294,451 individuals in the sample, there are 110,088 person-years in which a worker died and 3,356,700 person-years in which a worker survived, for a total of 3,466,788 pooled observations. The model measures the logit or log-odds of dying on

these 3,466,788 pooled observations using the maximum likelihood method of estimation.[17]

The Regression Equation for Cohort Life Expectancy Estimates. The regression equation form is as follows: dead (coded as 1 or 0) = intercept + β1(age) + β2(year of birth) + β3(age*year of birth) + β4(earnings dummy) + β5(age*earnings dummy) + β6(year of birth*earnings dummy) + β7(age*year of birth*earnings dummy) + error term. As discussed previously, this equation is estimated as a discrete-time logistic regression. The earnings dummy equals 1 if an individual's average nonzero relative earnings from age 45 to age 55 are in the bottom half of the earnings distribution for that individual's year of birth, and the earnings dummy equals 0 if an individual's average nonzero relative earnings from age 45 to age 55 are in the top half of the earnings distribution for that individual's year of birth.

The probability of death by age, year of birth, and earnings position or qx is calculated from the parameter estimates of the model. Life expectancy values are then calculated from qx values using the standard formulas for constructing a life table as described in Bell and Miller (2005). Probabilities of death are calculated from the regression coefficients for ages 60–89. After age 89, probabilities of death are grown by the rate of growth of the probabilities of death by age and year of birth projected by SSA's Office of the Chief Actuary (OCACT) based on the intermediate assumptions of the 2004 Trustees Report. Confidence intervals for the life expectancy estimates are estimated by a Monte Carlo simulation that takes 1,000 random draws from a multivariate normal distribution using the variance-covariance matrix and parameter estimates of the regression model.

The Regression Equation for Estimates of Mortality Differentials. For estimates of mortality differentials by small age and year-of-birth groupings, a similar setup is used. For example, to estimate mortality differentials for ages 60–64, observations begin in the year the individual turns age 60 and end in the earlier of the year of death or the year the individual turns age 64. The data are pooled in the same manner as described above. The regression equation form is as follows: dead (coded as 1 or 0) = intercept + β1(age) + β2(earnings dummy) + error term. The earnings dummy is identical to the one described in the previous section. A separate regression is run for each small age and year-of-birth grouping, so year of birth is not estimated separately from age and no interactions with earnings are modeled. Sample counts and detailed regression results are shown in the Appendix.

Findings

Estimates of mortality differentials over time and cohort and period life expectancies by earnings categories are presented here.

Mortality Differentials Over Time

This section examines how mortality differentials by average relative earnings category have changed over time. To estimate mortality differentials, the sample is broken into small age and year-of-birth groupings, and a regression is estimated for each group separately. This method of estimation has the advantage of avoiding linearity assumptions with regard to interactions between age, year of birth, and earnings category.[18] As is evident from the wide confidence intervals in Table 1, however, small age and year-of-birth groupings create more imprecise point estimates. Thus, one should keep in mind that the general pattern of the numbers in the table is more informative than a particular odds ratio reported in a particular cell.

In Table 1, the odds ratios measure the odds of dying for male Social Security–covered workers in the bottom half of the average relative earnings distribution, relative to male Social Security–covered workers in the top half of the average relative earnings distribution.[19] By reading down the columns by age grouping, one can observe that the greater odds of dying for men in the bottom half of the distribution have widened over time, particularly at ages 60–74. For example, at ages 60–64 the odds of dying for male Social Security–covered workers born early in the 20th century in the bottom half of the earnings distribution were 27 percent greater than for men in the top half of the earnings distribution. By birth years 1936–1938, the odds of dying were 84 percent greater for male Social Security–covered workers in the bottom half of the distribution relative to men in the top half, an increase of 57 percentage points.

By reading across the rows by years of birth groupings, one can observe a narrowing of the mortality differentials by age for birth cohorts 1912–1923. For example, for years of birth 1916–1919, the odds of dying for male Social Security–covered workers in the bottom half of the earnings distribution were 51 percent greater than for men in the top half at ages 60–64 and were statistically indistinguishable by ages 80–84.

Table 1.
Odds ratios (confidence intervals) for the bottom half of the earnings distribution relative to the top half of the distribution, by year of birth and age

Year of birth	60–64	65–69	70–74	75–79	80–84	85–89
1912–1915	1.27 (1.19–1.35) *	1.24 (1.17–1.31) *	1.20 (1.13–1.26) *	1.13 (1.07–1.19) *	1.09 (1.03–1.15) *	0.94 (0.88–1.00) **
1916–1919	1.51 (1.42–1.62) *	1.36 (1.29–1.44) *	1.34 (1.27–1.41) *	1.20 (1.14–1.27) *	1.05 (0.99–1.11)	. . .
1920–1923	1.50 (1.40–1.60) *	1.40 (1.32–1.48) *	1.34 (1.27–1.41) *	1.31 (1.24–1.38) *	. . .	. . .
1924–1927	1.51 (1.41–1.62) *	1.53 (1.44–1.63) *	1.48 (1.41–1.57) *	. . .	. . .	. . .
1928–1931	1.71 (1.59–1.84) *	1.61 (1.51–1.71) *	. . .	. . .	. . .	. . .
1932–1935	1.75 (1.62–1.89) *	1.73 (1.59–1.88) *	. . .	. . .	. . .	. . .
1936–1938	1.84 (1.68–2.03) *	. . .	. . .	. . .	. . .	. . .

SOURCE: Author's calculations on a matched 2001 Continuous Work History Sample.

NOTES: Confidence intervals are shown in parentheses.

For regressions for each age and year-of-birth group cell, dead (coded as 1 or 0) = intercept + B_1(age) + B_2(earnings dummy) + error term. Earnings dummy = 1 if average nonzero relative lifetime earnings are in the bottom half of the earnings distribution.

The odds ratios displayed in the table represent the odds of death for the bottom half of the earnings distribution relative to the top half of the earnings distribution for each cell.

* = standard error significant at the 1 percent level; ** = standard error significant at the 10 percent level.

The cells in the table that are *not* filled out help highlight the difficulty in separating age effects from cohort or period effects. By reading down the columns by age grouping, one can observe that younger ages include more birth cohorts than older ages. Thus, the difference in magnitude by age of the trend over time for the mortality differentials by earnings category could be attributed to either the biological age at which the differential is measured or the presence of younger birth cohorts in the sample at younger ages. Suppose that one simply assumes that the increased widening is caused by a cohort or period effect rather than a biological age effect. The matter still is not settled. One still does not know how much of the widening of the mortality differentials over time is attributable to changes in sample frailty as opposed to changes in the rate of change of mortality improvement over time, independent of changes in sample frailty. If the widening of the mortality differentials over time is due to less robust members of a population living to the ages observed in the sample than in the past, then the widening could represent progress for members of these less robust populations, relative to the past. Because we cannot observe frail members at older ages in the sample (they are already dead), we may not be estimating the true starting level of their life expectancy at the beginning of the sample period. It is therefore possible that sample frailty could cause one to underestimate the rate of improvement for less robust subpopulations over time. For this reason, this analysis should be regarded as a preliminary empirical look at the data. Future work on a model that incorporates sample frailty may contribute more knowledge to the appropriate qualitative interpretation of these results.

Nevertheless, given these caveats, these data indicate that the mortality risk differentials were not constant over time (where time is defined as a change over successive birth cohorts, observed by reading down the rows of Table 1), but rather have widened. Thus, setting aside the important caveat about sample frailty discussed above, a difference in both the level and the rate of change in mortality improvement over time has occurred at ages 60–79.

Cohort Life Expectancy Estimates by Earnings Category

In this article, the empirical estimates of mortality differentials by earnings group, age, and year of birth are the most certain, because these estimates are based purely on observed data. However, to create cohort life expectancies, mortality differentials by earnings group must be projected into the future. Because the causal pathways by which mortality varies with socioeconomic status are still under investigation in the literature, projections of these mortality differentials by earnings category involves a level of uncertainty greater than that associated with projections of events for which underlying causal relationships are known. Therefore, it is important to keep in mind that these cohort life expectancies represent a hypothetical possibility; many other life expectancy trajectories by earnings group are possible, and all of them depend on the path that mortality differentials by earnings take in the future.

Parameter estimates from the regression model used to estimate cohort life expectancies are converted into probabilities of death as described in the Methods section. To use probabilities of death to estimate cohort life expectancies, projections of probabilities of death are required. This is because as year of birth increases, the age at which an actual probability of death for the cohort can be observed decreases. For example, the 1941 birth cohort was only age 60 in 2001. Therefore, probabilities of death beyond age 60 must be projected for this birth cohort. In general, probabilities of death are lower for people born later in the 20th century than for people born earlier in the 20th century, because of improvements in medicine and health practices during that time period. Probabilities of death are also higher at older ages than at younger ages because the risk of death generally increases with biological age.

By estimating cohort life expectancies, one can study whether life expectancy levels can be expected to improve at different speeds for different earnings groups. Different rates of life expectancy improvement for different earnings groups could suggest that general improvements in medicine and health practices do not necessarily affect individuals of differing socioeconomic status equally. To capture such an interaction, the probability of death is modeled as being a function of age, year of birth, earnings group, and a three-way interaction of the former three variables. Note that this method is slightly different from the method used to estimate the mortality differentials reported previously. The previous method broke the sample into small age and year-of-birth groupings and estimated a regression for each group separately. This method groups all the ages and years of birth together and estimates a single regression in which the interactions between age, year of birth, and earnings are forced to be linear. The loss of detail involved in the linearity assumption was made to reduce standard errors. Without sample consolidation, probability of death levels tend to be more volatile, most likely because of the reduction in the number of death observations in each individual regression.

Because older birth cohorts are observed at older ages in the data than are younger birth cohorts, by necessity, the number of years over which life expectancy is projected increases by birth cohort. As indicated in Table 2, the 1913 birth cohort's mortality differentials by earnings group are observed at ages 60–88, while the 1941 birth cohort's differentials are only observed at age 60. Thus, life expectancy is projected from the parameter estimates of the regression model for 2002 for the 1913 birth cohort and for 2002–2030 for the 1941 birth cohort. At ages 90–119, probabilities of death for all birth cohorts are grown by the rate of growth of the probabilities of death by age and year of birth projected by SSA's Office of the Chief Actuary, based on the intermediate assumptions of the 2004 Trustees Report.

Recall that the regression model used to create the parameter estimates used for projections of probabilities of death from ages 60–89 is a discrete-time logistic regression model in the following form: dead (coded as 1 or 0) = intercept + $\beta 1$(age) + $\beta 2$(year of birth) + $\beta 3$(age*year of birth) + $\beta 4$(earnings dummy) + $\beta 5$(age*earnings dummy) + $\beta 6$(year of birth*earnings dummy) + $\beta 7$(age*year of birth*earnings dummy) + error term. The three-way interaction between age, year of birth, and the earnings dummy means that the projected probabilities of death include the narrowing of mortality differentials by age and the widening of mortality differentials by year of birth observed over the past 30 years.

Projected Cohort Survival Curves. Chart 1 illustrates survival curves (calculated from probabilities of death by age, birth cohort, and earnings position) for the oldest and youngest birth cohorts observed in the sample, by earnings group. When analyzing the survival curves it is important to remember that they incorporate the projections and accompanying assumptions described above.

In Chart 1, all birth cohort groups start out with 100,000 members at age 60. As members of each

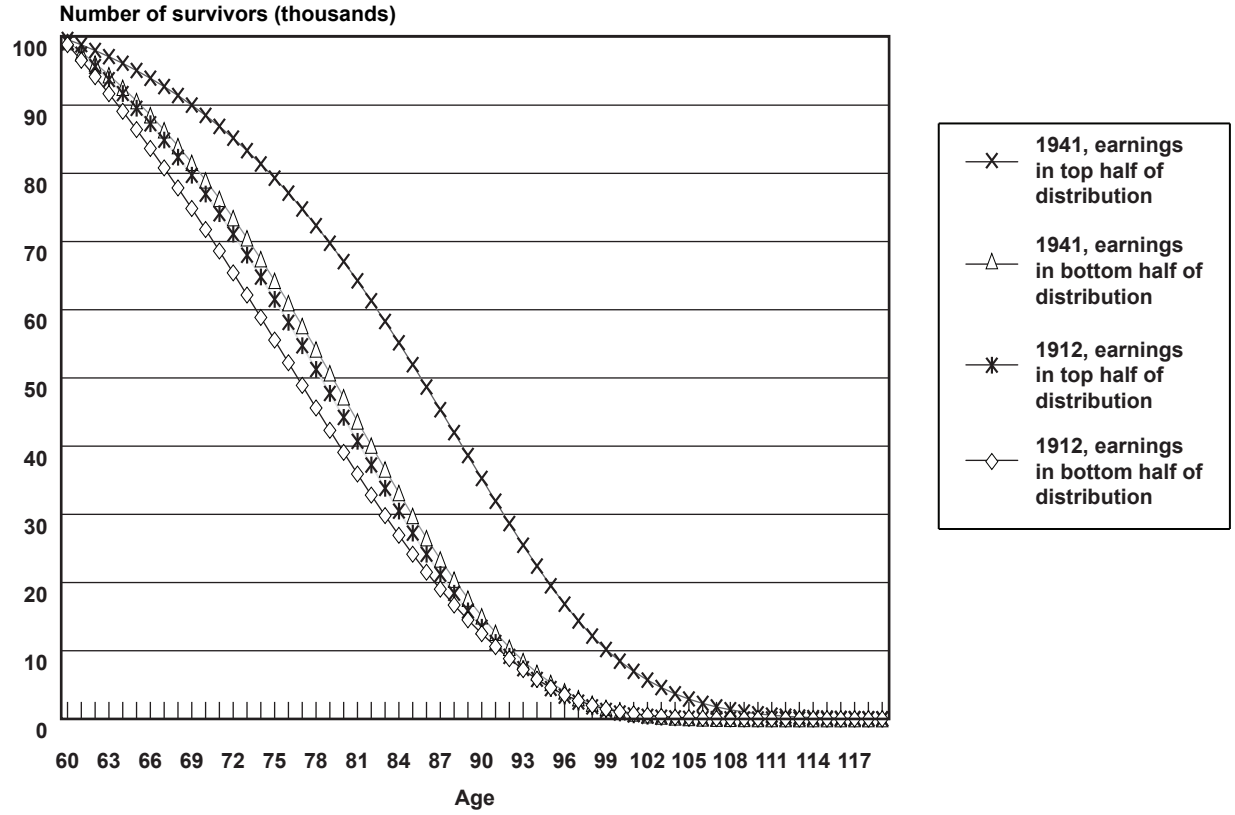
Table 2.
Range of observable data and projected data used in cohort life expectancy calculations, selected birth years 1912–1941

Year of birth	Age(s) death observed	Period(s) death observed	Period(s) earnings observed	Period(s) death projected [a]
1912	60–89	1972–2001	1957–1967	None
1913	60–88	1973–2001	1958–1968	2002
1920	60–81	1980–2001	1965–1975	2002–2009
1930	60–71	1990–2001	1975–1985	2002–2019
1941	60	2001	1986–1996	2002–2030

SOURCE: Author's calculations.

a. The years in this chart represent the years over which deaths are projected from the parameter estimates of the regression. All cohort life expectancies include projections from age 90 through age 119. See the methodology section for more details.

Chart 1.
Selected cohort survival curves for male Social Security–covered workers, by age and earnings group



SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

group age and die, the number of survivors falls, until almost no one is left at age 100 and beyond. The chart helps illustrate differences in both the change in rates of survival improvement over time between the earnings groups and in differences in the age to which a typical member of a group is likely to survive.

One way of understanding these differences is to compare the first age at which each group has less than half its members alive. In Table 3, the age at which less than half of male Social Security–covered workers in the bottom half of the earnings group were alive was 77 for the 1912 birth cohort and 80 for the 1941 birth cohort. The comparable ages for the top half of the earnings distribution were 79 for the 1912 birth cohort and 86 for the 1941 birth cohort. Thus, the age to which less than half the group is projected to survive increases by 3 years from birth year 1912 to birth year 1941 for the bottom half of the distribution and by 7 years for the top half of the distribution. This can be observed in Chart 1 as a greater shift outward in the survival curve for male Social Security–covered workers in the top half of the earnings distribution compared with men in the bottom half of the earnings distribution. The difference in levels between the two groups is also striking; by birth year 1941, the bottom half of the distribution is not projected to reach the survival age projected to be attained by the top half of the distribution by birth year 1922.

Table 3.
First age at which less than half the sample of male Social Security–covered workers is alive, by year of birth and earnings group

Earnings group	1912	1922	1932	1941
Age for bottom half of distribution	77	78	79	80
Age for top half of distribution	79	81	84	86

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

Projected Probabilities of Death by Age. Another way of understanding how the survival experience of the two groups has diverged over time is to examine how probabilities of death by age are projected to change over time for those groups. Chart 2 shows the projected percentage decrease in probabilities of death by age from birth year 1912 to birth year 1941. In general, probabilities of death for male Social Security–covered workers in the top half of the distribution are projected to be cut in half fairly evenly over the age range of the 29 birth cohorts studied. In contrast, the reduction of probabilities of death for men in the bottom half of the distribution are not projected to be even across the age range. Instead, the extent to which the bottom half lags behind the top half in mortality reduction increases as one moves up the age range.

However, recall that probabilities of death were actually lower for male Social Security–covered workers born in 1912 in the bottom half of the earnings distribution relative to the top half of the distribution at ages 85–89. It is these probabilities of death in 1912 that are being compared with projected probabilities of death in 1941. Thus, part of the sharp drop in the reduction of probabilities of death by age for the bottom half of the earnings distribution could be a reflection of sample selection for robustness (frailty), if frailty is, in fact, a valid explanation for the crossover in mortality differentials observed for birth years 1912–1915.

Projected Cohort Life Expectancies. Chart 3 converts the projected probabilities of death into cohort life expectancies by age and earnings group. Estimates of life expectancy at age 65 and the 95 percent confidence intervals surrounding these estimates for the top and bottom half of the earnings distribution for male Social Security–covered workers by selected years of birth are shown. From the chart, it is apparent that the expected years of life remaining between the two earnings groups are projected to widen over time. In addition, note that for the later birth years, confidence intervals begin to overlap and widen between birth cohorts in a particular earnings group, indicating the greater uncertainty of these estimates.

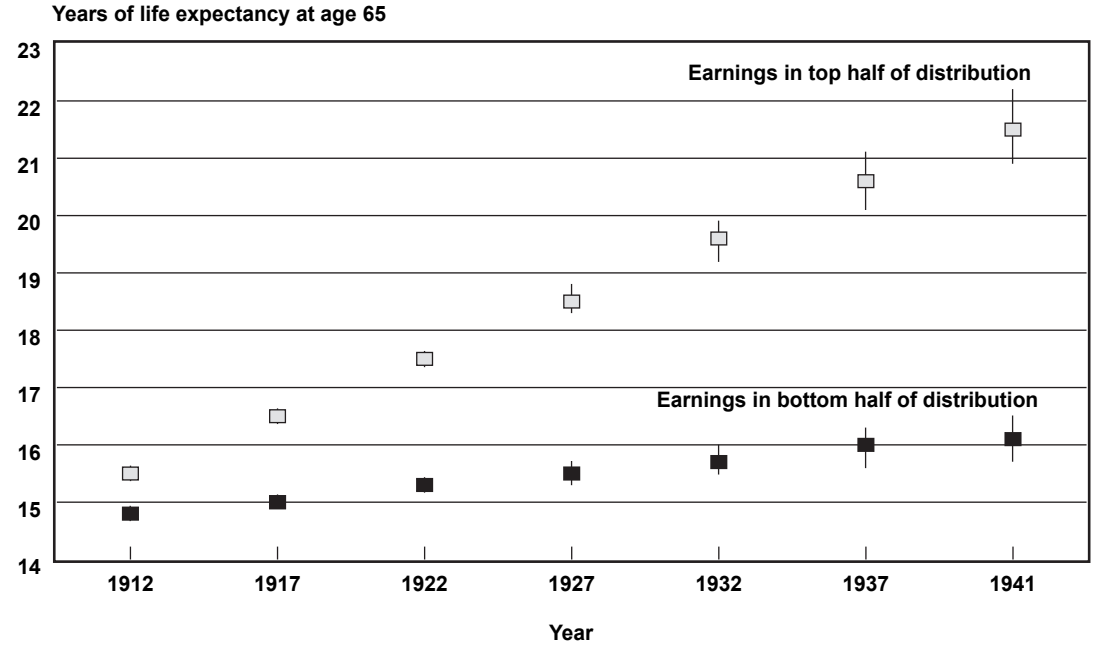
Table 4 provides a more detailed look at projected life expectancies from ages 60–90 and the projected differences between the top and bottom of the earnings distribution. For example, at age 60 and birth year 1912 only 1.2 more years of expected life separated the bottom half of the earnings distribution from the top half; by birth year 1941, that difference had increased to 5.8 years. Additionally, by reading across the rows for those projected to survive to age 60, one can see that over the 29 birth cohorts examined, the bottom half of the distribution is projected to gain 1.9 years of life (19.6 years minus 17.7 years), while the top half of the distribution is projected to gain 6.5 years of life (25.4 years minus 18.9 years). However, it is important to keep in mind that the amount of data that is projected increases with year of birth. This means that the estimate for the 1941 birth cohort

Chart 2.
Percentage change in the death rate for male Social Security–covered workers, by selected age and earnings group from birth years 1912–1941

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTE: The endpoints (years of birth 1912 and 1941) are used to calculate the percentage change.

Chart 3.
Cohort life expectancy at age 65 (and 95 percent confidence intervals) for male Social Security–covered workers, by selected birth years and earnings group



SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTE: Confidence intervals for 1912, 1917, and 1922 are so small that they are not visible on the chart.

Table 4.
Remaining years of life expectancy for male Social Security–covered workers, by earnings group, age, and year of birth

Age	1912	1917	1922	1927	1932	1937	1941
				Top half of earnings distribution			
60	18.9 (18.7–19.0)	20.0 (19.9–20.0)	21.1 (21.0–21.2)	22.2 (22.0–22.4)	23.3 (23.0–23.7)	24.5 (24.0–25.0)	25.4 (24.9–26.1)
65	15.5 (15.4–15.6)	16.5 (16.4–16.6)	17.5 (17.4–17.6)	18.5 (18.3–18.8)	19.6 (19.2–19.9)	20.6 (20.1–21.1)	21.5 (20.9–22.2)
70	12.6 (12.4–12.7)	13.4 (13.3–13.5)	14.3 (14.1–14.4)	15.2 (14.9–15.4)	16.1 (15.7–16.5)	17.0 (16.5–17.6)	17.8 (17.2–18.5)
75	10.0 (9.8–10.1)	10.7 (10.6–10.8)	11.4 (11.3–11.6)	12.2 (11.9–12.4)	13.0 (12.6–13.4)	13.8 (13.3–14.4)	14.5 (13.9–15.2)
80	7.7 (7.6–7.9)	8.3 (8.2–8.4)	9.0 (8.8–9.1)	9.6 (9.3–9.9)	10.3 (9.9–10.7)	11.0 (10.5–11.5)	11.6 (11.0–12.3)
85	5.9 (5.8–6.0)	6.4 (6.3–6.4)	6.9 (6.7–7.0)	7.4 (7.2–7.6)	8.0 (7.6–8.4)	8.5 (8.1–9.1)	9.0 (8.5–9.7)
90	4.3 (4.2–4.4)	4.7 (4.6–4.8)	5.1 (5.0–5.3)	5.6 (5.4–5.8)	6.1 (5.8–6.4)	6.6 (6.1–7.0)	7.0 (6.5–7.6)
				Bottom half of earnings distribution			
60	17.7 (17.6–17.8)	18.0 (18.0–18.1)	18.4 (18.3–18.5)	18.7 (18.6–18.9)	19.0 (18.8–19.3)	19.3 (19.0–19.6)	19.6 (19.2–20.0)
65	14.8 (14.7–14.9)	15.0 (15.0–15.1)	15.3 (15.2–15.4)	15.5 (15.3–15.7)	15.7 (15.5–16.0)	16.0 (15.6–16.3)	16.1 (15.7–16.5)
70	12.2 (12.1–12.3)	12.4 (12.3–12.4)	12.5 (12.4–12.6)	12.6 (12.5–12.8)	12.8 (12.5–13.1)	12.9 (12.6–13.3)	13.0 (12.6–13.5)
75	9.9 (9.8–10.0)	10.0 (9.9–10.1)	10.1 (10.0–10.2)	10.1 (9.9–10.3)	10.2 (9.9–10.5)	10.3 (9.9–10.7)	10.3 (9.9–10.8)
80	7.9 (7.8–8.1)	8.0 (7.9–8.1)	8.0 (7.9–8.1)	8.0 (8.0–8.2)	8.0 (7.7–8.3)	8.0 (7.6–8.4)	8.0 (7.6–8.5)
85	6.2 (6.1–6.3)	6.2 (6.1–6.3)	6.2 (6.1–6.3)	6.2 (6.0–6.4)	6.2 (6.0–6.4)	6.1 (5.8–6.5)	6.1 (5.7–6.5)
90	4.6 (4.5–4.7)	4.6 (4.6–4.7)	4.6 (4.5–4.7)	4.6 (4.4–4.8)	4.6 (4.4–4.9)	4.5 (4.2–4.8)	4.5 (4.2–4.9)
				Difference between top and bottom half of earnings distribution			
60	1.2	1.9	2.7	3.5	4.3	5.1	5.8
65	0.7	1.5	2.2	3.0	3.8	4.6	5.3
70	0.4	1.0	1.8	2.5	3.3	4.1	4.8
75	0	0.7	1.3	2.0	2.8	3.5	4.2
80	-0.2	0.4	1.0	1.6	2.3	3.0	3.5
85	-0.3	0.2	0.7	1.2	1.8	2.4	3.0
90	-0.3	0.1	0.5	1.0	1.5	2.0	2.5

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTES: The impact of the projection assumption on remaining life expectancy by earnings group increases as year of birth increases.

The 95 percent confidence intervals are shown in parentheses.

is almost entirely reliant on the assumption that the trends observed in the last 30 years of the 20th century will continue on into the first 30 years of the 21st century.

Rough Benchmark of Projected Cohort Life Expectancies. Male cohort life expectancy projections that are based on the intermediate assumptions of the 2004 Trustees Report are shown in Table 5 to provide a rough benchmark for the estimates presented in this study. In other words, the projections are intended to allow the reader to judge whether he or she considers the estimates presented in this article to be plausible or wildly off the mark.

The estimates by earnings group presented in Table 4 are not exactly centered around the benchmark presented in Table 5; instead, the bottom half of the population used for this analysis is slightly closer to the benchmark than the top half. This probably reflects the fact that the earnings sample used in this analysis is expected to be healthier than the general population because the sample of male Social Security–covered workers in the bottom half of the earnings distribution excludes zero earners (who are likely to be in the worst health).

An apparent oddity in the table is that the expected remaining years of life are actually lower in the benchmark series than in the bottom half of the sample at old ages for early birth cohorts. This could reflect both sample differences due to the nonzero and covered earnings requirements applied to the analysis sample and the fact that the projection method used in this analysis for ages 60–89 is more crude than that used by the 2004 Social Security Trustees. However, note that a comparison of the growth over time of expected remaining years of life between the top half of the earnings sample and the benchmark projections at older ages leads to the same general conclusion—that the majority of mortality improvement is projected to be concentrated in the top half of the earnings distribution. This projection is a result of the central finding of this study—that the two Social Security–covered earnings groups into which the sample is divided have not experienced the same rate of mortality improvement over time. In addition, confidence intervals around these life expectancy estimates confirm that the differential rate of mortality improvement observed and projected between the two groups is large enough that it cannot be explained by mere sample fluctuations.

Period Life Expectancy Estimates from 1999 Through 2001, by Earnings Category

In contrast to the cohort life expectancy estimates just discussed, the period life expectancy estimates produced for years 1999–2001 in this analysis are almost fully based on observed data. However, these estimates tell us little about trends over time. In addition to the less extensive projections required, the primary advantage of these period life expectancy estimates is that they are more readily comparable with international life expectancy estimates, which are more frequently available in period form. This analysis compares period life expectancy estimates by various earnings groups for U.S. male Social Security–covered workers with aggregate period life expectancy estimates for other countries belonging to the Organisation for Economic Co-operation and Development (OECD).

Table 5.
Estimates of male cohort life expectancy based on the intermediate assumptions in the 2004 Social Security Trustees Report, by age and year of birth (in years)

Age	1912	1917	1922	1927	1932	1937	1941
60	17.3	18.0	18.6	19.1	19.7	20.2	20.5
65	14.4	14.9	15.3	15.8	16.2	16.6	16.9
70	11.7	12.1	12.4	12.8	13.1	13.4	13.7
75	9.2	9.5	9.7	10.0	10.2	10.5	10.7
80	7.0	7.2	7.3	7.4	7.6	7.8	8.0
85	5.1	5.2	5.2	5.3	5.5	5.6	5.7
90	3.6	3.6	3.7	3.8	3.9	4.0	4.1

SOURCE: The life expectancies cover a different population than the Continuous Work History Sample and are calculated by the author from q_x values provided by the Office of the Chief Actuary that are based on the intermediate assumptions of the 2004 Trustees Report. See the 2004 Trustees Report for details.

For estimates of mortality risk that are used to calculate period life expectancies, observations begin at the age an individual reached in 1999 and end in the earlier of the year of death or at the age the individual reached in 2001. The dependent variable is equal to 1 in the year the worker dies and 0 in every year the worker survives. Counting all annual observations for the individuals in the CWHS sample, there are 21,607 person-years in which a worker died and 505,621 person-years in which a worker survived, for a total of 527,228 pooled observations. The model measures the logit or log-odds of dying on these 527,228 pooled observations using the maximum likelihood method of estimation.

Separate regressions are run on each male Social Security–covered earnings group subsample (the top half and bottom half of the distribution and the 0–25th, 26th–50th, 51st–75th, and 76th–100th percentiles of the average relative earnings distribution) using the same technique. Because only three adjacent ages are observed for each year of birth, each regression controls only for age, rather than for year of birth and age as in the cohort regressions. Specifically, the regression equation is in the following form: dead (coded as 1 or 0) = intercept + $\beta 1$(age) + error term.

The probabilities of death by age that are used to create the period life tables are calculated from the regression coefficients produced by each individual earnings subgroup regression through age 89, the last age observed in the sample. After age 89, probabilities of death grow by the rate of growth of the probabilities of death by age and year (period) projected by SSA's Office of the Chief Actuary (OCACT) using the intermediate assumptions of the 2004 Trustees Report.[20] Table 6 describes the data included in the regressions. Confidence intervals for the life expectancy estimates are estimated by a Monte Carlo simulation that takes 1,000 random draws from a multivariate normal distribution using the variance-covariance matrix and parameter estimates of the regression models.

Period life expectancy estimates for various CWHS male Social Security–covered worker earnings groups are displayed and compared with OCACT's life expectancies in Table 7. The last two columns of the table

Table 6.
Range of observable data used in period life expectancy calculations, selected birth years

Year of birth	Age(s) death observed	Period(s) death observed	Period(s) earnings observed
1912	87–89	1999–2001	1957–1967
1913	86–89	1999–2001	1958–1968
1920	79–81	1999–2001	1965–1975
1930	69–71	1999–2001	1975–1985
1941	60	1999–2001	1986–1996

SOURCE: Author's calculations.

Table 7.
Period life expectancy for male Social Security–covered workers, by age and earnings percentile, 1999–2001 (in years)

							Average life expectancy	
Age	0–50th	51st–100th	0–25th	26th–50th	51st–75th	76th–100th	CWHS full sample	OCACT [a]
60	18.3	20.9	18.0	18.7	20.5	21.3	19.6	19.4
	(18.2–18.4)	(20.8–21.0)	(17.8–18.1)	(18.5–18.9)	(20.3–20.7)	(21.1–21.5)	(19.5–19.7)	
65	14.9	16.7	14.7	15.0	16.5	17.0	15.8	15.8
	(14.7–14.9)	(16.6–16.9)	(14.5–14.9)	(14.9–15.2)	(16.3–16.6)	(16.9–17.2)	(15.7–15.8)	
70	11.8	13.0	11.8	11.7	12.8	13.1	12.3	12.6
	(11.7–11.9)	(12.8–13.1)	(11.7–12.0)	(11.6–11.9)	(12.7–13.0)	(12.9–13.2)	(12.3–12.4)	
75	9.1	9.6	9.3	8.9	9.6	9.6	9.4	9.7
	(9.0–9.2)	(9.5–9.7)	(9.1–9.5)	(8.8–9.1)	(9.5–9.8)	(9.5–9.8)	(9.3–9.5)	
80	6.9	6.9	7.2	6.6	7.0	6.8	6.9	7.2
	(6.8–7.0)	(6.8–7.0)	(7.0–7.4)	(6.5–6.7)	(6.8–7.2)	(6.6–6.9)	(6.9–7.0)	
85	5.1	4.8	5.5	4.8	4.9	4.6	5.0	5.2
	(5.0–5.2)	(4.7–4.9)	(5.3–5.6)	(4.6–4.9)	(4.8–5.1)	(4.5–4.7)	(4.9–5.1)	

SOURCE: Author's calculations on a matched 2001 Continuous Work History Sample.

a. Life expectancies estimated by the Social Security Administration's Office of the Chief Actuary (OCACT) are based on the intermediate assumptions of the 2004 Trustees Report and cover a different population. The estimates were calculated by the author to represent an average of life expectancies reported for 1999, 2000, and 2001. See the 2004 Trustees Report for details.

display the average of the 1999–2001 male life expectancy estimates of SSA's Office of the Chief Actuary based on the intermediate assumptions of the 2004 Trustees Report and life expectancy estimates based on the full CWHS sample. Because the CWHS sample is selectively healthier than OCACT's series (due to the positive earnings requirement), the closeness of these two samples is somewhat unexpected. Nevertheless, Table 8 indicates that, at age 60, there was a difference of 2.6 years in life expectancy between the top and bottom half and 3.3 years between the top quarter and bottom quarter of the average relative earnings distribution for male Social Security–covered workers. The magnitude of the difference in life expectancy between earnings groups generally declines with age, until at age 80 there is no difference between the top and bottom half of the earnings distribution. The result at older ages is driven by the crossover effects present in the CWHS sample at older ages as discussed in the preceding sections.

Table 8.
Difference in period life expectancy for male Social Security–covered workers, by age between selected earnings group for the period 1999–2000 (in years)

Age	Top half minus bottom half	Top quarter minus bottom quarter
60	2.6	3.3
65	1.9	2.3
70	1.2	1.3
75	0.5	0.3
80	0	-0.4
85	-0.4	-0.9

SOURCE: Author's calculations on a matched 2001 Continuous Work History Sample.

Comparison With Other OECD Countries. To explore how these period life expectancy estimates, by male Social Security–covered worker earnings groups, compare with aggregate period estimates for other OECD countries, the CWHS estimates by earnings group are included in a table of life expectancy estimates for the OECD (Table 9).[21] International trends in mortality decline are of considerable interest among demographers who have conducted research in the life expectancy projection area of the field. For example, both the 1999 and 2003 Technical Panels on Assumptions and Methods [of the Social Security Trustees Report] cited international mortality trends as a guide to future mortality trends in the United States. These technical panels were of the opinion that the United States was experiencing a temporary slowdown in its rate of mortality decline, relative to that in other advanced developed nations. These forecasters use international trends to bolster their arguments regarding future mortality declines. Demographers such as White (2002) and Oeppen and Vaupel (2002) go further by incorporating international trends in mortality into their forecasts of U.S. mortality declines.

Although a single period estimate for 2000 by position in the earnings distribution contributes very little to an understanding of comparative international trends in mortality decline over time, such an estimate is a tentative first step toward examining these international trends on a disaggregated basis. A disaggregated analysis of these trends would allow researchers to assess whether differing degrees of heterogeneity within various OECD countries could be influencing differences in aggregate rates of mortality decline between these countries. For example, both the 1999 and 2003 Technical Panels assert that it is more likely that the United States is different from other countries in terms of levels of mortality rather than rates of mortality decline. However, recall that past trends in rates of mortality decline by earnings group for male Social Security–covered workers in the United States indicate that the top and bottom half of the earnings distribution have experienced different rates of improvement across groups rather than constant rates of improvement at different levels.

Because the life expectancy estimates for the other OECD countries in Table 9 represent countrywide averages, it is particularly interesting to see whether U.S. male Social Security–covered workers in the top 25th percentile of the earnings distribution have a higher life expectancy than the average of any other OECD country.[22] A priori, one might expect such a result given the fact that many other OECD countries exhibit mortality differentials by socioeconomic status and so their countrywide averages are expected to be somewhat below their most advantaged group.

When viewing Table 9, recall that the sample analyzed here is selectively healthier than the total U.S. population (due to the positive earnings requirement) and that the CWHS sample estimates could therefore indicate a higher life expectancy than a truly representative sample. In particular, the population-wide

Table 9.
Male period life expectancy in 2000, by age and country (in years)

Country	Life expectancy	Country	Life expectancy	Country	Life expectancy
Males at age 60		***Males at age 65***		***Males at age 80***	
Iceland	22.2	Iceland	18.1	Mexico	8.7
Japan	21.4	Japan	17.5	Iceland	8.4
U.S. Social Security–covered workers (76th–100th percentile)	21.3	U.S. Social Security–covered workers (76th–100th percentile)	17.0	Japan	8.0
Switzerland	20.9	Australia	16.9	Canada	7.8
Australia	20.8	Canada	16.9	Australia	7.6
Canada	20.7	Switzerland	16.9	France	7.6
Sweden	20.7	Mexico	16.8	United States (OECD)	7.6
U.S. Social Security–covered workers (51st–75th percentile)	20.5	France	16.7	New Zealand	7.4
France	20.4	Sweden	16.7	Switzerland	7.4
Italy	20.4	Italy	16.5	Italy	7.3
New Zealand	20.3	New Zealand	16.5	Spain	7.3
Spain	20.3	Spain	16.5	U.S. Social Security–covered workers (0–25th percentile)	7.2
Mexico	20.2	U.S. Social Security–covered workers (51st–75th percentile)	16.5	United States (OCACT)	7.2
Norway	20.0	United States (OECD)	16.3	Sweden	7.1
United States (OECD)	19.9	Austria	16.0	Austria	7.0
Austria	19.7	Norway	16.0	Germany	7.0
United States (OCACT)	19.4	United States (OCACT)	15.8	U.S. Social Security–covered workers (51st–75th percentile)	7.0
Germany	19.4	Germany	15.7	United Kingdom	6.9
United Kingdom	19.4	United Kingdom	15.7	Denmark	6.8
Belgium	19.3	Belgium	15.5	U.S. Social Security–covered workers (76th–100th percentile)	6.8
Finland	19.2	Finland	15.5	Belgium	6.7
Luxembourg	19.2	Luxembourg	15.5	Norway	6.7
Netherlands	19.1	Netherlands	15.3	Finland	6.6
Portugal	19.0	Portugal	15.3	U.S. Social Security–covered workers (26th–50th percentile)	6.6
Denmark	18.9	Denmark	15.2	Luxembourg	6.5
U.S. Social Security–covered workers (26th–50th percentile)	18.7	U.S. Social Security–covered workers (26th–50th percentile)	15.0	Poland	6.5
Ireland	18.4	U.S. Social Security–covered workers (0–25th percentile)	14.7	Netherlands	6.4
U.S. Social Security–covered workers (0–25th percentile)	18.0	Ireland	14.6	Portugal	6.4
Czech Republic	17.0	Czech Republic	13.7	Czech Republic	6.1
Poland	16.7	Poland	13.6	Ireland	6.1
Slovak Republic	15.9	Slovak Republic	12.9	Slovak Republic	6.1
Turkey	15.9	Hungary	12.7	Hungary	6.0
Hungary	15.5	Turkey	12.6	Turkey	5.3

SOURCES: Organisation for Economic Co-operation and Development, OECD Health Data 2004, personal communication from the OECD Washington Center. Author's estimates for U.S. Social Security–covered workers are based on a matched 2001 Continuous Work History Sample. Estimates by the Social Security Administration's Office of the Chief Actuary (OCACT) are based on the intermediate assumptions of the 2004 Trustees Report.

NOTE: The comparisons are rough because the Continuous Work History Sample estimates represent an average from 1999 through 2001.

lowest earnings category could be below the lowest earnings category in this sample and thus place lower in the table of international rankings. In addition, note that SSA's OCACT estimates are about 6 months lower than the OECD's estimates, which may indicate a difference in the populations covered by the two agencies. It is not clear why the CWHS estimates are mainly below the OCACT estimate at age 80. One possibility is that the positive earnings requirement used in creating the CWHS sample leads to a greater divergence between OCACT's sample and the sample analyzed in this article, at older ages.

Keeping in mind these caveats, Table 9 indicates that at ages 60 and 65, male Social Security–covered workers in the bottom quarter of the earnings distribution could expect to live roughly as long as the average Irishman, while men in the top quarter of the earnings distribution could expect to live roughly as long as the average Japanese man at age 60 and roughly as long as the average Australian, Canadian, or Swiss man at age 65. It is perhaps surprising that at age 65, high-earning Social Security–covered men in the United States rank close to population-wide averages for several other countries, including their neighbor to the north, Canada. This could imply that, to the extent these countries exhibit differences in life expectancy by socioeconomic status, one might expect the top earnings group in these countries to be *above* the top earnings group in the United States. This result could have a myriad of explanations involving but not limited to differences between countries in the quality of medical care, in adverse health behaviors at high-earnings levels, and in many other factors that could potentially affect life expectancy. Another possible contributor to the interpretation of differences in life expectancy between countries could involve differences in the degree of sample selection for robustness (frailty) in various countries.

OECD Comparisons and Sample Frailty. Because the sample frailty interpretation is somewhat complicated, it is discussed in greater detail. At age 65, U.S. male Social Security–covered workers in the bottom quarter of the earnings distribution were ranked near the bottom of Western European countries in terms of life expectancy, while U.S. male Social Security–covered workers with earnings in the top quarter of the earnings distribution were ranked close to the top of Western European countries. By age 80, male Social Security–covered workers with high earnings had fallen closer to the lower middle of the Western European countries, while male Social Security–covered workers with low earnings had risen to the upper middle of the OECD rankings. In addition, at age 65, men in the bottom quarter of the distribution were expected to live 2.3 years *less* than their U.S. counterparts with earnings in the top quarter of the earnings distribution, while at age 80 they were expected to live 0.4 years *more*. One explanation for such extreme shifts in ranking by age could be that for low-earning men to live to age 80 in 2000, they would have to have had a greater than average robustness to counteract their greater disadvantage in socioeconomic terms. Hence, the frailer members of the low-earner population have died by age 80, leading low-earner men to rise in the rankings relative to populations that have been less selected in terms of health by age 80. Thus, at the other extreme, the drop in rank of U.S. male Social Security–covered workers in the top earnings category could reflect more frail individuals living to older ages in this group and hence driving up the probability of death at older ages relative to the U.S. male Social Security–covered worker low–earnings group.

If other countries experience sample selection for robustness (frailty) effects by age as the population of male Social Security–covered workers in the United States gives the appearance of doing, then international comparisons become much more complex. Each country could be experiencing different levels of selection for robustness affecting probabilities of death at different ages, depending on differing historical experiences of each country over time. The key idea is that from the cohort perspective one would have to examine changes in sample composition due to frailty in each country over the entire 20th century—rather than from the point at which the advanced developed nations experienced convergence economically (that is, the post-WWII period). Thus, the appropriate interpretation of international life expectancy rankings is not always obvious. In other words, the male populations we observe at older ages in each country could have experienced different degrees of selection for robustness—depending on the situation in a particular country at younger ages for these cohorts.[23]

A comparison of the placement of Mexico and the United States in the OECD rankings may provide an example of the potential for sample composition changes due to frailty to influence the ranking of a country at a particular age. At birth, Mexican men were expected to live 2.5 years less than U.S. men (OECD estimate not shown); at age 40, they were expected to live 0.3 years less (OECD estimate not shown), at age 60 they were expected to live

0.3 years more, at age 65 they were expected to live 0.5 years more, and at age 80 they were expected to live 1.1 years more—and were the most long-lived of all OECD men. Given the wide separation in gross domestic product (GDP) per capita between Mexico and the United States over the course of the 20th century, a possible explanation could be that less robust members of the Mexican population were less likely to live to age 80, so that by that age the Mexican population was selectively healthier and more robust than the U.S. population. Vaupel, Manton, and Stallard (1979, 450) discuss how convergence or crossovers of period mortality differentials between two heterogeneous populations "might be at least partially caused by decreases in the average frailty of a population cohort at later ages as frailer members are removed by mortality."

Conclusion

In 1973, Kitagawa and Hauser (p. 180) wrote,

> Certainly the biomedical know-how now available is either not available to the lower socioeconomic classes in the United States, or its impact, at this stage in the reduction of mortality, is relatively small compared with what could be achieved through reduction of the gap in levels of living and life styles associated with education, income, occupation, and geographic locale.

Over 30 years later, this statement would still seem to apply, although it is possible that progress for men of lower socioeconomic status is hidden by changes in sample frailty.

Regardless of the important caveat about sample frailty, it remains true that eliminating the gap in probabilities of death by socioeconomic status by lowering probabilities of death for lower-earning men would increase average male life expectancy in the United States. One important contribution of this study is to highlight that the segment of the male Social Security–covered worker population experiencing slower mortality improvement is large—that is, the entire bottom half of the population, rather than just a limited group of disadvantaged at the lowest end of the earnings distribution. This finding is consistent with research that finds that the link between socioeconomic status and health tends to be a gradient—with increases in socioeconomic status being associated with improvements in health throughout the entire distribution of socioeconomic class, rather than just being a function of extreme poverty (Pamuk and others 1998, 25). One should also recall that the sample used in this analysis is expected to be selectively healthier than the total U.S. population because of the requirement that men have some positive earnings between ages 45 and 55. The most disadvantaged members of society are probably excluded from this sample; thus it is possible that probabilities of death for the bottom half of the sample are somewhat lower relative to what they would be for a sample representative of the entire U.S. population.

The evidence presented in this article suggests that it would be prudent for forecasters to consider socioeconomic heterogeneity within the U.S. population and the likelihood of such heterogeneity continuing into the future when preparing their predictions. Unfortunately, the time period over which mortality differentials are computable is not long enough to make firm predictions based on historical data with regard to the possible future length of lags between mortality improvement for higher and lower earners. However, the length of such lags could be crucial to the outcome of projections and policies in which longevity is an important variable. Finally, because this research does not adjust for changes in sample frailty over time it should be regarded as a preliminary look at the data; the qualitative interpretation of these trends in differential mortality over time could well be more complex if the level of frailty of socioeconomic subgroups at various ages is changing over time.

Appendix

More detail is provided here on the regressions estimated for this article. Table A-1 presents sample counts and Table A-2 provides parameter estimates and standard errors for the odds ratios presented in Table 1. Table A-3 provides parameter estimates and standard errors used to estimate the cohort life expectancies presented in Table 4. Table A-4 provides parameter estimates and standard errors used to estimate the period life expectancy estimates presented in Table 7.

Table A-1.
Sample counts for men with some positive earnings from ages 45 through 55, by age group and year of birth

Year of birth	60–64	65–69	70–74	75–79	80–84	85–89
1912–1915	36,951	33,089	28,190	22,662	16,707	10,577
1916–1919	37,410	33,759	28,994	23,445	17,392	. . .
1920–1923	40,470	36,715	32,034	26,293	. . .	. . .
1924–1927	40,219	36,790	32,306	. . .	. . .	. . .
1928–1931	38,625	35,534	. . .	. . .	. . .	. . .
1932–1935	37,808	35,031	. . .	. . .	. . .	. . .
1936–1938	30,155	. . .	. . .	. . .	. . .	. . .

SOURCE: Author's tabulations using a matched 2001 Continuous Work History Sample.

NOTE: . . . = not applicable.

Table A-2.
Regression results for Table 1

Year of birth	Intercept	Age	Earnings dummy	-2Log likelihood
		Ages 60–64		
1912–1915	-7.668	0.0603	0.2357	
	(0.7156)	(0.0115)	(0.0327)	37117.83
1916–1919	-8.4233	0.0696	0.4136	
	(0.7365)	(0.0119)	(0.0341)	35510.266
1920–1923	-10.2445	0.0982	0.4027	
	(0.7285)	(0.0117)	(0.0335)	36901.038
1924–1927	-9.6752	0.0875	0.412	
	(0.7606)	(0.0122)	(0.0351)	34307.367
1928–1931	-11.1463	0.1089	0.5371	
	(0.8034)	(0.0129)	(0.0375)	31226.994
1932–1935	-9.7168	0.0842	0.5602	
	(0.8442)	(0.0136)	(0.0396)	28553.71
1936–1938	-10.333	0.0918	0.612	
	(1.0776)	(0.0174)	(0.049)	19296.989
		Ages 65–69		
1912–1915	-7.6299	0.0611	0.2163	
	(0.6897)	(0.0103)	(0.0291)	43456.37
1916–1919	-9.3568	0.0852	0.3094	
	(0.7005)	(0.0104)	(0.0296)	42684.078
1920–1923	-9.3817	0.0837	0.3363	
	(0.7056)	(0.0105)	(0.0299)	42932.774
1924–1927	-7.8657	0.0597	0.4256	
	(0.7193)	(0.0107)	(0.0307)	41502.171
1928–1931	-8.4903	0.0675	0.4733	
	(0.7561)	(0.0113)	(0.0324)	38067.181
1932–1935	-9.3037	0.0775	0.5478	
	(1.0845)	(0.0163)	(0.0419)	23685.446
		Ages 70–74		
1912–1915	-7.3666	0.0578	0.1804	
	(0.7012)	(0.00973)	(0.0275)	45654.158
1916–1919	-7.6979	0.0613	0.2891	
	(0.6998)	(0.00971)	(0.0275)	46058.959
1920–1923	-7.6789	0.06	0.29	
	(0.6872)	(0.00953)	(0.027)	48484.664
1924–1927	-8.1451	0.0649	0.3949	
	(0.6998)	(0.00971)	(0.0276	47182.178
		Ages 75–79		
1912–1915	-7.9476	0.0665	0.1222	
	(0.7288)	(0.00946)	(0.0267)	45250.984
1916–1919	-8.1345	0.0682	0.1842	
	(0.7226)	(0.00938)	(0.0265)	46216.315
1920–1923	-10.6336	0.0995	0.2675	
	(0.7361)	(0.00956)	(0.0262)	47731.564
		Ages 80–84		
1912–1915	-10.0582	0.0935	0.0844	
	(0.7774)	(0.00948)	(0.0268)	41685.831
1916–1919	-9.6895	0.0889	0.0439	
	(0.8959)	(0.011)	(0.0288)	36590.137
		Ages 85–89		
1912–1915	-9.323	0.0858	-0.0639	
	(1.2436	(0.0144)	(0.0346)	23216.484

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTES: Regression results for male Social Security–covered workers in the bottom half of the average relative earnings distribution relative to their counterparts in the top half, as presented in Table 1.

Standard errors are shown in parentheses.

Table A-3.
Regression results for Table 4, ages 60–89

Year of birth	Intercept	Age	Year of birth	Earnings dummy	Age * year of birth	Year of birth * earnings dummy	Age * earnings dummy	Age * year of birth * earnings dummy	-2Log likelihood
1912–1941	68.3626	-0.3248	-0.0404	21.6952	0.000212	-0.0107	-0.7549	0.000387	
	(15.3315)	(0.2262)	(0.00799)	(20.4953)	(0.000118)	(0.0107)	(0.3042)	-0.000159	938679.59

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTE: Standard errors are shown in parentheses.

Table A-4.
Regression results for Table 7, for male Social Security–covered workers aged 60–89 (birth years 1912–1941), by percentile of earnings distribution

Percentile of earnings distribution	Intercept	Age	-2Log likelihood
0–100th	-10.7742	0.1044	
	(0.0715)	(0.000939)	167319.25
0–50th	-9.5926	0.0905	
	(0.0885)	(0.00118)	95221.856
51st–100th	-12.3826	0.1235	
	(0.1091)	(0.00142)	74865.934
0–25th	-8.8563	0.081	
	(0.1207)	(0.00162)	49360.282
26th–50th	-10.4053	0.1010	
	(0.1304)	(0.00173)	45779.76
51st–75th	-11.6957	0.1151	
	(0.1481)	(0.00194)	39011.565
76th–100th	-13.1512	0.1329	
	(0.1615)	(0.00209)	35796.996

SOURCE: Author's calculations using a matched 2001 Continuous Work History Sample.

NOTE: Standard errors are shown in parentheses.

Notes

Acknowledgments: The author would like to thank Harriet Duleep, Lionel Deang, Susan Grad, Howard Iams, Bert Kestenbaum, Joyce Manchester, Linda Maxfield, David Pattison, Alice Wade, and Alvin Winters for their helpful comments and suggestions.

[1] Because interactions create a degree of multicollinearity between the interacted variables, they tend to increase standard errors. Thus, statistical techniques can fail to uncover interactions that exist "in nature" in samples that are simply too small for the interactions to stand out from the sample noise.

[2] Life expectancy at birth narrowed while the probability of surviving to age 75 remained constant because most of the greater reduction in probabilities of death for the lower income quintiles occurred before age 75.

[3] Results were similar when the sample was restricted to whites only in low-income areas in Detroit.

[4] The CWHS inactive file, which is not used in this analysis, contains longitudinal information, such as demographic information, for individuals who have never had an earnings report. Technically, earnings data begin in 1937. However, data appear in a different form from 1937 to 1950.

[5] A 1 percent sample of Social Security records is generally generated by taking a sample of Social Security numbers. The same criteria for selection of Social Security numbers is used for the CWHS, Numident, and MBR 1 percent samples. The 2001 CWHS, 2003 MBR, and 2003 Numident were used for this analysis.

[6] Although the Numident is the official repository of SSA death data, the MBR death data is generally considered of higher quality (Aziz and Buckler 1992). This study follows a procedure where the MBR, Numident, and CWHS are all scanned for a death report. If there is a death recorded on more than one file, the MBR date of death is taken first, the Numident second, and the CWHS third. This decision rule is organized roughly in descending order of expected accuracy. The CWHS has very few deaths recorded after 1978. Because the source of SSA's death information has changed over time (Aziz and Buckler 1992), rough experiments were conducted to assess whether the source of the death data influenced results. It was concluded that results were not sensitive to the source of the death data for this particular sample. However, these experiments were not comprehensive; a comprehensive analysis would probably require its own analysis.

[7] The Numident is the master file of assigned Social Security numbers, so, in theory, everyone with a Social Security number on the CWHS should have a Numident record. However, because of computing restraints caused by the large size of these files, the files were restricted by year of birth before they were merged. Because year of birth reports do not always match on the files (one file may receive corrections and another may not) a small number of records on the CWHS were found not to have a corresponding Numident record in the merge and were dropped.

[8] Although a tobit regression requires a normality assumption and the earnings are not distributed normally, results are unlikely to be affected by use of the tobit, because the earnings are measured in relative terms (Waldron 2004, Appendix).

[9] Because the 1983 act applied to only federal workers newly hired after December 31, 1983, and this analysis observes earnings at ages 45 through 55, most newly hired federal workers entering into coverage are probably too young to be included in this sample. Nonprofits already had fairly high rates of coverage (about 79 percent) at the time of the 1983 act (Myers 1993, 38).

[10] Technically, both nonfarm self-employed workers and farmers have a simplified reporting method allowable by law in certain low-income situations that differs slightly from the general dollar thresholds reported here. The same principle applies, however, because the dollar amounts in these procedures have not changed since 1956. See Myers (1993, 34–35) for details.

[11] The threshold for the earnings of domestic employees and domestic workers on farms was raised in the 1994 act (SSA 2005, Table 2.A1); however, this analysis observes earnings only until 1996, so the majority of the earnings are observed before this adjustment.

[12] Women are not analyzed because large changes in women's labor force participation over time imply that using women's own earnings for older cohorts could cause many women to be classified into low socioeconomic groups when they are in fact of high socioeconomic status.

[13] To be clear, the 15.6 percent of the sample dropped because of the positive earnings requirement referred to in the earnings data section should not be viewed as an approximation of the percent of the U.S. population excluded because of the positive earnings requirement. Individuals with no active CWHS records are also excluded (that is, individuals in the inactive file) as well as individuals residing in the United States for whom Social Security has no records.

[14] Year of death is the most robust unit of measurement. Month and day of death are less reliable. Greater detail in the timing of death is not really necessary for the purposes of this analysis.

[15] The implication of this assumption is that when two or more events appear to happen at the same time (that is, are tied), there is no underlying ordering; rather, the events really happened at the same time (Allison 1995, 134).

[16] The continuous time assumption implies that there is an exact ordering for tied event times but that the ordering is unknown (Allison 1995, 127).

[17] Although multiple observations are created for a single individual in the regression, the assumption of independence of observations is not violated because the factoring of the likelihood function for the data allows each term to be treated as independent (Allison 1995, 223). However, it is still true that if individuals had more than one event, the independence assumption would be violated (Allison 1995, 223), but the event measured for this analysis is death, and each individual dies only once.

[18] A nonlinear model of age, cohort, and earnings interactions estimated as a single regression runs into trouble because standard errors become too large due to the large number of dummy variables.

[19] A single dummy earnings variable that equals 1 if earnings are in the bottom half of the distribution and 0 if earnings are in the top half of the distribution is used to reduce standard errors. However, in rough experiments where dummy variables representing more detailed earnings quartiles are explored, the data show low probabilities of death for early birth cohorts in the bottom earnings quartile at older ages, and statistically significant crossover effects are observed. In other words, men in the lowest earnings quartile at older ages (older birth cohorts) have significantly *lower* odds of death than higher earners. A detailed examination of this crossover requires a frailty model. One interpretation of the data is that there is strong evidence for sample selection for robustness (frailty) operating in these older cohorts at the lowest earnings quartile. One could interpret this result as evidence of slight improvement for the lowest earnings quartile over time, if less robust members are making it into the sample at older ages than in the past, and thus pushing up the mortality differential. In addition, rough experiments indicated that men with earnings in the 25th–50th quartile of the earnings distribution—if analyzed separately—would not give the appearance of doing better relative to the upper two quartiles of the distribution. Rather, combining the bottom two quartiles into one group for this analysis gives the bottom quartile the appearance of slightly greater mortality improvement over time than it would exhibit independently.

[20] OCACT probabilities of death for years 1999, 2000, and 2001 are averaged together to obtain a series comparable with the one analyzed in this article.

[21] Note that the comparisons are rough because the CWHS estimates represent an average from 1999–2001 and the OECD estimates represent a single year (2000) estimate.

[22] Unfortunately, life tables subdivided by comparable socioeconomic categories are not available across OECD countries.

[23] For example, White (2002, 61, citing the United Nations [1952]) notes that Japanese male life expectancy at birth was thought to have dropped to 23.9 years in 1945. The Japanese cohorts supplying probabilities of death at older ages in 2000 would have been in their late teens and early twenties in 1945. From the cohort perspective, one might want to examine whether the severity of a country-specific stress such as this could differentially affect the sample composition (frailty) of these cohorts in old age relative to the countries with which Japan is compared. In addition, Japan had much lower national wealth at the beginning of the 20th century than did the United States. Links between national wealth and the nutrition and health of populations could suggest greater selection for robustness of the Japanese cohort in early childhood as well.

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Benefit Adequacy Among Elderly Social Security Retired-Worker Beneficiaries and the SSI Federal Benefit Rate

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Summary

Both target effectiveness and administrative simplicity are desirable properties in the design of minimum benefit packages for public retirement programs. The federal benefit rate (FBR) of the Supplemental Security Income (SSI) program has been proposed by some analysts as a potentially attractive basis of establishing a new minimum benefit for Social Security on both of these grounds. This type of proposal is related to a broader array of minimum benefit proposals that would establish a Social Security benefit floor based on the poverty rate.

In contrast to Social Security, the SSI program is means tested, including both an income and asset screen and also a categorical eligibility screen (the requirement to qualify as aged or disabled). The SSI FBR provides an inflation-adjusted, guaranteed income floor for aged and disabled people with low assets.

The FBR has been perceived by proponents as a minimal measure of Social Security benefit adequacy because it represents a subpoverty income level for a family of one or two depending on marital status. For this same reason it has been seen as a target-effective tool of designing a minimum Social Security benefit. An FBR-based minimum benefit has also been viewed as administratively simple to implement; the benefit can be calculated from Social Security administrative records using a completely automated electronic process. Therefore—in contrast to the SSI program itself—an FBR-based minimum benefit would incur virtually no ongoing administrative costs, would not require a separate application for a means-tested program, and would avoid the perception of welfare stigma.

While these ideas have been discussed in the literature and among policymakers in the United States over the years, and similar proposals have been considered or implemented in several foreign countries, there have been no previous analyses measuring the size of the potentially affected beneficiary population. Nor has there been any systematic assessment of the FBR as a measure of benefit adequacy or the tradeoffs between potential target effectiveness and administrative simplicity.

Based on a series of simulations, we assess the FBR as a potential foundation for minimum Social Security benefits and we examine the tradeoffs between administrative simplicity and target effectiveness using microdata from the 1996 panel of the Survey of Income and Program Participation (SIPP). Our empirical analysis is limited to Social Security retired-worker beneficiaries aged 65 or older. We start with the assessment of the FBR as a measure of benefit adequacy. We are particularly concerned about two types of error: (1) incorrectly identifying some Social Security beneficiaries

as "economically vulnerable," and (2) incorrectly identifying others as "not economically vulnerable." Operationally we measure economic vulnerability by two alternative standards. One of our measures considers beneficiaries with family income below the official poverty threshold as vulnerable. Our second measure is more restrictive; it uses a family income threshold equal to 75 percent of the official poverty threshold.

We find that a substantial minority of retired workers have Social Security benefits below the FBR. The results also show that the FBR-based measure of Social Security benefit adequacy is very imprecise in terms of identifying economically vulnerable people. We estimate that the vast majority of beneficiaries with Social Security benefits below the FBR are not economically vulnerable. Conversely, an FBR-level Social Security benefit threshold fails to identify some beneficiaries who are economically vulnerable. Thus an FBR-level minimum benefit would be poorly targeted in terms of both types of errors we are concerned about. An FBR-level minimum benefit would provide minimum Social Security benefits to many people who are clearly not poor. Conversely, an FBR-level minimum benefit would not provide any income relief to some who are poor. The administrative simplicity behind these screening errors also results in additional program cost that may be perceived as substantial. We estimate that an FBR-level minimum benefit would increase aggregate program cost for retired workers aged 65 or older by roughly 2 percent.

There are two fundamental reasons for these findings. First, the concept of an FBR-level minimum benefit looks at the individual or married couple in artificial isolation; however, the family is the main consumption unit in our society. The income of an unmarried partner or family members other than a married spouse is ignored. Second, individuals and couples may also have income from sources other than Social Security or SSI, which is also ignored by a simple FBR-based minimum benefit concept.

The substantial empirical magnitude of measurement error arising from these conceptual simplifications naturally leads to the assessment of the tradeoff between target effectiveness and administrative simplicity. To facilitate this analysis, we simulate the potential effect of alternative screening methods designed to increase target effectiveness; while reducing program cost, such alternatives also may increase administrative complexity. For example, considering the combined Social Security benefit of a married couple (rather than looking at the husband and wife in isolation) might substantially increase target effectiveness with a relatively small increase in administrative complexity. Adding a family income screen might increase administrative complexity to a greater degree, but also would increase target effectiveness dramatically. The results also suggest that at some point adding new screens—such as a comprehensive asset test—may drastically increase administrative complexity with diminishing returns in terms of increased target effectiveness and reduced program cost.

Whether a broad-based minimum benefit concept that is not tied to previous work experience is perceived by policymakers as desirable or not may depend on several factors not addressed in this article. However, to the extent that this type of minimum benefit design is regarded as potentially desirable, the tradeoffs between administrative simplicity and target effectiveness need to be considered.

Introduction

The Supplemental Security Income (SSI) program's monthly income guarantee—the federal benefit rate (FBR)—has entered policy discussions of the adequacy of benefits for Social Security beneficiaries in two ways. First, it has been described as one possible standard to judge the adequacy of the benefits provided by the Old-Age and Survivors Insurance (OASI) program. Second, the FBR is the basis of some Social Security minimum benefit proposals.

Thompson (2004) describes the federal SSI guarantee for a single individual as one of several adequacy benchmarks. The various benchmarks Thompson discusses—such as the poverty line for a single individual or the minimum wage—differ in their generosity and rationale. In contrast to the poverty line, the FBR may be seen as an appealing standard of adequacy because it represents an existing income guarantee for the elderly, as opposed to a measurement tool. In addition, Social Security benefit amounts can be directly observed in administrative records, while establishing family poverty status requires survey interview or other data. However, while the poverty measure considers the family as the unit of measurement and accounts for all sources of income, using the FBR as a measure of Social Security benefit adequacy limits the analysis to Social Security benefits and, thus, ignores all other sources of income. Further, when using the FBR, the focus of the analysis becomes the Social Security benefits of the individual and his or her possible spouse, and it moves away from the income of

the family, which is the principal consumption unit in our society.

The minimum benefit is not a new concept in Social Security policy. A broadly applicable minimum benefit was established by the 1939 Amendments to the Social Security Act. Subsequently it has been criticized as insufficiently targeted and was eventually eliminated by the 1981 amendments. A more targeted, "special" minimum benefit was established by the 1972 amendments, but it affected only a small and diminishing group of beneficiaries (Olsen and Hoffmeyer 2001/2002).[1] In fact, Feinstein (2000) estimates that it will be impossible for anyone who becomes entitled to Social Security benefits in 2013 or later to receive the special minimum. Major Social Security reform proposals such as Kolbe-Stenholm, H.R. 1793 (1999), Graham, S. 1878 (2003), and the minimum benefit provisions of Models 2 and 3 of the President's Commission to Strengthen Social Security (2001) also target low earners with long-term attachment to the labor force.[2] The application of the SSI FBR as a potential tool in establishing a Social Security minimum benefit is relatively new to policy discussions.

The proposal to establish a Social Security minimum benefit at the FBR level (Herd 2005) is related to a broader array of less-targeted minimum benefit proposals that would establish a Social Security benefit floor based on the poverty rate or some multiple thereof, with little or no conditioning on prior earnings history (McGarry 2000; Wasow 2004; Smeeding 1999; Smeeding and Weaver 2002).[3] The "Resident Minimum" proposal (Herd 2005) is universal and guarantees a flat benefit set at the federal SSI level for all elderly residents of the United States. The minimum benefit scenario analyzed by McGarry (2000) is also universal, but sets the minimum at the poverty line. The "Senior Income Guarantee" proposal (Smeeding and Weaver 2002) provides a minimum benefit guarantee of 75 percent of the poverty line and would provide benefits to all Social Security beneficiaries at or above the normal retirement age. Wasow (2004) proposes a "New Minimum Social Security Benefit" that would provide a Social Security benefit guarantee at the poverty line for households of retirees who receive at least 75 percent of their income from Social Security.[4] According to a recent review (OECD 2007), minimum pensions play some role in almost half (14 of 30) of the "first tier" of public pension systems in Organisation for Economic Co-operation and Development (OECD) countries. The appropriate roles of more universalistic minimum benefits versus means-tested pension system components are widely discussed among experts in the developed world. In contrast to the United States, some OECD countries have substantial present or past experience with universalistic minimum benefit components in their public pension systems.

In 2005, the monthly SSI FBR was $579 for individuals and $869 for couples.[5] The effective level was slightly higher for Social Security beneficiaries ($599 and $889, respectively) because the first $20 of Social Security or other income is exempted from the SSI payment calculation. The poverty threshold for a one-person family with a householder aged 65 or older with no children was $9,367 per year in 2005. The corresponding figure for a two-person family with an elderly householder was $11,805. These thresholds are higher than the annualized effective SSI FBR of $7,188 for an individual (a monthly benefit of $579 plus $20 multiplied by 12) and $10,668 for a couple in the same year (a monthly benefit of $869 plus $20 times 12). The effective FBR amounts to roughly between 77 percent and 90 percent of the applicable poverty threshold for one- and two-person elderly families. Both the FBR and the official poverty threshold are indexed to inflation. The FBR increases with the same automatic cost-of-living adjustment (COLA) that is applied to Social Security benefits each January.[6]

The FBR may be a potentially attractive tool for designing a minimum benefit because of its promise to avoid some perceived drawbacks of alternative approaches. In contrast to minimum benefit provisions that are conditional on substantial work experience, an FBR-level minimum OASI benefit guarantee could be applied to all elderly OASI beneficiaries.[7] Compared with minimum benefit approaches that are similar to the existing SSI program, the OASI minimum benefit would be an administratively simple way of reaching the targeted OASI beneficiaries without the imposition of a resource test. Yet, a minimum benefit based on the FBR may not be as target efficient as minimum benefits based on other approaches. Further, it may be less cost effective. This article presents evidence relevant to the tradeoffs between administrative simplicity, target efficiency, and program cost.

The analysis here provides empirical data necessary to assess (1) the usefulness of the SSI FBR as a measure of Social Security benefit adequacy, and (2) minimum benefit proposals that focus on the provision of FBR-level minimum Social Security benefits. Administrative simplicity is part of the appeal of this approach; the information necessary to measure ben-

efit adequacy and to administer the proposed minimum benefit would be available from administrative records. This simplicity, however, may result in error in classifying beneficiaries by economic vulnerability. We are particularly concerned about two types of classification error: (1) incorrectly *screening in* those who are not economically vulnerable, and (2) incorrectly *screening out* those who are economically vulnerable.[8]

Although there have been discussions on these issues in the literature and among policymakers, no reliable data have been published about the proportion of elderly retired-worker beneficiaries with benefits below the FBR, and no estimates are available to assess the target efficiency of FBR-related minimum benefit proposals. Without such information it is difficult to assess complex tradeoffs involving administrative simplicity, distributional outcomes, and program cost. This study intends to fill this information gap, but does not attempt to judge the policy merits of specific reform proposals.

The rest of the article is organized as follows. First we briefly describe the data and methodology for the empirical analysis, and then provide information on the prevalence of Social Security benefits below the effective FBR among elderly retired-worker beneficiaries. What follows is an analysis of SSI participation among elderly retired-worker beneficiaries with Social Security benefits below the effective FBR. Next we determine the quality of the FBR as a yardstick in assessing the adequacy of benefits using family income relative to the poverty threshold as the measure of economic well-being. In the section that follows, we assess the tradeoffs between administrative simplicity and effective targeting, and finally we conclude by discussing areas for potential future research.

Data and Methodology

The source of data for this study is the 1996 panel of the Survey of Income and Program Participation (SIPP) matched to Social Security administrative records. The sample universe here is limited to Social Security retired-worker beneficiaries aged 65 or older in the United States' noninstitutional population in November 1996. The institutional segment of the elderly population (for example, those in nursing homes) are not included in our empirical estimates. Beneficiaries are defined on the basis of Social Security participation (current-pay status) as reflected in records matched to the SIPP from the Social Security Administration's (SSA's) Master Beneficiary Record (MBR). In this article, "retired-worker beneficiary" is defined as a fully insured Social Security beneficiary who receives benefits as a result of his or her own earnings record. Former disabled workers who automatically converted to OASI at the full retirement age are included in this definition of retired-worker beneficiary. Only retired workers are counted as reference persons in our individual-level analysis file; other OASI beneficiaries (such as dependents and survivors) are excluded from the sample frame.[9]

Our study methodology is based on the Office of Retirement and Disability Policy's Financial Eligibility Model (FEM). The FEM is a static simulation model focusing on SSI financial eligibility, participation, and the assessment of various SSI policy options. The key elements of the FEM are described in Davies and others (2002). The basic structure of the FEM is similar to the SSI model that has been developed by McGarry (1996, 2000), except that the FEM utilizes administrative records matched to the survey data and contains a more detailed algorithm to establish SSI financial eligibility. This study extends the application of the FEM to the measurement of Social Security benefit adequacy and the assessment of OASI minimum benefit proposals.

We briefly describe some key elements of the FEM below as we applied them to the subject of this study. A key element of the FEM is a financial eligibility calculator that estimates potential SSI income and resource eligibility for any sample member regardless of actual program participation.[10] The eligibility calculator is based on detailed SSI income and asset eligibility rules applied to survey data on income and assets reported in the SIPP. For those deemed financially eligible for SSI, the FEM calculates expected (hypothetical) federal SSI payments based on the applicable FBR (individual or couple unit) and countable income from the SIPP.[11]

In this study we establish potential financial eligibility for "FBR-level" minimum Social Security benefits with some appropriate modifications. Since up to $20 of Social Security income can be excluded from countable income, we define an "effective" FBR measure, derived simply by adding $20 to the applicable SSI FBR.[12]

We define a retired-worker "unit" as a retired worker without a spouse present (individual unit) or a retired worker with a spouse present (couple unit). If both spouses are aged 65 or older, this is identical to the SSI unit concept. If there is a nonelderly spouse, the SSI determination of whether to apply the individual or couple FBR is more complicated. A sensitiv-

ity analysis indicated that the inclusion or exclusion of retired workers with a nonelderly spouse makes very little difference in the estimates. Thus, we include the spouses of all Social Security retired-worker beneficiaries aged 65 or older, if any, without regard to the age of the spouse.

For each individual in the sample, we calculate both an "effective individual FBR" and an "effective unit FBR." The effective individual FBR concept applies to each individual in the sample regardless of the presence of a spouse. The effective unit FBR concept is equal to the individual SSI FBR plus $20 for sample members without a spouse present and the couple SSI FBR plus $20 for those with a spouse present. By comparing the monthly retired-worker benefit recorded in the MBR to one of these "effective FBR" thresholds, one can establish whether a sample member has Social Security benefits below or above the FBR.

These measures in conjunction with other data on beneficiary characteristics reported in the SIPP are then used to assess benefit adequacy and tradeoffs between administrative complexity, distributional outcomes, and potential program cost. In comparing various outcomes of interest, we focus on patterns and magnitudes of substantive importance. However, we also provide standard error estimates to facilitate the calculation of confidence intervals or to perform simple tests of differences in means that may be of interest to some readers.[13] We do not model behavioral responses to alternative policy options—a simplification that is probably more reasonable for the benefit-claiming behavior of retired-worker beneficiaries beyond the full retirement age than would be the case for some other beneficiary groups such as disabled workers or early retirees.[14]

Prevalence of Social Security Benefits Below the Effective FBR Among Elderly Social Security Retired-Worker Beneficiaries

In order to provide an empirical estimate, one needs to deal with an ambiguity. As noted earlier, the SSI program distinguishes between two kinds of units—"individuals" and "couples." In order to account for economies of scale in consumption, the individual FBR is set at about two-thirds of the couple FBR. Are we to apply the individual FBR to the OASI benefits of the retired worker regardless of the presence or absence of a spouse, or should we apply the couple FBR to the combined benefits of the retired worker and spouse for married couples? The answer to this question has substantial effects on the estimates (see Table 1). When the individual FBR is applied to the individual benefit amount of the retired worker, we find that approximately one-fourth (23 percent) of retired workers have benefits below the FBR.[15] However, when the unit concept is used, the proportion drops to 15 percent.

The difference, of course, is attributable to married couples. Using the individual FBR, we see that about a quarter (25 percent) of married elderly retired-worker Social Security beneficiaries appear to have Social Security benefits below the FBR, while the consideration of the husband's and wife's combined Social Security benefits against the couple FBR cuts this estimate by more than half, to 12 percent. The relative position of the two groups is reversed as well. Using the "individual" concept would make the Social Security benefits of married retired workers look relatively inadequate. In contrast, when the unit concept is used, the results are consistent with the generally accepted notion of greater economic vulnerability of the single elderly person.

Table 1.
Percentage of Social Security retired-worker beneficiaries aged 65 or older with Social Security benefits below the effective SSI federal benefit rate

Measure	Single	Married	All
OASI benefit below effective *individual* FBR [a]	19.3	25.2	22.6
	(0.7)	(0.7)	(0.5)
OASI benefit below effective *unit* FBR [a]	19.3	12.1	15.2
	(0.7)	(0.5)	(0.4)
N	2,966	3,700	6,666

SOURCES: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: Standard error estimates (in parentheses) reflect the assumption of simple random sampling. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

SSI = Supplemental Security Income; OASI = Old-Age and Survivors Insurance; FBR = federal benefit rate; N = the unweighted count of the number of observations for the denominator of the estimated percentages; SIPP = Survey of Income and Program Participation.

a. The effective FBR (for individual or unit) equals the applicable FBR plus $20 to account for the exclusion of up to $20 from any source, including Social Security, in the benefit calculation.

Although policy discussions of applying the SSI FBR to the measurement of the adequacy of Social Security benefits are often unclear about the proposed use of the individual or couple FBR, the empirical differences are substantial. In the next two sections we will use the unit concept because it appears to provide a more reasonable measure of "adequacy." Later we revisit the relationship between the two measures of benefit adequacy as potential screening variables in establishing a Social Security minimum benefit.

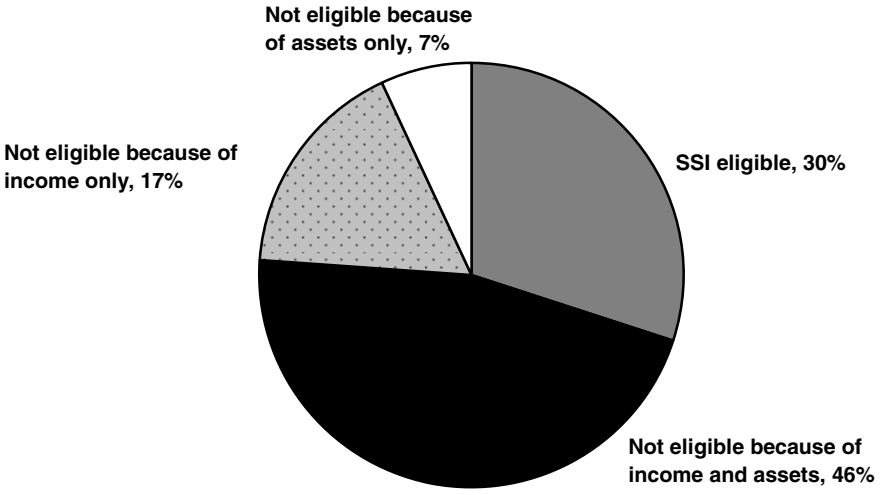
SSI Participation Among Elderly Social Security Retired-Worker Beneficiaries with Social Security Benefits Below the Effective Unit FBR

What is the extent of SSI participation among elderly retired-worker beneficiaries with Social Security benefits below the effective unit SSI FBR? Overall, only about 20 percent of elderly retired-worker beneficiaries with Social Security benefits below the effective unit FBR participate in the SSI program.[16]

What are the reasons for SSI nonparticipation? The main reason for nonparticipation is the lack of SSI financial eligibility. As Chart 1 shows, we estimate that only about 30 percent of elderly retired-worker beneficiaries with Social Security benefits below the unit FBR are financially eligible for SSI. This amounts to 4.7 percent of all Social Security retired-worker beneficiaries aged 65 or older.[17] All elderly persons are categorically eligible for SSI, but applicants also need to meet an income and asset test. Almost half of all beneficiaries with below-FBR Social Security benefits (46 percent) fail to meet both the income and asset screens. An additional 17 percent meet the asset test but have incomes that are too high to qualify for SSI, while a smaller group of 7 percent meet the income screen but have countable assets above the asset threshold. Another way to look at these numbers is to observe that the majority of Social Security beneficiaries with below-FBR Social Security benefits (63 percent) have countable income from sources other than Social Security benefits that would disqualify them from receiving SSI payments regardless of the asset screen.

Because SSI is a voluntary program, not all elderly who might be financially eligible for SSI actually participate. In addition to financial eligibility, the person (or couple) also has to apply—provide SSA with the necessary personal financial information—and be determined eligible by SSA. We estimate that about 63 percent of financially eligible retired-worker beneficiaries participate in SSI. Thus over one-third do not participate in SSI, forming about 10 percent of all beneficiaries with Social Security benefits below the FBR.

Chart 1.
Percentage distribution of Social Security retired-worker beneficiaries aged 65 or older with Social Security benefits below the effective SSI federal benefit rate for individuals or couples, by SSI income and asset eligibility status



SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTE: SSI = Supplemental Security Income.

What are the key characteristics associated with SSI nonparticipation among financially eligible retired workers aged 65 or older with below-FBR Social Security benefits? A description of the demographic characteristics of the two principal subgroups: participant and nonparticipant eligibles is presented in Table 2.

Several of the estimated differences between participants and nonparticipants are fairly minor. Other differences are noteworthy—even though not all of them would meet stringent statistical significance requirements because of the small sample size and the SIPP design effect. Participants are more likely to be Hispanic and women than nonparticipants, and they are also less likely to be married. High school graduates are substantially overrepresented among nonparticipants. This may reflect perceived stigma or other factors associated with high school graduation status. Former Disability Insurance (DI) beneficiary status is positively related to SSI participation. These beneficiaries usually have extensive past involvement with Social Security and may have previously received SSI on the basis of being categorically disabled. Access to Medicaid has additional value for participants and may contribute to the explanation of the pattern of relatively high rate of participation among those with poor and fair self-reported health and former DI beneficiary status.

Financial incentives should also be considered here because there is considerable evidence showing that expected SSI payments are associated with the decision to participate in the SSI program. Consistent with past research, participants are eligible for a higher SSI payment than nonparticipant eligibles would be if they applied (Table 3). We estimate that the expected SSI monthly payment[18] of nonparticipants is only 68 percent of that of participants. This difference is counterbalanced by the higher average Social Security benefit of nonparticipants. Note, however, that SSI nonparticipation still results in a nontrivial average amount of foregone income among nonparticipants. The model-predicted foregone SSI payment amounts to about 23 percent of the retired worker's Social Security benefit.[19] The net result is that the combined Social

Table 2.

Percent with selected characteristics among participant and nonparticipant SSI eligibles[a] among Social Security retired-worker beneficiaries aged 65 or older

	SSI participation status			
	Participant		Nonparticipant	
Characteristic	Percent	Estimated standard error (percent)	Percent	Estimated standard error (percent)
Women	65	3	57	4
Married	20	3	31	4
Resides in metropolitan statistical area	67	3	63	4
Black	35	3	28	4
Hispanic	18	2	10	3
Former DI beneficiary	22	3	16	3
Self-reported poor health	29	3	25	4
Self-reported fair or poor health	66	3	55	4
High school graduate	21	3	38	4
Aged 80 or older	20	3	23	4
N	247		137	

SOURCES: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: Standard error estimates reflect the assumption of simple random sampling. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

SSI = Supplemental Security Income; DI = Disability Insurance; N = the unweighted count of the number of observations for the denominator of the estimated percentage; SIPP = Survey of Income and Program Participation.

a. SSI eligibility has been estimated using the Office of Retirement and Disability Policy's Financial Eligibility Model (FEM) based on the SIPP. Participants who were estimated to be financially ineligible by the FEM are excluded from this table.

Table 3.
Actual and predicted Social Security benefit and SSI payment among Social Security retired-worker beneficiaries aged 65 or older who are estimated to be eligible to receive SSI payments, by SSI participation status

Benefit type	SSI participation status				Nonparticipant minus participant difference (1996 dollars)	Nonparticipant average as a percentage of participant average
	Participant		Nonparticipant			
	Average monthly amount (1996 dollars)	Estimated standard error (percent)	Average monthly amount (1996 dollars)	Estimated standard error (percent)		
Social Security benefit of retired worker	334	6	393	9	59	118
Social Security benefit of "unit" [a]	371	8	477	21	106	128
Model predicted SSI payment of retired worker [b]	*134*	*6*	*91*	*6*	*-43*	*68*
Observed SSI payment of retired worker	134	6	0	0	-134	0
Observed SSI payment of "unit" [a]	148	7	13	5	-135	9
Social Security plus SSI of "unit" [a]	519	6	489	22	-29	94
Model predicted Social Security plus SSI payment of "unit" [a, c]	*519*	*6*	*580*	*21*	*61*	*112*
N	247		137		--	--

SOURCES: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: Standard error estimates reflect the assumption of simple random sampling. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

SSI = Supplemental Security Income; SIPP = Survey of Income and Program Participation; N = the unweighted count of the number of observations for the denominator of the estimated percentages; -- = not applicable; FEM = Financial Eligibility Model.

a. For individuals with spouse present includes benefit of retired worker and of spouse. For others it includes benefit of retired worker only.

b. This row represents hypothetical benefits calculated from SIPP data by the FEM model. For participants it is expected to be close to the observed SSI payment. For nonparticipants it is a hypothetical amount predicting the SSI payment the retired worker would be entitled to receive conditional on application and award. In order to distinguish these hypothetical amounts from the observed amounts for other variables we use italics for this row.

c. The average monthly amounts are calculated by summing the observed Social Security benefit of the retired worker "unit," the model-predicted SSI payment of the retired worker and the observed SSI payment of the spouse (if any). A simplifying assumption is that the model-predicted SSI payment would equal the observed SSI payment for the spouse. Since the average of this estimate is small, the sensitivity of the overall estimates to this assumption should be minor.

Security and SSI benefit of nonparticipants ($489) is slightly lower than the corresponding value for participants ($519). However, if we assume SSI application and award among nonparticipants, the combined value of Social Security and SSI benefits for the "unit" would be 12 percent higher for nonparticipants (see last row of Table 3).

In conclusion, only about one in five retired-worker beneficiaries with Social Security benefits below the FBR participates in the SSI program. The main reason for nonparticipation is the failure to pass the SSI financial eligibility screens; 70 percent of the total is estimated to be ineligible for SSI.[20] We estimate that about 10 percent may be financially eligible, but do not participate.

Economic Well-being Among Elderly Retired-Worker Beneficiaries with Benefits Below the Effective Unit FBR

The results of the previous section imply that the vast majority of elderly retired-worker beneficiaries with Social Security benefits below the SSI FBR are not economically vulnerable if the yardstick of economic vulnerability used is the SSI means test, literally applied. Nevertheless some of those beneficiaries might be classified as economically vulnerable if a broader measure of economic vulnerability, such as poverty status is applied. While the poverty line is not a foolproof "gold standard," and in fact has been subject to methodological criticism,[21] the poverty rate is still widely used as a social indicator and is useful for the assessment of broad patterns of economic vulnera-

bility. Whereas the SSI means test has been developed to administer a cash-assistance program and was not designed to serve as a general measure of economic well-being, the poverty line has been explicitly developed and is used for purposes of measuring economic well-being.

Applying poverty status as an indicator of economic vulnerability might result in a different pattern of economic well-being than indicated by SSI financial eligibility status for several fundamental reasons. First, the SSI eligibility rules use the "unit" concept that distinguishes only between "individual" and "couple" status. However, people live in a family, which is widely recognized as the appropriate consumption unit. Thus the presence and income of other family members, as well as other factors—such as economies of scale assumptions—affect comparisons between the two measures. Second, in some sense the SSI income eligibility measure is stricter than the poverty threshold because it ensures only a subpoverty level of income (Koenig and Rupp 2004). Third, the SSI income test is also less strict in some aspects because of exclusions from "countable" income. The test disregards up to $20 of income from any source, up to $65 of any additional earnings from work, and 50 percent of the remainder of earnings. This results in the SSI income test being less strict in certain situations, which is not as important in the context of the present study because earned income is relatively infrequent among the elderly. Fourth, SSI financial eligibility is affected by both an income and an asset test, while poverty status is strictly an income measure. The inclusion of an asset screen makes SSI financial eligibility a stricter measure than it would be if based on the SSI income test alone.

The distribution of all retired workers with Social Security benefits below the SSI unit FBR by family income as a percentage of the poverty threshold is shown in Table 4. The categories therein roughly correspond to various measures of policy relevance. The 75 percent threshold indicates a strict measure of economic vulnerability, providing a useful measure in light of the SSI program's target of guaranteeing income for individual and couple units at a level that is below the poverty threshold; 101–125 percent of the poverty line is often used to identify the "near poor." Various programs—other than SSI—use income eligibility thresholds above 125 percent of the poverty threshold, typically not surpassing 200 percent of the poverty threshold. While the definition of "201 percent or more" as the top family income category is somewhat arbitrary, people with incomes above twice the

Table 4.
Percentage distribution of family income relative to the poverty threshold among Social Security retired-worker beneficiaries aged 65 or older with Social Security benefits below the unit FBR, by SSI financial eligibility status

Family income as a percentage of poverty threshold	All Social Security retired-worker beneficiaries with benefits below the effective unit FBR [a]		Subgroup			
			SSI eligible		Not SSI eligible	
	Percentage distribution	Estimated standard error (percent)	Percentage distribution	Estimated standard error (percent)	Percentage distribution	Estimated standard error (percent)
75 or below	11	1	27	2	4	1
76–100	20	1	44	3	9	1
101–125	8	1	6	1	8	1
126–200	16	1	12	2	18	1
201 or above	46	2	11	2	61	2
Total percent	100	0	100	0	100	0
N	1,089		370		719	

SOURCES: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: Standard error estimates reflect the assumption of simple random sampling. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

FBR = federal benefit rate; SSI = Supplemental Security Income; N = the unweighted count of the number of observations for the denominator of the estimated percentages; SIPP = Survey of Income and Program Participation.

a. For retired-worker beneficiaries without a spouse present, the individual SSI FBR is used. For retired-worker beneficiaries with a spouse present, the couple SSI FBR is used.

poverty line form a category that may be considered to represent beneficiaries that are not meant to be targeted by cash-assistance programs that focus on the neediest.

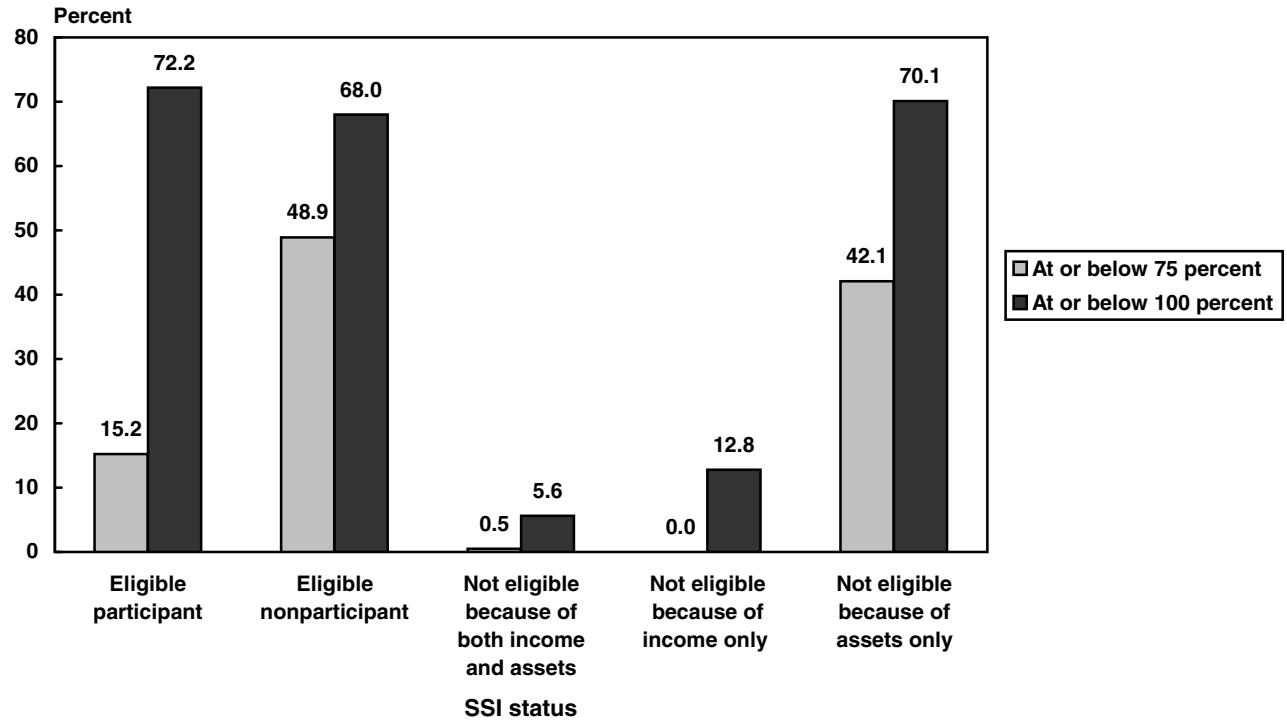
The table displays wide disparities. Almost half (an estimated 46 percent) have family income above twice the poverty threshold, while about 30 percent are poor. Only 11 percent fall into the subpoverty category of 75 percent or less of the poverty threshold, and the proportion "near poor" is relatively small.

Subgroup differences are also informative. In particular, there is substantial heterogeneity by SSI eligibility status. Table 4 compares the distribution for the 70 percent who are not SSI eligible with the distribution of the 30 percent who are SSI eligible. Clearly, the majority of the group that is not eligible for SSI is relatively well off, and only about 13 percent are poor. In contrast, the rate of poverty is 71 percent for the SSI-eligible group. Thus it appears that employing the SSI financial eligibility screen is helpful in identifying those who are economically vulnerable.

How do our subgroups identified by the four principal reasons for SSI nonparticipation compare in economic well-being? We are particularly interested in two aspects: (1) the proportion that is clearly economically vulnerable and (2) the proportion that is clearly not economically vulnerable. Chart 2 compares the five subgroups using a subpoverty threshold (75 percent of poverty line) and the poverty threshold (100 percent of poverty line). Only about 13 percent of the income-ineligible group is poor. In contrast, the proportion poor is around 70 percent for the two subgroups of eligibles and for the group that is ineligible as a result of the SSI asset test alone. There is a notable difference between eligible participants and the other two groups on the stricter 75 percent threshold measure. All but 15 percent of eligible participants have family income higher than the 75 percent subpoverty threshold.[22] In contrast, a larger percentage of nonparticipating eligibles and the group ineligible because of the asset test alone have family income at or below the 75 percent subpoverty threshold.

What about the proportion of elderly retired workers that appears clearly not economically vulnerable? Chart 3 shows the proportion in each SSI eligibility/participation category with family income above

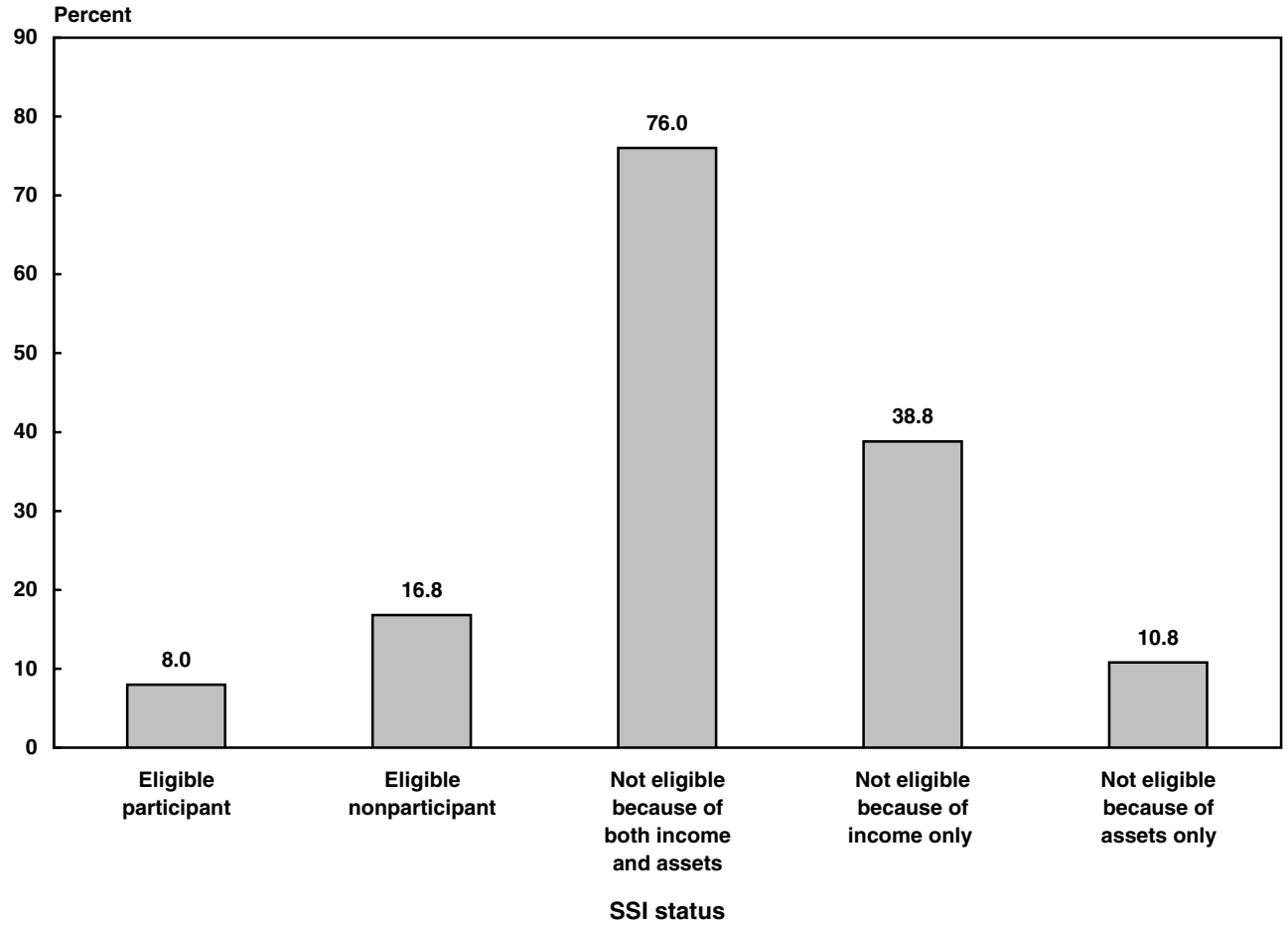
Chart 2.
Percent of elderly retired-worker beneficiaries with Social Security benefits below the unit FBR in each eligibility and participation status category with family income at or below 75 percent and 100 percent of the poverty threshold



SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTE: FBR = federal benefit rate; SSI = Supplemental Security Income.

Chart 3.
Percent of elderly retired-worker beneficiaries with Social Security benefits below the unit FBR in each SSI eligibility and participation status category with family income above 200 percent of the poverty threshold



SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTE: FBR = federal benefit rate; SSI = Supplemental Security Income.

200 percent of the poverty line. Not surprisingly the proportion is highest (76 percent) for those ineligible because of both the asset and income screens. Consistent with Table 4, a relatively large portion of those who are income ineligible have family income over 200 percent of the poverty line. The three groups that were characterized by high rates of poverty—eligible participants, eligible nonparticipants, and ineligible nonparticipants as a result of the asset test alone—have relatively low proportions with family income above 200 percent of the poverty line. Interestingly, the "eligible nonparticipant" group that had the highest proportion with family income below 75 percent of the poverty threshold also has the highest proportion above 200 percent of poverty among the three groups mentioned above. Thus family income well above the poverty line may contribute to SSI nonparticipation among eligibles.

The implications of the above findings are less definitive for the subgroup that is income eligible, but is asset ineligible according to current SSI standards. The poverty line measures only income. Thus it is possible that some of those with countable incomes below the FBR but countable assets above the SSI asset threshold might have very large assets and therefore would not be economically vulnerable in a broader sense.[23]

One way to approach this problem is to perform a sensitivity analysis. One of our sensitivity analyses excludes people whose assets are high enough to label them not economically vulnerable. This allows for the assessment of the economic vulnerability of the

remaining group that is asset ineligible, but income eligible using SSI standards. The selection of the asset threshold for this sensitivity analysis is somewhat arbitrary. We present results using the median value of countable assets ($10,000) as the cutoff point.[24]

Another approach to sensitivity analysis that avoids the use of an arbitrary cutoff point is to transform assets to an income debit and treat this debit as countable income. Rupp and others (2003) and Davies and others (2004) consider this approach in investigating SSI reform options that focus on modifying the asset test.[25] This approach results in a modified income screen that compares the sum of countable income under the status quo program and the annuitized value of countable assets to the FBR to establish a simulated SSI eligibility indicator.

Both approaches reduce the size of the "asset-ineligible" target group by half. The remaining half is deemed economically vulnerable for purposes of this sensitivity analysis. The exclusion of those with assets above the median would result in a poverty rate of 68 percent for the remaining subgroup that is deemed economically vulnerable using this technique. Likewise, the exclusion of those who would lose income eligibility as a result of the addition of annuitized assets would result in a poverty rate of 59 percent for a similar subgroup deemed economically vulnerable. Both results are qualitatively consistent with the overall finding of a relatively high poverty rate (70 percent) for the asset ineligible group (Chart 2). The results of the sensitivity tests with respect to the proportion below 75 percent of the poverty threshold also are comparable with the estimate presented in Chart 2 for the asset-ineligible group.

The qualitative conclusion from our sensitivity analysis is that reclassifying people with "high" assets as not economically vulnerable would reduce the size of the "asset ineligible" group judged to be economically vulnerable, but the remainder of the group would contain a relatively high proportion of economically vulnerable persons. Thus there are complex tradeoffs related to asset testing that arise from the conflict between the potential for substantial *screening out* error under a strict asset-test regime and a potentially salient *screening in* error in the absence of asset testing with clear implications for administrative complexity.

Another perspective is provided by comparing poverty-related outcomes for the baseline with a hypothetical unit FBR-level minimum benefit. Table 5 provides this comparison for Social Security retired-

Table 5.
Comparison of poverty outcomes under status quo baseline and hypothetical unit FBR-level minimum Social Security benefit

Subgroup of Social Security retired-worker beneficiaries	N	Percent with family income below official poverty threshold			Percent with family income below 75 percent of official poverty threshold		
		Status quo	Hypothetical	Difference	Status quo	Hypothetical	Difference
All Social Security beneficiaries aged 65 or older with benefits below effective unit FBR	1,089	30.6	28.1	2.5	11.1	4.0	7.1
		(1.4)	(1.4)	(0.5)	(1.0)	(0.6)	(0.8)
Of which:							
SSI eligible	370	70.7	67.7	3.1	27.1	10.5	16.6
		(2.4)	(2.4)	(0.9)	(2.3)	(1.6)	(1.9)
Not SSI eligible because of—							
Assets only	73	70.1	65.6	4.5	42.1	10.5	31.5
		(5.4)	(5.6)	(2.4)	(5.8)	(3.6)	(5.5)
Income only	199	12.8	11.1	1.7	0	0	0
		(2.4)	(2.2)	(0.9)	(0)	(0)	(0)
Both assets and income	447	5.6	3.4	2.2	0.5	0.5	0
		(1.1)	(0.9)	(0.7)	(0.3)	(0.3)	(0)

SOURCES: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: Standard error estimates (in parentheses) reflect the assumption of simple random sampling. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

FBR = federal benefit rate; N = the unweighted count of the number of observations for the denominator of the estimated percentages; SSI = Supplemental Security Income; SIPP = Survey of Income and Program Participation.

worker beneficiaries aged 65 or older with benefits below the effective unit FBR. The first panel provides information on poverty outcomes, and the second panel shows subpoverty outcomes using 75 percent of the poverty threshold as the operational measure. In both panels, the first column gives the relevant outcome under the status quo; the second column gives it for the hypothetical minimum benefit, and the third column gives the difference (status quo less hypothetical) in percentage points.[26] The difference is a measure of the magnitude of reduction attributable to the hypothetical unit FBR-minimum benefit. Overall, the data show substantial reduction in the proportion below the 75 percent subpoverty threshold (7.1 percentage points, representing a drop of over half of the baseline rate), and a more modest, 2.5 percentage-point reduction in the rate of poverty. This pattern is not surprising because the simulated minimum uses the FBR threshold for individual or couple units, which is below the poverty threshold for couple units and roughly equals 75 percent of the poverty threshold for individual units. The subgroup patterns are not surprising in that the percentage-point reductions are largest for the subgroups that are the most disadvantaged under the status quo by the given outcome measure, although this conclusion does not hold for the poverty outcome in relative terms. Importantly, despite the larger percentage-point reductions, the two subgroups most disadvantaged under the status quo (SSI eligible and ineligible because of assets alone) are clearly the most disadvantaged under the simulated minimum benefit as well.

In conclusion, retired workers with Social Security benefits below the SSI FBR form a fairly heterogeneous group in terms of economic vulnerability. Almost half of them have family incomes above 200 percent of the poverty threshold. This proportion is particularly high among those who are income-ineligible for SSI, reflecting the importance of income sources other than the retired worker's (and spouse's) Social Security benefit. While SSI participants are often poor, SSI participation is associated with a low proportion of persons in extreme poverty. Two subgroups of retired-worker beneficiaries that stand out with relatively high prevalence of extreme poverty are nonparticipating SSI eligibles and those who are ineligible for SSI as a result of the asset test alone. As noted above, some people in the latter subgroup may appear economically vulnerable on the poverty measure but would not be treated as such by some other measure that would consider both asset levels and current income in defining economic vulnerability in some fashion.

Administrative Simplicity and Effective Targeting: What are the Tradeoffs?

As noted in the Introduction, the idea of providing a Social Security minimum benefit at the SSI FBR level has been suggested by some (for example, Herd 2005) as a method to reach the most economically vulnerable in a manner that is administratively simple and that avoids welfare stigma. Policymakers may consider the tradeoffs between these potential advantages and other relevant factors such as program cost and target efficiency.

Given that only a minority of Social Security retired-worker beneficiaries with benefits below the effective FBR are eligible for SSI and given that SSI participation among eligibles is less than universal, the effect of a minimum benefit at the effective SSI benefit level would be more than merely substituting OASI for SSI benefits on a dollar-for-dollar basis. On the contrary, the net change would be a 25 percent increase in combined OASI and SSI benefits for affected individuals. We estimate the change in total program cost to be around 2 percent of aggregate OASI benefits to all retired workers aged 65 or older, with nontrivial implications for Trust Fund balances.[27] Note that these estimates assume no behavioral effects on OASI participation, an assumption that may be more or less valid depending on the specific way an FBR-based minimum benefit might be implemented.[28]

Although the effective SSI payment standard is below the poverty level, the additional expenditures would not necessarily go to recipients in poverty for two reasons. First, the additional income sources of people with OASI benefits below the effective SSI payment standard may move them out of poverty. Second, people with very low Social Security retired-worker benefits may live in families that are not in poverty because of the income of other family members. We estimate that only 18 percent of the additional hypothetical spending would accrue to poor retired-worker beneficiaries. This figure is low compared with that of the SSI program, which uses income and resource testing to target around 78 percent of program spending to people in poverty.[29] The 18 percent figure is also low compared with all but one of the Social Security reform options targeting economically vulnerable elderly beneficiaries analyzed by Anzick and Weaver (2001).[30]

Given the relatively low-target efficiency of the proposal to raise Social Security benefits to the FBR level, a closer look at the tradeoffs between administrative simplicity and effective targeting is warranted. We are particularly concerned about two types of classification error: (1) incorrectly *screening in* nonpoor beneficiaries, and (2) incorrectly *screening out* the "severely impoverished," which we operationalize by classifying beneficiaries with family income below 75 percent of the poverty line as *severely impoverished*. The choice of using both a poverty and subpoverty level threshold in the analysis is warranted by the fact that SSI was designed to provide subpoverty level income. As previously noted, the FBR is set at 90 percent of the poverty threshold for two-person *couple* families and 77 percent for one-person families. Thus income above 100 percent of the poverty threshold is clearly above what can be considered as "SSI level," and income below 75 percent of the poverty threshold is clearly below "SSI level." Income between 75 percent and 100 percent of the poverty threshold may be considered as representing a "gray area."

Using our measures of classification error we assess the potential tradeoff between administrative simplicity and effective targeting. We start out with a measure identifying individual retired-worker beneficiaries with Social Security benefits below the effective FBR for individuals as the target population. This is the simplest operational measure in that it requires only the comparison of the individual's Social Security benefit with a constant dollar value regardless of the presence or absence of a spouse, family structure, income, or assets. The individual's Social Security benefit is easily identifiable using Social Security administrative records on a monthly basis. Next we replace this measure with one that uses the "unit" concept of the FBR for individuals or couples.[31]

We continue our analysis by incrementally adding an income and an asset screen to the effective FBR for the retired-worker *unit* to explore whether there is a tradeoff between the increased administrative complexity introduced by these additional screens and the accuracy of targeting. We use the SSI income and asset screens for this illustration, but note that there might be some other (perhaps simpler) ways of defining an income and an asset screen for purposes of establishing a minimum Social Security benefit that have somewhat different properties in terms of administrative complexity and targeting error (for example, see Rupp and others 2003; Smeeding 1999).

Table 6 presents the screening properties of four alternative screening scenarios using 100 percent of the poverty threshold as the classification variable. The screening variable categories provide a mutually exclusive and exhaustive classification of all retired-worker beneficiaries aged 65 or older by the combination of poverty status (poor versus nonpoor) and screening status (screened in versus screened out) using the four different screening criteria identified by the rows of the table. Table 7 presents similar statistics using the 75 percent of the poverty threshold measure. While all of the statistics presented in these two tables are interesting and relevant, as noted before, the two most important statistics here are the "percent nonpoor screened in" (Table 6) and the "percent below 75 percent of the poverty threshold screened out" (Table 7). Chart 4 highlights these two key measures that can be seen as error rates in some sense.

First we compare the percentage with an OASI benefit below the *individual* and *unit* FBR screens. The differences in terms of administrative complexity are relatively minor here. The unit FBR screen performs unambiguously better on both screening indicators. Compared with the individual FBR screen, the unit FBR screen reduces the percent nonpoor (incorrectly) screened in from 20 percent to 11 percent, and it reduces the percent below 75 percent of the poverty threshold (incorrectly) screened out from 10 percent to 8 percent. These findings support our decision to focus on the properties of the *unit* FBR measure in earlier sections of this article.[32]

How does this improved performance of the unit (as compared with the individual) FBR screening variable translate into a reduction in the proportion incorrectly screened in among all who are screened in? A comparison of the first two bars of Chart 5 answers this question. By switching to the unit based screen, the percentage of nonpoor who are screened in is reduced by only about 10 percentage points—from 80 percent to 69 percent. These high percentages of screening-in error are explained by the dominance of the nonpoor in the *overall sample* of Social Security retired-worker beneficiaries—about 93 percent of all Social Security retired-worker beneficiaries are nonpoor (statistics not shown in the tables). Thus it is not surprising that target efficiency is relatively low even when the unit concept is used as we have seen above.

Given the high percentage of nonpoor incorrectly screened in using the FBR-level benefit screen, one may reasonably ask whether imposing additional

Table 6.
Percentage distribution of all Social Security retired-worker beneficiaries aged 65 or older, by poverty and screening status; percent of all nonpoor beneficiaries screened in; percent of all poor beneficiaries screened out

Screening variable	N [a]	Total percent	Poor		Nonpoor		Percent of all nonpoor screened in	Percent of all poor screened out
			Screened in	Screened out	Screened in	Screened out		
OASI benefit below individual FBR	6,666	100.0	4.5	2.8	18.1	74.6	19.6	38.0
OASI benefit below unit FBR	6,666	100.0	4.6	2.6	10.5	82.2	11.3	36.0
OASI benefit below unit FBR plus								
SSI income eligible	6,666	100.0	3.9	3.3	1.6	91.1	1.8	46.0
SSI income plus resource eligible	6,666	100.0	3.2	4.0	1.3	91.4	1.4	55.7
N		--	--	--	--	--	6,107 [b]	559 [c]

SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTES: OASI = Old-Age and Survivors Insurance; FBR = federal benefit rate; SSI = Supplemental Security Income; -- = not applicabe.

a. N refers to the unweighted count of Social Security retired workers aged 65 or older.

b. N refers to the unweighted count of nonpoor Social Security retired workers aged 65 or older.

c. N refers to the unweighted count of poor Social Security retired workers aged 65 or older.

Table 7.
Percentage distribution of all Social Security retired-worker beneficiaries aged 65 or older, by income below and above 75 percent of the poverty threshold and screening status; percent of all with family income above (below) 75 percent of the poverty threshold screened in (out)

Screening variable	N [a]	Total percent	Income below 75 percent of poverty threshold		Income above 75 percent of poverty threshold		Percent of all with family income above 75 percent of the poverty threshold screened in	Percent of all with family income below 75 percent of the poverty threshold screened out
			Screened in	Screened out	Screened in	Screened out		
OASI benefit below individual FBR	6,666	100.0	1.7	0.2	21.0	77.2	21.4	9.6
OASI benefit below unit FBR	6,666	100.0	1.7	0.1	13.5	84.7	13.7	7.9
OASI benefit below unit FBR plus								
SSI income eligible	6,666	100.0	1.7	0.2	3.9	94.3	4.0	9.7
SSI income plus resource eligible	6,666	100.0	1.2	0.6	3.3	94.9	3.4	32.8
N		--	--	--	--	--	6,532 [b]	134 [c]

SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

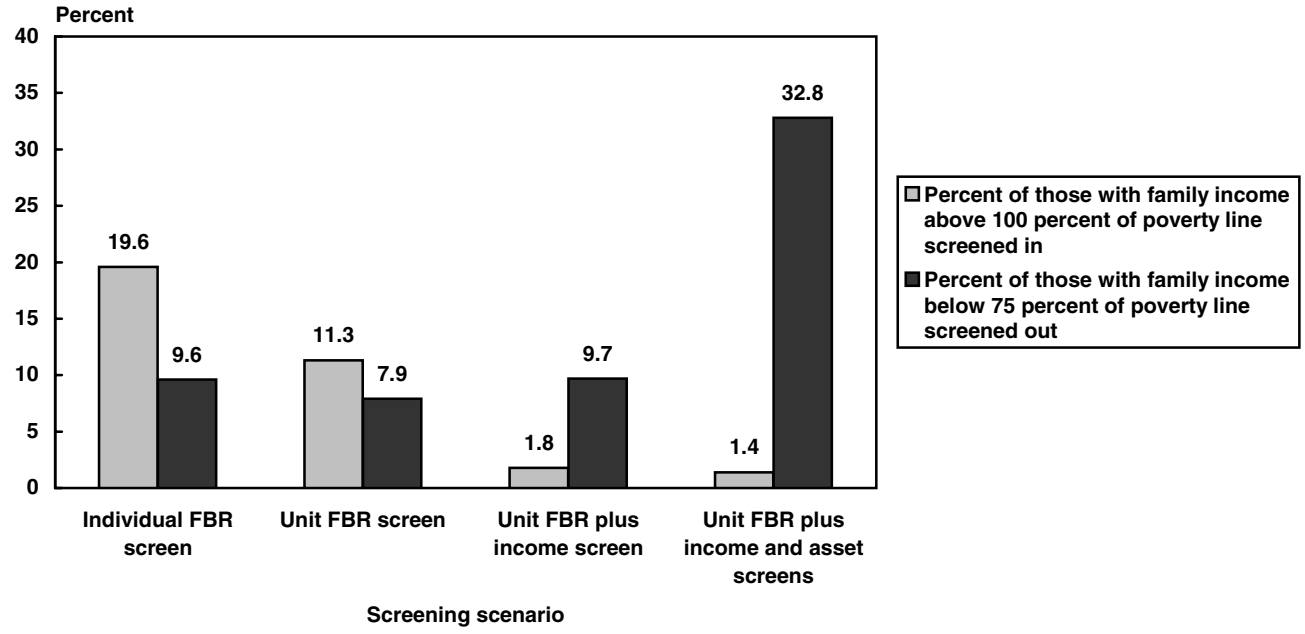
NOTES: OASI = Old-Age and Survivors Insurance; FBR = federal benefit rate; SSI = Supplemental Security Income; -- = not applicabe.

a. N refers to the unweighted count of Social Security retired workers aged 65 or older.

b. N refers to the unweighted count of Social Security retired workers aged 65 or older with family income *above* 75 percent of the poverty line.

c. N refers to the unweighted count of Social Security retired workers aged 65 or older with family income *below* 75 percent of the poverty line.

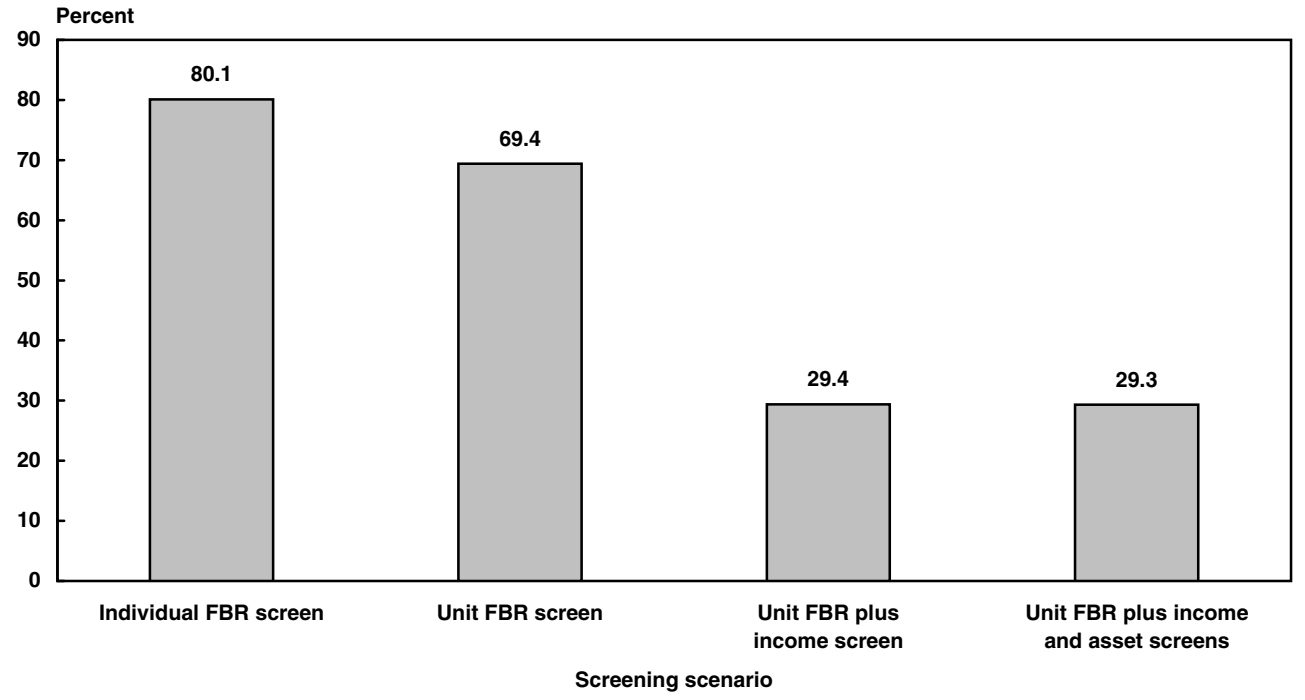
Chart 4.
Distributional effects of four alternative screening scenarios



SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTE: FBR = federal benefit rate.

Chart 5.
Nonpoor as a percent of all those screened in under four different screening scenarios



SOURCE: Authors' calculations based on November 1996 data from the Survey of Income and Program Participation.

NOTE: FBR = federal benefit rate.

screens that may increase administrative complexity (as well as intrusiveness) have potential benefits in terms of improved target efficiency. We address this issue by first adding the SSI income screen and then adding the SSI asset screen incrementally to the unit FBR-level OASI benefit screen. Either of these screens would introduce some means testing, which is arguably not desirable because the OASI program has always been an earned benefit program. However, adding one or both of these screens incrementally has the advantage of avoiding explicit means testing for the top 85 percent of elderly OASI retired-worker beneficiaries—those receiving OASI benefits that already exceed the effective SSI FBR (see authors' calculation from Table 1).[33]

The next addition—the SSI income screen—reduces the proportion of the nonpoor who are incorrectly screened in from 11 percent to 2 percent (Chart 4). As a result, the proportion nonpoor among those who are screened in drops from almost 70 percent to almost 30 percent (Chart 5). This should be weighed against increased administrative complexity, administrative costs and intrusiveness, as well as against a modest increase in those persons below 75 percent of the poverty threshold who are (incorrectly) screened out from 8 percent to 10 percent (Table 7).[34]

In contrast, the incremental addition of an SSI-style asset test would reduce the percent nonpoor who are *screened in* only slightly—from an estimated 1.8 percent to an estimated 1.4 percent (Chart 4)—but would dramatically increase the percent below 75 percent of the poverty threshold who are *screened out* from 10 percent to 33 percent (Chart 4). As noted earlier, our measure of economic vulnerability is solely income based, and therefore *screening out* error may be overstated from a broader perspective that considers very high assets to be a legitimate reason for *screening out* regardless of very low income.[35] Overall, while the incremental addition of the SSI asset test would reduce program cost somewhat—as the introduction of any additional screen is expected to do—this is to be balanced against increased administrative complexity, increased administrative costs, possibly increased *screening out* error, potential additional welfare stigma, and other negative factors. Among these other factors we acknowledge behavioral effects widely discussed in the literature. Perhaps the most problematic is the "spend-down" effects of the asset test: marginally disqualified people face strong incentives to reduce assets to a level that is below the applicable threshold.[36] In addition, certain asset classes (housing, automobile) are favored through exclusions, while defined contribution pensions are not favored.[37]

In summary, the potential advantages of the proposal to raise the minimum Social Security benefit for retired workers to the level of the SSI federal income guarantee are to be balanced against potential disadvantages. The disadvantages include relatively large program cost and relatively low target efficiency. Modifying the proposed approach by introducing some additional income screening could result in reduced program cost and increased target efficiency, but at the expense of increased administrative complexity and the possibility of an increase in perceived welfare stigma. As we have seen, however, if income screening is to be implemented incrementally (in addition to a "prescreening" based on OASI administrative records), about 85 percent of elderly Social Security retired-worker beneficiaries would not be subjected to this additional, explicit, test. Although our results are less definitive concerning asset testing, they suggest that the incremental addition of an asset test (in addition to an income test) might substantially increase *screening out* error without obvious gains in program cost or target efficiency. These results concerning the asset test are less definitive than the findings concerning the effects of prescreening based on administrative records or income screening; some who appear to show high-economic vulnerability based on current income may not be regarded as such once spend down (or potential spend down) from assets is explicitly considered. More work is needed on studying alternative approaches to asset testing and on examining the relationship between income and asset testing.

Concluding Comments

In this article we focused on the SSI FBR as a potential basis for designing a minimum Social Security benefit and limited our attention to elderly Social Security retired-worker beneficiaries. Future research may consider a broader range of minimum benefit proposals, as well as additional target groups. We briefly discuss these potential extensions.

Analysts have proposed the poverty standard as a potential basis for evaluating the adequacy of Social Security benefits and as a basis for determining a minimum Social Security benefit.

Although the poverty threshold is somewhat more generous than the FBR, the tradeoffs related to administrative implementation appear very similar. If one were to use the poverty threshold for a one- or

two-person family—depending on the presence of a spouse—as a minimum benefit threshold, the policy implementation would be similarly simple as with an FBR-level minimum benefit. The policy would, however, increase program cost even more than an FBR-level minimum benefit and would be even less target efficient. The tradeoffs between administrative complexity, program cost, target efficiency, and potential welfare stigma should also be very similar. Thus, the conclusions of this article seem applicable to a broader array of approaches that focus on the poverty measure.

Future research may also explore the SSI FBR as a measure of benefit adequacy and as a potential tool for establishing a minimum Social Security benefit for groups other than retired workers aged 65 or older. The most important of these other groups are elderly widow(er) beneficiaries, many of whom are economically vulnerable and a relatively high proportion of whom are SSI recipients (Rupp and others 2003). Other groups of Social Security beneficiaries, such as retired persons who retired before reaching the full retirement age and have not reached it by the survey reference month, raise additional policy issues not addressed in this article. Workers are eligible for early retirement beginning at age 62, and 8.7 percent of all retired-worker beneficiaries are aged 62 to 64.[38] This age group is not automatically eligible for SSI (for persons aged 64 or less, a disability screen also has to be met), and early retirees are subject to an actuarial reduction of their Social Security benefit. Thus, whether and how to implement an FBR-related minimum benefit for these beneficiaries raises important additional issues. Another important group, disabled-worker beneficiaries, differs from retired-worker beneficiaries in many relevant aspects. Of particular relevance in the context of this study is that earned income is more important in this working-aged group than among retired workers as a result of the presence of nondisabled spouses and other family members. The practical effect is that some disabled-worker beneficiaries have family income well above the poverty threshold. However, others, particularly those who are living alone, may have little or no income from sources other than Social Security, SSI, and the Food Stamp program.[39] There are other issues related to smaller groups of beneficiaries, such as the workers' compensation offset, that would need to be carefully considered in terms of tradeoffs related to administrative simplicity.

Aggregate program cost could be substantially higher if these additional groups are considered as well. Each group would also raise somewhat distinct issues about potential behavioral effects, a subject we did not address here. Nevertheless, many of the qualitative findings in this study are expected to hold for each of these additional groups of Social Security beneficiaries.

Another direction for future research would be to examine Social Security minimum benefits in the context of the transition to a solvent Social Security system. The broad-based minimum benefit proposals we focused on in this analysis were treated in the context of the current, status quo, safety net for the elderly. In contrast, Social Security solvency proposals often include minimum benefits targeted toward individuals with long work histories but with low levels of earnings and thus low Social Security benefits. A recent study by Favreault and others (2006) discusses both types of proposals, but provides longer-term estimates only for a set of reform scenarios with highly targeted minimum benefits. A logical follow-up study would assess the more universal minimum benefit proposals in the context of the long-term solvency of the Social Security system. Other things equal, movement toward a solvent Social Security system would be expected to increase the subset of beneficiaries that may qualify for the minimum benefit. However, the prevalence of poverty among the elderly is expected to decrease in the long run for reasons other than the reforms themselves, and this reduction may be substantial (Favreault and others 2006). Learning about the net effect of these opposing factors would be helpful for assessing the pros and cons of alternative minimum benefit proposals.

The relationship between Social Security and the SSI program may also be a subject for fruitful additional research. A related avenue for future research in evaluating the economic well-being of the elderly would be to further explore the role of assets owned by the elderly. This study used the standard poverty measure, which is based on income. The findings reported herein suggest that an asset screen could screen out many economically vulnerable people, yet the standard poverty measure fails to consider the characteristics and use of those assets in providing economic support.

Notes

Acknowledgments: We would like to thank Jasmin Kakar for expert programming support and Anne DeCesaro for outstanding research assistance. Many of our colleagues provided useful comments on various drafts. We particularly appreciate Ed DeMarco's sage and insightful feedback.

[1] An important context here is the establishment of the SSI program (Public Law 92-603, enacted October 30, 1972) that offers a guaranteed income floor for all elderly Americans who meet an asset test. The first SSI payments were made in January 1974.

[2] See also FitzPatrick and others (2003) and Diamond and Orszag (2004). Sandell and others (1999) simulate the estimated effects of minimum benefit provisions similarly structured as the subsequent Kolbe-Stenholm plan. Favreault and others (2006) provide a comprehensive review of recent minimum benefit proposals, most of them conditioning the benefit guarantee on years of covered earnings.

[3] The original Social Security minimum benefit was similar to these more recent proposals in that it established a broadly applicable benefit floor, but differed in that it was not tied to a measure of benefit adequacy such as the official poverty threshold or the SSI FBR. We note, however, that the original minimum benefit amounted only to 56 percent of the individual FBR in 1980 (authors' calculations based on Kollmann (2000) and the *Annual Statistical Supplement to the Social Security Bulletin*, 2002, Table 2.A27 and Table 2. B1). The concerns leading to the "freezing" of the original minimum benefit by the 1972 amendments were largely influenced by the perceived windfalls that would have otherwise occurred under the 1972 act as a result of large anticipated increases in the minimum benefit relative to the poverty line.

[4] Favreault and others (2006) discuss these proposals in more detail.

[5] These rates apply to individuals and couples living in their own household. The FBR for individuals and couples living in the household of another is lower. SSI rules also establish a separate (much lower) FBR for persons living in Medicaid institutions. In the Social Security minimum benefit simulations, we use the FBR for individuals and couples living in their own household. Note that Social Security administrative records do not contain information on living arrangements unless the beneficiary is a concurrent recipient of SSI.

[6] The 2006 FBR is 4.1 percent higher than the 2005 figures cited in the text. The 2006 FBR is $603 for eligible individuals and $904 for eligible couples. The corresponding 2007 values are $623 and $934, respectively. This represents an additional 3.3 percent COLA increase. In 2008, the FBR is $637 for individuals and $956 for couples.

[7] Insured status for OASI benefits generally requires 40 quarters of Social Security–covered employment, which is roughly equivalent to 10 years of employment.

[8] Salkever and others (2006) formalize judgments about the relative importance of these two sources of error in a cost-benefit framework.

[9] Note, however, that spouses are considered in measuring individual or couple unit status and in measuring Social Security benefits and SSI payments. Also, income-based measures consider the income of other family members.

[10] SSI policy generally refers to "resources" rather than "assets" as is common in the analytic literature. Assets generally only involve an ownership test, but there is both an ownership and availability test for resources as defined by SSI program rules. Thus, while all resources are assets, not all assets are resources. In this article we use SSI rules for identifying countable resources, but often use the broader term of "assets" throughout the study to clarify the analytic distinction between "income" and "assets" as these terms are defined by economists.

[11] In our simulations of FBR-level minimum Social Security benefits, we consider only the SSI federal cash benefit guarantee for individuals and couples living in households. We ignore SSI rules that reduce SSI payments because of the receipt of in-kind support and maintenance. Note that the SSI program also includes optional state cash benefits, and SSI recipiency status enters into the determination of eligibility for various in-kind benefits, such as Medicaid, food stamps, and housing assistance. Although important in their own right, none of these features of the SSI program are relevant to measuring an FBR-level minimum Social Security benefit.

[12] The qualitative results are fairly robust to the use of the traditional SSI FBR or the "effective" FBR measure.

[13] In tables focusing on estimated means for various population segments, we provide standard error estimates that assume simple random sampling (SRS). Because the SIPP has a complex sample design, these estimates tend to underestimate the true standard errors. See U.S. Census Bureau (2001) for the adjustments that are needed to account for the SIPP sample design effect.

[14] Note, however, that we had to make some assumptions about participation rates under alternative minimum benefit scenarios. We used the simplifying assumption of 100 percent participation, which is reasonable as long as receiving the minimum does not require any action other than the standard application for Social Security benefits. For some minimum benefit scenarios involving income or asset testing, this may be an upper bound depending on how the application process is operationalized.

[15] This estimate reflects the U.S. noninstitutional population in November 1996 as measured by the SIPP. We do not have comparable record data accounting for both the institutional and noninstitutional population for November 1996. We were able to derive the corresponding statistics from the 100 percent Master Beneficiary Record for December 2003; this estimate is somewhat lower, 19.4 percent. The differences may reflect a combination of true differences in the proportion and SIPP measurement error. Because the SIPP excludes the institutional population and has sampling error, some difference is expected even if there were no true differences in the November 1996 and December 2003 proportions.

[16] This amounts to roughly 3 percent of all Social Security retired-worker beneficiaries aged 65 or older in the U.S. noninstitutional population.

[17] The standard error estimate assuming SRS is 0.3 percent. See U.S. Census Bureau (2001) for the appropriate adjustment for the SIPP design effect.

[18] By expected payment we mean hypothetical benefits that would be paid conditional on application and award. These amounts are calculated from the FEM on the basis of SIPP data for participating and nonparticipating eligibles using an identical algorithm. Note that the model-predicted hypothetical average benefit is virtually identical to the actual average for participants, suggesting that the model produces fairly accurate estimates.

[19] This is calculated by dividing the model-predicted average SSI benefit of $91 for nonparticipants by the average Social Security benefit ($393) of the retired worker and taking percentages (authors' calculations, 1996 dollars).

[20] We note that some of those who are estimated not to be financially eligible, in fact, do participate in SSI. About 1.8 percent of all beneficiaries with Social Security benefits below the SSI FBR are estimated to participate in SSI, although they are classified as financially ineligible by the FEM. This amounts to about 8 percent of all SSI beneficiaries in the sample. The discrepancy may be attributed to a combination of measurement error (reporting error in SIPP or error in the measurement of financial eligibility in the FEM) and possible financial ineligibility among SSI participants. The overall results are highly robust to the possible misclassification of some participants as financially ineligible. We also note that some participants and nonparticipants we classify as financially eligible may in fact be ineligible because of the same measurement problems, but we do not have additional data to gauge the potential magnitude of this problem.

[21] See Citro and Michael (1995) for an overview of poverty measurement issues. U.S Census Bureau (2005) provides poverty estimates using alternative measures of poverty. Koenig and Rupp (2004) analyze the robustness of using the official poverty measure by comparing it with a three-parameter experimental scale in estimating poverty outcomes for SSI recipients and discuss the economies of scale assumptions of SSI program design and alternative poverty measures. Rupp and others (2003) use three alternative poverty measures as tools for examining the effects of SSI reform options on elderly women. Zagorsky (2004) develops alternative measures of poverty that considers both income and wealth. Hurd and Rohwedder (2005) compare income- and consumption-based poverty measures and address the implications of problems with survey measures of asset income for poverty measurement. Koenig and others (2004) simulate the effects of converting imputed asset income to countable income in calculating SSI financial eligibility of the elderly on the distribution of income relative to the poverty threshold.

[22] For both single and married couple units, the FBR is above the subpoverty threshold. Thus, it may sound counterintuitive for SSI participants to have family incomes below 75 percent of the poverty line, but there are several legitimate reasons. Perhaps most importantly, SSI recognizes only "individual" and "couple" units, while the poverty line is family based. Thus if there is an additional person in the family who is not part of the SSI unit (such as the sibling of an elderly SSI beneficiary) with zero income, family income may drop below 75 percent of the poverty line. Of course, SIPP measurement error may also result in family income measured to appear lower than 75 percent of the poverty line.

[23] Accounting for assets in assessing the economic vulnerability of the elderly is an issue with wider implications for policy evaluation of the relationship between aging, widowhood, and economic vulnerability among the elderly. The conventional wisdom—derived from studies using income-based measures of economic vulnerability—is that the older subgroups of the elderly (for example, those aged 80 or older) are much more economically vulnerable than their younger peers. However, using consumption-based measures, Hurd and Rohwedder (2005) suggest that these discrepancies might be substantially smaller once the effects of the life-cycle patterns of asset accumulation and spend down on current consumption are accounted for. Zagorsky (2004) finds that the elderly are among the population subgroups whose poverty status is relatively sensitive to the consideration of wealth in addition to income.

[24] We considered different methods to establish a cutoff point. The $10,000 value seems reasonable from three different perspectives. First, it roughly corresponds to the inflation-indexed value (to account for changes in prices) of the 1974 SSI asset thresholds for individual and couple units that have not changed at all from 1974 to date in nominal terms. Second, even if one takes a generous view of the income-producing capacity of $10,000 countable assets (a conservative assumption in this context), the imputed monthly income stream would be relatively low. For example, with a 12 percent annual nominal rate of return the imputed monthly asset income would be roughly $100. This is reasonably low in light of the average of $374 SSI-countable income for this subgroup. Adding the $100 imputed

asset income results in an average of $474, a value that is below the effective FBR for both individuals and couples in 1996 (all numbers are in nominal 1996 dollars.) Finally, $10,000 is the median, a statistic with a clear intuitive meaning of representing "the middle."

[25] See also Zagorsky (2004) for the sensitivity of the amortization of asset stocks to income flows to assumptions about the interest rate and time horizon.

[26] Note that the percentages reflect the subuniverse of retired-worker beneficiaries aged 65 or older with benefits below the effective unit FBR. Because only 15.2 percent of the universe of retired workers aged 65 or older have benefits below the effective unit FBR (Table 1), the percentages in Table 5 translate into much smaller percentages relative to this broader universe.

[27] These estimates assume instantaneous change in Social Security benefit and SSI payment amounts for retired-worker beneficiaries and their spouses (if any) as a result of the simulated policy change. In this analysis we used November 1996 data from the SIPP matched to Social Security administrative records. The analysis was limited to retired workers aged 65 or older. For sample members, we calculated the status quo monthly Social Security benefits received (primary and secondary benefits combined), the individual's SSI payment received, and the same quantities for a spouse beneficiary as applicable. For SSI recipients with an eligible spouse, half of the SSI couple benefit was allocated to the sample member and half to the spouse.

For the simulation scenario, we conducted separate analyses for (a) retired workers without a spouse beneficiary, and (b) retired workers with a spouse beneficiary. For retired workers *without* a spouse beneficiary we identified those sample members whose monthly Social Security benefit were less than the individual FBR + $20. For 1996 this amounted to $490 per month. We assumed that the Federal SSI payment for the individual was to be eliminated under the simulation scenario, and the individual's total Social Security benefit was raised to $490 per month in 1996. We calculated the net trust fund cost for the individual as $490 less the individual's combined Social Security benefit and federal SSI payment under the status quo. We created an aggregate amount of net trust fund cost by multiplying the per retired-worker cost with the weighted total of the retired workers. For retired workers *with* a spouse beneficiary, we used a similar procedure applied to the presumed "couple unit" and used the couple FBR in the calculations. We allocated 50 percent of the net trust fund cost (net benefit increase) for the couple to the sample retired worker. Finally, we summed the aggregate net trust fund cost estimate for the above two groups of retired workers.

Next we calculated the aggregate net trust fund cost estimate for retired workers as a percentage of the status quo and aggregate Social Security and federal SSI costs for the affected retired workers, as a percentage of the status quo aggregate Social Security benefit amount for all retired workers and as a percentage of status quo aggregate federal SSI payments for all retired workers. The denominators for these percentages were derived on the basis of the November 1996 SIPP sample to assure internal consistency.

[28] Interactions with Social Security's early retirement program seem particularly relevant here. An FBR-based minimum Social Security benefit without changes related to the early retirement program may produce strong incentives for early retirement among low-income individuals. One possible way to deal with the issue would be to implement a minimum benefit that preserves an actuarial reduction for those who choose early retirement. The detailed discussion of interactions with early retirement is beyond the scope of this study.

[29] For more information, see Davies and others (2004).

[30] One of the options analyzed by Anzick and Weaver (2001) has an estimated target efficiency of 14 percent. However, the target efficiency of the other four options ranges from 28 percent to 35 percent.

[31] In the previous sections, we focused on this second concept because it is relatively close to the "individual" measure in terms of administrative complexity, however it is based on a more reasonable assumption about economies of scale and is closer to the SSI approach. Nevertheless, we note that a number of operational issues would arise if a couple status measure would become an integral part of establishing the minimum benefit eligibility status of retired-worker beneficiaries.

[32] There are other relevant differences between these two measures that we acknowledge, but do not focus on here. Most importantly the "unit-based" measure is not neutral with respect to marital status, but arguably more reasonable in terms of the underlying consumption economies of scale assumption.

[33] We realize that the unit FBR approach may require some changes in the way marital status is represented in administrative records or in the use of administrative records currently available with the understanding that this may introduce some measurement error.

[34] Although screens for targeted assistance programs are designed to exclude those who are not intended to benefit from the policy, they may also have the unintended consequence of excluding some who are targeted. In our case, the SSI income screen is based on a unit concept considering an individual and the spouse if present, but not other members of the family. If for example, there is an additional elderly family member with zero income, the unit income may not pass the SSI income screen but family income may be below 75 percent of the applicable poverty threshold.

[35] Smeeding and Weaver (2002) consider whether their Senior Income Guarantee (SIG) proposal should include an asset test. They note that the Canadian Guaranteed

Income Supplement program does not include an asset test, but argue that such an approach is probably not politically viable in the United States. Thus the SIG proposal includes an asset test more generous than the SSI asset test, with thresholds of $20,000 in liquid assets for an individual and $30,000 for a couple, indexed for inflation for future years.

[36] There is considerable literature on the negative effects of means-tested programs on savings. Neumark and Powers (1998) provide evidence suggesting that SSI reduces savings among households with heads who are near elderly and who are likely participants in the program.

[37] Defined contribution (DC) assets are countable. Defined benefit (DB) pensions are considered only in the income test. For more information, see Parent (2006).

[38] This statistic represents retired-worker beneficiaries in current-pay status. A much higher proportion of the stock of beneficiaries in current-pay status receives reduced benefits (72 percent) as a result of early retirement. The major reason is that about half of new retired-worker awardees are aged 62 or older, and some additional retired-worker beneficiaries are awarded benefits before reaching the normal retirement age. The vast majority of this inflow of early retirees stay in the program beyond the normal retirement age with reduced benefits. In 2003 about 69 percent of new retired-worker awardees were aged 62-64. An additional 9 percent were converted from the DI program with full benefits, and 22 percent were new awardees aged 65 or older (authors' calculations based on the *Annual Statistical Supplement to the Social Security Bulletin*, 2004, Table 5.B5 and Table 6.B5).

[39] Technically, food stamps are regarded as in-kind benefits and are not included in traditional income measures. However, there is a wide consensus among policy analysts that food stamp benefits are highly liquid and therefore better regarded as cash-like benefits. Policy analyses sometimes use income and poverty measures that treat food stamp benefits as cash income. The National Research Council's panel on poverty measurement recommended the inclusion of food stamps (and other "near-money" in-kind benefits) in their proposed measure of family resources (Citro and Michael 1995, 66). The qualitative results of our study appear invariant to the inclusion or exclusion of food stamp benefits in measuring family income and poverty status.

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Effective Retirement Savings Programs: Design Features and Financial Education

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Summary and Introduction

This article provides an overview of the literature on best practices for designing retirement savings plans and providing financial education in the workplace. These two elements are critically important considerations for plan providers. Both must be carefully constructed to maximize the effectiveness of an employer-sponsored retirement savings program in helping participants build adequate funds for when their working career ends. Without a successful plan design, financial education will not be effective, and even a well-structured plan can fail to achieve retirement savings goals without financial education. The main components of a retirement savings program include options for enrollment, investment choices, employer matching of contributions, and distributions during the working career and at retirement. In addition, employees must be educated about the plan design and how it affects them. The core aspects of financial education are controlled by employers: the topics covered, the delivery methods used, the frequency with which it is offered, and its general availability. Financial education can be especially helpful to certain subgroups of the population, including minorities, women, and those with low income and education levels. This article is designed for use both by practitioners and academics seeking a broad overview of some of the significant issues that should be considered in designing a retirement savings program that counts the adequacy of long-term savings among participants as a goal.[1]

A large literature now exists on the effects of different plan designs and methods of education. The literature review is supplemented with information from the 2004 Survey of Consumer Finances (SCF) to document the need for well-designed retirement savings programs and financial education. The SCF is a triennial survey on wealth and saving that is undertaken by the Federal Reserve Board in conjunction with the Statistics of Income (SOI) Division of the Internal Revenue Service (Kennickell 2006).[2] The SCF data are intended to represent the financial characteristics of a subset of the household unit called a "primary economic unit." This unit consists of an economically dominant single individual or couple (married or living as partners) in a household and all other individuals in the household who are financially interdependent with that individual or couple. In a primary economic unit with a mixed-sex couple, the male is considered the head of household; for same-sex couples, the older individual is deemed the head of household.[3] Data from the SCF cover a broad variety of demographic and financial

characteristics, including saving behavior, account balances, and sources of investment advice.

In recent years, there has been an increased policy focus on retirement savings programs offered by employers. These savings programs, which include 401(k), 403(b), Simplified Employee Pensions (SEP), and other plans, are referred to as defined contribution (DC) plans because account balances at retirement depend on employee and employer contributions and the performance of the worker's investments.[4] These plans have largely replaced employer-sponsored defined benefit (DB) plans, which pay retirement benefits using formulas based on factors such as years of service and earnings. Indeed, projections from the Social Security Administration's Modeling Income in the Near Term (MINT) model indicate that current retirees will be the last group strongly dependent on DB pensions (Butrica, Iams, and Smith 2003/2004).[5] For middle-income individuals born between 1926 and 1935, DB pensions will account for 20 percent of their income at age 67, compared with only 3 percent of income from retirement savings programs. For those born in the late part of the baby boom (1956–1964), the corresponding figures are 9 percent and 8 percent. The relative importance of retirement savings programs will increase only for post boomer retirees: among all workers today, only 20 percent participate in DB plans, compared with 43 percent in DC plans.[6]

The passage of the Pension Protection Act (PPA) in August 2006 provided key legislation on both DB and DC plans. Among the changes for DC plans, the PPA removes barriers that prevented companies from automatically enrolling their employees in their plans, removes the risk factor for employers providing investment advice, and gives workers greater control over how their accounts are invested. Many of the PPA changes did not go into effect until after December 31, 2006, and some provisions do not become operational until 2008. It is therefore too early to determine the overall effect the PPA will have on DC plans and their participants. In addition, a technical corrections bill was introduced in the Senate on August 2, 2007, to fix some provisions of the PPA (S.1974). Relevant provisions of the PPA are discussed throughout the article in the context of their relationship to plan design and financial education.

Current Statistics on Saving

Data from the 2004 SCF highlight current deficiencies in savings and financial information.[7] According to SCF data, 10 percent of respondents do not save or invest at all, and certain demographic groups are particularly at risk. As Table 1 shows, the less-educated, non-Hispanic blacks, Hispanics/Latinos, and those with low total family income are all more likely to report that they are not saving or investing.[8, 9] The largest discrepancy is between those with no high school diploma (25 percent do not save) and those with a college degree (less than 5 percent do not save).

Table 1.
Percentage of respondents not saving or investing, by demographic group

Characteristic	Not saving or investing	
	Percentage	Standard error
Overall	10.0	0.44
Sex		
Men	8.5	0.41
Women	13.7	1.10
Education level		
No high school diploma	25.1	1.84
High school diploma	10.3	0.75
Some college	9.2	0.98
College degree	4.1	0.43
Age		
Under 30	7.9	1.03
30–39	8.5	0.89
40–49	8.3	0.73
50–59	8.0	0.86
60–69	12.7	1.30
70 or older	15.9	1.45
Race or ethnic group		
White (non-Hispanic)	8.7	0.44
Black (non-Hispanic)	13.8	1.60
Hispanic/Latino	13.5	1.27
Other	8.8	2.72
Total family income		
Under $20,000	21.6	1.51
$20,000–29,999	13.5	1.50
$30,000–39,999	8.3	1.39
$40,000–49,999	9.7	1.31
$50,000–59,999	6.8	1.50
$60,000–69,999	4.3	1.19
$70,000 or above	1.8	0.34

SOURCE: Authors' calculations using the 2004 Survey of Consumer Finances.

NOTE: The standard errors are total standard errors that incorporate estimates of variation due to sampling and imputation. (For details, refer to the "Codebook for 2004 Survey of Consumer Finances" provided by the Division of Research and Statistics, Board of Governors of the Federal Reserve System.)

When asked what their most important reasons for saving are, around 45 percent of respondents to the SCF answer "retirement/old age," and only about 13 percent say that a saving horizon of longer than 10 years is most important to them. Again, these answers vary by demographic characteristics. Table 2 shows that as income rises, so do planning horizons. Only about 19 percent of respondents with total family income below $20,000 are saving for retirement, as opposed to about 71 percent of respondents with total family income above $70,000. In addition to those with low income; the less-educated, those under age 30, and minorities are all less likely to have long-term saving horizons with money earmarked for retirement.

To some extent, inadequate savings can be attributed to a lack of sufficient retirement goals.[10] Without setting goals for retirement savings, many people fail to save enough and lack confidence in their future retirement income. The SCF asks respondents to rate the retirement income they expect to receive from Social Security and private pensions. As Table 3 shows, only about 8 percent of respondents are very satisfied with their expected retirement income, and 34 percent feel their retirement income will be enough to maintain their current standard of living. On the

Table 2.
Percentage of respondents saving for retirement or old age and percentage having a saving horizon longer than 10 years, by demographic group

Characteristic	Saving for retirement or old age		Saving horizon longer than 10 years	
	Percentage	Standard error	Percentage	Standard error
Overall	44.7	0.73	13.3	0.49
Sex				
Men	49.2	0.90	14.7	0.63
Women	33.3	1.27	9.7	0.65
Education level				
No high school diploma	20.2	1.76	4.7	0.60
High school diploma	40.0	1.16	11.2	0.74
Some college	44.3	1.45	12.1	1.16
College degree	58.6	1.26	19.1	0.86
Age				
Under 30	25.2	1.75	12.2	1.22
30–39	38.1	1.48	15.2	0.97
40–49	57.8	1.61	16.4	0.97
50–59	62.2	1.59	15.2	1.15
60–69	49.2	1.70	12.4	1.16
70 or older	26.9	1.69	6.3	0.95
Race or ethnic group				
White (non-Hispanic)	49.8	0.80	15.7	0.57
Black (non-Hispanic)	30.8	1.53	7.1	0.74
Hispanic/Latino	27.3	2.50	7.3	1.06
Other	49.8	3.23	8.1	2.35
Total family income				
Under $20,000	19.4	1.28	5.3	0.55
$20,000–29,999	29.1	1.72	10.0	1.24
$30,000–39,999	40.4	2.13	11.2	1.45
$40,000–49,999	44.6	2.55	14.4	1.76
$50,000–59,999	48.3	3.03	11.1	1.75
$60,000–69,999	56.4	2.41	19.5	1.99
$70,000 or above	70.8	1.22	21.0	1.18

SOURCE: Authors' calculations using the 2004 Survey of Consumer Finances.

NOTE: The standard errors are total standard errors that incorporate estimates of variation due to sampling and imputation. (For details, refer to the "Codebook for 2004 Survey of Consumer Finances" provided by the Division of Research and Statistics, Board of Governors of the Federal Reserve System.)

other hand, about 27 percent think that their retirement income will be totally inadequate. Sex, education, age, and race do not seem to affect the percentage of respondents who are totally satisfied with their retirement income, although there are modest demographic differences in the percentage of respondents who consider their retirement assets to be totally inadequate, and no group seems to feel exceedingly confident in their retirement savings. Perhaps the most striking finding in this analysis concerns individuals between the ages of 50 and 59, who are quickly approaching their retirement years. Of this group, roughly 25 percent believe that their retirement income will be totally inadequate. Having a quarter of the group so close to retirement feeling unprepared is a substantial problem.

As the above SCF data show, a majority of people are not saving for retirement, exhibit short-sightedness in savings planning, and do not feel satisfied with their expected retirement income. These issues could be partially remedied by a retirement program designed to encourage employee participation and contributions while offering effective financial information to partic-

Table 3.
Percentage of respondents rating their expected Social Security and pension income, by demographic group

	Totally inadequate		Somewhat inadequate		Enough to maintain living standards		Somewhat satisfactory		Very satisfactory	
Characteristic	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Overall	27.3	0.68	19.3	0.59	34.0	0.64	11.2	0.52	8.2	0.40
Sex										
Men	25.5	0.79	18.9	0.62	34.8	0.79	12.4	0.62	8.4	0.44
Women	32.0	1.35	20.5	1.25	31.8	1.21	8.2	0.84	7.5	0.71
Education level										
No high school diploma	31.6	2.02	20.4	1.43	35.1	1.79	6.1	0.99	6.7	1.00
High school diploma	29.5	1.26	18.4	0.97	35.0	1.48	9.4	0.88	7.7	0.62
Some college	31.3	1.54	20.1	1.28	32.0	1.63	9.6	0.88	7.0	0.82
College degree	21.7	1.07	19.3	0.89	33.6	1.14	15.6	0.86	9.7	0.69
Age										
Under 30	35.3	1.58	16.5	1.32	29.5	1.73	9.6	0.96	9.1	1.11
30–39	32.5	1.56	21.6	1.57	28.6	1.36	10.0	1.01	7.3	0.83
40–49	29.5	1.13	21.2	1.18	33.6	1.26	10.6	0.91	5.2	0.61
50–59	25.1	1.30	18.9	1.20	37.6	1.31	12.3	1.01	6.0	0.75
60–69	21.5	1.36	19.2	1.68	35.4	1.82	13.3	1.46	10.6	1.00
70 or older	18.5	1.83	17.2	1.21	39.1	1.98	12.0	1.45	13.3	1.36
Race or ethnic group										
White (non-Hispanic)	25.3	0.73	20.6	0.65	33.8	0.71	12.2	0.64	8.2	0.48
Black (non-Hispanic)	32.1	1.47	17.1	1.99	33.7	1.95	10.3	1.19	7.0	0.81
Hispanic/Latino	34.1	1.77	14.9	1.29	35.5	1.95	5.5	0.92	9.9	0.94
Other	29.0	3.54	17.4	2.86	34.6	3.25	12.5	3.38	6.5	1.84
Total family income										
Under $20,000	38.3	1.53	20.3	1.34	30.2	1.26	5.9	0.76	5.3	0.70
$20,000–29,999	33.3	1.95	18.6	1.35	30.7	1.65	8.8	1.36	8.7	1.20
$30,000–39,999	24.2	2.25	18.2	1.80	43.3	2.73	7.3	1.18	6.9	1.03
$40,000–49,999	28.6	2.18	20.8	1.41	34.8	1.90	10.3	1.34	5.6	1.18
$50,000–59,999	19.1	2.30	22.8	2.42	34.7	2.80	13.4	2.09	10.0	1.82
$60,000–69,999	21.1	2.30	17.9	2.44	30.3	2.45	18.8	2.37	12.0	1.49
$70,000 or above	20.1	1.13	18.3	0.81	35.2	1.11	16.2	1.08	10.2	0.77

SOURCE: Authors' calculations using the 2004 Survey of Consumer Finances.

NOTES: Respondents were asked to rate their expected retirement income on a scale from 1 to 5, with 1 being totally inadequate, 3 being enough to maintain living standards, and 5 being very satisfactory. The terms "somewhat inadequate" and "somewhat satisfactory" are the authors' choosing for those respondents who chose 2 and 4 on the scale, respectively.

The standard errors are total standard errors that incorporate estimates of variation due to sampling and imputation. (For details, refer to the "Codebook for 2004 Survey of Consumer Finances" provided by the Division of Research and Statistics, Board of Governors of the Federal Reserve System.)

ipants. Both of these methods are critical elements to consider in designing an employer-sponsored savings program that aims to help participants save adequately for retirement.

Plan Design

Retirement savings plans can be constructed and administered in a variety of ways. These design choices merit close consideration because research has shown that different enrollment, investment, matching, and distribution options can considerably influence participation and savings rates.

Enrollment

The most basic feature of a retirement savings program, and one that plays a significant role in determining participation rates, is the enrollment approach used in the plan. Retirement savings programs are generally designed using either an opt-in or automatic enrollment strategy. In an **opt-in plan**, the default is nonparticipation because employees are required to indicate their desire to be involved in the program, most often by submitting an enrollment form. Under **automatic enrollment**, employees are, by default, account holders in the retirement plan. They can opt-out of the plan but usually must fill out paperwork to do so.

Madrian and Shea (2000) find in their study of a large U.S. company that switching from an opt-in to an automatic enrollment plan increases participation substantially and lowers discrepancies in 401(k) participation among different demographic groups. Similar results are demonstrated in a report by Holden and VanDerhei (2005), which finds, for all eligible employees in the study, that automatic enrollment increased 401(k) participation by 26 percentage points. Automatic enrollment allows employees to avoid deciding whether to participate in the plan by making participation the default. This factor is particularly important because inertia and the desire to avoid making a complicated decision can have a significant impact on participation.[11]

Policymakers have begun to appreciate the impact of automatic enrollment plans on participation and have developed initiatives to help make these types of retirement savings programs more common. The most significant indicator of the growing faith in the efficacy of automatic enrollment is the passage of the PPA. The PPA amends the Employee Retirement Income Security Act (ERISA) expressly to preempt state laws that prohibit the withholding of any portion of an employee's pay without an affirmative election by the employee, that is, automatic enrollment (Purcell 2006). To obtain the preemption, employers must satisfy several requirements: deferrals and employer contributions must be placed in qualifying default investment alternatives (QDIAs) for participants who do not direct their account investments; notice must be given to participants explaining their right to opt-out or change the deferral percentage; participants must be informed that their accounts will be invested in QDIAs if they do not give investment directions; and participants must have a reasonable time to opt-out or to elect a different amount of deferral after notice is given.[12]

The PPA also amends the Internal Revenue Code to add a design-based safe harbor for plans that use automatic enrollment. The safe harbor is optional and allows plans to be exempt from nondiscrimination testing if the requirements are met.[13] To be eligible for the safe harbor, the default contribution rate for a retirement savings plan with automatic enrollment must be no less than 3 percent in the first year, increasing to minimums of 4 percent in the second year, 5 percent in the third year, and 6 percent in all following years. Contribution rates can be set higher than these thresholds, with 10 percent serving as the maximum (Purcell 2006).[14] The potential availability of safe harbor from nondiscrimination testing is designed to make automatic enrollment a more attractive option for plan providers, thereby increasing its use and, by extension, participation in retirement savings plans. Matching provisions are also part of the PPA rules governing safe harbor, and a discussion of these rules is included later in this article.

Evidence already indicates that the automatic enrollment elements of the PPA have worked as intended. According to a 2006 survey of chief financial officers completed by Financial Executives International and Baruch College, almost 28 percent of companies are either planning to modify or have already modified their 401(k) plans based on the PPA. Roughly 38 percent of the firms making such changes have set the introduction of automatic enrollment as a goal (Financial Executives International 2006).

However, despite the growing acceptance of automatic enrollment, the effects of this strategy are not all positive. There is evidence that automatic enrollment produces lower contribution rates than would occur under an opt-in program. Madrian and Shea (2000) note that in their study of automatic enrollment, 12.2 percent more employees remain at the default contribution rate than what would be predicted under a scenario where all new participants under automatic

enrollment contribute at the default rate. This finding indicates that automatic enrollment leads many individuals to choose the default contribution rate, even some who would have participated in the plan under an opt-in arrangement anyway and adopted a different contribution rate. One particular problem with participants remaining at the default rate is that this rate is nearly always well below the DC plan contribution rates that are generally required to achieve an adequate postretirement income, according to projections by Vanguard (2004).

A possible solution to low default savings rates is outlined by Thaler and Benartzi (2004). The authors develop what they term the SMarT program, which features an automatic escalating contribution rate that takes effect with the first paycheck following a raise, up to a certain predetermined maximum. The plan ensures that an employee's take-home pay is never reduced and helps overcome obstacles to saving, such as bounded rationality (people do not know how much they should save); lack of self-control (people lack the willpower to increase savings); procrastination (people often postpone tasks they find unpleasant); status quo bias (people are often controlled by inertia); and loss aversion (people weigh losses they experience more heavily than they do gains). In their study of the SMarT program at a midsized manufacturing firm, Thaler and Benartzi (2004) find that 80 percent of participating employees remain in the SMarT program through four pay raises, with contribution rates rising from 3.5 percent to 13.6 percent over a period of slightly more than 3 years.

Despite their benefits, retirement savings programs with automatic enrollment are sometimes criticized because of the paternalism such plans entail. If this issue is a concern, another alternative is to design a retirement program that uses active-decision making —an option discussed by Carroll and others (2005) in *Optimal Defaults and Active Decisions*. Under an active-decision plan, prospective participants are given a form, either when they come on duty or at a later date when they become eligible, that requires them to decide whether to participate in the retirement plan being offered. The authors find in their analysis of a large Fortune 500 company that changing to an active-decision plan increased enrollment by 28 percent over the standard, opt-in program during 3 months and that attrition rates showed no discernable change. Active-decision plans also resulted in participants choosing an average savings rate that would take 3 years to achieve using opt-in enrollment. However, active-decision plans also have definite costs. They require every potential participant to enter into an often time-consuming decision process that they may be ill qualified to make. In addition, these plans require the creation of an effective method for compelling completion of the form, lest the program become for all intents and purposes an opt-in plan (Carroll and others 2005). Active-decision plans avoid the paternalism present in automatic enrollment programs but place a greater burden on participants and may ultimately be less effective at increasing participation rates.[15]

Enrollment options can substantially influence participation rates, contributions, and consequently, the ability to sustain an adequate postretirement income. Changing from an opt-in to an automatic enrollment program has a positive impact on enrollment but can also decrease contribution rates as people fail to increase their savings rate from the default. Maintaining the low default rate, in turn, results in fewer participants having enough savings to maintain an adequate replacement rate when they are no longer working. Retirement savings programs, such as the SMarT plan, deal with these complicated issues and include enrollment features that achieve a balance among the distinct goals that savings plans must meet. If automatic enrollment is objected to on grounds of paternalism, active-decision making can be used instead—an approach that also avoids automatic enrollment's negative affect on contribution rates. No matter which path is chosen, however, the literature overwhelmingly encourages implementing a plan with enrollment features that increase participation beyond the levels attained through opt-in design.

Investment

After choosing to participate in a savings program, participants must determine how to best invest their money. The options offered by a retirement savings program are important factors in helping participants meet their own savings goals.

One issue of particular concern is a lack of diversification. Agnew, Balduzzi, and Sunden (2003) find a bimodal distribution of investment holdings with 47.61 percent of individuals in their study holding no equities and 21.73 percent holding only equities. Further, a 2007 Fidelity Investments report finds that 19 percent of DC plan participants hold only a single, non-diversified investment asset in their 401(k) plan (Fidelity Investments 2007). By concentrating investments in a limited number of assets, employees are not diversifying their accounts—which can be an impor-

tant protection from dramatic fluctuations in account value.

The most basic aspect of designing investment options for retirement plans is determining the range of opportunities that will be available for participants. In the 2004 SCF, nearly 53 percent of retirement plan participants reported having at least a limited choice in how the assets in their employer-run retirement plans are invested. The way in which these choices are constructed can have a sizable effect on savings behavior. Iyengar, Jiang, and Huberman (2003) find in their study of Vanguard Group clients that for every 10 funds that are added, 401(k) participation rates decrease between 1.5 percent and 2 percent. When people are faced with too many options, many choose to do nothing, overwhelmed by the complex decision-making required. This problem is particularly acute in investing, a topic in which few people feel well qualified (Iyengar, Jiang, and Huberman 2003).

Agnew and Szykman (2004) discover in their survey of individuals that reducing the number of investment options decreases the feeling of overload among those with substantial financial knowledge. However, although those with low financial knowledge still feel overwhelmed and would likely benefit from improved financial education. This finding highlights the importance of plan design in conjunction with financial education to prevent the abundance of poorly understood choices that produce uncertainty in, and avoidance of, investment.[16] The recommendation offered by Iyengar, Jiang, and Huberman (2003) to deal with the abundance of choice is to tier funds, setting up groups of funds in different sections according to investment goals. This approach allows participants to experience the positive effects of greater choice, such as a sense of personal control, without making them feel overwhelmed by the number of options available.

Beyond the problems associated with the inaction that often accompanies the feeling of being overwhelmed is the fact that when investors do make an investment choice, they generally make one ill suited to achieving their own savings goals. Benartzi and Thaler (2001) find investors often use what is termed the 1/n heuristic, where contributions are divided evenly among the options provided. Using this type of decisionmaking, participants may choose portfolios that are not along, or are at the wrong point of, the efficient frontier, which represents the optimal portfolio allocation that is consistent with an individual's desired balance of risk and return. Benartzi and Thaler's work demonstrates that many people are simply unable to effectively make complicated investing decisions in the manner most beneficial to them. However, these issues do not mean that investors are inherently unable to make effective investment decisions. Comprehensive financial education programs and a well-designed retirement savings plan can help alleviate the problems associated with excessive choice.

Regardless of the investment options offered, constructing the default fund requires great care. The propensity of many participants to maintain investments in the default option requires that the automatically adopted portfolio is well designed to achieve optimal investment decisions and high returns. Choi and Laibson (2001) describe how default savings rates are often low and placed in conservative investment options such as money markets, which can result in participants not having adequate funds throughout their retirement. This cautionary approach for defaults is logical given that employers are unlikely to automatically place employees in a position where their funds are dependent on volatile returns.

One effective default, and an increasingly popular option for managing investments, is a life-cycle fund. According to Vanguard (2006), more than 40 percent of new participants in DC plans used life-cycle funds for their investments. This type of diversified, evolving portfolio is discussed in *Funds for Retirement: The 'Life-Cycle' Approach* (Vanguard 2005a). In that report, Vanguard highlights two types of life-cycle funds: targeted-maturity funds and static-allocation funds. **Targeted-maturity funds** automatically alter risk as an investor ages; **static allocation funds** have to be actively managed by participants who can choose a portfolio ranging from extremely conservative to very aggressive (Vanguard 2005a). Both types of plans have distinct costs and advantages. Targeted-maturity funds do not allow participants to address issues such as spending needs or risk tolerance, but they also require little work on the part of investors. Static-allocation funds have a more significant time commitment but allow participants to more effectively meet their individual needs. Vanguard (2005a) recommends that only one of these types of life-cycle funds be offered in a retirement plan and, when choosing which of these life-cycle plans is most appropriate, that characteristics such as age, education level, the savings rate of the average participant, and the cost of funds need to be considered.

If not used as intended, the life-cycle fund's effectiveness is limited. The diversification within life-cycle funds is designed to allow participants to use this

investment option as "one-stop shopping." However, only 31 percent of participants in life-cycle funds use them in this way (Vanguard 2006). Like any facet of a retirement investment program, employers should advise participants about the purpose of life-cycle funds and how to use them effectively.

Another critical investment decision in the construction of a retirement savings program is the role of company stock. Utkus and Waggoner (2003) find in their survey of plan sponsors and participants that many employees underestimate their own holdings in company stock, and around two-thirds erroneously believe that their employer's stock is at least as safe as a diversified portfolio of stocks.

Agnew (2002) explains that over investment in company stock is a common mistake in retirement plan portfolios. In DB plans, employer stock cannot, by law, compose more than 10 percent of a portfolio. In DC plans, no such limit exists, and Agnew finds in her study of one large 401(k) plan that the mean allocation of company stock held by plan participants is 49 percent.

Although the allocation in company stock for this particular type of plan was unusually high, the implications of Agnew's (2002) findings are supported by the work of Mitchell and Utkus (2002). By analyzing figures from Holden and VanDerhei's study of data from the Employee Benefit Research Institute (EBRI) and the Investment Company Institute, Mitchell and Utkus find that nearly one-quarter of participants in 401(k) plans that allow investment in company stock have this option accounting for more than 60 percent of their holdings. Company stock can represent a risky investment, particularly when a portfolio is not adequately diversified. Although employers may find the option of providing heavy concentrations of their own stock attractive, employer stock has several deficiencies, making it a poor choice for the core component of a retirement fund, including transaction restrictions and greater volatility than other investment options (Utkus and Waggoner 2003).

The PPA includes diversification rules that went into effect on January 1, 2007, for new securities and will become effective within 3 years for previously held securities. These rules require DC plans to allow participants to diversify their holdings out of company stock into at least three other investment options (Purcell 2006). For all plan participants, regardless of tenure, this rule applies to company stock purchased using voluntary salary deferrals or after-tax contributions. Among employees with at least 3 years of service before 2007, the diversification rules also apply to employer contributions to the plan. However, under certain circumstances, these regulations do not apply to employee stock ownership plans (Purcell 2006).

Determining effective investment options is a difficult task in planning a successful savings plan. Poorly designed investment options, particularly as the default, can significantly decrease the likelihood that participants will be able to sufficiently provide for themselves after their working career ends. Offering tiered options, life-cycle funds, or both, and decreasing reliance on company stock all help ensure that participants in the retirement program invest effectively and according to their own desired risk.

Matching

Another important component of many retirement savings programs is an employer match, in which employers make a contribution to a participant's account based on the money already invested, up to a predetermined point. The match is used as a tool to increase participation and savings levels, as well as contribution rates. The two components of an employer match are the rate at which matching occurs and the threshold at which matching stops.

Engelhardt and Kumar (2006) analyze the complexities of measuring the affect of employer matching. They cite studies that demonstrate seemingly contradictory results. For instance, some studies find that increasing the employer match rate increases savings; others show that the existence of a matching program matters but the actual rate does not; and yet others report that increases in the match rate can lower contributions. On the basis of their own study, Engelhardt and Kumar conclude that individuals do not react strongly to employer matching in terms of either participation or contributions. However, the authors offer the caveat that their study focuses on older workers and younger workers may have a different response to employer matching. Other research, such as that reviewed by Munnell and Sunden (2003) more strongly suggests that the existence of an employer match increases the likelihood that employees will enroll in a retirement savings plan, while also increasing contribution levels.

Beyond the rate at which matching occurs, plan designers must consider the optimal match threshold, or the percentage at which employers' contributions to the plan cease. Choi and others (2001) discuss how the match threshold serves as a guide to employees, who often tailor their saving rate to this limit. The

authors note that the match threshold can help raise the contributions of households with low savings rates and provide an anchoring effect for investors who use the percentage as a starting point. However, the match threshold can also depress contributions if it is set too low, because participants are far less likely to contribute beyond this amount, particularly in plans that use automatic enrollment. According to the authors' analysis of three companies, 63 percent to 79 percent of participants in an opt-in plan contribute at or above the match rate, compared with only 26 percent to 49 percent of participants in an automatic enrollment plan.

One method that can be used to increase contribution rates without costing the employer more money is to match a smaller percentage of pay up to a greater threshold. For example, matching 50 cents on the dollar up to 6 percent, as opposed to 100 percent of each dollar up to 3 percent, may boost employees' contribution rates, even though the employers' cost stays the same (Sleyster 2006).

The PPA includes new rules governing the use of matching funds for safe harbor from nondiscrimination testing for plans using automatic enrollment. In addition to the qualifications that have already been discussed, safe-harbor eligibility also requires employers to match contributions for all non-highly compensated employees using the following guidelines: 100 percent of elective deferrals up to the first 1 percent of compensation, 50 percent of elective deferrals for the next 5 percent of compensation, and a non-elective 3 percent of compensation. Employer contributions must then be 100 percent vested after 2 years (Purcell 2006).

Employer matching can be an important factor in achieving the goals of a retirement plan. Although research on the effectiveness of employer matching is mixed, there is some evidence that matching can increase participation and contributions. Perhaps most importantly, the match rate and threshold seem to help increase contributions among households with low savings, a group particularly at risk for not having sufficient funds to maintain a comfortable standard of living in retirement. The design of an appropriate employer matching program is a worthwhile consideration for plan designers. Ultimately though, the controlling factor in deciding on a match rate and threshold may be the financial ability of the employer to provide funds.

Distributions

Another important aspect of retirement savings programs is the method through which funds are paid out of the account. The rules governing the distribution of funds, both before and after retirement, can have a dramatic impact on plan participation, contribution rates, and the maintenance of an adequate postretirement replacement rate.

One issue that plan designers must consider is whether they will permit money to be distributed before retirement through loans. In the 2004 SCF, almost 13 percent of respondents participating in plans that allow borrowing report having outstanding loans from their retirement plan, for a median amount of $4,500. Like private loans, plan loans are also generally paid back on a fixed time schedule. For example, in the federal government's Thrift Savings Plan (TSP), a general-purpose loan must be repaid in a period of 1 to 5 years, and a residential home loan can be paid off in 1 to 15 years. In addition to interest payments, which are credited back into the account, fees may be associated with the loans to pay for the administrative costs of processing these transactions.

Permitting distribution through loans is a popular feature among 401(k) plans and can have a noticeable impact on participation rates and contributions. According to a study by the Government Accountability Office, participation rates are 6 percentage points higher in plans that allow loans (GAO 1997). Studies indicate that the availability of loans also increases contribution rates. Munnell, Sunden, and Taylor (2001/2002), using the 1998 SCF, find that the possibility of borrowing funds increases contributions by 2.6 percentage points. Both factors are critical in the success of a retirement savings program and help ensure that as many employees as possible have an adequate income in retirement. Loans can also be problematic, however, because loans cause plan balances to grow more slowly since the money that has been removed is not available for investment.

Decisions must also be made regarding how to deal with the accounts held by employees when they leave their position, either at or before retirement. There are numerous options for distribution, and the method selected can affect the adequacy of retirement savings. This choice is ultimately up to the participant, but plan providers can promote the methods of distribution that are most effective in helping achieve retirement savings goals.

The fundamental question facing plan participants who leave their employer before retirement is whether to accept receipt of the funds in their retirement savings account immediately, to defer compensation until a later date by leaving the account with their employer,

or to roll the account over into an investment portfolio at their new job or into an IRA. According to Hewitt Associates (2005b), 45 percent of all employees elect to take a lump-sum payment when leaving their job. The rates are highest for younger workers, aged 20 to 29, 66 percent of whom accept a cash distribution. However, even among older workers, aged 40 to 49, over 42 percent elect a lump-sum payment upon ending their employment (Hewitt Associates 2005b). A significant factor in determining whether the 401(k) balance is taken as a lump sum or rolled over (meaning transferred into another tax-deferred savings vehicle) is the amount of money in the account. Of participants with less than $10,000 in their 401(k), 72.5 percent cash out their balance, compared with 31 percent for those with balances between $10,000 and $20,000 (Hewitt Associates 2005b). The payment of a lump sum can negatively affect savings because many participants are unlikely to reinvest these funds (Poterba, Venti, and Wise 1995). Beyond the fact that lump-sum payments are rarely reinvested, cashing out a 401(k) also lowers savings by decreasing the value of the account through tax penalties. If a participant accepts a lump-sum payment and is younger than 59½ years old, outside certain exceptions, the sum is generally subject to income tax as well as an extra 10 percent penalty for early withdrawal. The option of cashing out 401(k)s in a lump sum, although attractive for many participants, can largely defeat the purpose of a retirement plan.

The law previously allowed employers to provide a departing employee with a lump-sum cash distribution if the balance in the retirement account was under $5,000, regardless of the employee's consent. However, the Economic Growth and Tax Relief Reconciliation Act of 2001 lowered this threshold to $1,000. Instead of a cash distribution, employers must rollover the retirement account into an IRA for the employee if the employee does not make another election (Purcell 2003).

Turning to retirement distribution, if having adequate long-term retirement savings is a goal, annuities should be encouraged. As longevity increases, the possibility that individuals will outlive their retirement resources is a growing concern. Research from EBRI indicates that workers have a poor understanding of the variability of life expectancy, meaning that many fail to plan for the possibility of living longer than their own self-projected death age (Helman, Copeland, and VanDerhei 2006). As the National Academy of Social Insurance panel report argues, "economic analyses indicate that a life annuity would be a rational choice for a person who wanted to ensure income for life" (Reno and others 2005, 51).

Decisions about methods of distribution are a critical factor in determining the effectiveness of a retirement savings plan. Distribution rules can increase savings and are important in providing plan participants with an adequate postretirement replacement rate. Even a plan that has successfully helped participants accrue sizable funds for retirement can be rendered ineffective by design decisions that foster counterproductive distribution strategies. As such, it is important that plan designers do not overlook this final component of constructing a successful retirement savings plan.

Financial Education

Constructing a well-designed plan is only one aspect of developing a successful program with high levels of participation, significant contribution rates, and an adequate postretirement replacement rate. Financial education is another essential element of an effective retirement savings program. It can help employees set realistic goals for retirement savings and can increase employees' understanding of the choices available to them, thereby increasing their savings and net worth (Maki 2004). The need for financial education is made apparent when one considers that roughly 30 percent of households in the Health and Retirement Study whose head is nearing the end of his or her working career have engaged in little or no planning for retirement (Lusardi 2003).

Financial education has become a more important topic in the past few decades, largely as a result of the increase in DC plans in the workplace.[17] To successfully operate one of these plans, employers should provide information to employees that explains the details of the plan, encourages them to participate, ensures they make sound investments, and makes certain they are contributing enough during their working years to maintain a desired standard of living in retirement. According to *The Effects of Financial Education in the Workplace: Evidence from a Survey of Employers* by Bayer, Bernheim, and Scholz (1996), both participation in and contributions to DC plans are significantly higher when employers offer educational programs.

In a workplace, financial education is most often provided by employers to employees—both to those who are already enrolled in a savings plan and to those who do not participate. According to a 2005 Hewitt Associates study, 91 percent of employers offer investment education to employees (2005a). Forty-two

percent of employers stated that the most important goal of education they provide is to increase plan participation (Hewitt Associates 2003). With the passage of the PPA, which allows for automatic enrollment (as explained previously), employers may set new goals in offering education to their employees. Other reasons employers might offer financial education to employees could include improving employees' motivation, loyalty, and morale by demonstrating concern for their welfare; communicating the substantial value of pension benefits; or responding to employees' request for assistance with financial planning (Bernheim and Garrett 2003).

Although many employers offer financial education to their employees, several studies indicate that retirement savings plans are not achieving the primary goals for which they are designed. According to Hewitt Associates (2006a), about 33 percent of employees with 401(k)s do not participate in the plan offered by their employer. Of those who do participate, 22 percent do not contribute enough to max out their employer matching contribution, and only 35 percent of employees were definitely aware that their employer even offered matching contributions (Hewitt Associates 2003). Further, only 2 percent of workers, according to data from EBRI, say they are very knowledgeable about investing (Gross 2005). A survey by investment education provider ICC Plan Solutions finds that roughly 74 percent of retirement plan sponsors state that their participants need help with basic investment knowledge (Arnone 2005).

This lack of basic investment knowledge may lead employees to make poor investment decisions, leaving them ill prepared for retirement. Using Survey of Income and Program Participation (SIPP) data, a study by Copeland (2005) found that only 5.6 percent of workers are making the maximum contribution allowed to their 401(k)-type plan and that the average total account balance is only $33,647. In addition, the median account balance for workers closest to retirement (aged 55 to 64) is only $25,000.[18] Under IRS laws for 2008, employees can contribute up to $15,500 per year to their retirement savings accounts, and this amount can increase annually by cost-of-living adjustments.[19] With average account balances so low, many individuals will not be able to achieve the recommended 70 percent to 80 percent income replacement rate in retirement (Milne, VanDerhei, and Yahoboski 1995).

The PPA made it easier for employers to provide financial education at work without worrying about the risk involved. Previously, employers were hesitant to provide advice because they did not want to be held legally liable if their employees' investments did poorly. The PPA eliminated that risk by permitting a fiduciary that is a registered investment company, bank, insurance company, or registered broker/dealer to provide investment advice to participants in an "eligible investment advice arrangement" as long as they charge a flat fee that does not vary depending on the basis of any investment option selected or their recommendations are based on a computer model that has been certified by an independent third-party (Purcell 2006 and Doyle 2007).[20] An audit of the investment advice will be required annually (Purcell 2006). The provisions on investment advice could be further refined in the technical corrections of the PPA, since this was one of the most heavily debated provisions in the original legislation (Shidler 2006).

Financial education provided by employers (or plan sponsors) is often the only exposure many employees have to this type of information. With the passage of the PPA, employers now have more legal protections in providing investment advice to their employees and may be more inclined to offer or expand education within their retirement savings programs. Financial education can cover a wide range of topics, including basic investment terminology, principles of asset allocation, concepts of risk tolerance, and retirement goal setting. In addition, employers can determine how often and in what form they offer education to their employees. They can also tailor the type of financial education provided according to the demographics of their workforce, which can further increase the effectiveness of financial education in achieving the goals of a successful retirement savings program (that is, high contribution and participation rates, optimal investment decisions, and an adequate replacement rate).

Topics Covered

Financial education offered by employers can cover a wide range of topics and can be tailored according to the make-up of their workforce. For example, if employees are at the beginning of their career, financial education could focus on encouraging enrollment in the plan, slowly increasing contribution rates with career steps, and investment allocations that may yield more money over a long time horizon. As employees near retirement, financial education could shift to cover how the money should be distributed when leaving employment, what types of annuities to purchase,

or altering investment allocations to avoid sudden dips in the stock market close to retirement.

According to a study by Milne, VanDerhei, and Yahoboski (1995), the basic principles that employees should understand are the sources of retirement income, the establishment of goals for retirement income, the effect of inflation on buying power in retirement, the impact of personal lifestyle and assumptions concerning health status and expected life span on retirement income, and the income needs of survivors. Employees need to understand what their retirement income will consist of (Social Security, pensions, individual savings, and so on) and set goals for how much they need to put in their DC plan to ensure that all retirement income combined will result in a replacement rate of 70 percent to 80 percent of preretirement earnings. In addition to these basic principles, the authors argue that basic financial education should at a minimum include the importance of plan participation, contribution levels, asset allocation and diversification, and the individual's savings horizon. Other relevant topics can include basic investment terminology, a general explanation of the company's specific pension plans, understanding of risk and risk tolerance (which can change on the basis of the career stage the employee is in), and the impact of preretirement withdrawals on retirement income (see the previous section on distributions).

Milne, VanDerhei, and Yahoboski (1995) also discuss a 1993 Hewitt Associates study, which found that 87 percent of plan sponsors feel that asset allocation is the most important information need among employees, followed by risk tolerance (83 percent). Bernheim and Garrett (2003) find that financial education programs tend to be remedial and are offered more frequently in situations where employees are predisposed against saving. As the above SCF data show, respondents who are predisposed against saving for a number of reasons are unprepared for retirement. One explanation may be that financial education is not available to or is underused by the majority of those individuals, even though it may be tailored specifically for them. Bernheim and Garrett also state that employers are more likely to offer education in the context of plans, such as 401(k)s or the TSP, where employees make their own decisions about whether or not to enroll, how much they wish to contribute, and how their assets should be allocated.

Delivery Method

Financial education can be offered using a wide range of media, such as print materials or seminars, and the method through which it is provided will depend on the employer's resources and who will be using the information. The delivery method can be customized according to demographic factors such as the age of the employees or the language they speak. Types of program deliverables can include generic print publications (newsletters, guides, workbooks); personalized print items (individual benefit statements, retirement projections); group learning settings (live workshops or seminars, online sessions); individual learning (CDs, videotapes, audiotapes, Web-based self-study modules); telephone services (1-800 numbers); individual counseling with financial planners; and Web-based tools (Arnone 2005). The use of these types of materials can vary from company to company and even from office to office. For example, an educational CD might be very useful for employees who travel frequently, such as truck drivers, or individual counseling can be provided at smaller firms with fewer employees, where it would be less costly (Milne, VanDerhei, and Yakoboski 1995).

According to the 2002 Retirement Confidence Survey conducted by EBRI, the American Savings Education Council, and Matthew Greenwald & Associates, 82 percent of workers receive benefit statements, 82 percent receive brochures, and 68 percent receive either newsletters or magazines. The same study finds that 61 percent of employees have access to a financial planner and 66 percent are eligible to attend seminars. Online materials are available to 47 percent of employees at firms with educational offerings, 14 percent have access to computer software, and 14 percent have access to informational videos (Employee Benefit Research Institute 2002). The most recent Retirement Confidence Survey found that 61 percent of workers have referenced plan benefit statements, 52 percent have used information found over the internet, 28 percent have used computer software, and 21 percent have used information obtained from seminars when making retirement savings and investment decisions (Helman, Copeland, and VanDerhei 2007).

Maki's 2004 study cites a survey using Watson Wyatt Worldwide data, which finds that both generic newsletters and material specific to the employer's retirement savings plan can raise participation rates. If used together, they can increase participation rates 36 percentage points. In addition, the survey finds that

generic newsletters have no effect on contribution rates and that financial information specifically tailored to the employer's plan raises contribution rates approximately 2 percentage points. Though only around half of employees are eligible to attend seminars, Maki notes that retirement seminars are the most effective means of communication, raising participation rates by 8 percentage points and contribution rates by 0.66 percentage points, according to a KPMG Peat Marwick Retirement Benefit Survey. In addition, a 1994 EBRI study on the educational efforts within DC plans found that 92 percent of employees receiving educational materials report reading them. Among those who read the materials (or attended seminars), 33 percent report that the materials led them to increase their plan contributions and 44 percent said it led them to change their asset allocation.

Under the PPA, participants in DC plans who have the right to direct investments must receive a benefit statement once per quarter effective December 31, 2006. The statement must provide information on any restrictions on the right to direct investments, explain the importance of diversification, and include a statement on the risk of holding more than 20 percent of a portfolio in the security of any single entity, such as employer securities. Benefit statements may be provided electronically to the extent that they are reasonably accessible to participants (Hewitt Associates 2006b).

Frequency

In addition to the message and type of financial education provided to employees, the frequency with which it is offered can also affect whether employees are using their retirement savings plan in the most beneficial way. In their study, Bayer, Bernheim, and Scholz (1996) note that frequent seminars have a consistent and positive effect on participation in self-directed plans. They find that among lower-paid workers, frequent seminars are associated with participation rates that are 11.5 percentage points higher than the rates for plans with no seminars. For higher-paid workers, frequent seminars are associated with participation rates that are 6.4 percentage points higher than the rates for plans with no seminars.

According to the study by Milne, VanDerhei, and Yakoboski (1995), successful education requires efficient communication that depends on the consistent and regular delivery of messages. An example would be to provide quarterly benefit statements with a 1-800 number that employees can call to ask further questions about their statements or retirement savings program. If educational materials are not working to improve retirement savings, then a change such as placing posters around the office or sending out e-mails may encourage employees to take action. The authors discuss a Foster Higgins study that found that 69 percent of plan sponsors who made changes to their communication strategies within the previous 2 years reported an increase in plan participation.

These studies indicate that it is not fully sufficient for financial information to be provided only once, but that it must be appropriate and provided to employees regularly to reinforce the goals of the retirement savings plan.

Availability and Use

Regardless of the type, medium, or frequency of financial education offered, availability and use are the most important factors. Bernheim and Garrett (1996) find that educational offerings are strongly correlated with 401(k) participation. When education is available, 84 percent of respondents participate in the plan compared with only 70 percent when education is not offered. When available educational offerings are used by employees (for example, reading a financial education pamphlet offered by an employer), 88 percent participate in their 401(k) plans compared with only a 64 percent participation rate when the educational offerings provided are not used.

With the introduction of the PPA, financial education in the future will be less important for encouraging plan participation and more important for managing account balances and increasing contributions. Bernheim and Garrett (1996) find that when education is offered, median account balances are $8,250 compared with only $5,000 when education is not provided. They also find when employees use the education provided, median plan balances are $10,000 compared with only $4,000 when available educational offerings are not used. These findings demonstrate how important the availability of financial education can be as a tool in helping achieve the goals central to all retirement savings plans.

Effectiveness of Financial Education on Population Subgroups

The SCF data in this article have demonstrated that certain segments of the population are most in need of financial information to make sound investment and saving decisions. According to a Federal Deposit Insurance Corporation study by Burhouse, Grambrell,

and Harris (2004), individuals with less financial knowledge tend to be minority, single, younger or older than average, low earners, and less educated. The authors also find that individuals who need comprehensive financial education covering *all* basic topics (that is, cash flow, savings, and investments) were more likely to be single females, black or Hispanic, live in larger households, have less formal education, and have lower household income.

The sources from which these subgroups receive their financial information play an important role in their overall financial well-being. Among those in the 2004 SCF who save, respondents use a variety of sources to obtain advice and information about their savings and investments. The responses offered in the SCF can be split into three primary categories: formal advisors, informal advisors, and public sources. The **formal advisor** category includes information received from lawyers, accountants, bankers, brokers, financial planners, and insurance agents and materials from work/business contacts, investment clubs, or investment seminars. The **informal advisor** category includes advice from a friend/relative, oneself, partner, spouse, or telemarketer. The **public sources** category includes financial information obtained through calling around, magazines/newspapers, material in the mail, television/radio, online service/Internet, advertisements, other personal research, shopping around, or a store/dealer. Respondents to the SCF survey could provide several different answers as to how they make savings and investment decisions.

As Table 4 shows, the sources of investment advice used vary based on demographic characteristics. Men, better-educated individuals, older people, non-Hispanic whites, and those making $70,000 or more annually are significantly more likely to use formal advisors. For some groups the limited use of formal advisors is most likely the result of their prohibitive costs. Those with total family income under $20,000 are the most likely to rely on an informal advisor for their financial advice. The Hispanic/Latino group is least likely to use a formal advisor when making savings and investment decisions, but they may be restricted by language barriers. Only about 40 percent of Hispanic/Latinos interviewed used formal advisors. The presence of possible language barriers is an important example of the need for retirement plan providers to tailor financial education materials to the specific audience, such as providing plan information in Spanish if a significant number of potential participants are not proficient in English.

The lack of access to formal investment advice and general financial education may partly explain the current state of these groups' retirement savings plans. A study of university employees and their retirement savings by Clark and others (2003), finds that low earnings for women lead to smaller account balances in basic pension plans compared with men ($191,461 for women versus $514,801 for men). The authors also discover that women set lower retirement goals than men. For example, women have expected retirement ages of 63 years compared with 64 for men and retirement income replacement rates of 79 percent (81 percent for men). Women with fewer years of education are significantly more likely to report a lower desired retirement age. In Copeland's 2005 study using SIPP data, he finds that 22 percent of blacks and 14 percent of Hispanics are participating in a 401(k)-type plan compared with 31 percent of whites. In addition, he finds that only 0.4 percent of blacks and 1.4 percent of Hispanics make maximum contributions to their plans compared with 6.4 percent of whites. These studies raise concerns about whether certain subgroups of the population will have adequate income in retirement. Improved and more extensive financial education may address some of these concerns.

To reach the groups that need financial education, employers should use the most effective medium and cover the most relevant topics. Burhouse, Gambrell, and Harris (2004) find that personal finance management, budgeting, and recordkeeping are significant concerns for low-income audiences. They also discover that among the general population the Internet is the most popular source of financial information. That finding is supported by a Hewitt Associates study (2003) that finds that about 78 percent of plans used the Internet or intranet for employee investment education in 2001. However, according to the SCF data, these at-risk groups may not be comfortable with computer technology; reasons include that they may not be able to afford the technology, may be at jobs that do not offer it, or may experience language or literacy barriers. Of respondents in the 2004 SCF, only around 7 percent of individuals with income under $20,000 use computer software to manage their money compared with 34.5 percent of respondents with income over $70,000. In addition, just over 3 percent of respondents without a high school diploma use computer software to manage their money compared with roughly 31 percent of those with college degrees.

Burhouse, Gambrell, and Harris (2004) find that women, minorities, older individuals, and less-edu-

Table 4.
Percentage of savers reporting use of formal, informal, or public sources for savings and investment advice, by demographic group

Characteristic	Formal advisor		Informal advisor		Public sources	
	Percentage	Standard error	Percentage	Standard error	Percentage	Standard error
Overall	56.7	0.50	48.0	0.85	50.5	0.77
Sex						
Men	57.6	0.62	47.0	0.98	52.6	0.85
Women	54.1	0.94	50.8	1.43	44.7	1.47
Education level						
No high school diploma	44.1	1.24	48.9	1.95	40.1	2.06
High school diploma	53.5	1.21	49.8	1.75	44.1	1.56
Some college	56.9	1.24	49.1	1.59	54.2	1.56
College degree	62.8	0.87	45.9	1.26	57.0	1.28
Age						
Under 30	46.0	1.67	59.4	2.22	56.4	1.87
30–39	52.9	1.26	51.6	1.56	56.6	1.61
40–49	54.1	1.05	52.4	1.32	53.6	1.54
50–59	63.8	1.03	42.3	1.60	51.1	1.82
60–69	61.1	1.47	40.0	1.92	47.1	2.35
70 or older	62.5	1.39	40.1	2.06	34.5	1.95
Race or ethnic group						
White (non-Hispanic)	61.2	0.69	47.2	1.00	49.1	0.91
Black (non-Hispanic)	46.7	1.53	51.5	1.91	54.2	2.34
Hispanic/Latino	39.6	1.47	47.3	2.16	56.1	2.29
Other	50.6	2.63	54.8	3.79	48.2	4.65
Total family income						
Under $20,000	43.7	1.54	54.1	1.73	45.9	1.87
$20,000–29,999	50.5	1.75	52.6	2.45	46.8	2.54
$30,000–39,999	59.2	1.69	46.0	2.40	47.1	1.80
$40,000–49,999	52.6	2.42	49.9	2.86	51.3	2.68
$50,000–59,999	60.2	2.13	48.6	3.03	53.2	2.73
$60,000–69,999	66.4	2.27	44.7	2.88	55.0	3.31
$70,000 or above	64.7	1.00	42.9	1.27	54.3	1.21

SOURCE: Authors' calculations using the 2004 Survey of Consumer Finances.

NOTE: The standard errors are total standard errors that incorporate estimates of variation due to sampling and imputation. (For details, refer to the "Codebook for 2004 Survey of Consumer Finances" provided by the Division of Research and Statistics, Board of Governors of the Federal Reserve System.)

cated individuals prefer to learn in a communal environment, such as a formal course or informal seminar. According to the 1996 study by Bayer, Bernheim, and Scholz, seminars are the most effective type of financial education and are associated with an increase of 12 percentage points in the participation rate of lower-paid workers. The same study also finds that company-sponsored retirement seminars produce an increase of 1 percentage point in the contribution rate of lower-paid employees. This increase is sizable, since the authors note that the average contribution rate for these lower-paid employees is only 3 percent. In addition to seminars, printed educational materials can also be very helpful and less costly for these groups. According to Milne, VanDerhei, and Yakoboski (1995), 77 percent of employees without a college education and 81 percent with income below $25,000 read company-provided educational materials. Among those who read the materials, 33 percent reported increasing their contributions to the plan, and 44 percent reported changing asset allocations. This type of focused education initiative is already occurring in some cases, according to Bernheim and Garrett (2003). Employers are likely to offer financial education in their workplace to encourage participation among lower-paid

employees, with the goal of addressing nondiscrimination requirements that create binding constraints on pension participation among higher-paid employees. In addition, the passage of the PPA has eliminated barriers for employers to offer investment advice, which could help them to further serve these specific groups.

Examining data from the SCF along with studies on retirement savings by other authors, it becomes apparent that certain segments of the population are more in need of financial education than others. These individuals may not have reliable sources outside of work from which to draw this information, making it essential that employers offer some type of financial education to these groups. If resources allow, a seminar or course would be the most beneficial means to relay financial education; however, printed materials that discuss the company's specific pension plan, basic investment terminology, or other information can be very useful.

Conclusion

Employer-sponsored retirement savings programs are now common in the United States, with more than 4 in 10 workers in private industry participating in such programs (Beckmann 2006). These programs and their effects have been documented extensively in recent academic and industry studies. This article provides a comprehensive overview of literature relating to the best practices for designing retirement savings plans and providing financial education. The manner in which these two elements are structured can be critical in helping to ensure that participants in employer-sponsored retirement programs accumulate adequate savings for retirement. Throughout this article, original research from the 2004 SCF has been provided in an effort to further illuminate the extent of the problem facing retirement savings and some specific issues that plan providers should consider in developing their savings programs and attendant educational materials.

Plan Design

With regard to optimal plan design, strong evidence suggests that inertia lowers participation rates substantially in simple, opt-in savings programs. Some plans remedy this by establishing participation as the default (with the ability to opt-out), but research shows that many of these plans have default funds and contribution rates that are problematic for retirement savings. Some research suggests moving away from the opt-in and opt-out framework altogether and focusing on an active-decision model. The idea is to develop mechanisms that require a worker to make a formal decision about the savings program by a certain date. In addition, plan design often seeks to reduce the complexity associated with saving for retirement by simplifying investment choices. Offering too many investment options depresses participation in the plan and can lead to the use of potentially inappropriate strategies (for example, a worker simply putting an equal amount in each fund). One trend in plan design is to offer life-cycle funds, which in many cases are specifically designed to provide "one-stop" shopping to workers. Finally, the distribution of funds is a critical element of plan design that can ultimately affect the long-term adequacy of the payments provided by an employer-sponsored retirement savings program. Lump-sum distributions are an attractive option to many plan participants, but because these funds are often quickly spent rather than reinvested this approach can severely diminish retirement resources when compared with other strategies such as annuitization.

Financial Education

Even under optimal plan design, financial education is necessary for employees to understand how retirement savings programs work and how they can use them to achieve adequate retirement savings. For example, workers do not correctly "use" life-cycle funds; rather than being the only fund held in a portfolio, they are often combined with separate stock and bond index funds. This reflects a lack of financial education even where effective plan design exists. In addition, even if a program's design does not produce high participation or contribution rates, research indicates that education provided to employees can help increase those rates. The literature suggests that frequent educational events, particularly seminars, with consistent messages produce the largest effects on retirement savings. Some groups indicate a lower level of financial knowledge, and efforts to focus financial education on those groups may be an efficient use of company or plan resources. Finally, financial education can provide beneficial effects even after an employee separates from a firm. In particular, discussions of adequate retirement income are important in preventing individuals from consuming their retirement savings (that is, spending lump-sum distributions) before they reach retirement age.

As the provisions of the PPA become effective, further research will be needed to determine their outcomes. With substantial changes to DC plan design and investment advice, the PPA should have a notice-

able effect on participation in and contributions to DC plans. The passage of the PPA highlights the increased recognition of the importance of plan design and investment advice in helping people achieve economic security after their working career ends. The well-being of future cohorts of retirees will undoubtedly depend heavily on the quality of the structure of retirement savings programs and the financial education that accompanies these plans.

Notes

Acknowledgements: Kathleen Romig was instrumental in identifying the literature reviewed in this article and determining the content included. The authors thank Chris Anguelov, Angela Arnett, Denise Lamaute, Dave Shoffner, David Timmons, and David Weaver for their helpful comments and suggestions. Special thanks to Todd Williams for his help in calculating standard errors. The authors are also grateful to Sherry Snyder and Karyn Tucker for their assistance in preparing the article for publication.

[1] Although employers can provide savings programs as an employee benefit designed to make the organization a more attractive destination or to remain competitive with other employers, this article assumes that once such plans are established, a legitimate interest in helping participants achieve their retirement savings goals exists.

[2] The SCF uses a dual-frame sample design, with 3,007 cases drawn from a "multi-stage area-probability design" sample and the remaining data pulled from a list sample taken from SOI (Kennickell 2006). This latter sample was constructed to over sample affluent households. Weights must be used for descriptive analysis of the data set (see Kennickell, McManus, and Woodburn (1996) and Kennickell and Woodburn (1997) for a comprehensive discussion of weight design).

[3] Although sex is used as an independent variable in the included tables, it is not emphasized in the text as an indicator of sex-based discrepancies in financial well-being because of the assignment of sex in the SCF on a household level. Differences in financial well-being between the sexes found in other studies are discussed as part of the literature review.

[4] This study will primarily focus on the design of effective 401(k) plans, since slightly over 51 percent of respondents in the 2004 SCF with pension programs reported that a 401(k) was the "most important" of their plans.

[5] The Modeling Income in the Near Term (MINT) micro simulation model was developed by the Social Security Administration's Office of Policy along with the Urban Institute, the Brookings Institution, and the RAND Corporation. Data in the MINT model are largely based on the Survey of Income Program Participation for 1990–1993 and 1996. For more information see Butrica and Iams (2005).

[6] Based on tabulations from the 2006 Employee Benefits Survey (EBS) available at http://data.bls.gov/PDQ/outside-jsp?survey=eb.

[7] Where appropriate, respondents who do not save or are not employed at the time of the survey are excluded.

[8] Total family income includes income from *all sources* before taxes and deductions are made, including wages, salaries, self-employment, nontaxable investments, interest, dividends, unemployment, worker's compensation, child support, alimony, welfare assistance, and the sale of stocks, bonds, or real estate, among others. For a complete list of all income sources, see variables X5702 through X5725 in the 2004 SCF Codebook at http://www.federalreserve.gov/pubs/oss/oss2/2004/codebk2004.txt.

[9] It is sometimes argued that homeownership, which is more evenly distributed across the income distribution, can be used as a source of retirement wealth among low-earners. However, as Apgar and Di (2005) note in *Housing Wealth and Retirement Savings: Enhancing Financial Security for Older Americans*, research has shown that older household do not frequently use the equity found in their homes for other consumption needs (see Venti and Wise 2000). In addition, the burden of mortgage debt, even in old age, can be substantial. This is particularly true among lower income individuals (Apgar and Di 2005).

[10] Our discussion of goal-setting and financial education is not meant to deny the importance of other factors, such as insufficient earnings, that serve as significant explanatory factors in low saving rates. A broader discussion of the myriad factors that depress savings would be outside the scope of this article. As such, only elements that are particularly relevant to the structure of employer-provided retirement savings programs and educational materials are included in the text.

[11] Despite its role in raising participation, automatic enrollment has not yet become standard practice. In 2003, according to *Automatic Enrollment in Section 401(k) Plans* by Patrick Purcell (2004), only an estimated 8 percent of 401(k) plans used automatic enrollment.

[12] The Department of Labor has issued proposed regulations on the QDIAs. Under the PPA, the default investments must include a mix of asset classes consistent with capital preservation or long-term capital appreciation, or a blend of both. For more details on this subject, see the Employee Benefits Security Administration (EBSA) Website at http://www.dol.gov/ebsa/.

[13] In this instance, nondiscrimination refers to regulations governing participation and contribution among highly compensated employees and those who are not highly compensated.

[14] Although portions of the PPA are most relevant to elements of plan design outside of enrollment, they are presented here in order to provide a holistic, more easily understood summary of the legislation.

[15] As Choi, Laibson, and Madrian (2004) note in *Plan Design and 401(k) Savings Outcome*, while discussing the same organization examined in their 2005 publication, "[w]hile we do not know how automatic enrollment would have affected participation rates in this particular company, our guess is that automatic enrollment will generally lead to higher participation rates than active-decision." Thus, although the 28 percent figure is higher than the 26 percent increase in participation experienced under automatic enrollment in the 2005 Holden and VanDerhei piece, the authors expect that had the same company used automatic enrollment, the resulting increase in participation would have probably been even larger. The reasoning behind this assertion is that procrastination would lead those participants automatically enrolled in a 401(k) who do not wish to participate to delay their removal from the program.

[16] The role of financial education is discussed at length later in this article.

[17] Investment education reached mainstream status in 1992 through guidelines issued under the Employee Retirement Income Security Act (ERISA), which outlined information that must be provided to plan participants and beneficiaries (Arnone 2005). For further information on ERISA's financial information requirements, see http://www.dol.gov/dol/allcfr/Title_29/Part_2550/29CFR2550.404c-1.htm. The investment advice provision from the PPA requires that the fiduciary of the plan continue to adhere to ERISA's fiduciary and prudence requirements (Hewitt Associates 2006), but it also makes clear that plan sponsors and other persons who are fiduciaries do not have a duty under ERISA to monitor the specific investment advice that a fiduciary advisor provides (Doyle 2007).

[18] Because 401(k) and other defined contribution plans are relatively new, low balances for workers aged 55 to 64 may be due in part to the fact that they have not been able to contribute to these plans throughout their entire working career. These workers may have been relying more on traditional defined benefit pensions instead. However, the 2004 SCF data show that this age group was not exceedingly confident in their expected Social Security and pension income.

[19] See http://www.irs.gov/retirement/article/0,,id=96461,00.html for yearly cost-of-living increases for dollar limitations on benefits and contributions for pension plans.

[20] A fiduciary is a person or entity named in the plan as having control over the plan's operation. For some plans, it may be an administrative company or a company's board of directors. See http://www.dol.gov/ebsa/publications/fiduciaryresponsibility.html for more information on fiduciary responsibility.

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Social Security Cost-of-Living Adjustments and the Consumer Price Index

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Summary

OASDI benefits are indexed for inflation to protect beneficiaries from the loss of purchasing power implied by inflation. In the absence of such indexing, the purchasing power of Social Security benefits would be eroded as rising prices raise the cost of living. By statute, cost-of-living adjustments (COLAs) for Social Security benefits are calculated using the Bureau of Labor Statistics (BLS) Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). Some argue that this index does not accurately reflect the inflation experienced by the elderly population and should be changed to an elderly-specific price index such as the Experimental Consumer Price Index for Americans 62 Years of Age and Older, often referred to as the Consumer Price Index for the Elderly (CPI-E).

Others argue that the measure of inflation underlying the COLA is technically biased, causing it to overestimate changes in the cost of living. This argument implies that current COLAs tend to increase, rather than merely maintain, the purchasing power of benefits over time. Potential bias in the CPI as a cost-of-living index arises from a number of sources, including incomplete accounting for the ability of consumers to substitute goods or change purchasing outlets in response to relative price changes. The BLS has constructed a new index called the Chained Consumer Price Index for All Urban Consumers (C-CPI-U) that better accounts for those consumer adjustments.

Price indexes are not true cost-of-living indexes, but approximations of cost-of-living indexes (COLI). The Bureau of Labor Statistics (2006a) explains the difference between the two:

> As it pertains to the CPI, the COLI for the current month is based on the answer to the following question: "*What is the cost, at this month's market prices, of achieving the standard of living actually attained in the base period?*" This cost is a hypothetical expenditure—the lowest expenditure level necessary at this month's prices to achieve the base-period's living standard. . . . Unfortunately, because the cost of achieving a living standard cannot be observed directly, in operational terms, a COLI can only be approximated. Although the CPI cannot be said to equal a cost-of-living index, the concept of the COLI provides the CPI's measurement objective and the standard by which we define any bias in the CPI.

While all versions of the CPI only approximate the actual changes in the cost of living,

the CPI-E has several additional technical limitations. First, the CPI-E may better account for the goods and services typically purchased by the elderly, but the expenditure weights for the elderly are the only difference between the CPI-E and CPI-W. These weights are based on a much smaller sample than the other two indices, making it less precise. Second, the CPI-E does not account for differences in retail outlets frequented by the aged population or the prices they pay. Finally, the purchasing population measured in the CPI-E is not necessarily identical to the Social Security beneficiary population, where more than one-fifth of OASDI beneficiaries are under age 62. Likewise, over one-fifth of persons aged 62 or older are not beneficiaries, but they are included in the CPI-E population.

Finally, changes in the index used to calculate COLAs directly affect the amount of benefits paid, and as a result, projected solvency of the Social Security program. A switch to the CPI-E for the December 2006 COLA (received in January 2007) would have resulted in an average monthly benefit $0.90 higher than that received. If the December 2006 COLA had been adjusted by the Chained CPI-U instead, the average monthly benefit would have been $4.70 less than with current indexing. Any changes to the COLA that would cause faster growth in individual benefits would make the projected date of insolvency sooner, while slower growth would delay insolvency. Hobijn and Lagakos (2003) estimated that switching to the CPI-E for COLAs would move projected insolvency sooner by 3–5 years. A projection by SSA's Office of the Chief Actuary estimated that annual COLAs based on the Chained C-CPI-U beginning in 2006 would delay the date of OASDI insolvency by 4 years.[1]

Introduction

Several recent legislative proposals have called for the annual Cost-of-Living Adjustment (COLA) for Old-Age, Survivors, and Disability Insurance (OASDI) benefits to reflect the spending patterns and inflation experience of the elderly U.S. population.[2] These proposals are motivated by the belief that the elderly experience higher rates of inflation and therefore should be receiving greater benefit increases. At the same time, many economists and others, including then-Federal Reserve Chairman Alan Greenspan and former Commissioner of Social Security Robert Ball, have argued that the annual COLAs currently being granted are in fact larger than actual inflation and should be reduced rather than increased (Greenspan 1997 and 2004; Ball 2004). Thus, some proposals have called for annual COLAs to be reduced to account for the current overstatement of inflation.[3] This article describes some of the issues involved with indexing Social Security benefits for inflation in general and explores the implications of adopting either of the two alternate COLAs suggested for indexing benefits.

OASDI benefits are indexed after initial receipt to protect beneficiaries from the loss of purchasing power due to inflation.[4] In the absence of such indexing, the purchasing power of Social Security benefits would be eroded as rising prices raise the cost of living, constraining beneficiaries to purchase fewer goods and services with a fixed-dollar benefit. By statute, COLAs for Social Security benefits are currently calculated using the Bureau of Labor Statistics (BLS) Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). That is, Social Security beneficiaries receive an annual COLA that increases their benefits by the rate of inflation as measured by the CPI-W.

The consumption of medical care by those aged 62 or older is a significant factor behind the belief that the elderly population experiences higher rates of inflation than the overall population and that the annual CPI-W COLAs are insufficient to cover their rising cost of living. In short, the argument is that the elderly consume relatively more medical care than the overall population and that medical care prices have risen more rapidly than prices in other consumption categories. The BLS has developed an Experimental Consumer Price Index for Americans 62 Years of Age and Older, often referred to as the Consumer Price Index for the Elderly (CPI-E), that takes into account increased utilization of medical care and seems to lend support to these claims.[5] The actual COLAs based on the CPI-W and granted to Social Security beneficiaries from 1984 to 2006 have averaged 3.02 percent annually. If the same COLA calculations had been based on the CPI-E instead, the COLAs would have averaged 3.35 percent, 0.33 percentage points higher.[6] In fact, a COLA based on the CPI-E would meet or exceed the CPI-W COLA in every year between 1984 and 2006 except 2005. In 2005, the standard CPI-W COLA would have exceeded a hypothetical CPI-E COLA by 0.30 percentage points.

Although researchers have identified a number of concerns regarding the CPI-E and do not deny that the issue is worth investigating, many doubt the need for or the practicality of constructing a price index specifically for the elderly.[7] Furthermore, the newly developed chain weighted (C-CPI-U) provides strong evidence that the methodology used to construct both

the CPI-W and CPI-E implies a substantial upward bias in the measurement of inflation. A correction of this upward bias in the measurement of inflation would actually imply smaller COLAs, not larger ones.[8] COLAs based on the Chained C-CPI-U would have averaged 2.32 percent between 2001 and 2006, compared with 2.70 percent and 2.92 percent for annual COLAs based on the CPI-W and CPI-E, respectively, over the same period.[9]

In light of these perceived biases, it might seem natural to consider designing a chain–weighted CPI-E price index for the elderly. Such a price index could theoretically address the concerns represented by both alternative points of view. However, as this article demonstrates, both chain–weighted indexes and price indexes restricted to the OASDI elderly population suffer from significant limitations when used as the basis for COLA calculations. Furthermore, as the two currently perceived biases seem to be offsetting and of roughly equal magnitude, there is reason to suspect that such a hybrid index would be similar to the currently used CPI-W.

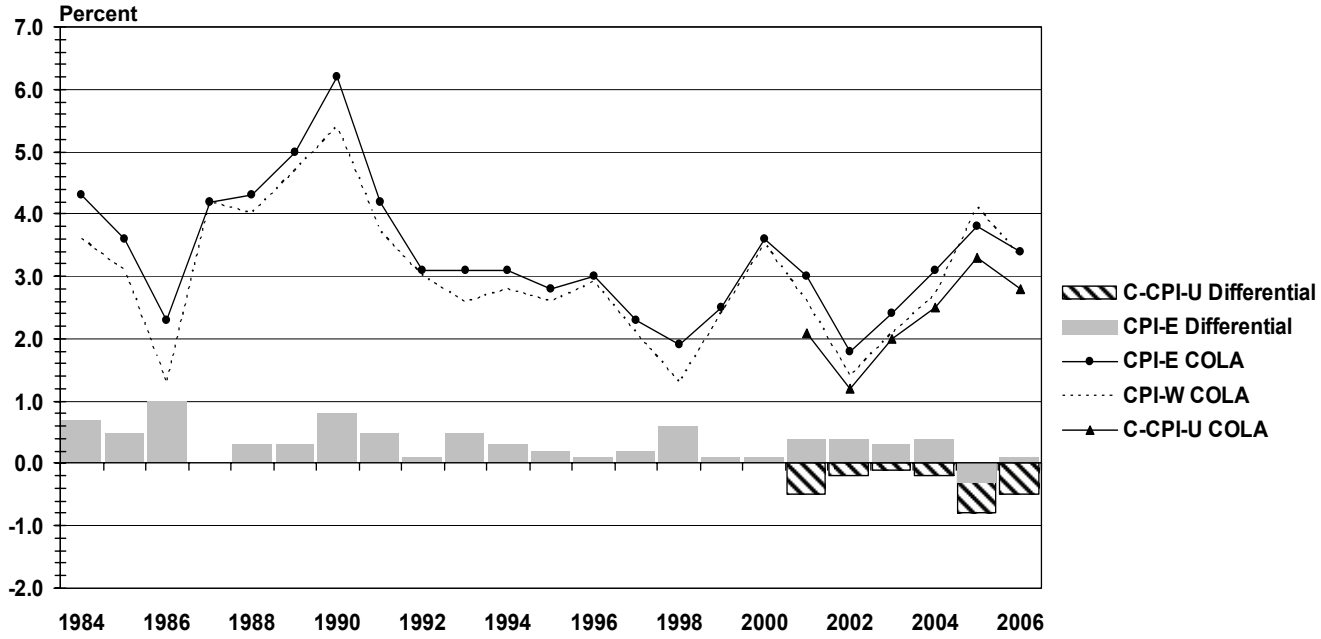
Background

Prior to 1975, Social Security (OASDI) and Supplemental Security Income (SSI) benefit increases were determined only by periodic legislative action. Since 1975, these benefits have been automatically adjusted for inflation. The legislation establishing the automatic indexation of OASDI benefits specified that the annual COLA calculations be based on the rate of increase in the CPI-W as published by the BLS.[10, 11]

> The first automatic COLA, for June 1975, was based on the increase in the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W) from the second quarter of 1974 to the first quarter of 1975. The 1976-83 COLAs were based on increases in the CPI-W from the first quarter of the prior year to the corresponding quarter of the current year in which the COLA became effective. After 1983, COLAs have been based on increases in the CPI-W from the third quarter of the prior year to the corresponding quarter of the current year in which the COLA became effective (Social Security Administration 2004).

Chart 1 shows the annual COLAs based on the CPI-W and granted to Social Security beneficiaries between 1984 and 2006.[12] These COLAs averaged 3.02 percent over the past 23 years. Also shown in Chart 1 are what the COLAs would have been if the same calculations had been performed using the CPI-E

Chart 1.
Annual Cost of Living Increases (COLAs): Hypothetical versus actual



SOURCE: Authors' calculations based on CPI data from the Bureau of Labor Statistics.

NOTE: C-CPI-U = Chained Consumer Price Index for All Urban Consumers; CPI-E = Consumer Price Index for the Elderly; CPI-W = Consumer Price Index for Urban Wage Earners and Clerical Workers.

or the chain–weighted CPI-U. The differences between the two hypothetical Colas and the actual historical Colas are illustrated in the bar graph of Chart 1.

Between 1984 and 2006, COLAs based on the CPI-E would have resulted in benefits in 2006 that would have been 15.1 percent higher for individuals who had been beneficiaries for the entire 23-year period.[13] Table 1 outlines the differences in benefits based on which CPI was used and the length of time an individual has been a beneficiary. Individuals who had been beneficiaries for 10 years as of 2006 would have had benefits approximately 3 percentage points higher under a COLA based on the CPI-E, and individuals who had been beneficiaries for 5 years as of 2006 would have had benefits approximately 1 percentage point higher. As of December 2005, approximately 12 percent of retired-worker beneficiaries had been entitled to benefits for at least 23 years; 28 percent of retired-worker beneficiaries had been entitled to benefits for fewer than 5 years, and more than half had been entitled to benefits for fewer than 10 years.[14] Hobijn and Lagakos (2003) calculated that the average benefit for *all* beneficiaries would be 3.8 percentage points higher had the CPI-E been used for COLAs from 1984 to 2001, taking into account differing numbers of years on the program for beneficiaries in 2001.

Table 1.
Accumulated benefit increases from COLAs derived from different CPIs as of January 2007 (in percent)

Starting year and number of years in beneficiary status	Accumulated COLA increase from—		
	CPI-E	CPI-W/ actual	Chained C-CPI-U
2002 (5 years)	15	14	12
1997 (10 years)	32	29	. . .
1992 (15 years)	53	47	. . .
1987 (20 years)	93	83	. . .

SOURCE: Author's calculations.

NOTE: CPI-E = Consumer Price Index for the Elderly; CPI-W = Consumer Price Index for Urban Wage Earners and Clerical Workers; Chained C-CPI-U = Chained Consumer Price Index for All Urban Consumers; . . . = not applicable.

Consumer Price Indices

The Bureau of Labor Statistics (BLS) produces monthly price indices for several subsets of the U.S. population. Among these are the Consumer Price Index for All Urban Consumers (CPI-U) and the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). About 87 percent of the U.S. population fits the BLS definition of All Urban Consumers, while 32 percent fit the definition of Urban Wage Earners and Clerical Workers. In addition, the 1987 Amendments to the Older Americans Act of 1965 directed the BLS to develop a new experimental data series, the CPI-E, to measure the inflation experience of those aged 62 or older, an even smaller subset of the U.S. population (approximately 15 percent in 2001-2002) (Bureau of Labor Statistics 2006b). The CPI-E data series produced by the BLS is unpublished, but is available from the BLS upon request.

These different price indices are constructed using a common framework. The BLS surveys prices for a collection of roughly 90,000 goods and services from a sample of urban retail purchasing outlets. The basket of goods and services are divided into broad "major group" expenditure categories, which are further divided into expenditure classes. Expenditure classes are further subdivided into item strata and still further into sub-strata. The Food and beverages category is an example of a major group expenditure—the fresh fruits and vegetables expenditure is a class within this major group category; and the apples item is a stratum within this class. Within the apples item stratum, the whole array of apples (for example, Fuji, Golden Delicious, MacIntosh)—is priced. The sampled prices are combined into a price index for each sub-stratum and these sub-strata price indices are aggregated up to form price indices for each stratum, class, and category. The price indices for each expenditure category are then combined to form an overall consumer price index like the CPI-U, CPI-W, or, CPI-E.

When forming the overall price indices like the CPI-U and CPI-W, the BLS examines the spending patterns of each subset of the population using data from the Consumer Expenditure Survey (CEX).[15] These data are used to estimate expenditure weights that measure the fraction of total expenditures made on each expenditure category for a given subset of the population. The December 2005 expenditure weights for each population are shown in Table 2.

The apparel item category accounts for a larger fraction of total expenditures made by Urban Wage Earners and Clerical Workers than for All Urban Consumers and thus receives a larger expenditure weight in the CPI-W than it does in the CPI-U. Similarly, the medical care item category receives a larger expenditure weight in the CPI-E than it does in either the

CPI-U or the CPI-W because the elderly spend a larger fraction of their income on medical care. It is only the variation in these expenditure weights across subsets of the population that cause the overall price indices to differ.

The housing category receives the largest expenditure weight in each of the three CPI measures and is larger for the CPI-E than for either the CPI-U or CPI-W. This is significant because in 2005, 68 percent of owner-occupied housing units with an elderly householder were owned free and clear (U.S. Bureau of the Census 2006, Table 7-15). This means that "Owner Equivalent Rent of Primary Residence" (the largest stratum in the housing category in Table 2 above), which represents 28.8 percent of total expenditures of the elderly, is measuring an opportunity cost for many of the elderly rather than an actual out-of-pocket expense. Rental equivalence is used to identify the value of housing services provided by a purchased home, not necessarily the cost to individuals of obtaining those housing services. Using mortgage payments or other home purchase data to form the expenditure weight is considered to be inappropriate since the purchase of a home provides a form of saving in addition to providing a flow of housing services.

Traditionally, the CPI-U, CPI-W, and CPI-E were known as fixed-weight Laspeyres indices. A Laspeyres price index measures the cost of purchasing a fixed basket of goods and services and assumes that consumers do not alter their spending patterns as prices change. Beginning with data for December 1999, the BLS has also produced a chain-weighted index, the Chained Consumer Price Index for All Urban Consumers (C-CPI-U), using a Tornqvist formula. In chained price indices, the expenditure weights are not held constant, reflecting the fact that consumers alter their spending patterns in response to price changes.

CPI Measurement Issues

In 1996, the Senate Finance Committee formed the Advisory Commission to Study the CPI (commonly referred to as the Boskin Commission) to evaluate

Table 2.
Expenditure categories by CPI population, December 2005 (in percents)

Expenditure categories	CPI-U	CPI-W	CPI-E
All items	100.00	100.00	100.00
Food and beverages	15.10	16.80	12.90
Food at home	8.10	9.40	7.60
Food away from home	6.10	6.40	4.60
Alcoholic beverages	1.00	1.10	0.70
Housing	42.20	39.30	48.20
Shelter	32.40	29.70	37.60
Rent	6.10	8.00	3.90
Owners' equivalent rent	23.00	19.60	28.80
Apparel	3.70	4.00	2.50
Transportation	17.70	20.10	14.00
Medical care	6.20	5.10	10.90
Medicare care commodities	1.50	1.10	3.10
Medical care services	4.70	3.90	7.80
Recreation	5.60	5.40	4.40
Education and communication	5.80	5.40	3.20
College tuition	1.40	1.00	0.50
Other goods and services	3.70	3.90	4.00
Tobacco and smoking products	0.80	1.30	0.60

SOURCE: Bureau of Labor Statistics (2006b).

NOTES: CPI-U = Consumer Price Index for All Urban Consumers; CPI-W = Consumer Price Index for Urban Wage Earners and Clerical Workers; CPI-E = Consumer Price Index for the Elderly.

the accuracy of the CPI as a cost-of-living measure. The Boskin Commission estimated that bias in the CPI likely overstated increases in the cost of living by 1.1 percentage points annually. The BLS itself has stated that the CPI is only a proxy for the cost of living and that changes in the CPI are an upper limit of the cost of living (Abraham 1995 and 1997).

Bias in the CPI as a cost-of-living index can arise from a number of sources. Substitution bias refers to the ability of consumers to substitute one good or service for another in response to relative price changes, an ability that is poorly accounted for in the measurement of the fixed-weight CPI. For example, if the price of grapefruit rises, individuals may purchase oranges instead. A fixed-basket approach, however, incorporates the price increase of grapefruit in the CPI by assuming that the consumer still purchased the same number of grapefruit as in the prior period.

Another form of substitution bias refers to the ability of consumers to alter their purchasing outlets in response to price changes; again, this is poorly accounted for in the measurement of the CPI. If a store lowers its price on DVDs, consumers may start buying DVDs from that store instead of the store they bought DVDs from in the previous period. This change in purchasing outlet is not captured in a fixed-weight basket.

There are also new product and quality change biases inherent in the fixed-basket CPI. New products are ignored until they are ultimately included in the basket, often long after their prices have already fallen substantially. For instance, prices of computers and electronic items often decline rapidly after introduction, but these declines would not be tracked until the items are included in the CPI basket. Likewise, price changes that reflect quality improvements rather than inflation are difficult to measure. For instance, computers or cars today may cost more than in the past, but these items are generally of higher quality. Changes in quality are especially problematic for sectors like medical care and technology because they experience rapid changes in the quality of goods and services available for consumption.[16]

The BLS has not ignored these issues; on the contrary, the BLS has continually updated its techniques and procedures over time to better address the shortcomings of a fixed-basket approach to calculating a CPI (Abraham 1997). Since the Boskin Commission's report, the BLS has implemented a number of changes in its methodology for measuring the CPI. These changes included the replacement of arithmetic mean estimators with geometric mean estimators to better reflect substitution;[17] increasing reliance on hedonic price regressions to account for quality change;[18] new methods of sampling among different purchasing outlets; pricing medical treatments rather than specific medical procedures; more frequent updating of the basket of goods and services; and several other technical changes. As a result, the CPI today measures changes in the overall price level more accurately.

The changes to CPI measurement resulting from the Boskin Commission's report slowed the rate of growth of the CPI by about 0.2 percentage points per year. Moreover, the bias in the CPI as a cost-of-living measure was reduced by an even greater amount. According to a General Accounting Office (2000) survey of the Boskin Commission members in 1999, the changes to the measurement of the CPI reduced the bias from 1.1 percentage points to 0.8 percentage points. A recent article by Lebow and Rudd (2003) places the remaining upward bias in the CPI at 0.87 percentage points.

The extent of remaining bias in the CPI as a cost-of-living measure is of concern for a variety of reasons. In addition to being a measure of inflation that influences both fiscal and monetary policy, the CPI is used to index or adjust expenditures of many government programs. Most importantly for present purposes, Social Security benefits are indexed for inflation according to the CPI-W, but the CPI is also used to adjust income-tax brackets and determine interest rates for Treasury Inflation Protected Securities commonly referred to as TIPS.[19] An upward bias in the CPI implies that many government programs are being overindexed, or rising faster than the cost of living. Duggan and Gillingham (1999) estimated the financial impact to Social Security from errors in the CPI. They calculated the present-value cost to the OASDI trust funds through 2040 to be $965 billion at the end of 1997.[20]

Starting with data for December 1999, the BLS has also produced a chain–weighted Consumer Price Index for All Urban Consumers, the Chained C-CPI-U. This chain-weighted CPI reduces substitution bias by changing the expenditure weights each month rather than biennially, as is done for the other nonchained consumer price indexes. In this way, the chain-weighted CPI better accounts for changing purchasing habits. The annual COLAs based on the new C-CPI-U for 2004-2006 would have been 2.5 percent, 3.3 percent, and 2.8 percent, respectively. In contrast, the CPI-W based COLAs actually granted were 2.7 percent, 4.1 percent, and 3.3 percent, respectively. This provides further evidence that the current formula for

COLAs based on the CPI-W actually overcompensates for inflation. On average, increases based on the C-CPI-U would have been 0.38 percentage points lower than the actual COLAs based on the CPI-W since 1999.

The Chained C-CPI-U suffers from limitations of its own. Because the C-CPI-U relies on expenditure data that is available only after a significant time lag, its values are not final when first published. Final values for the C-CPI-U are not published until up to 2 years after the initial values are published. Interim values for the C-CPI-U become available in February of the following calendar year.[21] Some method of reconciling this substantial time lag would have to be developed before annual COLAs could be based on the chain weighted C-CPI-U.

Medical Care

The treatment of medical care is particularly complicated when measuring inflation, and a number of important issues need to be considered. This is especially true in the context of measuring inflation experienced by the elderly, since medical care has a larger expenditure weight for the CPI-E than in the CPI-U or CPI-W.

The medical component of the CPI has several issues inherent to the goods and services it covers that other components may not. For example, medical technology is constantly changing. Graboyes (1994) outlines some of the issues that make measurement of medical prices complex: the introduction of treatment for a previously untreatable condition, changes in treatments, preventive measures like vaccination, and changes in efficacy of treatment.[22] The National Research Council (2002) provides a more in-depth discussion of the medical CPI than can be covered here.

Hospitalization

The segment of the medical CPI that covers hospital expenditures has a couple of issues. First, transactions in which Medicare Part A and Medicaid are payors are not included in the CPI (Bureau of Labor Statistics 2001 and Cardenas 1996). Because Medicare Part A coverage is nearly universal for persons aged 65 or older, the price changes calculated on transactions by private payors in the hospital segment are not representative of the hospital expenses for the elderly.[23] This issue is exacerbated when hospitals attempt to compensate for restrictions of allowable charges and reductions for Medicare and Medicaid reimbursement by increasing fees to private pay patients, causing the hospital price index to increase more quickly (Wilson 2003).

The second issue is one of quality change that has partially been addressed. Many medical procedures have decreased the number or intensity of inputs necessary to achieve a particular outcome, from shortening the length of stay to diminished intensive nursing needs following less invasive surgeries. Instead of pricing individual inputs, like hospital room days, the pricing unit as of January 1997 is the hospital visit (Bureau of Labor Statistics 2001 and 2003). The opinion that medical services should be viewed in light of treatment outcomes has been gaining prominence (Bureau of Labor Statistics 2003). Another related issue is that as doctors become more adept at new procedures their success rates rise, improving outcomes, but pricing the input of a hospital visit does not capture this.[24]

Physicians' Services

House, office, clinical, and hospital visits billed by private-practice medical professionals with an MD (except ophthalmologists) are included in this stratum. This stratum index uses transaction prices and includes Medicare Part B payments in addition to payments by private payors (Bureau of Labor Statistics 2003).[25]

Prescription Drugs

Prior to publication of the January 1995 CPI, the BLS did not substitute generic drugs unless the brand name drug was no longer carried by a retail outlet. Since January 1995, however, a brand name drug may be substituted for by a therapeutically-equivalent drug 6 months after it loses patent protection. The 6-month period allows the new therapeutically equivalent drug to gain market share, and then the chance of selection for the sample is determined by the proportion of sales of each version.[26] If a substitute is chosen, the price difference between the original drug and the substitute is recorded as a price change in the CPI (Knudsen 1994 and Bureau of Labor Statistics 2003).[27]

The recent enactment of a prescription drug benefit for Medicare beneficiaries (Part D) introduces another complicating factor in measuring effective price changes faced by the elderly. The impact of Medicare Part D on the inflation experience of the elderly is not yet clear, nor is the effectiveness of the CPI-E in capturing this experience.[28]

Health Insurance

The CPI indirectly factors price changes of medical insurance into three parts. The first part encompasses most of the expenditure for health insurance reflecting insurers' payments for medical treatment. The CPI allocates this segment to the indexes for those treatments. The remaining weight, comprising the unpublished health insurance index, reflects changes in the cost of administering policies and maintaining reserves and profits (Bureau of Labor Statistics 2001).

The CPI considers employer-paid health insurance premiums to be part of the consumers' incomes and not their expenditures, and as such, does not include them in the CPI (Bureau of Labor Statistics 2001). This presents a difficulty for two reasons. The first is best illustrated by an example: suppose a potential employee can choose between two jobs that are identical, with the exception that one offers a health insurance benefit and the other does not, with the salary differential equal to the employer-paid premium. If the employee chooses the job with the health insurance benefit, he has essentially chosen to expend that part of his pay on health insurance:

> Since the employer's portion of health care insurance is a benefit provided to employees, and since employees can, to some extent, choose their employers on the basis of the full compensation package (wages, salaries, and health insurance benefits), it makes sense to incorporate the employer portion of health insurance in the CPI and MCPI weights, rather than treating it as a business expense unrelated to employee compensation or consumers' expenditures.(National Research Council 2002).[29]

The second reason is that, all else equal, a change in the employee-employer relationship could appear as a price change. Suppose the total employee-employer insurance premium remains unchanged, but the employer decides to pay a smaller portion of the premium. This is a decrease in the employee's compensation, but because the employee's share of the premium increases, it also appears as a price increase in the CPI. In this case, the employer has reduced the employee's compensation, but the price the health insurance company receives for the policy remained unchanged.

Limitations of the CPI-E

In addition to the limitations of all CPI indices described in the preceding sections, the experimental CPI-E has several additional technical limitations.

As mentioned previously, the Consumer Expenditure Survey (CEX) is used to compute all variations of the CPI. The CPI-U (all urban consumers) and CPI-W (urban wage earners and clerical workers) represent approximately 87 percent and 32 percent of the U.S. population, respectively. Only 16.5 percent of eligible urban consumers met the BLS definition of elderly in the 2001-2002 CEX used for the CPI expenditure weights in 2004-2005 (Bureau of Labor Statistics 2006b).[30] Because the sample size for CPI-E is smaller than the samples for CPI-U and CPI-W, the expenditure weights used to compute the CPI-E are measured less precisely and have larger sampling errors than the expenditure weights used in either of the published series. This imprecision renders the CPI-E a less accurate measure of inflation than the CPI-U or the CPI-W.

There are additional concerns with using the CPI-E as a measure of the inflation experience of the elderly. While the expenditure weights vary by CPI population group, the price changes within the expenditure categories and classes are based upon the purchases of the entire CPI-U population. Because the purchasing patterns of the elderly may differ from those of the general urban population in ways not captured by the expenditure weights, the CPI-E may mismeasure the inflation experience of the elderly. In other words, the elderly may differ from other groups not only in what they spend their money on, but in how and where they shop and in the prices they may pay. The direction of the mismeasurement is not always clear however, and may differ from one expenditure category to another, or even within the category.

The medical expenditure category is a prime example of how the elderly may differ in the composition of their within-category expenditures. Berndt and others (1998) describe scenarios in which the elderly may be prescribed drugs that would experience faster or slower growth in prices. For acute conditions, the elderly may be more medically fragile and be prescribed the newest drugs with the fewest side effects; for chronic conditions, physicians may not want to switch their elderly patients from the older drugs that they are taking and are working well. The elderly would experience faster price growth in the first case but slower in the second.

Box 1.
Additional complications

While the issues discussed here and many others are easily identifiable, they are often difficult to analyze fully. In many cases the direction of change attributable to an issue is not even clear. For example, while the concentration of elderly in a small number of states is known, it is not known whether these states experience rates of inflation that are higher or lower than the national average. Many elderly choose to live in Florida, but while the BLS does compute separate price indices for major metropolitan areas, it does not compute cost indices by state. For example, during the second half of 2003, Miami experienced inflation higher than the national average while Tampa-St. Petersburg experienced lower inflation (Bureau of Labor Statistics 2004, Table 30). Whether the elderly experience higher or lower rates of inflation as a result of their geographical concentrations remains an open question.

Similarly, the impact of differential use of retail outlets is difficult to assess. While the conventional wisdom may be that the elderly are less likely to make purchases over the internet or from warehouse clubs, it is also true that the elderly may have a lower opportunity cost of time. Because the elderly may have more time to spend searching for the best deal, they may make purchases at or below the prices offered at the more convenient retail outlets (like the internet) preferred by the nonelderly population.

Hospital costs are another area in which the CPI-E may not reflect the experience of the elderly. As mentioned previously, Medicare Part A transactions are not included in the CPI, thereby excluding a substantial number of transactions involving the elderly.

Housing is another area in which there is uncertainty about how the out-of-pocket expenses of the elderly match the estimate in the CPI-E. Over 80 percent of housing units occupied by householders aged 65 or older were owner occupied in 2005, compared with nearly 66 percent of nonelderly householders (U.S. Bureau of the Census 2006, Table 2-1). As mentioned previously, the majority of elderly own their homes free and clear and do not have rental or mortgage payments, making their out-of-pocket homeownership costs smaller.[31] However, property taxes and insurance premiums are highly sensitive to property values, making the out-of-pocket housing expenses of the elderly more volatile than for the nonelderly population. If the objective of a COLA is to protect the purchasing power of the elderly, it is not clear that use of rental rate equivalence will accomplish that, since it measures consumption of housing services rather than out-of-pocket expenditures.

The retail outlets frequented by the elderly population may also differ from those utilized by the general urban population. The retail outlets from which prices are sampled by the BLS are randomly, but relatively uniformly, selected to represent the outlets where purchases are made by households in 87 geographic regions from across the entire United States, while the elderly U.S. population is concentrated more heavily in a small number of states such as Florida.[32] Hence, from the perspective of the elderly, the BLS is undersampling prices from states with high concentrations of elderly and oversampling from other states. Furthermore, the elderly may be less likely to make purchases over the internet or at warehouse clubs than the general urban population. They may also have more physical limitations that would lead them to make purchases through mail order. Berndt and others (1998) indicate that data made available to them from one mail-order firm shows that more than half of the prescriptions it dispensed were to customers aged 65 or older. Because the sampling of retail outlets, from which price changes are determined, is based upon the purchases of the entire urban population, this also can lead the CPI-E to mismeasure the inflation experience of the elderly.

Box 1 above discusses additional complications.

Senior citizen discounts pose an additional difficulty in measuring the inflation experience of the elderly. Because inflation depends on the rate of change of the CPI, senior citizen discounts that represent a fixed-percentage reduction from the normal retail price are not a major concern since they will have, at most, a small effect on the growth rate. Senior citizen discounts that are not a fixed-percentage markdown from the retail price, however, will introduce errors into the CPI-E measure of inflation for the elderly. If a theatre sells a regularly priced movie ticket for $10.00 in 2006 and $11.00 in 2007, it would be a 10-percent increase in price. If the the theatre offers a 10-percent discount to seniors, the ticket costs would be $9.00 in 2006 and $9.90 in 2007; the resulting change in price is still 10 percent. If, however, the theatre offers a fixed $1.00

Table 3.
Fixed percentage versus fixed price discount, 2006-2007 (in dollars unless otherwise specified)

	2006	2007	Change in price (in percents)
Regular price	10.00	11.00	10.00
Senior discount			
Fixed percentage (10 percent)	1.00	1.10	n.a.
Fixed dollar	1.00	1.00	n.a.
Senior price (fixed percentage)	9.00	9.90	10.00
Senior price (fixed dollar)	9.00	10.00	10.00

SOURCE: Authors' calculations.

discount to seniors, the senior price increases from $9.00 to $10.00, resulting in an increase of 11 percent (Table 3).

Finally, it should be noted that the usefulness of CPI-E for indexing Social Security benefits is limited by the fact that many beneficiaries are not elderly. While all retirement beneficiaries must be at least age 62 by definition, spousal benefits, survivor benefits, and disability benefits can accrue to persons under age 62. As of December 2005, 22.2 percent of OASDI beneficiaries were under age 62.[33] Likewise, not all persons aged 62 or older are beneficiaries, but they are included in the CPI-E population. In 2005, 79.8 percent of persons aged 62 or older were beneficiaries.[34] Consequently, indexing annual cost-of-living adjustments and other program parameters to the CPI-E may not necessarily reflect the inflation experience of the OASDI beneficiary population.

Effects of Changes in Indexing

Beyond the technical issues just described, there are practical issues regarding the effects of adopting the CPI-E or the Chained CPI-U for COLAs on individuals and on the Old-Age and Survivors Insurance (OASI) Trust Fund. As noted previously, the average difference between the CPI-E and the CPI-W from 1984 to 2006 was 0.33 percentage points. The average monthly OASDI benefit received in December 2006 was $924.70 (Social Security Administration 2007b). An OASDI beneficiary receiving the average benefit in December would have received a benefit increase of $30.50 with the December 2006 COLA received in January 2007. If the COLA had been based on the CPI-E instead, the benefit increase would have been $31.40, or $0.90 more. The effect of implementing the CPI-E is larger over an extended period of years: accounting for the age distribution of beneficiaries, Hobijn and Lagakos (2003) estimated that the difference in the average monthly benefit from 1984 to 2003 would have been $34. Only if an individual had been a beneficiary for the entire 1984 to 2003 period would the average monthly benefit have been $904, or $62 more per month.

The effect on individual benefits using the Chained C-CPI-U would be larger in size and in the opposite direction. The average difference between the Chained-CPI-U and the CPI-W from 2001 to 2006 was 0.38 percentage points. Had the December 2006 COLA been adjusted by the Chained C-CPI-U instead, an OASDI beneficiary receiving the average benefit in December would have received a benefit increase of $25.80 in January 2007, or $4.70 less than that with the CPI-W.

Hobijn and Lagakos (2003) addressed the potential ramifications of indexing Social Security benefits by the CPI-E for the OASI Trust Fund. Starting the CPI-E indexation in May 2003, two simulations were produced, one assuming that inflation for the elderly was 3.22 and the other assuming it was 3.38 percent.[35] Because benefit levels would increase more rapidly over the next 40 years if the CPI-E were used, the Social Security Trust Fund would become insolvent sooner than the CPI-W projection of 2043 reported in the 2002 Social Security Administration's Trustees' Report. Insolvency would occur in 2041, assuming inflation as measured using the CPI-E of 3.22 percent, or in 2038, assuming CPI-E inflation of 3.38 percent.

The Hobijn and Lagakos results cited above are based on changes to the overall inflation rate and hence include effects (on nominal wage growth for

example) that extend beyond the change in the COLA calculations. In 2005, Social Security's Office of the Chief Actuary (OCACT) produced results for a Social Security Advisory Board publication specifically analyzing changes to the COLA calculations without changing the overall inflation rate. Although these results did not include an analysis of higher COLAs based on the CPI-E, OCACT estimated that basing the annual COLA on the chained C-CPI-U beginning in 2006 would delay the date of OASDI insolvency until 2045, 4 years later than the year 2041 estimated in the 2005 OASDI Trustees' Report. OCACT also reported that fixed reductions of 0.5 and 1.0 percentage points to the current COLA calculations would delay the date of insolvency by 9 and 16 years, respectively.[36]

Once again, because the perceived upward and downward biases in the current COLA calculations seem to be roughly of the same magnitude and hence offsetting, it seems unlikely that any attempt to simultaneously correct both perceived biases would have a substantial impact on the overall solvency of the OASDI system.

Other Related Findings

The general consensus of the economic literature on the CPI and COLAs for the elderly is that while the elderly may experience a slightly higher rate of inflation than the nonelderly, largely due to greater consumption of medical services, the CPI-E as it currently stands is an imperfect guideline for the indexation of benefits. For example, the National Research Council (2002) concluded that there is no rationale for switching to an index along the lines of the CPI-E until the index can capture the differences in the prices or qualities of goods purchased by the elderly. They noted that the heavier weight on medical expenses is largely responsible for the difference between the CPI-E and the CPI-U or CPI-W. As with other sources, the uncounted quality change is blamed for the overstatement in healthcare inflation, but the sources also cite Newhouse (2001), stating that the measurement of medical care prices in the CPI overstated their rise during the periods studied.

Other studies also examine implications of further use of the CPI to adjust benefits. The Boskin Commission (1996) made several recommendations regarding measurement of the total CPI including the addition of "quality of life" issues in the survey. They suggested including data on crime and the environment that "value not only the market consumption basket, but also the resulting leisure and quality of life experienced by the average individual." (Advisory Commission to Study the Consumer Price Index 1996).

The inclusion of a measure of "quality of life" is controversial, however. Tobin (1997) and Solow (1997) argued that attempting to judge the value of quality of life or environmental amenities in a price index is inappropriate.

Several other approaches to indexing benefits are addressed in the literature. Including

- issues surrounding the possible use of a tax and price index, a wage index, or a National Income and Product Accounts (NIPA) index to calculate adjustments to benefits (National Research Council 2002, chapter 7.).
- Myers (1998a) and the resulting discussion, Brown (1998), and reply, Myers (1998b), also discuss indexing by wages and mention indexing preretirement earnings credits to the cost of living, rather than to wages.
- Moulton and Stewart (1999) offer an overview of experimental superlative CPIs and experimental CPIs for poor Americans.
- The Personal Consumption Expenditure (PCE) deflator is an alternative chain-weighted price index that measures inflation at the consumer level. While the CPI is based on consumer utility theory, the PCE deflator is a somewhat broader measure of inflation based on the macroeconomic definition of consumption as defined in the National Income and Product Accounts (NIPA) (Fixler and Valliant 2004 and Seskin and Parker 1998). Beginning in 2000, the PCE deflator became the Federal Reserve's preferred barometer of inflation, although it considers a variety of aggregate price measures when assessing inflation (Board of Governors of the Federal Reserve System 2000).
- Nordhaus (1999) examines an augmented cost-of-living index which would also take into account tax-financed public goods, and goods and services provided by employers and mandated social regulations.
- Jorgenson and Slesnick (1999) advocate the econometric method for cost-of-living measurement, building several group cost-of-living indices, including an index for the elderly. The cumulative difference in their econometric group cost-of-living indices spanning 1978 to 1995

resulted in a price level 1.7 percent higher for the elderly than the non-elderly.

- Because rental rate equivalence in the housing expenditure category measures an opportunity cost rather than actual out-of-pocket expenses for many elderly, Hobijn and Lagakos (2003) question its use for indexing a cash benefit program like OASDI. In addition, several other countries, including Canada, Australia, and the United Kingdom, use alternatives to rental rate equivalence to determine the owner-occupied cost of housing.[37] Diewert (2003) and Woodhouse (1997) provide overviews of the various treatments of owner-occupied housing, such as acquisition cost, rental rate equivalence, and user cost.

Regardless of the methodology employed, the ultimate goal of these and many other papers is to construct as accurate an index as possible to reflect the rate of inflation experienced by a population. An index represents an average level of inflation over an entire population, however, and some individuals in that population experience rises in the cost of living that are higher or lower than indicated by any one particular index.

Conclusion

Annual Social Security COLAs based on the CPI-W were implemented in 1975 to automatically adjust benefits for inflation. Unfortunately, consumer price indexes are not true cost-of-living indexes. Failure to completely account for substitution or changes in quality has led many economists, including the Boskin Commission, to conclude that the CPI overstates inflation. While many of the suggestions made by the Commission have been implemented, only some of the upward bias in the CPI have been eliminated. The Chained C-CPI-U is another step toward eliminating the substitution bias remaining in the CPI-U and CPI-W.

Medical care has been a particularly troublesome area for the CPI. Rapid advances in technology introduce new treatments and increases in quality of medical care that the CPI does not completely capture. Other studies have found that the rise in medical prices indicated by the CPI is overstated. This is exacerbated in the CPI-E because the elderly spend relatively more on healthcare, placing greater weight on this expenditure category than the currently published indices. Thus, potential errors in the measurement of health care inflation would affect the CPI-E more heavily than the CPI-U or CPI-W.

In addition to the fixed-basket index problems encountered with the CPI-U and CPI-W, the CPI-E has additional technical limitations. The expenditure weights for the elderly are the only difference between the CPI-E and the CPI-U or CPI-W. These weights are based on a much smaller sample than the other two indices, making it less precise. In addition, the retail outlets frequented by the elderly and the prices they pay are not reflected in the CPI-E any more than they are in the CPI-U. Perhaps the most practical objection to using the CPI-E for Social Security COLAs is that over one-fifth of OASDI beneficiaries are under age 62. Likewise, over one-fifth of persons age 62 or older are not beneficiaries, but they are included in the CPI-E population.

Notes

[1] See Social Security Administration (2005) and Social Security Advisory Board (2005).

[2] Examples include HR 1953 (110th Congress), HR 2262 (108th Congress), HR 2035 (107th Congress), and HR 1422 (106th Congress). All call for the use of the experimental Consumer Price Index for the Elderly (CPI-E) produced by the Bureau of Labor Statistics to index Social Security benefits. HR 4551 (106th Congress), however, would have required the formation of a separate Consumer Price Index Review Committee to create a more accurate price index for the elderly and repealed the 1993 increase in tax on Social Security benefits.

[3] Examples include HR 440 (109th Congress).

[4] The annual COLAs paid to OASDI beneficiaries should not be confused with recent discussions of price indexed benefits as a Social Security reform option. Price indexing of benefits refers to a change in the formula for calculating the initial benefit. COLAs are applied only after the initial benefit has been calculated.

[5] The BLS created this experimental index in response to the 1987 amendments to the Older Americans Act of 1965.

[6] Thanks to Sharon Gibson of the Bureau of Labor Statistics for providing the CPI-E series and expenditure weights given in a later section along with data from the 2001-2 CEX.

[7] See National Research Council (2002), Boskin and others (1996 and 1998), Boskin and Hurd (1985), and Jorgenson and Slesnick (1983).

[8] Conceptually, both points of view could be accommodated by a chain-weighted C-CPI-E. However, such a price index does not currently exist and significant effort would be required to implement a chained price index for the elderly.

[9] The C-CPI-U series starts with December 1999. Since COLAs are calculated from third quarter to third quarter, 2001 is the first year for which a chained C-CPI-U COLA can be estimated. There is a substantial lag in calculating final values for the chained C-CPI-U so we have used interim values for 2006. This lag is discussed in greater depth later in the paper.

[10] President Nixon signed this measure into law on July 1, 1972 as part of P.L. 92-336 (SSA 2004d).

[11] The U and W distinction did not occur until 1978 when the broader coverage CPI for all Urban Consumers (CPI-U) was initially released. Prior to 1978, the only CPI that existed was the CPI for Urban Wage Earners and Clerical Workers, denoted then as the CPI and now as the CPI-W. CPI-U data from that period are identical to the CPI-W.

[12] The COLAs in the graph are all computed using the ratio of average Q3 values for the CPI-W with base year 1982-84 = 100. In actuality, the COLA granted in 1984 was computed using the same formula, but with the base year 1967 = 100 version (BLS changed the base year in 1988 and has published both versions subsequently) of the CPI-W resulting in a 1984 COLA of 3.5 percent rather than the 3.6 percent shown in Chart 1. Also, Public Law 106-554 legislated a 1999 COLA of 2.5 percent instead of the 2.4 percent shown in the chart.

[13] The restriction to individuals who were beneficiaries over the entire period is because benefits would not be adjusted by the CPI-W (or CPI-E) until receipt of benefits begins.

[14] These calculations were made using Table 5.B4 (Social Security Administration 2005). Entitlement is determined by the date of application.

[15] The Consumer Expenditure Survey provides data on the buying habits of American consumers, including their expenditures, income, and demographic characteristics (Bureau of Labor Statistics 2005b).

[16] See Graboyes (1994) for an overview of problems with medical care price indexes and a guide to published indexes.

[17] A geometric mean is multiplicative mean rather than the common arithmetic mean. For example $\sqrt{x_1 \bullet x_2}$ rather than $\frac{1}{2}(x_1 + x_2)$. See Dalton, Greenlees, and Stewart (1998) for an explanation of geometric mean estimators. Because the geometric mean is used at the lowest level of aggregation, this improvement makes the CPI what is technically known as a Laspeyres-geometric hybrid index.

[18] In order to account for improvements in quality, a hedonic price regression determines the price of an item as a (typically linear) function of its attributes. For example, a computer with a larger hard drive would command a higher price as would a car or truck with greater horse power. See Fixler and others (1999) or Kokoski (1993) for discussion of hedonic regressions and quality change.

[19] They are also called Treasury Inflation Indexed Securities.

[20] This total does not include overpayments from the housing error, which pushes the total cost to the trust funds over $1.25 trillion. For further information on the housing error and its correction, see Bureau of Labor Statistics (1983) and Duggan, Gillingham, and Greenlees (1999).

[21] The hypothetical C-CPI-I COLAs calculated in the preceding paragraph rely on these interim values. How an actual C-CPI-U COLA might be implemented in light of the time lag required to obtain the revised final C-CPI-U values remains an open question.

[22] The BLS has made numerous improvements to the measurement of medical prices over the past several years. This section outlines issues currently involved with the CPI. For an overview of prior concerns about the medical CPI, which affected the index earlier, see Graboyes (1994).

[23] In 2000, over 94 percent of the population aged 65 or older was enrolled in the hospital insurance component of Medicare (Committee on Ways and Means U.S. House of Representatives 2004, Tables 2-2 and A-1).

[24] See Graboyes (1994) for an example. Work by Cutler and others (1998) and Frank and others (2003) find slower, or even negative, price growth in quality-adjusted indices they construct for heart attacks and schizophrenia, respectively, for the time periods they study.

[25] See Bureau of Labor Statistics (2003) for the list of services by other medical professionals included in the CPI.

[26] A recent study by the Government Accountability Office (2005) compared the increase in prices of a selection of commonly used drugs and found that the price of brand drugs increased more quickly from 2000-2004 than the price of generic drugs.

[27] See Bureau of Labor Statistics (2003) for treatment of drugs changing prescription/over-the-counter status.

[28] Any prescription drug subject to senior discounts is eligible to have a Medicare Drug Discount Card selected; any reduction in price due to shifting from a senior discount to the selected card's price is reflected in the index (Bureau of Labor Statistics 2005c).

[29] The National Research Council (2002) refers to Pauly (1997), Summers (1989), and Gruber (1994) for further discussion.

[30] See also Amble and Stewart (1994) or Stewart and Pavalone (1996) for further detail.

[31] The 2003 CEX reports that housing costs account for 33 percent of out-of-pocket expenditures by consumer units 65 or older (Bureau of Labor Statistics 2005a).

[32] In 2002, the elderly comprised 12.3 percent of the population of the United States, but over 17 percent of the population of Florida, and (ranked in descending order) between 14 and 16 percent of the populations of Pennsylvania, West

Virginia, North Dakota, Iowa, Maine, Rhode Island, and South Dakota. (U.S. Bureau of the Census 2003).

[33] The authors' calculations use Tables 5.A5 and 5.A16 of the *Annual Statistical Supplement, 2006* (Social Security Administration 2007 and 2007b).

[34] The authors' calculation uses the 2006 Annual Demographic Survey (Current Population Survey March Supplement).

[35] At the time of Hobijn and Lagakos's estimates, the Social Security Administration's Board of Trustees' long-term solvency projections (2002) assumed future inflation of 3 percent each year. An assumed CPI-E COLA of 3.38 would be consistent with the average CPI-E-CPI-W differential from 1984–2001, and a CPI-E COLA of 3.22 would be consistent with the average differential from 1994–2001. Hobijn and Lagakos (2003) note that Jason Shultz and Seung An of the Social Security Administration's Office of the Chief Actuary provided them projections under these scenarios that matched their own projections derived from their data sample.

[36] See Social Security Administration (2005) and Social Security Advisory Board (2005).

[37] Canada, for example, applies a user cost approach using mortgage interest cost, depreciation, property taxes, homeowners' insurance, maintenance and other related expenses to estimate the effect of price changes on the cost of using dwellings. While Canada uses rental rate equivalence for its National Accounts, Statistics Canada argues against its use in a price index because "the purchasing power of homeowners is neither directly dependent on rent changes nor is it necessarily correlated with these changes, especially in the short and medium terms" (Statistics Canada 2004).

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The Evolution of Japanese Employer-Sponsored Retirement Plans

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Summary

This article examines the development of Japanese voluntary employer-sponsored retirement plans with an emphasis on recent trends. Until 2001, companies in Japan offered retirement benefits as lump-sum severance payments and/or benefits from one of two types of defined benefit (DB) pension plans. One type of DB plan was based on the occupational pension model used in the United States before the adoption of the Employee Retirement Income Security Act of 1974 (ERISA), but lacked the funding, vesting, and other protective features contained in ERISA. The other type of DB plan allowed companies to opt out of the earnings-related portion of social security, commonly referred to as "contracting out."

Landmark laws passed in 2001 introduced a new generation of occupational retirement plans to employers and employees. One law increased funding requirements and enhanced employee protections for employer-sponsored DB plans, while a second law introduced defined contribution (DC) plans for several reasons, chiefly to increase retirement savings and help boost Japanese financial markets. These laws complemented earlier changes in the tax code and financial accounting standards already affecting employer-sponsored retirement plans. As a result, new retirement plan designs will replace most prereform era company retirement plans by 2012.

In 2001, the experience of 401(k) plans in the United States, where 42 million participants had accumulated more than $1.8 trillion in assets over 20 years, attracted considerable attention among Japanese lawmakers finalizing provisions of the DC pension law. Even with government support and encouragement from the financial services industry, Japanese companies have not adopted these new DC plans in large numbers. As a result, occupational retirement plans in Japan have remained predominantly DB—a surprising development in light of the shift in a number of countries from DB to DC plans observed in recent decades. However, recent proposals to make DC plans more attractive to employers in Japan are likely to be implemented in the near future.

This article

- summarizes the Japanese retirement system, with an emphasis on private-sector employees, and the complementary role played by voluntary employer-sponsored retirement plans;
- describes the financial pressures that faced retirement plan sponsors in the late twentieth century and the factors motivating the reform of Japanese voluntary retirement plans;

- examines the 2001 legislative changes that have transformed company retirement plans; and
- concludes with a review of trends and recent developments in employer-sponsored retirement plans since the implementation of the 2001 pension laws.

Japan's Retirement System

A combination of low birthrates (1.26 children per woman of child-bearing age in 2005, well below the 2.1 needed to maintain population size) and gains in life expectancy at birth (rising from 76.9 years in 1980 to the current 82.6 years) has made Japan one of the world's oldest societies. According to government estimates, the percentage of Japanese aged 65 or older will climb from the current 20 percent of the population to nearly 36 percent by 2050, while the working-aged population, aged 15 to 64, will decrease from roughly 66 percent to about half the population (Dow Jones International News 2006). If these trends continue, the population will decline from its peak of 128 million in 2005 to 101 million persons by 2050. To counteract effects on social security finances from these projected demographic developments, the country initiated a series of major reforms in 1994, 1999, and 2004 to limit social security retirement program expenditures.

Japan's retirement system is largely comprised of a social security system and employer-sponsored retirement plans. Under the social security system, private-sector employees and the self-employed are treated differently (U.S. Social Security Administration 2007; Yamamoto and Fukawa 2003; Kabe 2006).

The National Pension (NP), a partially funded compulsory system, covers the self-employed, farmers, and others, aged 20-60, who are not full-time employees. These individuals contribute a flat-rate monthly contribution, which was 13,860 yen (US$128) in April 2006. The NP system provides a pension benefit proportional to the number of years of contribution. The full monthly NP benefit, available after 40 years of contributions, amounts to about 66,000 yen (US$611). The eligible age for full NP benefits, currently age 62, has been increasing by 1 year every 3 years since 2001, targeted to reach age 65 by 2013. All NP administrative costs and one-third of NP benefits are subsidized by tax revenues.[1]

For full-time private-sector employees in Japan, there is a two-tiered social security system, known as the Employees' Pension Insurance (EPI). The EPI includes a flat-rate first tier, with contribution and benefit features identical to the NP program, and an earnings-related second tier. The overall EPI contribution rate (combined employer and employee) is 14.29 percent of employee pretax earnings. Since October 2004, this contribution rate of 13.58 has been rising in increments of 0.35 percent each year and will reach 18.30 percent in 2017. Contributions are levied and benefits are calculated based on monthly earnings ranging from a minimum of 98,000 yen (US$822) to a maximum of 620,000 yen (US$5,197). The earnings-related benefit equals 0.55 percent of the employee's average monthly wage indexed over his or her working career multiplied by the number of covered years (Sakamoto 2005).

Under the EPI system, the average replacement rate for male employees 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. The average EPI household replacement rate for a male employee with the same earnings profile, but with a nonworking spouse, is approximately 59 percent. These replacement rates are projected to decline gradually to 36 percent by 2023 for male employees and to about 50 percent by 2023 for households (Sakamoto 2005).[2]

The current eligible age for full EPI benefits will rise from age 60 to age 65 in the coming decades. For men, the earliest age to receive retirement benefits will increase by 1 year every 3 years from 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 2006).

Voluntary employer-sponsored retirement plans in Japan complement the country's two-tiered social security system. Historically, companies have generally rewarded departing employees for their long service to the firm with lump-sum severance payments. After that employee benefit lost its tax advantages in 2002, the popularity of employer-paid lump-sum severance payments declined. Since the 1960s, employers began to offer defined benefit (DB) pension plans in addition to or as a substitute for, their lump-sum severance programs. In 2005, about 14 million of 37 million salaried employees were covered by employer-sponsored DB plans. These pension plan assets accounted for 60 trillion yen (US$517 billion) out of a total 266 trillion yen (US$2 trillion) for all private and public pension funds that same year (Y. Watanabe 2006-2007).

Employer-Sponsored Plans Before the 2001 Reform

Before 2001, Japanese employers generally used three types of voluntary retirement arrangements for departing employees: an unfunded book-reserve plan providing lump-sum payments and two DB plans, a Tax-Qualified Pension Plan and an Employee Pension Fund. Both DB plan designs received preferential tax treatment and required that third party administrators manage the plan assets. Table 1 indicates the major characteristics of these retirement plans.

Book-Reserve Plans (BRP)

Changes to the tax code in 1952 provided incentives for firms to establish an internal account or BRP for their severance pay program, enabling firms to make periodic tax-favored contributions to their BRP plan.[3] However, since firms were under no legal obligation to set aside funds to offset the firm's accumulating liabilities to employees, nearly all BRPs have been unfunded (N. Watanabe 1998).

Tax-Qualified Pension Plans (TQPPs)

TQPPs were introduced in 1962 and were based on the DB pension model then used in the United States. A company with 15 or more employees could establish a TQPP with the approval of the National Tax Administration, an agency of the Ministry of Finance. Employer contributions, either a specified amount or percentage of payroll, are deductible as a business expense. TQPP benefits are based on years of service, using a flat benefit or an earnings-related formula and may be offered as either a monthly annuity or a lump sum. Eligible employees select lump-sum payments over annuities more than 80 percent of the time (Katsumata 2005). In addition, TQPP plans must be managed by an outside financial contractor—either a trust bank or a life insurance company.

Table 1.
Major Japanese employer-sponsored retirement plans in 2001, by year started and plan characteristics

Type of plan or fund	Year started	Plan characteristics
Book Reserve Plan (BRP)	1952	Traditional way of providing severance payment to departing worker Benefit in the form of a lump sum Unfunded pay-as-you-go method financed by employers alone Earmarked reserves as a liability on company balance sheet Loss of tax-deductible status beginning in 2002
Tax-Qualified Pension Plan (TQPP)	1962	Based on U.S. Defined Benefit model Plan must be externally funded and assets managed by contract with life insurance companies and trust banks Employer's contributions are 100 percent tax deductible as a business expense Plan must contain a provision for annuities, although a lump-sum option is provided No tax on investment earnings Used primarily by small and medium-sized firms with more than 15 employees Regulated by the Ministry of Finance
Employees' Pension Fund (EPF)	1966	Defined Benefit plan contracted out from social security Must be established as a legal entity independent from the employer In return for a lower social security contribution, firms must provide benefits equivalent to the earnings-related portion of social security and a supplementary benefit (lump sum or annuity) financed by the employer Plan must be funded and assets held outside the firm in a trust fund or in an insurance contract Life annuities must be provided Tax treatment virtually the same as TQPP Used by large companies and by multiemployer groups Regulated by the Ministry of Health, Labor and Welfare

SOURCE: Compiled by author.

Employees' Pension Fund (EPF)

A second DB plan design, and one closely linked to the earnings-related portion of the EPI system, is the EPF plan. Since October 1966, companies could partially "contract out" of social security by setting up an independent EPF corporation to manage the earnings-related (EPI) portion of social security. The phrase "contract out" means that a firm—provided that its union members (if any) agree and both the Ministry of Health and Welfare and the Ministry of Finance approve—may pay a reduced social security contribution in exchange for providing a pension benefit that replaces the earnings-related EPI social security benefit. The EPF plan must also provide an overall pension benefit higher than the earnings-related portion of EPI (Hewitt Associates 2003). This additional EPF benefit originally equaled 30 percent, but the government reduced the additional EPF benefit from 30 percent to 10 percent in 2001 to discourage companies from terminating their EPF plans.[4]

The EPF plan must achieve at least the government-specified annual nominal yield. Initially, the government set a guaranteed rate of 5.5 percent, but allowed this rate to decline in the 1990s to match the fall in Japan's interest rates. The government reduced the guaranteed nominal rate for EPF plans to 4.5 percent in 1994 and then to 1.5 percent in 1999 as the economy weakened (Dai-Ichi 2006). Should an EPF plan become over-funded, plan sponsors could either reduce their employer contribution or improve plan benefits (Clark 1991).

Because of concerns about the financial stability of EPF plans, the Japanese government required a minimum number of participants in an EPF plan based on whether the plan sponsor was a single company or a group of companies. The volatility of plan finances is larger for plans composed of small companies since these small companies have a greater risk of bankruptcy than do large companies. For that reason, EPF plans composed of small companies must have a higher minimum number of employees than that required of EPF plans where only larger companies participate (Turner and Rajnes 1995). In 2005, the government raised the minimum number from 500 to 1,000 employees for a single-employer sponsor from 800 to 1,000 employees for jointly affiliated sponsor companies and from 3,000 to 5,000 employees for a group sponsor of smaller companies (categorized by industry, occupation, or region). Given this size requirement, the number of employees in EPF plans tends to be larger than in TQPP plans (Japan Ministry of Health, Labor, and Welfare 2005b).

Due to the contracted-out nature of these liabilities, the government treats EPF plans as quasi-public entities with very detailed administration and management rules (Usuki 2003). For example, EPF rules require plan sponsors to distribute at least half of the retirement benefit as an annuity unless a pensioner requests a lump sum. Originally, EPF investments were restricted to a list of approved investments managed by trust banks and insurance companies, but those restrictions were abolished in 1997 (Watanabe, Y. 2006-2007).

EPFs also are required to participate in the national association of EPF plans, known as the Pension Fund Association (PFA). The PFA serves two major purposes. First, it insures against loss of benefits in the event of a plan sponsor's bankruptcy.[5] Second, it assures there is no loss of benefits for employees who switch employers, since the accumulated contributions of departing employees are transferred to the PFA to manage, thus providing a portable pension system for those changing jobs (Turner and Rajnes 1995; N. Watanabe 1996).

By 2000, employee coverage for firms with at least 30 employees using one of these three types of occupational retirement plans was close to 90 percent, although coverage by a TQPP or EPF plan offering an annuity was only around 50 percent. Table 2 shows the percentage of firms with 30 or more employees offering a retirement plan in 1997 and 2003. These data indicate that larger firms were more likely to offer a retirement plan than were smaller firms. Comparable data are not available for firms with fewer than 30 employees.

Table 2 also shows the type of retirement plan offered—BRPs, EPFs, or TQPPs—and percentage change by firm size from 1997 to 2003. Retirement benefits offered by smaller firms were more likely to consist only of a BRP plan. Overall, the percentage of firms offering a retirement plan decreased slightly from 1997 to 2003, as did the percentage of firms offering an annuity-based (EPF or TQPP) retirement plan. No consistent pattern by firm size was evident regarding either the BRP or the combination (BRP/annuity) retirement plans. While the use of BRP plans declined overall, the percentage of firms with more than 300 employees offering these plans actually increased slightly. Nearly half of the firms with less than 100 employees offered a BRP as the only retire-

Table 2.
Japanese employer-sponsored retirement plans, 1997 and 2003 (in percents)

Number of employees in firm	Percent of firms with—				Type of retirement plan offered					
	Retirement plans		No plans		BRP lump sum only		Annuity (EPF or TQPP)		Both (BRP/Annuity	
	1997	2003	1997	2003	1997	2003	1997	2003	1997	2003
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
30–99	85.7	84.7	14.3	15.3	48.1	45.8	15.6	15.5	22.1	23.5
100–299	95.9	89.5	4.1	10.5	33.8	31.1	22.9	19.3	40.0	39.1
300–999	97.7	95.7	2.3	4.3	17.2	21.7	30.5	25.3	50.1	48.7
1,000 or more	99.5	97.1	0.5	2.9	9.5	10.7	22.5	18.5	67.4	67.9

SOURCE: Japanese Ministry of Health, Labor, and Welfare (2003, 2004).

NOTE: BRP = Book Reserve Plan; EPF = Employee Pension Fund; TQPP = Tax Qualified Pension Fund.

ment plan, and this percentage decreased as the firm size grew. While the percentage of firms with both an annuity-based (EPF or TQPP) plan and a BRP retirement plan increased somewhat, this change occurred only among the largest (1,000 or more employees) and the smallest (from 30 to 99 employees) firms studied.

Company Retirement Plans Encounter Problems in the 1990s

Following a period of high investment and employment growth beginning in the late 1980s, the Japanese business sector entered a prolonged slump in 1992 that lasted for more than a decade. Lower profitability prevented many plan sponsors from increasing contributions to their retirement plans to offset the shortfall in plan investment earnings needed to maintain retirement plan benefits. As economic stagnation persisted throughout the 1990s, many companies took cost-cutting steps, including employee layoffs, the increased use of part-time employees, and the reduction or elimination of retirement plans.

Defined benefit plans (EPF and TQPP) and membership peaked between 1994 and 1997 before declining thereafter. For example, the number of TQPP participants declined from a high of 10.8 million in 1995 to 9.2 million in 2001. The number of TQPP plans (referred to as "contracts") exhibited a similar pattern, increasing to 92,467 plans in 1993 before declining to 73,582 plans in 2001. The number of EPF plan participants declined from its highest level of 12.2 million in 1997 to 10.9 million in 2001. The number of EPF plans increased to 1,883 in 1996 before declining to 1,737 in 2001 (Table 3).

In contrast to the general decline in the number of DB plans and DB plan members, total assets under management for both TQPP and EPF plans grew throughout the period from 1991 to 2001. Total assets managed by EPF plans expanded steadily throughout the 1990s and reached 58.3 trillion yen (US$482.1 billion) in 2001, while TQPP plan assets rose to 22.7 trillion yen in 2001. Much of the explanation for the continued rise in asset values stems from the fact that plan sponsors recorded higher book values on their financial statements instead of the lower market values, as reflected by declining financial markets at that time.[6] Therefore, one must exercise caution in interpreting the steady rise in managed plan assets for both EPF and TQPP plans throughout the 1990s.

Before 1990, EPF plans earned roughly 8.0 percent to 10.0 percent in nominal terms each year on their assets, well above the 5.5 nominal target rate of return required by the government, while inflation-adjusted rates of return remained well below those yields much of the time. After inflation dipped below 3.0 percent after 1981, the spread between nominal and real yields narrowed significantly. Both nominal and real yields fell dramatically with the decline in Japan's economy around 1989 and remained below 5.0 percent in the 1990s except for 1995 and 1999. Chart 1 shows the variability in nominal and real asset returns from 1975 to 2005 for existing EPF plans and from 1990 to 2005 for former EPF plans managed by the Pension Fund Association.

By the late 1990s, with declining asset values and a rise in employer contribution holidays, the estimated underfunding of employer-sponsored (EPF and TQPP) pension plans reached roughly between 40 trillion yen (US$404 billion) and 60 trillion yen (US$485 billion) (Clark and Mitchell 2002). At the same time, the unfunded liabilities of BRP plans

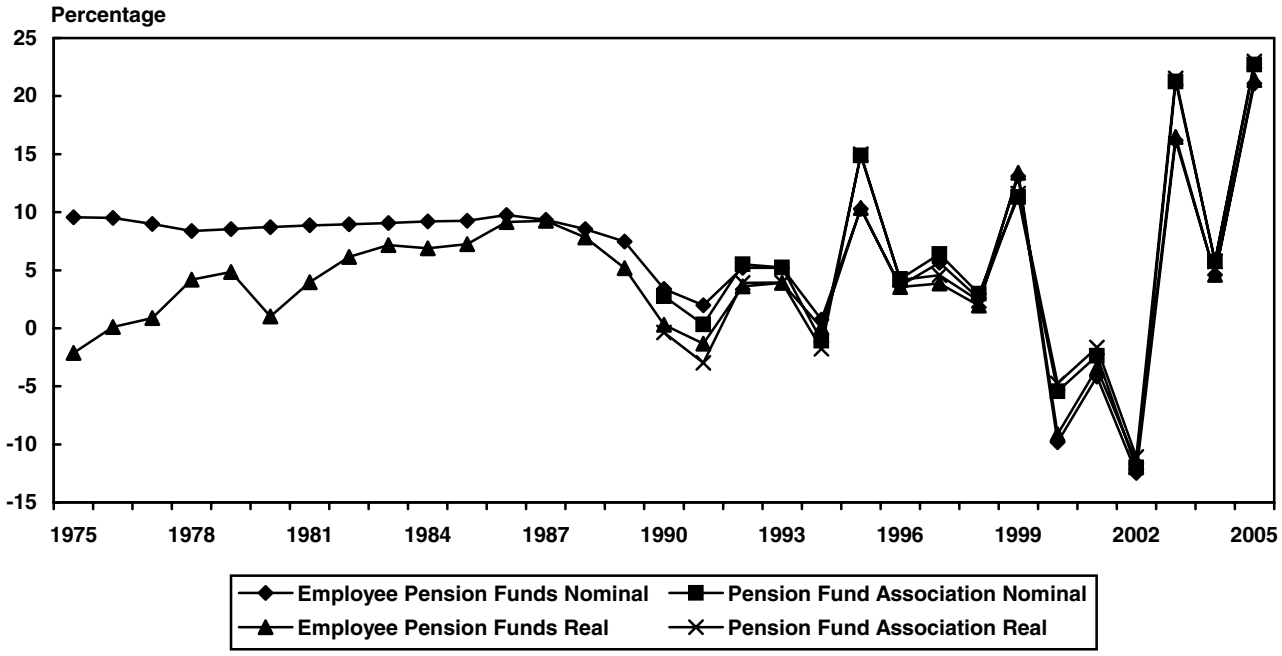
Table 3.
Japanese employer-sponsored pension plans, by number of participants, and assets prior to pension reform, 1991–2001

Year	Employees pension funds			Tax-qualified pension plans		
	Number of funds	Number of participants (in thousands)	Assets under management (in billion yen)	Number of contracts	Number of participants (in thousands)	Assets under management (in billion yen)
1991	1,593	10,678	28,800	90,434	9,770	14,100
1992	1,735	11,571	32,184	92,082	10,400	15,029
1993	1,804	11,919	35,416	92,467	10,600	16,071
1994	1,842	12,051	38,426	92,355	10,751	16,957
1995	1,878	12,130	41,775	91,465	10,776	17,801
1996	1,883	12,096	44,959	90,239	10,626	18,466
1997	1,874	12,254	48,695	88,312	10,432	19,156
1998	1,858	12,002	51,281	85,047	10,297	19,988
1999	1,832	11,692	55,486	81,605	10,011	21,137
2000	1,801	11,396	58,017	77,555	9,656	22,358
2001	1,737	10,871	58,297	73,582	9,167	22,719

SOURCE: Usuki (2003) for Assets under management, 1992-2001; remaining data taken from the Japanese Ministry of Health, Labor and Welfare (2005a).

NOTE: Data are as of the end of the fiscal year. Japanese fiscal years run from April 1 to March 31.

Chart 1.
Investment performance for Japanese corporate pension plans, 1975–2005 (nominal and real yields)



SOURCE: Pension Fund Association, *The Basic Statistics about Company Pension Plans*, various years. Pension Fund Association, *Annual Report of Employees' Pension Funds*, various years.

NOTE: Annual data reflect yields for fiscal years specified. The Japanese fiscal year runs from April 1 to March 31.

represented another US$324 billion to US$404 billion (Goldman Sachs 1999). The funding levels of retirement plans worsened when both nominal and real investment yields turned negative during 2000-2002. By 2001, 96 percent of corporate pension funds were underfunded (Nakamoto 2003).

In 2000, Japan adopted new accounting rules that exposed the extent of pension underfunding in many company plans (Usuki 2003; Nakada 2004). Under the old accounting rules, corporate pension plan shortfalls did not appear on corporate financial statements as a liability. The new rules, however, require companies with 300 or more employees to disclose unfunded pension and retirement obligations on their balance sheets (Takahashi 2006). At the same time, the government allowed the discount rate pension plans used for calculating pension liabilities to float according to the nominal yield of less risky long-term investment vehicles, such as government bonds, effectively increasing the amount required to make employer-sponsored pension funds solvent (Shimada 2002).

2001 Reform of Employer-Sponsored Retirement Plans

Recognizing the growing financial pressures on retirement plan sponsors and their problems funding those plans, the Japanese legislature passed two pieces of legislation in 2001 that significantly affected what retirement benefits employers could offer employees. One law changed the rules governing DB plans, included an option for EPF funds to return their assets related to social security contributions to the government, introduced hybrid plans and other new DB plan designs, and scheduled a date for the elimination of TQPP plans. A second law introduced defined contribution (DC) plans as a new pension plan option for employers.

Defined Benefit Corporate Pension Law (2001)

The objectives of the Defined Benefit Corporate Pension Law of 2001 were to unify the regulations and tax provisions of DB plans while enhancing the retirement income security of DB plan participants (Urata 2001). Specifically, the law provided for a greater variety of DB fund designs than was available with the existing EPF system and imposed stricter funding rules for employee benefits than those under TQPP plans. In addition, the DB law defined fiduciary duties of pension plan sponsors for the first time, including greater disclosure requirements of plan operations to plan participants. The law also introduced rules for transferring rights and obligations from one type of pension fund to another, including the conversion of a DB plan to a DC plan. Table 4 summarizes the key provisions of the law outlined in the text below.

The DB law permitted some EPF plan sponsors to transfer their EPF obligations for contracted out benefits back to the government. In addition, the law created a fund-type DB plan with a design similar to an EPF plan but lacking the contracting out option. Also, the law specified that no TQPP plans could be created after April 2002; existing TQPP plans must eventually, and transfer their assets to another fund type or distribute them to employee participants within 10 years. For that reason, the DB law created a contract-type DB plan, which resembles the TQPP type, but has stricter rules on reporting, disclosure, vesting, and funding.

Finally, the 2001 DB law permitted companies to create the cash balance plan, a hybrid pension which combines features of a DB and a DC plan design. Under the cash balance design, each employee has a notional account into which the employer credits a fixed percentage of the basic salary and an annual interest payment. The periodic interest credited to the employee account must be one of the following:

> (a) fixed rate; (b) national bond rate or another common index such as the consumer price index (CPI); (c) an interest rate combining (a) and (b); or (d) a floating rate using a national bond rate as a floor and a combined fixed/notional rate as a ceiling (Endo 2002, Fujiwara 2006).

Additional changes in the 2001 DB law affected funding, benefits, and plan termination. First, funding levels for new DB plans must satisfy EPF plan requirements, including the requirement that plans issue a statement of vested benefits and a present-value calculation of vested benefits. If a pension plan is underfunded, plan sponsors must develop a schedule to restore plan assets to the minimum funding level through increased contributions and/or accelerating the amortization of unfunded liabilities. Plan sponsors may use a funding surplus to take a contribution holiday.

Second, regulations specify that a minimum benefit and the benefit formula must be considered "reasonable" after taking into account an employee's years of service, salary, and so forth. A plan must pay old-age benefits as an annuity, although a portion may be paid as a lump sum. Survivor and disability benefits are not required but may be available to participants at

Table 4.
Defined Benefit Corporate Pension Law 2001, by key provisions and affected areas

Affected areas	Key Provisions
Choice of Plans	Three new Defined Benefit (DB) plan types created with differing features: **(1) Contract-type DB plan** Similar to Tax Qualified Pension Plan (TQPP) but more tightly regulated (funding standards, fiduciary duties, and disclosure) No minimum number of employees required Plan sponsor establishes a plan by contracting with trustee companies Employer contributions paid to trustee Pension assets transferrable to another plan Trustee responsible for management of pension assets and payment of pension benefits No contracting out feature **(2) Fund-type DB plan** Similar to Employee Pension Fund (EPF) plan but no option to "contract out" of social security system Minimum number of employees required to establish a plan is 300 Employer or a group of employers can establish a plan to manage contributed assets or contract with trustee companies Plan is a separate legal entity independent of firm Employer contributions paid to trustee who pays benefits Trustee responsible for management of pension assets and payment of pension benefits Plan is administered by a board of directors and an assembly of delegates **(3) Cash balance plan** Each participant has a hypothetical account balance The two amounts credited to the account each year are contributions based on the participant's wage or salary and guaranteed interest with the rate specified by the plan Plan sponsor bears investment risk and must pay additional contributions if managed assets do not outperform guaranteed rate
Contributions	Employer-only contributions (tax-deductible) unless plan regulations specify otherwise Additional contributions required to make up for any plan underfunding
Plan establishment	Plan sponsor needs assent of at least half of employees or union approval to establish the plan Approval needed from the Ministry of Health, Labor and Welfare (MHLW) to establish the plan according Converting plan assets to another type of corporate DB plan permissible
Plan conversions	TQPPs must be converted by March 31, 2012 to ensure employer contributions remain tax-deductible Conversion options include EPF plan, mutual aid plan, or one of the three new plan types (see above)
Employee Pension Fund	EPF plans contracting out of social security given opportunity to transfer assets for that liability back to the government 4-step process established with rules for steps 1 and 2 included in the 2001 law and rules for steps 3 and 4 implemented in 2003: Step 1–employer gets approval from employees and then applies to MHLW for exemption from future contracting-out obligations Step 2–establish payment of social security contributions by employer and employees at the full (non-contracted-out) rates Step 3–data reconciliation for past EPF service with the government and the Pension Fund Association Step 4–final government approval for the separation of assets and their transfer back to the government

SOURCES: Freshfields (2003), Mizuho Financial Group (2001), Morito (2001), and Hewitt Associates (2003).

the plan sponsor's discretion. The law defined a cash balance benefit formula for plans converted from a traditional DB plan to a cash balance plan.

Finally, a plan sponsor may terminate a plan only with the consent of the relevant labor union or employee representatives and approval by the Ministry of Health, Labor and Welfare (Japan MHLW). At termination, the plan sponsor is required to make up any funding shortfall.

Defined Contribution Plan Law (2001)

The Japanese government supported passage of the Defined Contribution Plan Law in 2001 for several reasons (Katsumata 2005; Fujiwara 2003; McLellan 2004). First, unlike DB plans, the DC law gave employers more retirement plan choices, including limiting their pension obligations under the new DC plans. Second, Japan's increasingly mobile labor force appeared compatible with the portability of individual accounts. Third, DC plans, it was thought, would encourage individuals to focus on retirement planning in anticipation of the scheduled reduction of social security benefits previously approved in 2000.

Finally, the Japanese government hoped the introduction of DC plans might stimulate the flow of individual retirement account assets into Japanese financial markets. To many observers in Japan at that time, the expanding U.S. economy and stock market boom of the 1990s appeared driven, in part, by the growth of DC plans, primarily 401(k) plans, so the introduction of a 401(k)-style pension plan surfaced as a potential remedy to boost the weak Japanese stock market by raising the demand for Japanese stocks.

Provisions under the new DC law established two types of DC plans: a corporate DC plan and an individual DC plan. Details on both plan types are contained in Table 5.

Employers establishing a corporate DC plan, after obtaining employee approval, usually contract out responsibility for administering the plan to a third-party administrator (such as a qualified bank or insurance firm). These employers contribute a fixed monthly tax-deductible contribution on behalf of their employees. Initially, the maximum allowable (nontaxable) annual contribution for each employee was set at 216,000 yen (US$1,880) if the company established a DC plan in addition to an existing DB plan. If the company had no DB plan it was set at 432,000 yen (U.S.$3,759). As part of the 2004 social security reform, these contribution limits increased to 276,000 yen (US$2,344) per year for employees with access to a qualified DB plan and to 552,000 yen (US$4,690) per year for employees without access to a qualified DB plan. Employees may not contribute to a corporate DC plan.

An individual DC plan is available to self-employed workers and employees who do not have access to a company pension plan. These individuals may apply to join the National Pension Fund Association, which contracts on behalf of its members with trustee companies to manage their members' DC assets. Self-employed workers pay a tax deductible monthly contribution up to an annual limit of 816,000 yen (US$6,866), while employees without access to a company retirement plan may contribute up to an annual limit of 180,000 yen (US$1,515). The contribution limit of employees in companies without a retirement plan was raised in October 2004 to 216,000 yen per year (US$1,773).

Below are provisions introduced by the 2001 DC law.

Eligibility. To be eligible for coverage by a DC plan, workers aged 60 or younger must participate in the social security system. Government workers and spouses of company employees are ineligible.

Vesting. After 3 years of service with an employer, an employee's corporate DC plan account is non-forfeitable.

Investments. Participants may select from among three or more investment alternatives that must contain at least one capital guaranteed product. A registered company (third party administrator) provides the range of investment products, information to improve financial literacy, and administration of participant investments.

Benefit Distribution. Funds can be withdrawn beginning at age 60 with 10 years of contributions, but must begin no later than age 70. Benefits may be claimed either as an annuity or as a lump sum. For those contributing less than 10 years, the withdrawal date may be delayed, but must occur no later than age 66.

Portability. Employees must transfer their accumulated assets to their new employer's DC plan after changing jobs or to an individual DC plan if the new employer does not offer a corporate DC plan, unless the worker is older than age 60.

Table 5.
Defined Contribution Corporate Pension Law, effective October 1, 2001

Affected areas	Key Provisions
Plan establishment	Two new Defined Contribution (DC) plan types created: **(1) Corporate DC plan** Empoyees eligible if employer sponsors plan Requires assent of majority of employees or union representative as to plan rules No minimum number of employees required Employer appoints trustees (usually trust banks or insurance companies) to administer pension assets Plan sponsor responsible for providing financial education information to participants Employer only pays a fixed percentage of salary or a fixed monthly contribution (tax-deductible) on behalf of employees Maximum allowable contribution for each employee varies (¥216,000 (US$1,843) for companies also having a Defined Benefit (DB) plan and ¥432,000 (US$3,684) for companies without a DB plan) Vesting rules vary across plans but plans must have 100 percent vesting after 3 years and may have partial vesting within that time Companies are permitted to convert from a severance pay (book reserve) plan to a DC plan with benefits calculated on the basis of new contributions and/or past service credits from old plan, plus interest **(2) Individual DC plan** Available to self-employed workers and others not participating in a corporate pension plan, but must be covered by social socurity Individual can apply to join the National Pension Fund Association (NFPA) which acts as trustee on behalf of members Employees have their employer deduct contributions from pay and send them to the NFPA Self-employed persons remit contributions directly to NFPA Individual selects plan administrator who prepares a packaged product containing certain investment options Individual decides how much to contribute and pays it on a monthly basis up to certain annual limits (up to ¥816,000 (US$6,959) for self-employed workers and up to ¥180,000 (US$1,535) for employees ineligible to receive pension benefits)
Benefits	Three types of benefits (old age, disability, and survivors) payable in a lump sum; benefits may vary depending on plan rules
Taxation	Contributions are fully tax-deductible and investment earnings are tax-deferred
Investments	Individual participant selects from among at least three investment options products (one of which guarantees principal) Participant can rebalance portfolio as often as once every 3 months Third parties administering employee investments and providing investment information must register with the Ministry of Health, Labor and Welfare
Age	Eligible persons include those younger than age 60 and covered by the social security system Persons aged 60 or older eligible for old-age benefit with 10 years of participation Persons may start receiving benefits as early as age 60, but must begin receiving them at age 70
Rollover accounts	Mandatory rollover of plan assets (individual accounts) for those aged 60 or younger upon termination of employment or change of employer to new employer's DC plan or to individual DC plan account The exception to mandatory rollover is loss of eligibility within 3 years of becoming a participant

SOURCES: Freshfields (2003), Mizuho Financial Group (2001), Takayama (2005), Urata (2001), and Morito (2001).

Postreform Developments in Employer-Sponsered Plans

In the 6 years since Japan implemented its 2001 DB and DC pension laws, the mix of employer-sponsored retirement plans offered in Japan has changed significantly, and overall employee coverage has declined. This outcome can be attributed to post-2001 changes in the tax code and other laws affecting employer-sponsored pensions. Pension experts expect further pension changes based on a government review released in July 2007.

Trends in the postreform era

Since 2001, the number of plans and participants in prereform retirement plans, such as EPF and TQPP plans, have declined as new plan types (DB and DC) were adopted (Table 6).[7] By 2005, the downward trend in DB plans reversed, while the total number of DB and DC plans being offered by employers increased slightly. Table 6 presents similar patterns of decline and growth in the number of retirement plan participants beginning in 2004. On balance, employer-sponsored retirement plans have remained largely DB in design.

From 2001 to 2006, the number of EPF plans fell 61 percent (from 1,737 to 672), while the number of plan participants declined more than 50 percent (10.9 million to 5.3 million). Government statistics show that nearly 80 percent of former EPF plans converted to a new type of DB plan allowed under the 2001 law, a small portion of EPF plan assets were transferred to a DC plan, and less than 20 percent of EPF plans were dissolved (Shimizu 2005).

Most of the decrease in EPF plans and plan assets occurred after 2003 when many EPF plan sponsors began to transfer their obligations for the contracted-out EPI (earnings-related) social security portion of the EPF fund back to the government to remove signifi-

Table 6.
Post-reform trends in Japanese employer-sponsored pension plans, 2001–2006

Year	Total	Types of DB plans				Total DC corporate
		EPF	TQPP	DB contract and fund type plans	DB fund type plan	
			Number of pension plans			
2001	75,319	1,737	73,582	. . .	. . .	70
2002	68,412	1,656	66,741	15	0	361
2003	60,835	1,357	59,162	165	151	845
2004	54,591	838	52,761	479	513	1,402
2005	47,207	687	45,090	833	597	1,866
2006	47,432	672[a]	45,090[b]	1,067[a]	603[a]	2,191[c]
			Number of participants (in thousands)			
2001	20,038	10,871	9,167	. . .	. . .	88
2002	18,972	10,386	8,586	. . .	. . .	325
2003	16,151	8,351	7,770	30	. . .	708
2004	14,032	6,152	6,530	1,350	. . .	1,255
2005	14,827	5,300	5,687	3,840	. . .	1,733
2006	14,810	5,300[a]	5,670[b]	3,840[b]	. . .	2,106[d]

SOURCE: Ministry of Health, Labour and Welfare (2005a) for all EPF and TQPP through 2004 and for other data through 2003; remaining data obtained from sources noted.

NOTES: Defined Benefit Plans started from April 1, 2002; Defined Contribution Corporate Plans started from October 1, 2001

Data through 2005 reflect figures at end of fiscal year. Japanese fiscal years run from April 1 to March 31.

DB = Defined Benefit plan; EPF = Employee Pension Fund; TQPP = Tax-Qualified Pension plan; DC = Defined Contribution plan; . . . = not applicable.

a. Data as of September 1, 2006 (Pension Fund Association).

b. Data as of July 31, 2006 (Pension Fund Association).

c. Data as of January 31, 2007 (Ministry of Health, Labor and Welfare).

d. Data as of December 31, 2006 (Ministry of Health, Labor and Welfare).

cant pension liabilities from corporate pension balance sheets and thus improve firm credit ratings (Sato 2005). This process involves several steps. First, the Ministry of Health, Labor, and Welfare must approve an employer's request to return the contracted out portion of social security. Once approved, plan sponsors then transfer the accumulated social security-related funds back to the government. After the transfer, a plan sponsor can convert its remaining DB plan assets to one of the two new DB plans or the new DC corporate plan.

The government's buy-back program was quite generous and nearly all employers with single-employer EPF plans took advantage of this program. For EPFs with multiple plan sponsors, negotiating an agreement to return the contracted-out assets to the government has been difficult because the process often requires protracted coordination and cooperation among participating companies. Thus, these employers cannot withdraw easily from their EPF arrangement since they must receive approval from three-quarters of participating employers as well as their own employees (McGuinness 2003; McLellan 2005; Fujiwara 2006).

The 2001 DB law requires plan sponsors to convert TQPP plans into another type of pension plan by 2012. As evident in the data in Table 6, the decline of TQPP plans has been almost as dramatic as that for EPF plans. However, the relatively smaller firm size associated with most TQPP plans may explain why over 60 percent of these plans still have not converted. Close to 45,100 TQPP plans with around 5.7 million participants were operational in 2006 compared with nearly 73,600 such plans covering almost 9.2 million workers in 2001. Some TQPP plan sponsors have transferred their TQPP contracts to the government-run Mutual Aid Organization for Employees' Retirement Allowances for businesses with less than 300 million yen (US$2.6 million) or fewer than 300 employees (Freshfields 2003). By November 2005, the number of TQPP contract transfers to the government reached 7,447 plans (Arimori 2006). Some employers converted their TQPP plans, which resulted in 627 additional DC plans by early 2005 and 358 contract-type DB plans by the end of 2004 (Shimizu 2005). Plan sponsors terminated the remaining TQPP plans.

Like TQPP plans, book-reserve plans (BRPs) lost their tax-favored status as a result of changes in the tax law, not the pension laws of 2001. Specifically, amendments to the *Corporate Tax Act* in July 2002 require companies with 300 or more employees to fund any outstanding tax-favored BRP reserves within 4 years; companies with fewer than 300 employees are allowed up to 10 years to fund these reserves (Dai-ichi 2006). According to some pension experts, BRP plans remain a popular employee retirement benefit despite the loss of their tax advantages (Fujiwara 2003 and 2006).

Data in Table 6 indicate there were 992 new DB plan types in operation by 2004, including 479 contract DB plans and 513 fund DB plans, covering 1.35 million workers. By 2006, the number of employees in these new plans exceeded 3.80 million. Approximately 40 percent of all new DB plans operating in June 2005 were cash balance plans, which often cover several companies (Sugita 2006).

The number of corporate DC plans reached 2,191 by the end of January 2007, representing more than a 50-percent increase over 2004. Firms with fewer than 300 employees, primarily in retail and other industries with high turnover levels, operate approximately 80 percent of these DC plans (Daily Yomiuri 2006; Huh and McLellan 2007). Nearly 7,300 companies sponsored DC plans at the end of August 2006—an increase of almost 50 percent from a year earlier (Nikkei Report 2006b). According to some pension experts, much of the increase can be explained by the higher limit allowed for tax-advantaged employer contributions to DC plans, effective in October 2004, encouraging companies to convert more of their existing DB plans into DC plans to reduce the volatility from pension liabilities on corporate balance sheets (Huh and McLellan 2007; McLellan 2004). At the end of December 2006, corporate DC plans covered more than 2.1 million employees—nearly 70 percent more than in 2004 (Table 6).

Even though the number of workers participating in DC plans has been growing, they covered less than 3 percent of the entire Japanese labor force in March 2006 (with about 12 percent of active participants in private-sector pension plans), and accounted for roughly 2 percent of all corporate pension assets. Smaller firms tend to join multiemployer DC plans, which are administered by financial companies with the expertise and resources to handle the administrative and recordkeeping responsibilities. Participation by the self-employed and others eligible for DC plans has been negligible, covering only about 70,000 persons in July 2006.

Prospects for Employer-Sponsored Private Retirement Plans

Buoyant financial markets and steady economic growth, averaging more than 2 percent since 2003,

marked an end to nearly 15 years of economic stagnation in Japan. Japanese pension funds have benefited from positive investment returns in the improved economic environment (Chart 1), including an average yield in nominal terms of more than 19 percent for company pension funds in 2005 (Nikkei Report 2006a and 2006b). A survey in 2006 of Japanese occupational pension plans found average funding levels have steadily improved in recent years from 62 percent of liabilities funded in 2003, to 83 percent in 2005, and to 96 percent in early 2006 (Pension & Investments 2006b; Greenwich Associates 2006). The improvements in investment performance and plan funding are contributing to an increasingly optimistic outlook among DB and DC pension plan sponsors, according to that survey (Greenwich Associates 2006).

While employers continue to maintain DB plans for most employees, the financial services industry in Japan is projecting significant growth of DC plans in the next several years (Turner 2006; Nomura Research Institute 2006; Pensions & Investments 2006a). Specifically, pension industry experts consider the mandated termination or conversion of TQPPs by 2012 as the primary source of expected DC plan growth. TQPPs, which accounted for roughly 20 percent of the 17.2 trillion yen (US$164.7 million) managed pension assets in 2005, are popular among small and mid-sized companies. For smaller companies that lack the scale and resources required to set up and manage a DB plan, the less onerous TQPP plan regulations have worked well. A recent report by Nomura Research Institute (NRI) indicated that many companies with TQPP plans might convert to DC plans. NRI expects larger companies to select DC plans (often alongside their existing DB plans), while smaller firms with fewer than 300 employees will likely switch to the government-run Mutual Aid Organization for Employees' Retirement Allowances. The NRI estimates that these mandated TQPP conversions could triple DC plan assets over the next 5 years.

MHLW Review

In October 2006, the Ministry of Health, Labor, and Welfare convened a monthly study group to review the corporate pension system every 5 years as required by law. The study group sought to encourage the growth of DC plans and will examine DB plan issues as well. The study group produced its report in July 2007. According to the government, some recommendations for employer-sponsored retirement plans could be implemented as early as 2008.

The study group examined the taxation of DB contributions and the introduction of a guarantee system in case DB pension funds become insolvent (Nikkei Report 2006c). Issues under discussion for DC plans included:[8] permitting employee contributions, increasing contribution limits, and permitting withdrawals from DC accounts before retirement.

Permitting employee contributions

The 2001 DC law prohibited employees from contributing to corporate DC plans. In a U.S. 401(k) plan, by comparison, generally, employees (not the employer) choose to participate if a 401(k) plan is offered by the employer, and the employer may contribute, resulting in a larger pool of tax-deferred savings for participating employees. The typical contribution rate for a 401(k) plan participant is 6 percent of salary, with an employer match of 3 percent (U.S. Department of the Treasury 2006; Munnell and Sundén 2006). There is a maximum limit (indexed for inflation) on the total yearly employee pretax salary deferral for 401(k) plans, which was US$15,500 (1,673,931 yen) for 2007, and employees aged 50 or older are allowed additional pretax "catch-up" contributions of US$5,000 (539,931 yen).

Increasing contribution limits

Employees may not contribute to DC plans, and employer contributions are currently limited to 276,000 yen (US$2,344) per year on behalf of employees with access to a qualified DB plan and 552,000 yen (US$4,690) per year on behalf of employees without a qualified DB plan. These limitations prevent DC plans from providing a very high level of retirement benefits. According to the Japanese government, the average employer DC plan contribution in early 2006 was about 4 percent of employee salary. By comparison, contribution limits for US 401(k) plans are much higher, as indicated above.[8] In addition, the limitations on Japanese tax-exempt employer contributions discourage many companies from converting more of their entire pension (EPF or TQPP) plan assets into a single DC plan. Similar to the experience in the U.S., employees in large Japanese companies will more likely receive both DB and DC retirement benefits.

Permitting withdrawals from DC accounts before retirement

Existing prohibitions on employee early withdrawals (before age 60) keep the Japanese DC plan account size unavailable to participants until retirement.

Despite the potential threat to income adequacy in retirement, a relaxation of these withdrawal rules for accounts with relatively small asset balances is under consideration.

Other topics being considered

Other topics under review include increasing the eligibility age for receiving benefits from DC plans from age 60 to age 65 and exploring ways to improve investment education for DC plan participants.

Notes

Acknowledgments: Although pension data used in this research come from a variety of sources, the Institute of Pension Research database managed by the Nikko Financial Intelligence, Inc. provided a particularly rich source of information. This online database may be accessed at http://www.nikko-fi.co.jp/modules/pension_e9/. In addition, the help provided by the Japanese External Trade Organization (JETRO) in obtaining data from the Japanese government was a significant contribution toward the completion of this article.

[1] According to provisions of the 2004 social security reform law, the government subsidy for the NP will rise to 50 percent by 2009 (Sakamoto 2005).

[2] The Japanese government uses a male employee and non-working spouse as the model household when publishing the average EPI replacement rate. The current average EPI replacement rate for a female employee is approximately 53 percent, which will decline to 45 percent by 2025. This higher EPI replacement rate for women reflects a lower average wage, versus male workers, and the redistributive benefit formula (Y. Watanabe 2006–2007).

[3] In general, book reserves occur when a voluntary retirement plan's assets are recorded as a liability on the plan sponsor's balance sheet (Yermo 2002).

[4] According to the 2004 social security reform, EPF plans established on or after April 1, 2005, must provide a supplemental benefit equal to 50 percent. However, no EPF plans have been established since April 1, 2005. EPF plans established before April 2005 are not subject to this new rule (Y. Watanabe 2006–2007).

[5] There is an upper limit to the benefit guaranteed by the PFA. If an EPF supplemental benefit is more than 30 percent above the earnings-related EPI benefit replaced, then the guarantee covers 50 percent of the benefit beyond the supplemental 30 percent. A PFA review committee, however, may reduce this extra guaranteed amount for EPF rule violations, such as the failure by trustees to exercise their fiduciary duties. EPF plans support this guarantee system through fees based on the number of plan participants (Clark 1991; Y. Watanabe 2006–2007).

[6] Accounting changes introduced in 2000 did encourage corporations to use market valuation rather than book value to account for pension assets in financial statements. However, the time at which changes in asset values began to be reflected on plan sponsor financial statements was not clear given the continued weakness of financial markets until 2003.

[7] Tables 5 does not show trends in BRP plans. Anecdotal evidence suggests a decline in their use, primarily conversions into newer DB and DC plan types, following the loss of tax advantages in 2002. There are no official figures documenting this decline, however.

[8] This comparison between Japanese and American workers is fair, given that the 2005 hourly compensation costs for production workers in manufacturing are comparable in the two countries: U.S. workers received $23.65 versus Japanese workers received $21.76 (US Bureau of Labor Statistics 2006).

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OASDI and SSI Snapshot and Monthly Statistics

Each month, the Social Security Administration's Office of Retirement and Disability Policy posts key statistics about various aspects of the Old-Age, Survivors, and Disability Insurance (OASDI) and Supplemental Security Income (SSI) programs at http://www.socialsecurity.gov. The statistics include the number of people who receive benefits, the type of benefit they receive, and the average monthly benefit. Data from the Office of the Chief Actuary on the receipts, expenditures, and assets of the OASI and DI trust funds, which previously appeared in Table 11 of the Monthly Statistics, are available at http://www.socialsecurity.gov/OACT/ProgData/funds.html. This issue presents OASDI data for November 2006–November 2007 and SSI data for December 2006–December 2007. Effective with the December 2007 OASDI data, we will provide only the OASDI snapshot tables, not the more detailed tables, in the monthly statistical section of the *Bulletin*. Persons wanting detailed monthly OASDI information should visit the Office of the Actuary's Web site at http://www.ssa.gov/OACT/ProgData/beniesQuery.html.

The Monthly Statistical Snapshot summarizes the information about the programs presented in the more detailed tables and provides a summary table on the trust funds. Data for December 2007 are given on pages 106–107. The more detailed OASDI tables begin on page 109; SSI tables begin on page 127.

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 trust funds (Table 4) are available at http://www.socialsecurity.gov/OACT/ProgData/funds.html.

Monthly Statistical Snapshot, December 2007

Table 1.
Number of people receiving Social Security, Supplemental Security Income, or both, December 2007 (in thousands)

Type of beneficiary	Total	Social Security only	SSI only	Both Social Security and SSI
All beneficiaries	54,656	47,296	4,791	2,569
Aged 65 or older	35,987	33,971	868	1,149
Disabled, under age 65 [a]	11,701	6,358	3,923	1,420
Other [b]	6,968	6,968	. . .	. . .

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 2007

Type of beneficiary	Beneficiaries		Total monthly benefits (millions of dollars)	Average monthly benefit (dollars)
	Number (thousands)	Percent		
All beneficiaries [a]	49,865	100.0	49,218	987.00
Old-Age Insurance				
Retired workers	31,525	63.2	34,001	1,078.50
Spouses	2,431	4.9	1,292	531.70
Children	494	1.0	266	538.00
Survivors Insurance				
Widow(er)s and parents [b]	4,438	8.9	4,529	1,020.40
Widowed mothers and fathers [c]	165	0.3	129	781.80
Children	1,892	3.8	1,332	704.30
Disability Insurance				
Disabled workers	7,101	14.2	7,131	1,004.10
Spouses	154	0.3	41	266.50
Children	1,665	3.3	498	299.00

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 special age-72 beneficiaries.

b. 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.

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

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Table 3.
Supplemental Security Income recipients, December 2007

Age	Recipients		Total payments [a] (millions of dollars)	Average monthly payment [b] (dollars)
	Number (thousands)	Percent		
All recipients	7,360	100.0	3,736	468.40
Under 18	1,121	15.2	661	555.30
18–64	4,222	57.4	2,291	484.20
65 or older	2,017	27.4	784	386.90

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 2007 (in millions of dollars)

Component	OASI	DI	Combined OASI and DI
		Receipts	
Total	93,572	12,762	106,334
Net contributions	43,447	7,380	50,827
Income from taxation of benefits	12	0	12
Net interest	50,113	5,374	55,486
Payments from the general fund	0	0	8
		Expenditures	
Total	41,452	8,829	50,281
Benefit payments	41,187	8,660	49,847
Administrative expenses	265	169	434
Transfers to Railroad Retirement	0	0	0
		Assets	
At start of month	2,018,403	210,951	2,182,447
Net increase during month	5,210	3,933	56,053
At end of month	2,023,613	214,884	2,238,500

SOURCE: Data on the trust funds were accessed on March 14, 2008, on the Office of the Chief Actuary's Web site at http://www.socialsecurity.gov/OACT/ProgData/funds.html.

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

Old-Age, Survivors, and Disability Insurance
November 2006–November 2007

OASDI Benefits in Current-Payment Status

Awards of OASDI Benefits

NOTE: Effective with the December 2007 OASDI data, persons wanting detailed monthly OASDI information should visit the Office of the Actuary's Web site at http://www.ssa.gov/OACT/ProgData/beniesQuery.html.

Table 1.
All OASDI benefits, by program and type of benefit, November 2006–November 2007

Month	Total, OASDI [a]	OASI			DI
		Subtotal, OASI [b]	Retirement	Survivors	Subtotal, DI [c]
			Number (thousands)		
2006					
November	49,091	40,495	33,930	6,566	8,596
December	49,123	40,503	33,938	6,566	8,619
2007					
January	49,247	40,613	34,076	6,537	8,634
February	49,353	40,694	34,148	6,547	8,659
March	49,439	40,752	34,193	6,559	8,688
April	49,537	40,815	34,244	6,571	8,722
May	49,614	40,866	34,290	6,576	8,748
June	49,598	40,858	34,329	6,529	8,739
July	49,552	40,828	34,356	6,472	8,724
August	49,633	40,889	34,414	6,475	8,744
September	49,659	40,861	34,387	6,474	8,798
October	49,739	40,883	34,396	6,487	8,856
November	49,816	40,929	34,438	6,491	8,887
			Total monthly benefits (millions of dollars)		
2006					
November	45,392	38,460	32,774	5,686	6,932
December	46,938	39,757	33,882	5,875	7,181
2007					
January	47,142	39,946	34,095	5,852	7,195
February	47,274	40,059	34,195	5,864	7,215
March	47,377	40,141	34,264	5,877	7,236
April	47,497	40,233	34,344	5,889	7,263
May	47,592	40,307	34,409	5,897	7,285
June	47,643	40,343	34,476	5,867	7,300
July	47,676	40,364	34,537	5,827	7,312
August	47,783	40,451	34,618	5,833	7,332
September	47,823	40,439	34,605	5,834	7,384
October	47,905	40,467	34,622	5,845	7,438
November	48,048	40,579	34,727	5,851	7,470

Continued

Table 1.
Continued

Month	Total, OASDI [a]	OASI			DI
		Subtotal, OASI [b]	Retirement	Survivors	Subtotal, DI [c]
			Average monthly benefit (dollars)		
2006					
November	924.70	949.80	965.90	866.00	806.50
December	955.50	981.60	998.40	894.80	833.10
2007					
January	957.20	983.60	1,000.50	895.20	833.30
February	957.90	984.40	1,001.40	895.70	833.30
March	958.30	985.00	1,002.10	896.00	832.90
April	958.80	985.80	1,002.90	896.30	832.80
May	959.20	986.30	1,003.50	896.80	832.80
June	960.60	987.40	1,004.30	898.60	835.30
July	962.10	988.60	1,005.30	900.40	838.10
August	962.70	989.30	1,005.90	900.90	838.60
September	963.00	989.70	1,006.30	901.10	839.40
October	963.10	989.80	1,006.60	901.40	839.90
November	964.50	991.40	1,008.40	901.40	840.50

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

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

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 special age-72 beneficiaries.

   Excludes a number of Railroad Retirement beneficiaries who would have been eligible for Social Security benefits had they applied. The reason they have not applied is that receipt of a Social Security benefit would reduce their Railroad Retirement benefit by a like amount. The number of Railroad Retirement beneficiaries who would be eligible for a Social Security benefit if they applied is not available, but is estimated to be less than 100,000.

b. Benefits paid from the OASI trust fund to retired workers and their spouses and children and to all survivors.

c. Benefits paid from the DI trust fund to disabled workers and their spouses and children.

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Table 2.
OASI retirement benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Retired workers	Spouses	Children
		Number (thousands)		
2006				
November	33,930	30,959	2,483	488
December	33,938	30,971	2,476	490
2007				
January	34,076	31,110	2,473	493
February	34,148	31,179	2,470	498
March	34,193	31,225	2,466	502
April	34,244	31,276	2,463	506
May	34,290	31,322	2,460	508
June	34,329	31,374	2,457	499
July	34,356	31,419	2,452	485
August	34,414	31,477	2,451	487
September	34,387	31,456	2,444	487
October	34,396	31,467	2,440	489
November	34,438	31,510	2,437	492
		Total monthly benefits (millions of dollars)		
2006				
November	32,774	31,286	1,244	244
December	33,882	32,346	1,282	254
2007				
January	34,095	32,556	1,282	257
February	34,195	32,655	1,281	259
March	34,264	32,724	1,279	262
April	34,344	32,802	1,277	264
May	34,409	32,868	1,276	266
June	34,476	32,941	1,274	261
July	34,537	33,012	1,272	253
August	34,618	33,092	1,272	255
September	34,605	33,082	1,268	255
October	34,622	33,100	1,266	256
November	34,727	33,203	1,266	258

Continued

Table 2.
Continued

Month	All beneficiaries	Retired workers	Spouses	Children
		Average monthly benefit (dollars)		
2006				
November	965.90	1,010.60	501.10	500.70
December	998.40	1,044.40	517.90	518.10
2007				
January	1,000.50	1,046.50	518.20	520.00
February	1,001.40	1,047.30	518.40	521.00
March	1,002.10	1,048.00	518.40	521.80
April	1,002.90	1,048.80	518.50	522.50
May	1,003.50	1,049.40	518.50	523.00
June	1,004.30	1,050.00	518.70	523.10
July	1,005.30	1,050.70	518.80	522.30
August	1,005.90	1,051.30	518.90	523.10
September	1,006.30	1,051.70	518.90	523.70
October	1,006.60	1,051.90	518.80	524.10
November	1,008.40	1,053.70	519.60	525.40

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

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

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.

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Table 3.
OASI retired-worker beneficiaries, by sex and election of early retirement, November 2006–November 2007

Month	All beneficiaries				Men				Women			
	Total	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of total	Subtotal	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of subtotal	Subtotal	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of subtotal
Number (thousands)												
2006												
November	30,959	8,368	22,591	73.0	15,862	4,668	11,194	70.6	15,096	3,700	11,397	75.5
December	30,971	8,373	22,598	73.0	15,866	4,669	11,197	70.6	15,106	3,705	11,401	75.5
2007												
January	31,110	8,394	22,716	73.0	15,941	4,677	11,264	70.7	15,168	3,717	11,452	75.5
February	31,179	8,400	22,779	73.1	15,976	4,680	11,296	70.7	15,203	3,720	11,483	75.5
March	31,225	8,406	22,819	73.1	15,997	4,683	11,314	70.7	15,227	3,722	11,505	75.6
April	31,276	8,416	22,859	73.1	16,022	4,689	11,332	70.7	15,254	3,727	11,527	75.6
May	31,322	8,426	22,896	73.1	16,043	4,695	11,348	70.7	15,279	3,730	11,548	75.6
June	31,374	8,438	22,935	73.1	16,063	4,699	11,364	70.7	15,310	3,739	11,571	75.6
July	31,419	8,453	22,966	73.1	16,080	4,705	11,375	70.7	15,339	3,748	11,591	75.6
August	31,477	8,466	23,011	73.1	16,106	4,712	11,394	70.7	15,371	3,753	11,617	75.6
September	31,456	8,443	23,013	73.2	16,089	4,699	11,389	70.8	15,367	3,743	11,624	75.6
October	31,467	8,418	23,049	73.2	16,089	4,685	11,404	70.9	15,379	3,733	11,646	75.7
November	31,510	8,432	23,077	73.2	16,104	4,692	11,412	70.9	15,405	3,740	11,665	75.7
Total monthly benefits (millions of dollars)												
2006												
November	31,286	9,903	21,383	. . .	18,071	6,220	11,851	. . .	13,215	3,683	9,532	. . .
December	32,346	10,240	22,106	. . .	18,681	6,430	12,250	. . .	13,666	3,810	9,855	. . .
2007												
January	32,556	10,272	22,285	. . .	18,809	6,447	12,362	. . .	13,747	3,825	9,922	. . .
February	32,655	10,283	22,371	. . .	18,866	6,453	12,412	. . .	13,789	3,830	9,959	. . .
March	32,724	10,295	22,429	. . .	18,902	6,460	12,442	. . .	13,822	3,835	9,987	. . .
April	32,802	10,316	22,486	. . .	18,945	6,473	12,472	. . .	13,857	3,843	10,015	. . .
May	32,868	10,333	22,535	. . .	18,980	6,484	12,496	. . .	13,888	3,849	10,040	. . .
June	32,941	10,354	22,587	. . .	19,013	6,493	12,520	. . .	13,928	3,861	10,067	. . .
July	33,012	10,379	22,633	. . .	19,046	6,504	12,541	. . .	13,966	3,874	10,092	. . .
August	33,092	10,401	22,691	. . .	19,088	6,518	12,570	. . .	14,003	3,882	10,121	. . .
September	33,082	10,378	22,703	. . .	19,073	6,503	12,570	. . .	14,009	3,875	10,133	. . .
October	33,100	10,351	22,748	. . .	19,076	6,484	12,591	. . .	14,024	3,867	10,157	. . .
November	33,203	10,401	22,802	. . .	19,128	6,515	12,614	. . .	14,075	3,886	10,189	. . .

Continued

Table 3.
Continued

Month	All beneficiaries				Men				Women			
	Total	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of total	Subtotal	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of subtotal	Subtotal	Without reduction for early retirement	With reduction for early retirement	Early retirees as a percentage of subtotal
						Average monthly benefit (dollars)						
2006												
November	1,010.60	1,183.40	946.50	. . .	1,139.20	1,332.50	1,058.70	. . .	875.40	995.40	836.40	. . .
December	1,044.40	1,223.00	978.20	. . .	1,177.40	1,377.20	1,094.10	. . .	904.70	1,028.60	864.40	. . .
2007												
January	1,046.50	1,223.70	981.00	. . .	1,179.90	1,378.30	1,097.50	. . .	906.30	1,029.10	866.50	. . .
February	1,047.30	1,224.20	982.10	. . .	1,180.90	1,378.90	1,098.80	. . .	907.00	1,029.50	867.30	. . .
March	1,048.00	1,224.70	982.90	. . .	1,181.60	1,379.40	1,099.70	. . .	907.70	1,030.20	868.10	. . .
April	1,048.80	1,225.70	983.70	. . .	1,182.50	1,380.40	1,100.50	. . .	908.50	1,031.10	868.80	. . .
May	1,049.40	1,226.30	984.20	. . .	1,183.00	1,381.00	1,101.10	. . .	909.00	1,031.70	869.40	. . .
June	1,050.00	1,227.10	984.80	. . .	1,183.70	1,381.70	1,101.80	. . .	909.70	1,032.70	869.90	. . .
July	1,050.70	1,227.80	985.50	. . .	1,184.40	1,382.50	1,102.50	. . .	910.50	1,033.60	870.70	. . .
August	1,051.30	1,228.60	986.10	. . .	1,185.20	1,383.30	1,103.20	. . .	911.10	1,034.30	871.20	. . .
September	1,051.70	1,229.30	986.50	. . .	1,185.50	1,383.80	1,103.70	. . .	911.60	1,035.30	871.80	. . .
October	1,051.90	1,229.70	986.90	. . .	1,185.70	1,384.10	1,104.20	. . .	911.90	1,036.00	872.20	. . .
November	1,053.70	1,233.40	988.10	. . .	1,187.80	1,388.30	1,105.30	. . .	913.70	1,039.10	873.40	. . .

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

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

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. . . = not applicable.

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Table 4.
OASI survivors benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Widow(er)s and parents [a]	Widowed mothers and fathers [b]	Children
		Number (thousands)		
2006				
November	6,566	4,503	172	1,890
December	6,566	4,496	171	1,899
2007				
January	6,537	4,472	159	1,906
February	6,547	4,472	161	1,914
March	6,559	4,471	162	1,926
April	6,571	4,471	164	1,936
May	6,576	4,470	166	1,940
June	6,529	4,463	167	1,899
July	6,472	4,455	166	1,850
August	6,475	4,455	167	1,853
September	6,474	4,449	163	1,862
October	6,487	4,448	164	1,874
November	6,491	4,444	165	1,882
		Total monthly benefits (millions of dollars)		
2006				
November	5,686	4,310	126	1,249
December	5,875	4,447	130	1,298
2007				
January	5,852	4,427	119	1,306
February	5,864	4,431	120	1,313
March	5,877	4,434	122	1,322
April	5,889	4,437	123	1,330
May	5,897	4,439	124	1,333
June	5,867	4,436	126	1,305
July	5,827	4,432	126	1,269
August	5,833	4,434	127	1,272
September	5,834	4,431	124	1,279
October	5,845	4,433	125	1,287
November	5,851	4,431	126	1,294

Continued

Table 4.
Continued

Month	All beneficiaries	Widow(er)s and parents [a]	Widowed mothers and fathers [b]	Children
		Average monthly benefit (dollars)		
2006				
November	866.00	957.10	733.70	661.10
December	894.80	989.30	756.60	683.70
2007				
January	895.20	989.90	745.90	685.30
February	895.70	990.90	747.40	685.80
March	896.00	991.60	748.40	686.30
April	896.30	992.40	749.30	686.90
May	896.80	993.10	750.40	687.30
June	898.60	994.00	754.60	687.10
July	900.40	994.70	759.70	685.80
August	900.90	995.40	761.70	686.30
September	901.10	996.00	762.20	686.60
October	901.10	996.40	763.10	686.80
November	901.40	996.90	764.90	687.80

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

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

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.

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Table 5.
DI benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Disabled workers	Spouses	Children
		Number (thousands)		
2006				
November	8,596	6,796	156	1,644
December	8,619	6,812	156	1,652
2007				
January	8,634	6,824	154	1,657
February	8,659	6,841	154	1,664
March	8,688	6,859	154	1,675
April	8,722	6,882	154	1,686
May	8,748	6,901	153	1,693
June	8,739	6,924	153	1,662
July	8,724	6,947	152	1,624
August	8,744	6,966	152	1,626
September	8,798	7,012	152	1,633
October	8,856	7,058	154	1,644
November	8,887	7,078	154	1,655
		Total monthly benefits (millions of dollars)		
2006				
November	6,932	6,432	39	462
December	7,181	6,661	40	480
2007				
January	7,195	6,674	39	482
February	7,215	6,691	39	485
March	7,236	6,709	39	488
April	7,263	6,733	39	491
May	7,285	6,753	39	493
June	7,300	6,777	39	484
July	7,312	6,800	39	471
August	7,332	6,821	39	472
September	7,384	6,869	40	475
October	7,438	6,919	40	479
November	7,470	6,946	40	483

Continued

Table 5.
Continued

Month	All beneficiaries	Disabled workers	Spouses	Children
		Average monthly benefit (dollars)		
2006				
November	806.50	946.40	249.10	280.80
December	833.10	977.90	257.00	290.50
2007				
January	833.30	978.00	256.90	291.00
February	833.30	978.10	256.50	291.20
March	832.90	978.10	256.20	291.20
April	832.80	978.40	256.10	291.30
May	832.80	978.50	256.20	291.40
June	835.30	978.80	256.90	291.00
July	838.10	979.00	258.30	290.20
August	838.60	979.10	258.30	290.50
September	839.40	979.70	260.00	291.00
October	839.90	980.20	260.90	291.40
November	840.50	981.40	260.90	292.00

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

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

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Table 6.
OASDI child benefits, by type of beneficiary and age, November 2006–November 2007

Month	All children	Children of retired workers			Children of deceased workers			Children of disabled workers		
		Under age 18	Students aged 18–19	Disabled aged 18 or older	Under age 18	Students aged 18–19	Disabled aged 18 or older	Under age 18	Students aged 18–19	Disabled aged 18 or older
					Number (thousands)					
2006										
November	4,022	283	13	192	1,322	55	512	1,531	41	72
December	4,041	282	16	192	1,321	65	513	1,530	50	72
2007										
January	4,056	283	18	192	1,319	74	513	1,527	57	72
February	4,076	284	21	193	1,318	83	513	1,527	65	72
March	4,102	285	24	193	1,319	93	514	1,529	73	73
April	4,128	286	26	193	1,320	101	515	1,534	79	73
May	4,141	287	28	194	1,318	107	515	1,535	84	74
June	4,060	287	18	194	1,318	66	516	1,537	51	74
July	3,960	286	5	194	1,315	19	517	1,535	15	74
August	3,965	286	6	195	1,311	25	517	1,532	19	75
September	3,983	284	8	195	1,309	35	518	1,532	26	75
October	4,008	283	11	195	1,308	47	520	1,533	35	76
November	4,029	282	14	196	1,304	57	520	1,534	44	77
					Total monthly benefits (millions of dollars)					
2006										
November	1,956	134	7	103	859	40	351	417	16	29
December	2,032	138	9	106	886	49	363	430	20	30
2007										
January	2,045	139	11	107	887	56	363	429	23	30
February	2,057	140	12	107	886	63	364	429	26	30
March	2,071	141	14	107	886	71	364	429	29	30
April	2,085	141	15	108	888	77	365	429	32	30
May	2,092	141	16	108	886	82	366	429	34	30
June	2,049	142	11	108	887	51	367	432	21	30
July	1,994	142	3	109	888	14	367	435	6	31
August	1,999	142	3	109	885	18	368	434	7	31
September	2,009	141	5	109	884	26	369	434	10	31
October	2,023	141	6	109	883	35	370	434	14	31
November	2,036	141	8	110	881	43	371	434	17	32

Continued

Table 6.
Continued

Month	All children	Children of retired workers			Children of deceased workers			Children of disabled workers		
		Under age 18	Students aged 18–19	Disabled aged 18 or older	Under age 18	Students aged 18–19	Disabled aged 18 or older	Under age 18	Students aged 18–19	Disabled aged 18 or older
					Average monthly benefit (dollars)					
2006										
November	486.20	474.10	556.60	536.20	649.40	719.10	685.00	272.50	387.20	396.90
December	502.80	490.00	580.00	554.40	671.10	747.60	708.00	281.30	400.50	410.30
2007										
January	504.10	491.90	584.80	555.30	672.60	752.50	708.40	281.20	401.30	411.00
February	504.60	492.50	587.10	556.00	672.50	755.60	708.80	280.80	401.00	411.00
March	504.90	492.70	589.10	556.60	672.20	759.40	709.20	280.30	401.00	410.80
April	505.20	492.80	591.80	557.30	672.30	762.70	709.70	279.90	402.20	410.40
May	505.30	492.80	592.90	557.80	672.00	765.30	710.10	279.70	402.80	410.00
June	504.80	494.20	601.70	558.50	673.50	773.10	710.60	281.30	408.30	411.20
July	503.50	496.60	566.10	559.30	675.40	718.10	711.10	283.30	385.30	412.60
August	504.00	497.30	576.70	559.50	675.60	728.50	711.30	283.40	389.10	412.20
September	504.40	497.40	582.20	559.60	675.40	737.30	711.60	283.20	397.20	411.80
October	504.70	497.00	585.50	559.80	675.00	740.80	711.80	283.00	399.20	411.00
November	505.40	498.20	587.90	560.30	675.70	744.40	712.10	283.00	399.70	410.60

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

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Table 7.
All OASDI benefits, by program and type of benefit, November 2006–November 2007

Month	Total, OASDI [a]	OASI			DI
		Subtotal, OASI [b]	Retirement	Survivors	Subtotal, DI [c]
			Number (thousands)		
2006					
November	398	276	199	77	122
December	283	204	150	54	79
2007					
January	550	455	371	84	95
February	402	299	224	75	103
March	420	303	218	85	116
April	409	290	211	79	119
May	369	259	191	68	109
June	393	280	205	75	113
July	394	285	206	79	109
August	368	265	192	73	104
September	354	239	158	81	115
October	341	227	148	79	114
November	406	281	197	84	125
			Average monthly benefit (dollars)		
2006					
November	798.60	844.50	888.70	730.80	694.80
December	854.30	899.30	944.50	774.50	737.90
2007					
January	985.40	1,035.10	1,078.00	844.50	746.30
February	869.20	911.00	956.80	774.90	747.30
March	842.90	890.30	938.40	766.70	719.20
April	839.90	885.20	930.90	763.20	729.00
May	838.50	884.60	927.80	764.10	728.70
June	853.10	896.10	939.60	777.80	746.30
July	861.90	903.70	952.40	775.80	753.10
August	855.30	896.10	942.50	773.80	751.00
September	807.90	839.80	876.40	768.40	741.60
October	799.20	828.80	860.20	770.30	740.10
November	834.30	877.60	922.20	772.30	736.70

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

NOTES: Award actions are processed not only for new beneficiaries but also for persons already on the rolls whose benefits in one category are terminated but who become entitled to another type of benefit. These actions are called conversions. Benefit conversions are included in the data, except for conversions of benefits for children of retired workers to benefits for children of deceased workers upon the death of the worker.

Beginning with April 2007, individuals whose benefits have been reinstated under the Expedited Reinstatement provisions are no longer included. Therefore, the statistics reported in this publication differ from those reported by the Office of the Chief Actuary.

a. Includes special age-72 beneficiaries.

Excludes a number of Railroad Retirement beneficiaries who would have been eligible for Social Security benefits had they applied. The reason they have not applied is that receipt of a Social Security benefit would reduce their Railroad Retirement benefit by a like amount. The number of Railroad Retirement beneficiaries who would be eligible for a Social Security benefit if they applied is not available, but is estimated to be less than 100,000.

b. Benefits paid from the OASI trust fund to retired workers and their spouses and children and to all survivors.

c. Benefits paid from the DI trust fund to disabled workers and their spouses and children.

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Table 8.
OASI retirement benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Retired workers	Spouses	Children
		Number (thousands)		
2006				
November	199	162	26	11
December	150	125	17	8
2007				
January	371	320	38	13
February	224	183	29	11
March	218	177	29	12
April	211	172	28	12
May	191	156	25	10
June	205	168	26	10
July	206	171	26	9
August	192	158	25	9
September	158	126	23	9
October	148	117	21	9
November	197	161	26	11
		Average monthly benefit (dollars)		
2006				
November	888.70	1,002.10	373.00	458.60
December	944.50	1,045.80	400.50	515.70
2007				
January	1,078.00	1,182.80	381.10	528.90
February	956.80	1,077.10	374.40	506.60
March	938.40	1,061.40	368.00	496.80
April	930.90	1,050.20	374.90	483.20
May	927.80	1,047.10	372.10	478.40
June	939.60	1,054.70	380.90	480.40
July	952.40	1,065.70	386.70	480.50
August	942.50	1,054.10	397.10	493.90
September	876.40	995.60	380.80	487.10
October	860.20	977.00	381.20	484.90
November	922.20	1,037.00	385.00	492.00

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

NOTES: Award actions are processed not only for new beneficiaries but also for persons already on the rolls whose benefits in one category are terminated but who become entitled to another type of benefit. These actions are called conversions. Benefit conversions are included in the data, except for conversions of benefits for children of retired workers to benefits for children of deceased workers upon the death of the worker.

Beginning with April 2007, individuals whose benefits have been reinstated under the Expedited Reinstatement provisions are no longer included. Therefore, the statistics reported in this publication differ from those reported by the Office of the Chief Actuary.

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Table 9.
OASI survivors benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Widow(er)s and parents [a]	Widowed mothers and fathers [b]	Children
		Number (thousands)		
2006				
November	77	44	3	30
December	54	30	2	22
2007				
January	84	54	3	27
February	75	45	3	27
March	85	50	3	32
April	79	47	3	29
May	68	40	3	25
June	75	48	3	24
July	79	52	3	24
August	73	47	3	23
September	81	49	3	28
October	79	48	3	29
November	84	51	3	30
		Average monthly benefit (dollars)		
2006				
November	730.80	780.70	716.60	659.80
December	774.50	826.50	736.20	707.90
2007				
January	844.50	920.80	739.00	700.70
February	774.90	827.70	726.30	693.20
March	766.70	816.40	741.80	691.00
April	763.20	813.80	735.20	685.80
May	764.10	817.00	728.10	683.10
June	777.80	836.20	735.00	666.60
July	775.80	827.00	750.30	667.80
August	773.80	822.80	749.30	679.30
September	768.40	821.00	735.20	680.10
October	770.30	827.30	732.00	680.80
November	772.30	823.50	747.00	686.50

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

NOTES: Award actions are processed not only for new beneficiaries but also for persons already on the rolls whose benefits in one category are terminated but who become entitled to another type of benefit. These actions are called conversions. Benefit conversions are included in the data, except for conversions of benefits for children of retired workers to benefits for children of deceased workers upon the death of the worker.

Beginning with April 2007, individuals whose benefits have been reinstated under the Expedited Reinstatement provisions are no longer included. Therefore, the statistics reported in this publication differ from those reported by the Office of the Chief Actuary.

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.

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Table 10.
DI benefits, by type of beneficiary, November 2006–November 2007

Month	All beneficiaries	Disabled workers	Spouses	Children
		Number (thousands)		
2006				
November	122	73	4	45
December	79	48	3	28
2007				
January	95	59	4	32
February	103	64	4	35
March	116	70	4	43
April	119	72	4	42
May	109	66	4	39
June	113	71	4	38
July	109	70	4	36
August	104	66	4	34
September	115	71	4	40
October	114	70	4	40
November	125	77	4	43
		Average monthly benefit (dollars)		
2006				
November	694.80	986.40	256.30	257.50
December	737.90	1,025.20	271.30	291.30
2007				
January	746.30	1,028.30	273.90	290.40
February	747.30	1,023.20	275.10	282.50
March	719.20	1,018.60	266.50	272.60
April	729.00	1,025.90	267.80	268.70
May	728.70	1,026.80	268.70	265.50
June	746.30	1,030.70	269.10	263.20
July	753.10	1,032.00	269.00	265.20
August	751.00	1,030.30	270.00	268.40
September	741.60	1,033.70	270.00	272.90
October	740.10	1,034.50	271.20	276.40
November	736.70	1,021.20	274.20	273.70

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

NOTES: Award actions are processed not only for new beneficiaries but also for persons already on the rolls whose benefits in one category are terminated but who become entitled to another type of benefit. These actions are called conversions and are included in the data.

Beginning with April 2007, individuals whose benefits have been reinstated under the Expedited Reinstatement provisions are no longer included. Therefore, the statistics reported in this publication differ from those reported by the Office of the Chief Actuary.

CONTACT: Kevin Kulzer (410) 965-5366 or oasdi.monthly@ssa.gov for further information.

Supplemental Security Income
December 2006–December 2007

SSI Federally Administered Payments

Table 1. Recipients (by type of payment), total payments, and average monthly payment
Table 2. Recipients, by eligibility category and age
Table 3. Recipients of federal payment only, by eligibility category and age
Table 4. Recipients of federal payment and state supplementation, by eligibility category and age
Table 5. Recipients of state supplementation only, by eligibility category and age
Table 6. Total payments, by eligibility category, age, and source of payment
Table 7. Average monthly payment, by eligibility category, age, and source of payment

Awards of SSI Federally Administered Payments

Table 8. All awards, by eligibility category and age of awardee

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

Table 1.
Recipients (by type of payment), total payments, and average monthly payment, December 2006–December 2007

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		
2006						
December	7,235,583	4,967,004	1,971,686	296,893	3,499,569	454.80
2007						
January	7,278,616	5,001,693	1,982,999	293,924	3,558,160	466.70
February	7,289,764	5,010,594	1,985,260	293,910	3,566,305	465.60
March	7,286,345	5,007,291	1,984,953	294,101	3,591,053	468.00
April	7,324,892	5,035,947	1,994,253	294,692	3,654,231	467.80
May	7,312,686	5,026,449	1,990,699	295,538	3,599,541	466.60
June	7,314,027	5,025,486	1,992,529	296,012	3,625,876	467.70
July	7,346,122	5,048,420	2,000,801	296,901	3,665,925	466.70
August	7,335,942	5,039,337	1,999,139	297,466	3,645,801	466.70
September	7,355,596	5,053,437	2,004,028	298,131	3,647,862	467.10
October	7,383,815	5,074,012	2,011,161	298,642	3,713,167	465.80
November	7,350,382	5,048,638	2,002,851	298,893	3,586,332	467.60
December	7,359,525	5,057,395	2,003,839	298,291	3,735,792	468.40

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 2006–December 2007

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2006						
December	7,235,583	1,211,656	6,023,927	1,078,977	4,152,130	2,004,476
2007						
January	7,278,616	1,215,149	6,063,467	1,090,447	4,176,511	2,011,658
February	7,289,764	1,213,573	6,076,191	1,095,222	4,183,744	2,010,798
March	7,286,345	1,211,572	6,074,773	1,091,061	4,184,852	2,010,432
April	7,324,892	1,212,155	6,112,737	1,105,058	4,206,926	2,012,908
May	7,312,686	1,209,531	6,103,155	1,103,451	4,199,204	2,010,031
June	7,314,027	1,208,766	6,105,261	1,102,812	4,200,005	2,011,210
July	7,346,122	1,210,261	6,135,861	1,112,881	4,217,655	2,015,586
August	7,335,942	1,209,640	6,126,302	1,106,044	4,213,591	2,016,307
September	7,355,596	1,210,708	6,144,888	1,115,317	4,220,609	2,019,670
October	7,383,815	1,212,151	6,171,664	1,119,468	4,240,142	2,024,205
November	7,350,382	1,210,582	6,139,800	1,109,414	4,218,103	2,022,865
December	7,359,525	1,204,512	6,155,013	1,121,017	4,221,920	2,016,588

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 2006–December 2007

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2006						
December	4,967,004	621,081	4,345,923	858,917	2,989,045	1,119,042
2007						
January	5,001,693	623,434	4,378,259	868,577	3,009,150	1,123,966
February	5,010,594	621,840	4,388,754	872,744	3,015,191	1,122,659
March	5,007,291	620,032	4,387,259	869,362	3,016,061	1,121,868
April	5,035,947	619,544	4,416,403	880,820	3,032,833	1,122,294
May	5,026,449	617,410	4,409,039	879,684	3,027,104	1,119,661
June	5,025,486	616,075	4,409,411	879,074	3,027,082	1,119,330
July	5,048,420	616,218	4,432,202	887,162	3,040,043	1,121,215
August	5,039,337	615,064	4,424,273	881,580	3,037,019	1,120,738
September	5,053,437	614,705	4,438,732	889,387	3,042,388	1,121,662
October	5,074,012	614,708	4,459,304	893,023	3,057,468	1,123,521
November	5,048,638	613,372	4,435,266	885,284	3,041,160	1,122,194
December	5,057,395	608,957	4,448,438	895,007	3,045,176	1,117,212

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 2006–December 2007

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2006						
December	1,971,686	487,844	1,483,842	217,437	1,015,345	738,904
2007						
January	1,982,999	490,703	1,492,296	219,437	1,020,363	743,199
February	1,985,260	490,351	1,494,909	220,176	1,021,869	743,215
March	1,984,953	490,150	1,494,803	219,375	1,021,950	743,628
April	1,994,253	491,065	1,503,188	222,006	1,026,855	745,392
May	1,990,699	490,614	1,500,085	221,421	1,024,130	745,148
June	1,992,529	491,001	1,501,528	221,409	1,024,834	746,286
July	2,000,801	492,067	1,508,734	223,385	1,029,047	748,369
August	1,999,139	492,359	1,506,780	222,026	1,027,961	749,152
September	2,004,028	493,533	1,510,495	223,619	1,029,251	751,158
October	2,011,161	494,892	1,516,269	224,036	1,033,537	753,588
November	2,002,851	494,588	1,508,263	221,670	1,027,751	753,430
December	2,003,839	492,483	1,511,356	223,626	1,028,547	751,666

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 2006–December 2007

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2006						
December	296,893	102,731	194,162	2,623	147,740	146,530
2007						
January	293,924	101,012	192,912	2,433	146,998	144,493
February	293,910	101,382	192,528	2,302	146,684	144,924
March	294,101	101,390	192,711	2,324	146,841	144,936
April	294,692	101,546	193,146	2,232	147,238	145,222
May	295,538	101,507	194,031	2,346	147,970	145,222
June	296,012	101,690	194,322	2,329	148,089	145,594
July	296,901	101,976	194,925	2,334	148,565	146,002
August	297,466	102,217	195,249	2,438	148,611	146,417
September	298,131	102,470	195,661	2,311	148,970	146,850
October	298,642	102,551	196,091	2,409	149,137	147,096
November	298,893	102,622	196,271	2,460	149,192	147,241
December	298,291	103,072	195,219	2,384	148,197	147,710

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 2006–December 2007 (in thousands of dollars)

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			All sources			
2006						
December	3,499,569	453,529	3,046,040	610,874	2,134,335	754,360
2007						
January	3,558,160	465,101	3,093,060	626,086	2,156,920	775,154
February	3,566,305	463,945	3,102,360	627,032	2,165,106	774,167
March	3,591,053	464,588	3,126,465	633,981	2,180,788	776,284
April	3,654,231	465,465	3,188,766	646,540	2,229,592	778,099
May	3,599,541	463,653	3,135,888	632,874	2,190,607	776,060
June	3,625,876	463,582	3,162,294	640,116	2,208,751	777,009
July	3,665,925	464,155	3,201,770	647,979	2,239,112	778,834
August	3,645,801	463,747	3,182,055	639,088	2,227,682	779,031
September	3,647,862	464,238	3,183,624	645,054	2,222,415	780,394
October	3,713,167	465,917	3,247,250	649,895	2,279,476	783,796
November	3,586,332	463,971	3,122,362	636,647	2,168,620	781,065
December	3,735,792	465,272	3,270,520	660,768	2,290,670	784,354
			Federal payments			
2006						
December	3,130,803	351,915	2,778,887	592,877	1,936,436	601,490
2007						
January	3,189,631	363,156	2,826,474	608,101	1,959,936	621,594
February	3,196,882	361,966	2,834,916	608,997	1,967,385	620,499
March	3,220,577	362,448	2,858,129	615,963	1,982,334	622,281
April	3,279,825	363,048	2,916,777	628,175	2,028,018	623,632
May	3,228,738	361,547	2,867,191	614,754	1,992,028	621,956
June	3,253,877	361,379	2,892,498	621,978	2,009,269	622,630
July	3,291,113	361,617	2,929,496	629,561	2,037,639	623,913
August	3,271,808	361,166	2,910,642	620,948	2,026,925	623,935
September	3,273,668	361,412	2,912,256	626,806	2,021,979	624,884
October	3,334,497	362,565	2,971,931	631,480	2,075,609	627,407
November	3,215,652	361,041	2,854,611	618,801	1,971,532	625,319
December	3,357,680	362,064	2,995,615	642,355	2,087,346	627,979

Continued

Table 6.
Continued

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			State supplementation			
2006						
November	365,935	102,290	263,645	17,571	194,531	153,833
December	368,767	101,614	267,153	17,997	197,900	152,870
2007						
January	368,530	101,944	266,585	17,985	196,985	153,560
February	369,423	101,979	267,444	18,035	197,721	153,668
March	370,476	102,140	268,336	18,018	198,455	154,004
April	374,406	102,417	271,989	18,364	201,574	154,467
May	370,803	102,106	268,698	18,120	198,580	154,103
June	371,999	102,203	269,796	18,138	199,482	154,379
July	374,812	102,538	272,273	18,418	201,473	154,921
August	373,994	102,581	271,413	18,140	200,758	155,096
September	374,194	102,826	271,368	18,248	200,436	155,510
October	378,670	103,352	275,319	18,414	203,867	156,389
November	370,680	102,930	267,750	17,846	197,088	155,746

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 2006–December 2007 (in dollars)

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			All sources			
2006						
December	454.80	373.10	471.20	541.90	470.60	375.10
2007						
January	466.70	382.10	483.60	555.60	482.90	384.60
February	465.60	381.30	482.40	552.20	482.00	384.00
March	468.00	382.40	485.00	561.10	483.60	385.00
April	467.80	382.60	484.70	559.80	483.10	385.20
May	466.60	382.60	483.30	554.20	482.60	385.30
June	467.70	382.70	484.50	560.10	482.90	385.40
July	466.70	382.50	483.30	555.90	482.10	385.20
August	466.70	382.70	483.40	556.10	482.30	385.40
September	467.10	382.70	483.70	557.00	482.40	385.50
October	465.80	382.60	482.20	551.70	481.60	385.30
November	467.60	382.80	484.30	558.90	482.90	385.60
December	468.40	384.10	484.90	555.30	484.20	386.90
			Federal payments			
2006						
December	423.10	316.50	443.40	527.40	441.60	322.90
2007						
January	435.10	325.60	455.90	541.00	454.10	332.40
February	434.10	324.80	454.70	537.60	453.30	331.90
March	436.50	325.80	457.40	546.60	454.80	332.80
April	436.30	325.90	457.10	545.20	454.40	332.90
May	435.20	325.80	455.70	539.70	453.90	333.00
June	436.30	325.90	457.00	545.60	454.20	333.10
July	435.20	325.60	455.70	541.40	453.40	332.90
August	435.30	325.70	455.80	541.70	453.60	333.00
September	435.70	325.70	456.20	542.60	453.80	333.00
October	434.40	325.40	454.70	537.40	453.00	332.80
November	436.20	325.60	456.80	544.60	454.40	333.00
December	437.10	327.10	457.40	541.10	455.70	334.50

(Continued)

Table 7.
Continued

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
			State supplementation			
2006						
December	156.20	170.60	151.20	77.00	159.80	171.30
2007						
January	156.60	171.10	151.40	76.90	160.10	171.90
February	156.40	171.00	151.30	76.80	159.90	171.80
March	156.70	171.30	151.50	77.00	160.10	172.00
April	156.50	171.20	151.30	76.80	160.00	171.90
May	156.50	171.30	151.30	76.90	160.00	172.00
June	156.50	171.30	151.30	76.80	160.00	172.00
July	156.40	171.30	151.20	76.60	159.90	172.00
August	156.50	171.40	151.30	76.70	159.90	172.00
September	156.40	171.40	151.20	76.60	159.80	172.00
October	156.40	171.40	151.10	76.50	159.70	172.00
November	156.60	171.50	151.30	76.60	159.90	172.10
December	156.60	171.70	151.30	76.40	159.90	172.30

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 2006–December 2007

Month	Total	Eligibility category		Age		
		Aged	Blind and disabled	Under 18	18–64	65 or older
2006						
December	73,498	8,126	65,372	15,180	50,072	8,246
2007						
January	64,483	7,710	56,773	13,353	43,313	7,817
February	65,894	9,005	56,889	13,341	43,419	9,134
March	66,217	7,828	58,389	13,593	44,664	7,960
April	79,277	9,019	70,258	16,293	53,812	9,172
May	69,940	8,553	61,387	14,191	47,071	8,678
June	65,342	8,489	56,853	13,366	43,362	8,614
July	75,000	8,638	66,362	15,935	50,285	8,780
August	69,927	8,822	61,105	13,822	47,149	8,956
September	68,181	9,054	59,127	13,164	45,843	9,174
October [a]	79,714	8,658	71,056	15,985	54,907	8,822
November [a]	55,484	8,655	46,829	10,463	36,272	8,749
December	78,598	8,280	70,318	16,189	53,998	8,411

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.

Instructions for Authors Writing for the "Perspectives" Section of the *Social Security Bulletin*

The *Social Security Bulletin's* "Perspectives" section welcomes rigorous, clearly written manuscripts from persons in the social and behavioral sciences, as well as from those in the humanities and in other professions, particularly manuscripts that may have implications for social policy. We are especially interested in receiving scholarly research that contributes to an improved understanding of the Old-Age and Survivors Insurance (OASI), Disability Insurance (DI), and the Supplemental Security Income (SSI) programs and issues related to their beneficiaries and contributors. We will interpret these subjects broadly and will also consider for publication articles on other countries' social insurance experiences.

The *Bulletin* is the quarterly research journal of the Social Security Administration. It has a broad readership of policymakers, government officials, academics, graduate and undergraduate students, business people, and other interested nonspecialists. This diverse readership cuts across academic disciplines and includes persons in technical as well as applied fields.

Therefore, when writing for the *Bulletin*, keep in mind that your audience will include readers who may not be familiar with existing academic literature. Present your material in a clear manner, without jargon. Articles should be factual and analytical, not polemical. You may include technical or mathematical exposition where relevant: findings and conclusions, however, must be written in a straightforward, nontechnical style. And the relevance of your conclusions to public policy should be explicitly stated.

We regard the submission of a manuscript as your implied commitment not to submit the paper to another publication while it is under consideration by the *Bulletin*. If you have published a related article elsewhere, you should state this in your cover letter to us.

Bulletin or "Perspectives" Policies

Authors planning to submit a manuscript should be aware of several policies related to publishing in the *Bulletin*.

Editorial Policy

The Bulletin's editorial policy regarding items submitted for the "Perspectives" section is comparable with that of other professional journals. Manuscripts will be rejected outright by the "Perspectives" Editor if they have obvious mistakes, are so poorly written that correctness cannot be determined, or are otherwise inappropriate for our journal. In such cases, we will return the manuscript as quickly as possible. Manuscripts accepted for consideration will be sent anonymously to two or more outside referees. The decision to publish will be based primarily on the recommendations of the referees.

Policy on Availability of Data

If your manuscript is accepted for publication, you will be asked to make your data available to others at a reasonable cost for a period of 3 years (starting 6 months after actual publication). Should you want to request an exception from this requirement, you must notify the "Perspectives" Editor when you submit your manuscript. (The use of confidential or proprietary data sets, for example, could prompt an exemption request.) If you do not request an exemption, we will assume that you have accepted this requirement.

Policy on Disclosure

Authors are expected to disclose in their cover letter any potential conflicts of interest that may arise from their consulting or political activities, financial interests, or other nonacademic activities.

Preparing and Submitting the Manuscript

Manuscripts should typically be less than 10,000 words, including the text, the notes, and the references (and excluding the tables and charts). Type the manuscript on 8.5 by 11 inch white paper, with 1.5-inch margins on all sides. Number each page consecutively (in the bottom center), starting with the Title Page as page 1, and present materials in the order given in the Elements section, below.

Style Guide

Use the *Chicago Manual of Style*, 15th ed. (University of Chicago Press) as a guide for notes, citations, references, and table presentation.

Elements of the Manuscript

Title Page. Include the title of the article, the name of the author(s), the author's affiliation(s), and the author's address; include the name, postal address, e-mail address, fax, and telephone number of the person to whom correspondence should be directed. The Acknowledgments paragraph should also be on this page. In a separate paragraph within the acknowledgments, reveal the source of any financial or research support received in connection with the preparation of the article. Because manuscripts will undergo a double-blind review, remove all other identifying information from the rest of the manuscript before it is submitted. (Once the manuscript has been accepted for publication, you will be responsible for reinserting self-identifying citations and references when you prepare the manuscript for final submission.)

Synopsis. On page 2, reprint the title of the manuscript along with a synopsis (1–3 sentences) of the research question.

Summary. On the third page, start a brief summary (1–2 double-spaced pages) of the article. Describe in nontechnical language the research question, methodology, and findings. You should also discuss the policy implications of the findings.

Text. The actual text of the article should begin on a new page. The text should be prepared in Microsoft Word, printed in 12-point type, and double-spaced. Account for all table, chart, and graphic citations, but do not include actual placement within the text.

Notes. Number notes consecutively in the text and designate them using superscripts. Do not use notes for citation purposes, only for brief substantive comments. (See Chicago Manual of Style for citations.) All notes should be grouped together and printed in 12 point type, single-spaced, starting on a new page.

References. Verify each reference carefully; the references must correspond to the citations in the text. List references alphabetically by the last name of the author(s) and then by year, with the most recent first. Only the first author's name is inverted. List all authors (and avoid using et al. in lieu of authors' names). The name of each author and the title of the citation should be exactly as it appears in the original work. The list of references should start on a new page following the notes and be printed in 12-point type, single-spaced.

Tables. Tables must be prepared in Microsoft Excel. When preparing the table, use a point size that is easily read. Make sure all tables are referenced in the text. Give each table a number and a title. Number the tables consecutively, in the order they are mentioned in the text. Place each table in a separate file. Notes for tables (including the Source note, which should be presented at the beginning of the table's notes) are independent of the rest of the manuscript and should be ordered using lowercase letters, beginning with the letter "a" in each chart. The sequence runs from left to right, top to bottom. The order of the notes as they appear below the tables is (1) Source, (2) general notes to the table, if any, and (3) letter notes. They may be single-spaced. A hard copy of each table should be printed and placed at the end of the manuscript.

Charts. Charts or other graphics must be prepared in Microsoft Excel. There should be a separate file for each chart. This file should contain a sheet for the graph and a sheet with only the data needed to plot the chart. Make sure all charts are referenced in the text. Give each chart a number and a title. Number the charts consecutively, in the order they are mentioned in the text. Notes for charts (including the Source note, which should be presented at the beginning of the chart's notes) are independent of the rest of the manuscript and should be ordered using lowercase letters, beginning with the letter "a" in each chart. The sequence runs from left to right, top to bottom. The order of the notes as they appear below the tables is (1) Source, (2) general notes to the table, if any, and (3) letter notes. They may be single-spaced. A hard copy of each chart and the data needed to plot the chart should be printed and placed at the end of the manuscript.

Submitting the Manuscript

Submit your manuscript along with a cover letter to perspectives@ssa.gov.

Accepted Manuscripts

Electronic Copies

After we have notified you that your work has been accepted for publication, e-mail your final revised manuscript to perspectives@ssa.gov. All elements and specifications (as defined herein) must be included with your final submittal. Manuscripts not adhering to guidelines will be determined not ready for publication. Be sure to reinsert any identifying information that you removed initially and include plotting data for each chart.

Editing and Production

Using your electronic manuscript, we will edit the manuscript in track changes and forward it directly to the corresponding author for approval. After final production, a PDF will be forwarded to the author for final approval. The author will be responsible for checking this file for completeness and accuracy. Return corrected proofs (together with the original, edited manuscript) to the Managing Editor of the Social Security Bulletin within 3 days of receipt. Corrections may also be sent via e-mail or fax ( ).

Reprints

We will provide you with up to 150 reprints of each article free of charge.

Abstract

If your article is appropriate to be indexed in the Journal of Economic Literature, include an abstract of not more than 150 words. The abstract should be double-spaced, in a separate file, and clearly labeled "JEL Abstract." The abstract should state the purpose of the study, the basic methodology, main findings, and conclusions. Below the abstract, supply 2-6 key words that are not in the title and the JEL classification number.

Copyright

You are responsible for obtaining written permission to publish material for which you do not own the copyright.

Questions???

If you have questions regarding the mechanics of submitting a manuscript, please contact Karyn Tucker, Managing Editor of the Social Security Bulletin*,* at karyn.m.tucker@ssa.gov or .

If you have other questions, please contact Michael Leonesio, "Perspectives" Editor, at perspectives@ssa.gov or .

Program Highlights, 2007

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	97,500
Medicare (Hospital Insurance)	No limit
Earnings Required for Work Credits (dollars)	
One Work Credit (One Quarter of Coverage)	1,000
Maximum of Four Credits a Year	4,000
Earnings Test Annual Exempt Amount (dollars)	
Under Full Retirement Age for Entire Year	12,960
For Months Before Reaching Full Retirement Age in Given Year	34,440
Beginning with Month Reaching Full Retirement Age	No limit
Maximum Monthly Social Security Benefit for Workers Retiring at Full Retirement Age (dollars)	2,116
Full Retirement Age for Those Who Turn 65 in 2007	65 and 10 months
Cost-of-Living Adjustment (percent)	3.3

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	623
Couple	934
Cost-of-Living Adjustment (percent)	3.3
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)	900

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
March 2008