



## Will You Have Enough to Retire On? The Retirement Security “Crisis”

By Andrew G. Biggs

*Americans are concerned about the state of preparedness for retirement, and many believe that retirement security is nearing a crisis. As life expectancies increase, traditional defined-benefit pensions decline, and Social Security faces significant reforms, many argue that a significant share of Americans will be at risk of an inadequate income in retirement. But despite these anxieties, most older Americans seem well prepared for retirement. Controlling for household composition, the Social Security replacement rate for typical workers born in 1940 was 63 percent of average preretirement earnings, and the median total pension replacement rate was 92 percent of prior earnings—well over financial planners’ recommended rate of around 75 percent. Even among the younger 1960 birth cohort, for whom the projected median Social Security replacement rate declines to 54 percent, the median total pension replacement rate remains at 82 percent. While policymakers should work to strengthen Social Security and private pension savings, talk of a crisis in retirement income preparedness appears premature.*

Policymakers and the general public are increasingly concerned that a significant share of Americans are at risk of having insufficient retirement income. A common rule of thumb for financial advisers is that retirees should have enough income to replace roughly three-quarters of their preretirement earnings. A survey of financial planners and educators recommended mean and median replacement rates of 74 and 75 percent, respectively.<sup>1</sup> This *Retirement Policy Outlook* will accept these recommendations as at least approximately correct.

In this *Outlook*, I use a microsimulation model of Social Security and private pension benefits to analyze the level and distribution of combined pension benefits for retirees in the 1940 and 1960 birth cohorts as of age seventy. I use two integrated microsimulation models—GEMINI, which simulates Social Security taxes and benefits, and PENSIM, which simulates defined-contribution and defined-benefit pension benefits—to calculate replacement rates for retiree households in the 1940 and 1960 birth cohorts. I then adjust replacement

rates for differences in household composition. Replacement rates have come under criticism for being a relatively crude tool for retirement planning,<sup>2</sup> but they can be refined by adjusting them for the presence of children and for economies of scale in household size.<sup>3</sup>

The life-cycle model of consumption implies that individuals will use borrowing and saving to smooth consumption over time, seeking to consume roughly the same amount in working years as in retirement. However, without accounting for the costs incurred in raising children and efficiencies achieved in household size, traditional replacement rates may give misleading readings of preparedness for retirement. Children can consume a significant portion of a household’s income, leaving less to be consumed by their parents. Although children are often an economic burden during their parents’ working years, the lower preretirement consumption by parents implies that a lower level of retirement income is needed to match that preretirement consumption. As John Karl Scholz and Ananth Seshadri of the University of Wisconsin–Madison argue, “financial planning rules of thumb,

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and specifically replacement rates, ignore the role that children play in optimal life-cycle wealth decisions.<sup>74</sup> Adjusting for the presence of children will generally increase replacement rates for households with children, although it can reduce replacement rates for individuals who continue to support children while in retirement.

Economies of scale in household size imply that households with more than one member have lower relative costs of living than single-member households. Spouses (and children) sharing housing, food, transportation, and other costs can reap significant savings versus individuals living alone. Economies of scale in household size exist during working years as well as in retirement, so the net effect on measured replacement rates of adjusting for economies of scale depends upon individual circumstances.

### Shared Earnings and Retirement Income

Following standard practice in Social Security analysis, income during working years and retirement is calculated on a “shared basis.” Shared income is designed to account for two factors: first, that spouses tend to share income and costs equally, and second, that household composition changes over time due to marriage, divorce, birth, death, and so on.

The shared approach divides income equally between spouses in any year in which a spouse was present. Consider a household in which the husband earns \$50,000 per year while the wife earns \$20,000. Under the shared approach, their total household earnings of \$70,000 would be divided by two, giving each spouse a “shared” income of \$35,000 for that year. Likewise, a couple’s Social Security benefits and pension income are deemed to be shared between them.

Replacement rates are calculated by dividing an individual’s shared Social Security benefit or combined Social Security and pension benefit as of age seventy by average preretirement earnings.<sup>5</sup> Age seventy is chosen because, by this time, almost all individuals have claimed Social Security benefits and most have exited the paid workforce.

Some have argued that replacement rates should be adjusted for increases in Medicare premiums (which are automatically deducted from Social Security benefits) and for out-of-pocket health care costs.<sup>6</sup> Doing so would reduce

measured replacement rates. However, this concern seems misplaced. If health care provides a value at the margin equal to its cost, such that individuals would rather spend their income on health care than on other goods or services, then there seems little reason to treat health care provision differently from other items in a household budget.<sup>7</sup>

### Accounting for Household Size and Composition

The method used here extends the shared earnings approach described above by adjusting earnings and pension income for the presence of children and for economies of scale in household size. In doing so, it constitutes an improvement over previous analyses using other models that do not include the presence of children.<sup>8</sup>

In most previous analyses of retirement income, children would be effectively ignored. Total household income would simply be divided by the number of adults living in the household to calculate each individual adult’s share. Yet, we know that children consume resources during an individual’s working years, and we also know that a household consisting of multiple adults will have lower costs of living than had those adults lived separately. I use a formula devised in a National Academy of Sciences (NAS) project to measure poverty.<sup>9</sup> This formula calculates the number of “adult equivalents” living in a household. In my approach, shared income is adjusted for the presence of children and economies of scale in household size by dividing total household income by the household’s number of adult equivalents.

The first issue to consider is how the presence of children affects their parents’ need to save for retirement. Dartmouth economist Jonathan S. Skinner describes the effect of children on retirement income needs in simple terms:

Parents are already used to getting by on peanut butter, given that a large fraction of their pre-retirement budget has been devoted to supporting children, so it’s not difficult to set aside enough money to keep them in peanut butter through retirement. By contrast, childless households with the same income accustomed to caviar and fine wine must set aside more assets to maintain themselves in the style to which they have become accustomed.<sup>10</sup>

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That is to say, the costs of raising children imply that the consumption of goods and services by the parents will be significantly lower than in a childless household with similar income. While parents have lower standards of living than nonparents at similar earnings levels during their working lives, this also sets a lower bar that their retirement savings must meet. Replacement rate measures should account for these differences.

The second issue I consider is how economies of scale in household composition during working years and in retirement affect the income level required in retirement. Two can generally live more cheaply than one; a couple has a lower cost of living than two singles. Moreover, a child generally consumes less than an adult, so adding a child to a household does not necessarily imply a proportionate increase in costs of living.<sup>11</sup>

Household equivalence scales are designed to account for how differences in the size and composition of households affect a household's true cost of living. The adult equivalence scale from the NAS has been widely used.<sup>12</sup> It takes the form

$$\text{Adult equivalents} = (A + PK)^F$$

where  $A$  is the number of adults in the family,  $K$  is the number of children,  $P$  is the cost of a child relative to an adult, and  $F$  is a factor reflecting economies of scale in household size. Lower values of  $P$  will result in relatively lower costs of living for a child versus an adult household member, while lower values of  $F$  will result in larger economies of scale as household size increases.

The NAS recommends a value for  $P$  of 0.7 and a value for  $F$  of between 0.65 and 0.75; I will use a value of 0.7 for both variables. A  $P$  value of 0.7 implies that a child costs 70 percent as much to support as an adult. The  $F$  value's interpretation is less intuitive, but it implies that as additional household members are added, the incremental cost of supporting each new additional household member declines.<sup>13</sup>

I adjust for household size by dividing the household's total earnings by the number of adult equivalents in the household. Assuming an economy of scale factor ( $F$ ) value of 0.7, a household consisting of two adults would have only 1.6 adult equivalents. To illustrate, if total household earnings were \$70,000, dividing by 1.6 would produce a shared earnings value for each spouse of \$43,750. This value implies that

their standard of living would be equivalent to that of a single individual earning \$43,750. If the couple had two children, the adult equivalent factor would then be 2.4, and each adult's attributed share of total earnings would be

\$29,167. This value would reflect both that larger households use resources more efficiently and that a share of the household's total earnings flows to the children rather than the adults.

In each year, the number of adult equivalents in the household is calculated, and household income is divided by this figure to produce the shared income for that particular year. This adjusted shared income is used both for calculating pre-retirement earnings and Social Security and total pension income as of age seventy.

Dividing the adjusted Social Security or total pension income by adjusted preretirement earnings produces a replacement rate adjusted for household composition.

## Replacement Rates for the 1940 Cohort

In this section, I report projected replacement rates for members of the 1940 birth cohort as of age seventy. It is worth noting that these projections are not adjusted for recent economic conditions, which doubtless have affected the assets and incomes of many retirees. Retirees are in many ways less exposed to an economic downturn than working age individuals, as many have left the workforce and derive income from Social Security and defined-benefit pensions, meaning that higher unemployment and lower financial asset prices may have less effect. However, retirees also are far more dependent on asset income than working age individuals and have less time to allow asset values to recover. For these reasons, figures shown here should be taken to be generally representative of the retirement income adequacy of current new retirees, based on broad trends in Social Security and pension income.

Results of the simulation are first shown to illustrate the effects of the adult equivalent adjustment factor on replacement rates. Table 1 compares unadjusted Social Security and total pension replacement rates, which are worth reporting in their own right, to those adjusted for household size and composition. Table 1 calculates the median replacement rate in each decile of lifetime earnings.

To illustrate, median replacement rates in the fifth and sixth deciles of lifetime earnings are 51 and 49 percent,

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Accounting for differences in household composition can have a significant effect on judgments about the adequacy of retirement income.

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respectively. This is higher than the commonly reported figure of around 40 percent, but, for several reasons, it should be considered the more accurate figure.<sup>14</sup> When adjusted for the presence of children and economies of scale in household size, the median replacement rate for the fifth decile rises from 51 percent to 63 percent of preretirement earnings. When Social Security replacement rates are adjusted for household size and composition, they rise in every earnings decile, with the largest increases for lower earners. However, replacement rates do not increase for every individual. While around 81 percent of individuals' replacement rates would increase, around 11 percent would decline. The remainder would be unchanged.

Table 1 also shows that Social Security replacement rates tend to be progressive, with unadjusted rates ranging from 74 percent for the lowest earnings decile to 32 percent for the highest. Social Security appears to be somewhat more progressive when viewed on an adjusted rather than an unadjusted basis.<sup>15</sup>

Total pension replacement rates likewise increase when adjusted for household size, from a value of 75 percent in the fifth decile to 92 percent.<sup>16</sup> Median replacement rates in every earnings decile exceed 89 percent, indicating that the typical person in the 1940 birth cohort is well prepared to replace preretirement consumption. This is particularly so because this analysis excludes several significant sources of retirement income, such as earnings and the implicit rent derived from owned housing. Total pension replacement rates are significantly less progressive than Social Security replacement rates, although this is not unexpected, as Social Security's progressivity was designed in part to account for lower private pension coverage among low earners.

Table 2 illustrates Social Security and pension replacement rates by marital status rather than lifetime earnings. Adjusted Social Security replacement rates increase for all household types, but—as expected—increases are largest for married individuals. Widows have the smallest increase in Social Security replacement rates, from 59 to 62 percent, and, in fact, experience *decreases* in median replacement rates from total pension benefits. The most likely explanation is that widows were beneficiaries of economies of scale in household size while married but not in retirement.

TABLE 1  
MEDIAN SOCIAL SECURITY AND PENSION REPLACEMENT RATES BY  
LIFETIME EARNINGS DECILE, 1940 BIRTH COHORT (PERCENTAGE)

Earnings decile	Social Security		Total pension	
	Unadjusted	Adjusted	Unadjusted	Adjusted
10	75	92	87	106
20	62	77	77	95
30	57	71	74	92
40	54	67	76	93
50	51	63	75	92
60	49	60	74	90
70	47	56	76	90
80	44	52	76	90
90	40	47	77	91
100	32	36	78	89

SOURCES: Author's calculations; GEMINI and PENSIM models.

TABLE 2  
MEDIAN SOCIAL SECURITY AND PENSION REPLACEMENT RATES BY  
MARITAL STATUS, 1940 BIRTH COHORT (PERCENTAGE)

Marital status	Social Security		Total pension	
	Unadjusted	Adjusted	Unadjusted	Adjusted
Divorced < 10 years	51	60	70	85
Divorced > 10 years	51	60	74	93
Married	47	60	73	93
Widowed	59	62	96	93

SOURCES: Author's calculations; GEMINI and PENSIM models.

Tables 1 and 2 indicate that adjusting for the economies of scale in housing size and the presence of children can have significant upward effects on replacement rates and that the typical individual at all earnings levels and in all household types has a replacement rate that is more than sufficient to satisfy financial advisers' recommendations for retirement income adequacy. However, it is also worth evaluating the number of individuals who have very low replacement rates, as they may be in danger of having insufficient income in retirement.

The distribution of adjusted total pension income replacement rates by lifetime earnings decile is illustrated in table 3. For each decile of the lifetime earnings distribution, table 3 shows the tenth, twenty-fifth, fiftieth (median), seventy-fifth, and ninetieth percentiles of replacement rates. To illustrate, in the upper left data cell of table 3, we can see that among the bottom 10 percent of lifetime earners, only 10 percent have replacement rates below 65 percent. For

such low earners, of course, absolute income adequacy to prevent poverty is generally a more important consideration than merely smoothing resources efficiently across the life cycle.<sup>17</sup>

At the middle of the earnings distribution, 10 percent of individuals have replacement rates below 53 percent of preretirement earnings, illustrating that relatively few current new retirees have retirement incomes that can be described as seriously inadequate. At the high end of the earnings distribution, a larger share of individuals have lower replacement rates. However, these individuals likely have financial assets not measured here and would have high absolute retirement incomes in any case.

In fact, one could argue that many current retirees have oversaved. While of lesser concern than undersaving, there are large numbers of retirees with replacement rates significantly exceeding their preretirement earnings; 44 percent of individuals in the 1940 birth cohort have retirement incomes exceeding 100 percent of preretirement earnings, and 16 percent have replacement rates exceeding 150 percent. Although it is impossible to know how each individual would optimally choose to allot consumption between working years and retirement, these individuals may have inadvertently sacrificed consumption earlier in life to amass a retirement income significantly out of proportion to their needs or their ability to spend it enjoyably. These retirees may have been better served to save less during their working years, although surely many would not regret preparing for retirement as effectively as they did.

## Replacement Rates for Future Retirees

While a strong majority of the 1940 birth cohort appears to have adequate retirement income to replace their preretirement earnings, many are concerned about how future retirees will fare. Social Security benefits will be lower, and private pensions will shift from defined-benefit schemes—which are perceived to be more generous—to defined-contribution plans.<sup>18</sup> To examine these questions, I analyze projected replacement rates for members of the 1960 birth cohort, who will retire in the 2020s.

TABLE 3  
DISTRIBUTION OF ADJUSTED TOTAL PENSION REPLACEMENT RATES,  
1940 BIRTH COHORT (PERCENTAGE)

Earnings decile	Replacement rate percentile				
	10th	25th	50th	75th	90th
10	65	82	106	141	189
20	60	76	95	126	171
30	57	71	92	125	165
40	57	71	93	125	167
50	53	69	92	126	171
60	54	67	90	124	167
70	51	65	90	127	170
80	50	65	90	127	175
90	47	63	91	130	180
100	41	59	89	132	187

SOURCES: Author's calculations; GEMINI and PENSIM models.

TABLE 4  
DISTRIBUTION OF ADJUSTED SOCIAL SECURITY REPLACEMENT RATES,  
1960 BIRTH COHORT (PERCENTAGE)

Earnings decile	Replacement rate percentile				
	10th	25th	50th	75th	90th
10	57	71	87	108	134
20	49	59	72	85	98
30	45	54	64	76	88
40	41	50	60	71	81
50	39	48	57	67	77
60	36	45	54	63	71
70	35	42	50	59	66
80	32	39	46	53	59
90	28	33	39	45	50
100	15	21	27	33	38

SOURCES: Author's calculations; GEMINI and PENSIM models.

As table 4 illustrates, median adjusted replacement rates for the 1960 cohort are lower at every decile of lifetime earnings than those reported for the 1940 cohort, shown in the second column of table 1. This decline is primarily due to an increase in the normal retirement age, from 65.5 years for the 1940 birth cohort to 67 years for the 1960 cohort. This policy change alone would reduce Social Security benefits by roughly 10 percent, assuming no behavioral changes. In addition, changes in household composition—particularly rising earnings by working wives and increased percentages of divorced and never-married retirees—reduce the percentage of beneficiaries

receiving auxiliary benefits based on a spouse's earnings.<sup>19</sup>

Table 5 illustrates adjusted total pension income replacement rates for the 1960 birth cohort, for which typical total pension replacement rates as of age seventy are lower than for the 1940 cohort (shown in table 3). The median projected replacement rate for the 1960 cohort is 82 percent of preretirement earnings, versus 92 percent for the 1940 cohort. This is due in part to lower Social Security replacement rates, detailed above, as well as to changes in private pension provision. Fewer individuals in the 1960 cohort will have access to defined-benefit pensions, with more relying on defined-contribution plans.

That said, a median replacement rate of 82 percent of preretirement earnings should not be considered a danger sign in itself. It is on the high end of most recommended replacement rates, particularly given that the PENSIM/GEMINI calculations exclude several sources of retirement income that are included in other studies. In addition, by far the largest decline in replacement rates between the 1940 and 1960 birth cohorts is in the highest decile of lifetime earners, for whom median replacement rates decline by 17 percentage points. Less than 7 percent of individuals in the bottom half of the earnings distribution have replacement rates below 60 percent, and only 3.4 percent of individuals in the bottom quarter of the distribution have replacement rates below 65 percent.

Moreover, if individuals choose to work even a few years longer—either in reaction to longer life spans, lower Social Security benefits, or potential policies to encourage longer work lives—replacement rates could approach current levels. GEMINI estimates an average Social Security benefit-claiming age of 62.8 years for the subsample of the 1940 birth cohort examined here. For the 1960 cohort, the average claiming age rises slightly to 63.1 years. To investigate the effects of longer working lives, a variable in the PENSIM model governing retirement behavior is altered so that individuals choosing voluntary retirement will retire one year later, on average.<sup>20</sup>

Under this assumed change in retirement behavior, the median replacement rate would increase to 89 percent of prior earnings. Given that longer life spans should result in lower replacement rates, as preretirement consumption would decline in order to save for a longer period in

TABLE 5  
DISTRIBUTION OF ADJUSTED TOTAL PENSION REPLACEMENT RATES,  
1960 BIRTH COHORT (PERCENTAGE)

Earnings decile	Replacement rate percentile				
	10th	25th	50th	75th	90th
10	61	77	100	131	171
20	54	69	87	113	146
30	50	64	83	109	143
40	49	63	82	109	142
50	48	62	82	109	142
60	47	62	82	109	141
70	46	61	83	112	145
80	45	60	83	111	144
90	43	61	84	113	150
100	33	50	72	99	130

SOURCES: Author's calculations; GEMINI and PENSIM models.

TABLE 6  
DISTRIBUTION OF ADJUSTED TOTAL PENSION REPLACEMENT RATES, 1960 BIRTH COHORT (PERCENTAGE)

Earnings decile	Baseline	Delayed retirement
10	100	150
20	87	122
30	83	107
40	82	98
50	82	89
60	82	79
70	83	72
80	83	63
90	84	51
100	72	32

SOURCES: Author's calculations; GEMINI and PENSIM models.

retirement, an 89 percent replacement rate could be considered qualitatively sufficient.

As shown in table 6, delayed retirement would result in significant replacement rate increases for low earners. In the bottom third of the earnings distribution, typical replacement rates rise by over twenty-five percentage points. Recent research by Joyce Manchester of the Congressional Budget Office and Jae Song of the Social Security Administration indicates that increases in the full retirement age for Social Security can have a significant effect on Social Security claiming ages, so these questions should be explored more fully.<sup>21</sup> Paradoxically, an increase in working years may result in *lower* replacement rates at high earnings

levels. Social Security and most defined-benefit pensions are not actuarially fair at the margin, meaning that continued work at high earnings levels would increase lifetime earnings (and thereby the measure of preretirement earnings) more than it would increase retirement benefits. Again, however, very high earners may have significant nonpension financial assets that are not captured here.

## Conclusion

Accounting for differences in household composition can have a significant effect on judgments about the adequacy of retirement income. Adjusting for household size and the presence of children increases the typical replacement rate for the 1940 birth cohort by approximately fifteen percentage points, although measured replacement rates decline for roughly one in ten retirees.

For the 1940 birth cohort, overall retirement preparedness appears to be strong. The typical Social Security replacement rate adjusted for household composition is 63 percent of preretirement earnings, while the median total pension income replacement rate is 92 percent. This latter figure significantly exceeds financial advisers' recommended replacement rate of around 75 percent.

Projected replacement rates for the 1960 cohort are lower, with a median adjusted total pension replacement rate of 84 percent. But even this reduced level is adequate on average, and if individuals were to choose to remain in the workforce for just one more year, the median replacement rate would rise to around 89 percent.

The most significant gray area surrounding these projections is when and how the Social Security program will be reformed to improve its financial soundness. While the program is projected to be solvent until the 2040s—meaning that scheduled benefits should be payable as of the 2020s, when the 1960 cohort will retire—changes to taxes and benefits are likely to occur in the near future. These changes are likely to reduce average replacement rates, although they will probably shield low earners from the greatest changes. While it is important to reduce the growth of Social Security benefits to ease pressure on the federal budget, Social Security reform should also include provisions to increase individual retirement savings outside of Social Security so as to help maintain income replacement rates at retirement.

While policymakers should not ignore policies to help individuals build sufficient income for retirement, such as reforming Social Security and automatically enrolling

employees in pension plans, neither should they panic or assume a crisis is at hand. Most Americans, both current retirees and future ones, appear to be reasonably well prepared to support themselves in retirement.

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*AEI research assistant Adam Paul worked with Mr. Biggs to produce this Retirement Policy Outlook.*

## Notes

1. Sue Alexander Greninger, Vickie L. Hampton, Karrol A. Kitt, and Susan Jacquet, "Retirement Planning Guidelines: A Delphi Study of Financial Planners and Educators," *Financial Services Review* 9, no. 3 (2000): 231–45.

2. For instance, see Laurence J. Kotlikoff, "Is Conventional Financial Planning Good for Your Financial Health?" (Boston University, Boston, January 2006), available at <http://people.bu.edu/kotlikoff/Is%20Conventional%20Financial%20Planning%20Good%20for%20Your%20Financial%20Health.pdf> (accessed January 5, 2009).

3. Replacement rates measured in this analysis are based on Social Security and pension benefits alone and exclude some sources of income included in other studies. Boston College's Alicia H. Munnell, Anthony Webb, and Luke Delorme include, for instance, implicit rent derived from housing equity and a reverse mortgage based on the future sale price of the house. Those sources of income, which would increase total household income by around 15 percent, are not modeled here. See Alicia H. Munnell, Anthony Webb, and Luke Delorme, "A New National Retirement Risk Index" (Issue in Brief 48, Center for Retirement Research, Boston College, Newton, MA, June 2006), available at [http://crr.bc.edu/images/stories/Briefs/ib\\_48.pdf](http://crr.bc.edu/images/stories/Briefs/ib_48.pdf) (accessed February 5, 2009).

4. John Karl Scholz and Ananth Seshadri, "Children and Household Wealth" (Working Paper 2007-158, Retirement Research Center, University of Michigan, Ann Arbor, MI, October 2007), available at [www.mtrc.isr.umich.edu/publications/papers/pdf/wp158.pdf](http://www.mtrc.isr.umich.edu/publications/papers/pdf/wp158.pdf) (accessed February 5, 2009).

5. This earnings stream is calculated this way: Shared earnings are calculated for each year of work, then discounted at the government bond interest rate to produce a single "present value" of shared lifetime earnings. An income stream is then calculated that would have the same present value as the individual's lifetime shared earnings. This income stream would flow from ages twenty-one to sixty-five and would increase each year along with average wages in the economy. The individual's shared Social Security benefit or total pension income would be divided by this approximation of preretirement earnings to produce a replacement rate.

6. Alicia H. Munnell, Mauricio Soto, Anthony Webb, Francesca Golub-Sass, and Dan Muldoon, "Health Care Costs Drive Up the National Retirement Risk Index" (Issue in Brief 8-3, Center for

Retirement Research, Boston College, Newton, MA, February 2008), available at [http://crr.bc.edu/images/stories/Briefs/IB\\_8-3.pdf](http://crr.bc.edu/images/stories/Briefs/IB_8-3.pdf) (accessed February 5, 2009).

7. Even if health care does not provide positive value at the margin, which is possible or even probable, retirees do not bear the full cost of their own health care provision. Medicare premiums and out-of-pocket costs are only a fraction of the total cost of health care for seniors, as most costs are covered by Medicare itself. This implies that retirees' true consumption of health care goods and services is well in excess of the price they pay for it.

8. For instance, work by Urban Institute researchers uses the Social Security Administration's (SSA) MINT4 model to analyze projected replacement rates for retirees in 2022 and 2062. However, the MINT4 model does not incorporate the presence of children and so cannot be factored into the replacement rate calculations. MINT5, however, which is currently employed at SSA, does model the presence of children. See Barbara A. Butrica, David B. Cashin, and Cori E. Uccello, "Projections of Economic Well-Being for Social Security Beneficiaries in 2022 and 2062," *Social Security Bulletin* 66, no. 4 (2005/2006): 1–19, available at [www.ssa.gov/policy/docs/ssb/v66n4/v66n4p1.pdf](http://www.ssa.gov/policy/docs/ssb/v66n4/v66n4p1.pdf) (accessed February 5, 2009).

9. Constance F. Citro and Robert T. Michael, eds., *Measuring Poverty: A New Approach* (Washington, DC: National Academies Press, 1995).

10. Jonathan S. Skinner, "Are You Sure You're Saving Enough for Retirement?" (Working Paper 12,981, National Bureau of Economic Research, Cambridge, MA, March 2007), available at [www.nber.org/papers/w12981](http://www.nber.org/papers/w12981) (accessed February 5, 2009).

11. Children are generally assumed to consume around 70 percent as much as adults in the same household, based on work by David M. Betson using the Consumer Expenditure Survey. See David M. Betson, *Alternative Estimates of the Cost of Children from the 1980–86 Consumer Expenditure Survey* (Washington, DC: U.S. Department of Health and Human Services, September 1990).

12. Constance F. Citro and Robert T. Michael, eds., *Measuring Poverty: A New Approach*.

13. In this analysis, children are counted as part of the household until age twenty-one. This is an imperfect value since many children will leave home before age twenty-one, while others, such as those attending college or graduate school, may require support from their parents until later ages.

14. An individual who earns the average wage in each year of his life and retires at the full retirement age will receive a Social Security benefit equal to 40 percent of his preretirement earnings. However, the typical person does not work in every year and so has lifetime earnings lower than the stylized medium-wage earner. Since Social Security is progressive, the typical person would therefore receive a higher

replacement rate. Moreover, the stylized example used in the Social Security Trustees' report does not account for spousal benefits, which are received by most married female beneficiaries and can increase benefits above those based on the individual's own earnings record.

15. A linear regression of the data summarized in table 1 indicates a slope of  $-0.5$  for adjusted replacement rates versus a slope of  $-0.37$  for unadjusted replacement rates, indicating that adjusted replacement rates decline more quickly as lifetime earnings rise.

16. About 70 percent of individuals in the 1940 birth cohort are estimated to have at least some defined-benefit or defined-contribution pension income. However, all individuals are included in the total pension replacement rate calculations, including those with only Social Security income. Note that these replacement rate calculations exclude retirees' earned income; had current earnings been included, average replacement rates would have risen by approximately two percentage points. In addition, other sources of income are not included, so the replacement rates estimated here should be considered a lower bound.

17. In addition, these figures should not be taken as definitive for very low earners, who differ significantly from the typical retiree. While very low earners are unlikely to hold significant housing equity or financial assets, they are more likely to be eligible for means-tested income assistance, such as Supplemental Security Income, none of which are measured here.

18. For a comparison of the adequacy of defined-benefit versus defined-contribution pension plans, see Andrew A. Samwick and Jonathan S. Skinner, "How Will Defined Contribution Pension Plans Affect Retirement Income?" (working paper, Social Science Research Network, June 1, 1998), available at [www.ssrn.com/abstract=98311](http://www.ssrn.com/abstract=98311) (accessed January 5, 2009).

19. Future retiree cohorts will have a larger share of female beneficiaries who have either never married or divorced prior to ten years of marriage, in both cases making them ineligible for spousal benefits. In addition, rising earnings among married women imply that spousal benefits, when available, will be smaller and that in more cases, married women will receive benefits based entirely on their own earnings records.

20. The projected average Social Security claiming age for the 1960 cohort rises by less than one year, from 63.1 years to 64.0, as this modeling change does not affect disabled individuals who transition to retirement benefits, nor will it allow any individual to claim benefits after age seventy. While the analysis excludes disabled individuals, there may be some disabled spouses of non-disabled individuals in the sample.

21. Joyce Manchester and Jae Song, "New Evidence on Earnings and Benefit Claims Following Changes in the Retirement Earnings Test in 2000," *Journal of Public Economics* 91, nos. 3–4 (April 2007): 669–700.