Are You Sure You’re Saving Enough for Retirement?

Jonathan Skinner

Many view the soon-to-retire Baby Boomers as woefully unprepared for their golden years. Bernheim (1992) suggested this cohort was saving just one-third of what they needed to retire comfortably. Christine Weller of the Economic Policy Institute stated that “the average American household has virtually no chance to reach an adequate retirement savings in the next 50 years” (Dupas, 2002). One recent report declared 43 percent of American households “at risk” of substantial declines in retirement income, even after factoring in financial and housing wealth (Hannell, Webb, and Delorme, 2006).

Other economists have taken a more sanguine view of American levels of saving (for example Engen, Gale, and Urrutia, 1999). Baby Boomers may not be accumulating enough, but at least they’re saving more than their parents did (Scholz and Manchester, 1980; Keister and Debo-Sussa, 2001). Households don’t need to save because of reduced expenses as children leave the household (Scholz and Seshadri, 2006), or because they can rely on programs such as Medicaid and Supplemental Security Income once they retire (Pauly, 1958; Hubbard, Stinnett, and Zedka, 1999; Scholz, Seshadri, and Khatriaskar, 2006).

And many feel that Baby Boomers just don’t need to spend as much once they retire because of their greater ability to cut back on expenses (Brick, 2004). Aglalui and Hurst (2005a, b) find that retired households spend less money and engage in more “home production” such as shopping for lower prices, even while maintaining the quality and quantity of calorie intake through retirement. Finally, if Americans are failures at saving enough for retirement, why are some retirees so happy?

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As one wrote to the *New York Times* (as quoted in Loewenstein, Prelec, and Weber, 1999): "You can get by on a lot less when you're retired, without really depriving yourself of anything important. ... If I had known earlier how much 'wealth' derives from such simple pleasures, I would have retired a lot sooner." Indeed, some financial planners have evolved into "life planners" who encourage clients to reevaluate their life priorities rather than accept the status quo of meaningless materialism (Ehrenberg, 2006).

This paper attempts to reconcile these widely diverging views of saving adequacy. The seemingly simple question of "Are I saving enough for retirement?" is apparently not so simple at all. Instead, it touches on a variety of deeper issues in economics, psychology, and health policy. As a starting point, several observations seem to hold true. First, wealth requirements necessary to maintain steady consumption through retirement are indeed daunting for many households, even those with generous 401(k) plans and high incomes. (Readers are warned that life-cycle retirement wealth targets presented below may lead to feelings of financial inadequacy.) Most households cannot save enough to guard against all future contingencies, such as dramatically lower rates of return on investments or unexpected earnings losses near planned retirement.

Second, while smoothing consumption through retirement may not be the sole goal of retirement planning, it's not entirely clear what is needed for retirement security. In theory, prospective retirees know they can always move to smaller houses or to less-expensive regions of the country, or cook at home rather than eat out, but how will their future selves feel about calling the moving van or seeking out less-expensive stores? There is no simple answer to this question because retirement is such a heterogeneous experience, one that depends on health and temperament as well as wealth (Kelly, 1998). Still, one can conclude that many newly retired households both anticipate a modest decline in consumption, and adjust to it.

The final observation is that retirement encompasses both age 66, when healthy households can easily substitute home cooking for more expensive prepared food, and age 86, when few can substitute home production for purchased health care. Growth rates for out-of-pocket health care spending have kept pace with overall health care cost growth, and thus continue to outstrip GDP growth, and they may accelerate as firms phase in retiree health benefits. These health care cost projections are perhaps the scariest beast under the bed. Fromstein (2006) estimates that a 55-year-old couple in 2006, planning to retire at age 65, would need to accumulate more than $400,000 during the next 10 years in order to afford supplemental health costs, beyond what Medicare already covers, through age 90. Even in the near term, projections based on the Health and Retirement Study suggest that by 2019, nearly one-tenth of elderly retirees will be devoting more than half of their total income to out-of-pocket health expenses. Thus, saving for retirement may ultimately be less about the golf condo at Hilton Head and more about being able to afford a wheelchair lift, private nurses, and a high-quality nursing home.
Retirement Saving in a Life-Cycle Model

A good starting point for calculating retirement saving is the standard life-cycle model in which consumption (adjusted for family size) is flat over the life cycle and so is "smoothed" through retirement. Thus, households save while working in order to finance income shortfalls during retirement. Of course, depending on levels of risk, and on how the rate at which individuals discount future consumption compares to the after-tax interest rate, a flat path of consumption may not be optimal, but it is a reasonable first step, and is consistent with observed growth rates in consumption near retirement (Bernheim, Skinner, and Weinberg, 2002).

How Much Wealth Do You Need to Smooth Consumption Through Retirement?

The first task of this paper is to calculate how much wealth you should own to smooth consumption. These calculations are performed only for those aged 40 and up. Readers in their 20s and 30s should be maximizing their workplace matching contributions (Benartzi and Thaler, this issue), seeking automatic saving mechanisms such as house mortgages, and hoping that their generation can still look forward to solvent Social Security and Medicare programs.

I will focus here on nonhousing net worth, under the working assumption that most households value the option of remaining in one’s house until declining health forces a move or a sale (Lasardi and Mitchell, 2006). To calculate nonhousing net worth, count up 401(k) plan balances, IRA, business equity, stock investments, equity in second houses, and so forth, but do not count defined benefit pension plans that pay a fixed amount at retirement, or prospective Social Security payments; these will both be included as components in retirement income flows. Now take the ratio of net nonhousing wealth to before-tax income.

The next step is to calculate the hypothetical target wealth that would allow for smoothing consumption through retirement. Note that the intertemporal budget constraint specifies that (a) current nonhousing net wealth plus (b) the present value of lifetime net earnings, pension flows, and Social Security benefits is equal to (c) the present value of lifetime nonhousing consumption plus bequests. Ignoring bequests for the moment, the unknown wealth level (a)—that is, the difference between (c) and (b)—is the level of current wealth that would ensure a consumption path sustainable through retirement as long as the household shall exist. This target wealth is "The Number"; if current assets are below "The Number," you’re not saving enough, or you need to plan for a reduction in consumption at retirement. In a simplified life cycle, just a few parameters are necessary to calculate this target wealth: 1) current age, expected retirement age, marital status, and retirement planning horizon; 2) the expected real rate of return, or interest

1 "The Number," the subject of Eiserberg’s (2006) terrific book, is a bit different because it is the amount of money one needs to retire today to pursue one’s life goals.
rate; 3, the mortgage payment rate as a fraction of earnings, where the mortgage is assumed to be paid off by retirement; 4, the saving rate, as a fraction of before-tax earnings; 5, the retirement “replacement rate” β, or the fraction of retirement annuity flow divided by pre-retirement earnings.  

Retirement annuity flows should include any income from a defined benefit pension plan, but for many baby Boomers (and most academics), the only guaranteed income transfers will consist of Social Security benefits. These are anticipated to pay an annual maximum of $33,900 (in 2006 dollars) in 2091 for an age-65 individual with special benefits, or $45,240 if both members of the family contribute to the 2006 maximum of $94,260. Amounts are more if retirement is deferred, and could turn out to be less if Social Security is trimmed back under the weight of its long-term obligations. Thus I adopt a final household value of 8 = 0.3, which is consistent with a final working-age income of $120,000 and Social Security payments of $40,000. (Ignore here the possibility of borrowing wealth to anticipate, which would allow households to increase β at the expense of current wealth.)  

The first row of Table 1 displays asset-income ratios for a set of benchmark parameters: a replacement ratio β of 30 percent, real interest rate of 3 percent, retirement at age 65, planning horizon of age 95, 20 percent average and marginal tax rate, mortgage payments comprising 30 percent of income, and the flow of new savings equal to 7.5 percent of before-tax earnings. (Relatively few Americans work until 65, but academics do tend to retire later than the general population.) At age 40, the nonhousing wealth-to-income ratio is 1.8; it rises to 2.5 at age 50 and peaks at 5.1 when retirement occurs.  

Sensitivity of “The Number”  

The first sensitivity analysis, in row 2 of Table 1, shows the importance of housing wealth in magnifying the need to accumulate nonhousing wealth for retirement. Renters would need to set aside 8.6 times income by the time they retire to afford both nonhousing consumption (as above) plus 50 years of future rental payments. Thus paying off the mortgage by retirement reduces nonhousing wealth requirements substantially.  

Target wealth is also sensitive to changes in the saving rate; the wealth-income ratio at age 40 is 0.5 when the saving rate is 15 percent, and 5.1 when the saving rate is 2.5 percent (rows 3 and 4). One puzzle is why wealth requirements at retirement are so much larger for the household saving 2.5 percent (5.8 times income) instead of 15 percent (5.8 times income). The resolution is to note that the high saving household has gotten used to lower rates of consumption while working, so less is needed to smooth consumption through retirement. Raising saving rates therefore yields a “double dividend” in lifecycle

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Footnote: An alternative approach is to take current wealth as given and calculate necessary replacement rates, with three alternative models assuming no sources of income, longevity, or health risk (Vanherwegh, 2006).
Table 1
Target Nonhousing-Wealth-to-Income Ratios in a Life-Cycle Model

<table>
<thead>
<tr>
<th>Row</th>
<th>Model specification</th>
<th>Age 40</th>
<th>Age 45</th>
<th>Age 50</th>
<th>Age 55</th>
<th>Age 60</th>
<th>At retirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Simple lifecycle benchmark</td>
<td>1.8</td>
<td>2.3</td>
<td>2.9</td>
<td>3.6</td>
<td>4.3</td>
<td>5.1</td>
</tr>
<tr>
<td>2</td>
<td>No housing debt</td>
<td>3.7</td>
<td>4.5</td>
<td>5.2</td>
<td>6.0</td>
<td>7.8</td>
<td>8.0</td>
</tr>
<tr>
<td>3</td>
<td>Higher saving rate (15%)</td>
<td>0.3</td>
<td>0.3</td>
<td>1.1</td>
<td>1.9</td>
<td>2.8</td>
<td>3.8</td>
</tr>
<tr>
<td>4</td>
<td>Lower saving rate (25%)</td>
<td>0.1</td>
<td>0.4</td>
<td>0.8</td>
<td>1.5</td>
<td>2.1</td>
<td>3.0</td>
</tr>
<tr>
<td>5</td>
<td>Late retirement (age 70)</td>
<td>0.9</td>
<td>1.4</td>
<td>1.9</td>
<td>2.5</td>
<td>3.1</td>
<td>4.5</td>
</tr>
<tr>
<td>6</td>
<td>Early retirement (age 60)</td>
<td>2.7</td>
<td>3.3</td>
<td>4.0</td>
<td>4.7</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>7</td>
<td>Early death (age 80)</td>
<td>1.0</td>
<td>1.5</td>
<td>2.0</td>
<td>2.6</td>
<td>3.2</td>
<td>3.9</td>
</tr>
<tr>
<td>8</td>
<td>Replacement rate β = 0.6, retired at 62</td>
<td>1.8</td>
<td>2.3</td>
<td>2.7</td>
<td>3.3</td>
<td>3.9</td>
<td>4.2</td>
</tr>
<tr>
<td>9</td>
<td>Earnings and consumption growth of 2% until retirement</td>
<td>3.2</td>
<td>5.0</td>
<td>6.0</td>
<td>7.4</td>
<td>9.1</td>
<td>5.1</td>
</tr>
<tr>
<td>10</td>
<td>Consumption decline at retirement</td>
<td>0.6</td>
<td>1.1</td>
<td>1.6</td>
<td>2.1</td>
<td>2.7</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Note: Weights-income ratios necessary to ensure smooth consumption through the household’s lifetime. Baseline lifecycle simulation parameters: 5 percent real interest rate; no growth in earnings; retirement planning horizon of 35 years; age of 60; 7.5 percent saving rate; 20 percent mortgage payment, and 20 percent marginal and average tax rate.

saving by stimulating asset accumulation and attenuating future required consumption.

Extending retirement age to 70 (row 5), not uncommon among academics, sharply reduces required wealth accumulation at all ages, while retiring early at 60 (row 6) raises wealth accumulation. As row 7 demonstrates, dying early is another approach to ensuring retirement security. A scenario that might be plausible for a low-income worker who doesn’t own a house—a replacement ratio of β = 0.6, a retirement age of 62, and a saving rate of 5 percent—yields a wealth-income target of 1.8 at age 40, rising to 4.2 at retirement (row 8). Finally, allowing earnings to grow at 2 percent, coupled with consumption growth of 2 percent until retirement, leads to even larger wealth requirements relative to the benchmark, since consumption growth also raises the level of retirement consumption (row 9).

Figure 1 demonstrates the sensitivity of retirement savings to two important factors: the income replacement ratio β and the interest rate. The target retirement wealth ratio is graphed for different values of the replacement rate β (0.2, 0.4, and 0.6) and the interest rate. Note that the wealth target is not particularly sensitive to the interest rate when β = 0.6. When the household saves 7.5 percent of earnings, pays a mortgage of 20 percent of earnings, and pays income taxes, what’s left over for consumption is sufficiently small to be taken care of by retirement income flows. Thus high replacement rates help to insure against the risk of interest rate fluctuations. By contrast, when saving requirements are much greater, as in the case
Figure 1
The Impact of the Interest Rate on Required Life-Cycle Wealth Accumulation

Note: This graph shows how changes in assumptions about future and interest rates affect target wealth values to ensure consumption smoothing, evaluated at age 50. The model is as described in the notes to Table 1. The association between the interest rate and wealth-income ratios are shown for different replacement ratios of retirement income relative to preretirement income: $\beta = 0.2$ (20 percent of preretirement income), $\beta = 0.4$, and $\beta = 0.6$.

where $\beta = 0.2$, "The Number" is highly sensitive to adverse outcomes in equity and bond markets. It ranges from below one (that is, wealth less than current income) for a 10 percent rate of return, to 8.0 for a lagged 1 percent return.5

This model ignores many factors potentially relevant to retirement planning, such as tax-deferred accounts (where balances are typically pretax dollars before being distributed from the account), the progressivity of the tax code, children's expenses (including college or bail bonds), mortgage payments, estate planning, and a variety of other factors. To handle this additional complexity, I turn to ESPlanner, a commercial retirement planning program built on the same life-cycle framework simulated in Table 1, but with all these other factors relevant for saving plans built in.6 I use several representative income levels based on the 2005 annual

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5 This model assumes a steady state with constant real interest rates. Were interest rates to fluctuate, the calculations would be affected by simultaneous changes in the market value of assets held by the household.

6 It was programmed originally by Jagdish Kohli and Laurence Kotlikoff. Kotlikoff (2006) argues persuasively that this model provides better financial advice than popular alternatives. In the program, I determined target wealth recursively to within a tolerance of under 2% between actual and recommended consumption.
American Economic Association survey of economics departments, kindly supplied by John Siegfried (Vanderbilt University, Tennessee) and Charles Scott (Loyola College, Maryland).

The income distribution is based on median earnings at schools (not individuals), but the percentiles are weighted by the number of faculty at each institution. I begin with what is a relatively low baseline academic-year income for full professors $65,000, at the 50th percentile (from the bottom) of B.A.-granting colleges. This rises to $88,000 for the median and $120,000 at the 50th percentile. By contrast, the 10th percentile salary for full professors at Ph.D.-granting institutions is $104,000, the median $134,000, and the 90th percentile $184,000. To span these ranges, I adopt multiples of $66,000, reaching as high as $272,000 to capture the hypothetical income of very well-compensated dual working households (or a richer finance professor). These calculations cannot be generalized to the wealth requirements of low-income households whose saving needs may be more modest owing to more generous replacement rates in Social Security or from Social Security Disability Insurance (Berndt, Bernstein, Geishe, and Kollhoff, 2000, although see VanDerhe, 2000).

Table 2 provides these target wealth holdings by age for single and married households for a variety of income and demographic scenarios. The detailed inputs are described in the notes to Table 2; the surprising feature is how important all of these additional variables are for retirement planning. The house is assumed to be worth 2.5 times income, and the mortgage balance, with 20 years remaining, is initially equal to twice income. The equivalence scale of a spouse is assumed to augment consumption by 0.6, while each child increases the consumption requirements of the household by 25. I assume a baseline saving rate equal to 7.5 percent of pretax income with 5 percent to a 401(k) and 2.5 percent to nonretirement assets, split equally between bonds and stocks. This is a flow measure, and underestimates the real saving rate, which includes capital gains, the reinvestment of interest and dividend income, and any appreciation in housing equity. An important assumption implicit in this model is that once the house mortgage is paid off, monthly payments are diverted to saving, not consumption.

Consider the simplest case, of a single person with income of $68,000 and whose contingency planning allows for a 95-year lifespan. As in the previous analysis, I focus solely on nonhousing wealth. The first row in Table 2 shows that wealth at age 60 necessary to sustain a constant consumption flow is just $14,000. By retirement, nonhousing wealth has grown to $272,000, somewhat below the prescribed wealth-to-income ratio in Table 1. For households with children (row 2), target wealth levels in a household with $68,000 in income are higher during their 40s in anticipation of college expenses. For single households earning $135,000

5 The total equivalence scale for two adults and two children in this model, 2.1, matches the OECD-median equivalence scale (although they place slightly more weight on children and less on adults) for a very similar inelasticity, see Organization for Economic Cooperation and Development (2000).
Table 2

<table>
<thead>
<tr>
<th>Row</th>
<th>Marital status, income, other variables</th>
<th>Age 40</th>
<th>Age 50</th>
<th>Age 60</th>
<th>Household data (age 65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single, $0,000, house</td>
<td>14</td>
<td>15</td>
<td>25</td>
<td>272</td>
</tr>
<tr>
<td>2</td>
<td>Married, $50,000, house, no children</td>
<td>39</td>
<td>76</td>
<td>94</td>
<td>321</td>
</tr>
<tr>
<td>3</td>
<td>Single, $150,000, house</td>
<td>182</td>
<td>382</td>
<td>501</td>
<td>694</td>
</tr>
<tr>
<td>4</td>
<td>Single, $150,000, no house</td>
<td>580</td>
<td>719</td>
<td>871</td>
<td>1,049</td>
</tr>
<tr>
<td>5</td>
<td>Married, $150,000, house, two children</td>
<td>347</td>
<td>315</td>
<td>399</td>
<td>506</td>
</tr>
<tr>
<td>6</td>
<td>Married, $150,000, house, two children, defined benefit plan</td>
<td>46</td>
<td>87</td>
<td>12</td>
<td>50</td>
</tr>
<tr>
<td>7</td>
<td>Single, $104,000, house</td>
<td>202</td>
<td>180</td>
<td>1,128</td>
<td>1,265</td>
</tr>
<tr>
<td>8</td>
<td>Married, $204,000, house, two children</td>
<td>119</td>
<td>138</td>
<td>291</td>
<td>516</td>
</tr>
<tr>
<td>9</td>
<td>Married, $304,000, house, two children</td>
<td>400</td>
<td>565</td>
<td>797</td>
<td>924</td>
</tr>
<tr>
<td>10</td>
<td>Married, $200,000, house, two children</td>
<td>516</td>
<td>699</td>
<td>990</td>
<td>1,220</td>
</tr>
<tr>
<td>11</td>
<td>Single, $150,000, house, two children</td>
<td>18</td>
<td>38</td>
<td>50</td>
<td>594</td>
</tr>
<tr>
<td>12</td>
<td>Married, $200,000, two children, newly married couples</td>
<td>477</td>
<td>636</td>
<td>764</td>
<td>1,282</td>
</tr>
<tr>
<td>13</td>
<td>Married, $204,000, two children, newly married couples, 15% of income</td>
<td>130</td>
<td>307</td>
<td>481</td>
<td>1,099</td>
</tr>
</tbody>
</table>

Note: All calculations performed using ESPPlanner. Baseline parameter values: inflation rate 3 percent; nonmedical care 6 percent; tapering rate 3 percent to 0 at 65; 2.5 percent in marital preference assets (split evenly between mortgage and stocks); house value 2.5 times household income; property tax rate is 0.68 times house value; child and headship, 1988; mortgage payment for $204,000 loan at 5.5 percent ($603 per month per $100,000 mortgage). For defined benefit plans, pensions are 50 percent of final-year income. The home mortgage is assumed paid off by age 65. Two children are ages 8 and 9 when sibling age 65; (7) equivalence scale for children is 0.5 (in Ashbaugh, Banks, Meghir, and Weber, 1999). $10,000 per person of college expenses in 2005 dollars for income of $35,000 or above, $10,000 per year for the $65,000 income household. In the medical expenses scenario, there are tax-deductible out-of-pocket expenditures for a nonliving home only for the first 5 years of spouse’s life. These are assumed to be $10,000 annually (in 2005) but in each year can decrease as a 3% annualized rate, so that by 2051 they are $75,000 for each of the beneficiaries. The household is assumed to reside in Pennsylvania for state tax purposes. Single estate Style, life expectancy of 0.5. Marital estate Style Equivalence scale of 0.6 for spouse; life expectancy of male child, life expectancy of female is 85. 250,000 is held in a term life insurance policy annually (row 5), wealth requirements are substantially greater, $964,000 at retirement, because the progressivity of Social Security payments leads to a lower replacement rate. Home ownership reduces target wealth (row 4 versus row 5) because the homeowner need not save against future rental payments during retirement (as in the example above), and because of the extra saving gained by paying off the mortgage at age 60.

For married households with two children and income of $150,000, saving requirements are $147,000 at age 40, raising to $850,000 price to retirement (row 5). In the presence of a defined benefit plan that pays 30 percent of before-tax income.
However, wealth requirements drop substantially, with prescribed wealth of only $95,000 at age 65 (row 6). This is because combined Social Security and pension payments match the consumption of the household (and the nonworking spouse) quite closely. As one moves up the income distribution (rows 7–10), target wealth measures rise accordingly, but the wealth-to-income ratio for these higher-income groups is actually a bit lower; for example, the wealth-to-income at retirement for the household earning $150,000 (row 9) is 6.2, but is only 5.5 for the household earning $272,000 (row 10). This pattern largely reflects the progression in the tax code leading to less-than-proportional increases in lifetime consumption streams.

A comparison of rows 9 and 10 suggests a somewhat smaller interest elasticity of target wealth than that suggested by the earlier simulations, in part because the discount rate is less important for college expenses, and also because of declining total expenditures as first children, and then a spouse, leave the household. Table 2 also demonstrates that the presence of children, with equivalent scale measures of 0.7, actually reduce required wealth accumulation (row 11 compared to row 5), and that wealth requirements necessary to plan for a future in which the spouse spends five years in a nursing home are indeed daunting (row 12 compared to row 8). These topics are taken up in more detail below.

How Much Money Do You Really Need to Enjoy Retirement?

As noted above, a variety of studies show that most American households fail to meet saving goals suggested by certain life-cycle models (Amicka and Utzus, 2006; Warshawsky and America, 2006; Stackeumer, 2005; Movre, Webb, and Delorme, 2006; Mitchell and Moscow, 1998; Lusardi and Mitchell, 2006). Figure 2 shows that even Baby Boomers aged 51–55 with postgraduate degrees fail short of the conventional savings targets calculated above; the median nonhousing-wealth-to-income ratio is 1.7, with the 25th percentile just 0.5 (Lusardi and Mitchell, 2006). Many well-educated Baby Boomers will likely need to scale back consumption at retirement. But does this mean that they’ve failed to save “enough”? Here I consider several explanations for why consuming less at retirement might not imperil retirement security.

Meaning Equity Can Be Used to Finance Consumption during Retirement

Some financial planners have noted how much retirees could save simply by unleashing their housing equity and moving to towns such as Henderson, Nevada, where living costs are less than half that in New York (Brock, 2004, p. 74). A more limited approach would be to purchase a smaller house or condominium in the

* Of course, this strategy begs the question of why housing costs are so low in Henderson, Nevada.
same town. If one is planning to downsize in the future, it’s okay to add some part of housing equity to the retirement nest egg available for nonhousing consumption—but the value should be discounted, perhaps at a risky rate of return. In practice, Venti and Wise (1999) have shown that recent retirees are about as likely to move into more expensive as less-expensive housing. The exception occurs when there are adverse transitions such as widowhood or severe illness, at which point households are more likely to tap into housing equity (Venti and Wise, 2004). Thus, average housing equity tends to decline with age, particularly among older households (Blau, 2003).

Still, future retirees are typically unwilling to commit to having to move to a smaller house. Lusardi and Mitchell (2006) found nearly 70 percent of respondents to the Health and Retirement Survey aged 70 and under felt there was a minimal (10 percent or less) chance of selling their house to pay for retirement (see also Sneedling, Torrey, Fisher, Johnson, and Marchant, 2006). Reverse mortgages allow retirees to borrow money against housing equity, to be repaid upon death; however, little use has not been widespread (Sun, Trzst, and Webb, 2006).

A middle ground recognizes the option value of housing equity for future uncertain contingencies. Housing equity is perhaps the best hedge against future catastrophic health care costs, because such equity is often exempted from Medicaid asset limits, and because patients with expensive chronic illnesses who require specialized health care would need to vacate their house in any case (Skinner,
Even if these adverse events don't occur, home equity can still provide a bequest to children or to other worthy causes (Dyman, Skinner, and Zeiders, 2002).

With Children Gone (Or a Spouse Lost), Consumption Expenses Are Lower During Retirement

Any parent will know the expenses of raising children, ranging from diapers early in the life cycle to college education and helping out with housing down payments later. For this reason, parents may reasonably expect a decline in family expenses as the children depart. The importance of children in life-cycle consumption and saving was emphasized by Scholz, Sehidli, and Khistavskiy (2006) and Scholz and Sehidli (2009), who found 89 percent of U.S. households were optimally saving for retirement after accounting for the timing and influence of children on optimal consumption plans. E-Planner equivalence scales were used to adjust household consumption by differences in the size and composition of the household. Their equivalence scale, from Citro and Michael (1995), implied that a married couple with no children now consuming $46,000 can smooth person-equivalent consumption by planning for $94,400 in expenditures once the children have left, and for $17,000 following the departure of a spouse.2

The importance of equivalence scales can also be seen in E-Planner by comparing row 11 in Table 2 (a single parent with two children) against row 4 (a single person without children). In row 11, the E-Planner default equivalence scale of 0.7 per child is used. Target wealth at age 65 is $180,000 for the household with children, and $226,000 for the household without. Despite the additional expense of college, retirement saving is eliminated for the parent with children because her annual consumption at retirement is just $49,301, rather than the $94,400 required for the single household.

In other words, parents are already used to getting by on peanut butter, given that a large fraction of their preretirement budget has been devoted to supporting children, so it's not difficult to save enough money to keep them in peanut butter through retirement. By contrast, childless households with the same income accustomed to caviar and fine wine want so wide a range of assets to maintain themselves in the style to which they have become accustomed. This assumption is central to why the Scholz, Sehidli, and Khistavskiy (2006) and Scholz and Sehidli (2006) studies and Kuliakoff's own studies using E-Planner show that many households are using too much for retirement (Durlauf, 2007). In practice, whether parents should plan to continue consuming just peanut butter is not entirely clear, particularly if they want to substitute into more consumption for themselves. And even a peanut butter diet might not be sufficient if they value strategic bequests and the warm glow from intertemporal transfers.

2 The classic study of how demographic factors affect lifecycle consumption is Attanasio, Banks, Mickle, and Weber (1996), who find more modest effects of children and spouses on consumption.
There are ample opportunities to economize while retired

It is reasonable to believe that households need not spend as much during retirement, given the sudden increase in available time. In this view, retirement is an opportunity to substitute leisure, or house production, for market expenditures, given that the price of labor inputs into the household production (or the reservation wage) has just fallen (Glick and Becker, 1975). For example, retirees now have more time to cook spaghetti at home rather than buy prepackaged sauce, or shop for stew-cook but equally nutritious food. And it is certainly true that if households can plan on a decline of (say) 20 percent at retirement, their target wealth while younger declines substantially, from a wealth-income ratio of 2.3 to only 1.1 at age 65 (Table 1, row 10).

Consider an economic model in which leisure (inclusive of house production) and consumption expenditures are combined to create contemporaneous utility $Z$. For those who retire voluntarily, $Z$ will rise simply because the "shadow" wage rate, or the implicit cost of time spent in house production, has declined, leading to a jump in hours spent at home. This can be shown in Figure 3, where the contemporaneous utility $Z$ jumps to discontinuously at retirement. It is straightforward to show in a consumption-elasticy-of-substitution utility function that consumption smoothing is optimal only when the intertemporal elasticity of substitution of $Z$ is smaller than the case of substituting utility from one time period to the next—is equal to the intertemporal elasticity of substitution between consumption and leisure.  

Intuition might suggest that optimal consumption expenditures should drop discretely at retirement, as is shown in Figure 3. However, this result holds only when the intertemporal elasticity of substitution of $Z$ is less than the intratemporal elasticity of substitution between consumption and leisure—meaning that households can more evenly substitute leisure for consumption than shift household production of utilities (or $Z$) to later in life. Conversely, when the intertemporal elasticity is less than the intratemporal elasticity, optimal consumption is predicted to rise at retirement, meaning that households would want to save more so they could really enjoy themselves during their retirement years.

There is mixed evidence on the relative magnitude of these elasticities; some imply a rise in optimal consumption at retirement (for example, Zilkha and Knieser, 2005), while others imply a decline. Aguiar and Hurst (2005a) find that recently retired households are remarkably efficient in house production, saving

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* It might appear that retiring from a job frees up expenditures on commuting, work-related clothing, and other expenses associated with employment. However, work-related expenses do not appear to increase for much of the consumption decile (between 60th and 100th percentiles) (Brown, 2001).

* The intertemporal elasticity is related closely to the labor supply elasticity. In standard notation, leisure utility $U = (\lambda - 1 - 1)Z$, $Z = e^{\alpha_{1}L_{1}}$, and $Z = e^{\alpha_{1}L_{2}}$. Since $\alpha_{1}$ does not change, the intertemporal elasticity of substitution between consumption and leisure, $\gamma$, is determined by the time preference rate, $\phi$, and the intratemporal elasticity of substitution across the household production of utilities ($e$), and $\beta$ measuring the relative rate for leisure. Alternatively, smoothing holds when consumption and leisure are strongly separable.
large amounts in their market expenditures while maintaining both the quality and quantity of food. Similarly, Aguilar and Hurst (2005b) find that in a cross-section of shoppers in Denver, prices paid for identical supermarket items varied systematically across demographic groups, with higher-income and middle-aged people paying more, and younger and older households less.

Distinguishing between consumption and home production of utility can potentially resolve a puzzle in the data: 73 percent of retirees wished they had saved more (Hurd and Ziesimos, 2005), yet the majority of voluntary retirees are as happy or happier being retired (Loewenstein, Prelec, and Weber, 1999; Charles, 2002; Bender, 2004). These retirees may not have saved enough for the retirement they thought they wanted, but the additional leisure cannot help but raise their utility and create good cheer. The story is different when retirement is involuntary because of job separation or poor health, which occurs for 37 percent of the Health and Retirement Study (Bender, 2004). For this group, subjective well-being declines (Charles, 2002), a decline that could also reflect a much diminished household production function.

There is a remarkable heterogeneity in the saving adequacy of households, even in academic settings (Bernheim, Borstein, Gokhale, and Kotlikoff, 2002). Perhaps 20 percent of households arrive at retirement with generous replacement rates β and asset-income ratios, and these households do smooth consumption or even increase consumption by a small amount. These households also spend...
more time cooking and shopping (Schwab, 2003). But for the one-third of the population with inadequate replacement rates and wealth accumulation, consumption declines by 20 percent or more, because of the unremitting discipline of the budget constraint (Bernheim, Skinner, and Weisberg, 2001). Households largely anticipate the decline (Ford and Robeiner, 2006), with the exception of those who didn't plan well for retirement, where roughly one-quarter are surprised by how high their expenses are at retirement (Auerbach, Caplin, and Leahy, forthcoming). What we don't know is whether this heterogeneity in wealth accumulation at retirement reflects natural variation in the household production function (some are better at making spaghetti than others) or heterogeneity in psychological bias toward saving (Bernheim and Rengey 2005).10

Evidence that favors psychological explanations for variations in wealth accumulation come from the literature on 401(k) plan participation, in which simple changes in program participation default rules, so that workers start out of a 401(k) other than eye in, had a dramatic impact on participation rates (Madrian and Shea, 2001; Choi, Laibson, Madrian, and Metrick, 2004). In this issue, Baratta and Thaler discuss this default rule as well as other default rules involving issues such as the level of contributions to a retirement savings account over time and how those savings are invested. Similarly, Langeti (1996) and Ameling, Caplin, and Leahy (2003) suggest that simply planning for retirement encourages greater savings, while Lazzarini and Mitchell (2006) find that financial literacy—whether households understand compound interest—is also associated with higher levels of wealth. From this perspective, the lack of wealth at retirement for many Americans may not be the consequence of well-former preferences, but instead of procrastination or inertia.

However, behavioral models cut both ways in terms of whether retirees will be happy with the savings choices they made earlier in life, because these models also have demonstrated that people have the ability to adapt to new circumstances. For example, psychologists report happiness levels that are not so far from lottery winners (Brickman, Coates, and Janoff-Bulman, 1978). By comparison, learning to live with a 20 percent decline in consumption at age 66 shouldn't be too difficult, particularly for those in comfortable economic circumstances. If households are able to replicate the same nutritional consumption flow postretirement with relatively little effort, as in Aguilar and Hurst (2000a), it could even prompt households to wonder why they hadn't economized on expensive food expenditures years before.

Some retirement planners go one step further, using the role of life-cycle therapy and trying to understand what makes Baby Boomers happy. As Eisenberg (2006, p. 211) gently admonishes, "You're simply trapping yourself in a never ending cycle of acquisition and you haven't even taken a stab at figuring out what...

10 Another possibility is variations in time preference rates. However, Bernheim, Skinner, and Weisberg (2001) found no evidence that consumption growth rates differed across these groups prior to retirement, when households should be most likely to encounter liquidity constraints.
it would cost to do what you really want." In other words, why work until age 65 to maintain a $150,000 per year consumption habit if by retiring early, one can live a fulfilling life on "only" $106,000 annually? Recognizing that money may not buy happiness, Elswenberg suggests instead that retirement may be better spent in early-morning meditation, spending a few hours writing "the great American novel," and then volunteering at a community center. But when the client becomes too sick or frail to write a novel and needs volunteers to visit her—then what?

The Real Worry: Growing Out-of-Pocket Health Care Costs

Models of retirement planning with perfect certainty are likely to underestimate the risks from poor health. First, there are risks to future income and wealth from poor health prior to retirement. In a 10-year period, seven out of ten adults aged 51-69 developed health problems, lost their job, or lost spouses owing to divorce or death (Johnson, Mermin, and Uccello, 2006; also see Smith, 2005). Most of these shocks had a sharp adverse impact on wealth: among couples, a new medical condition caused a 17 percent decline in wealth for couples, work disability caused a 16 percent decline, and divorce a 44 percent decline, presumably the consequence of uninsured legal fees and other contingencies (Johnson, Mermin, and Uccello, 2006). Typically, complex dynamic programming models call for higher levels of precautionary saving to guard against such risks.

Once retired, health care is a commodity where opportunities for substitution between leisure and health expenditures are limited. Poor health both restricts the ability of elderly people to engage in house production (for example, if they can no longer drive around to search for low prices) while increasing demand for expensive health care. Also, the elderly face substantial financial risk from health care expenditures (McGarry and Shoen, 2005; Goldman and Lissimopoulos, 2003; Fried and Jones, 2004).

Currently, Medicare requires a 20 percent copayment and a one-day deductible for hospital stays. Most retirees have a "Medigap" plan that covers these out-of-pocket liabilities, while Medicare picks up the difference for more severe circumstances who are eligible. By the percentage of private-sector employers offering retiree health benefits has eroded, from 20 percent in 1997 to just 13 percent in 2002 (Fronstin, 2005). Even academic institutions are shedding their retiree health benefits, only 75 percent offered such benefits in 2004, and many of those are planning to drop coverage within the next five years (Fronstin and Yackobov, 2005). As noted earlier, a 55-year-old couple retiring in 2016 will need to accumulate more than $400,000 over the next decade to pay for Medigap.

6

[Note: This section of the passage is not visible in the image provided.]
insurance (Francin, 2006), and this sum does not include provision for nursing home expenditure risk.

To capture the distribution and growth of these expenditures, out-of-pocket medical expenditures for households age 75–84 were estimated from 1993 and 2004 in the Health and Retirement Study (HRS); these are shown in Figure 4. In 1993, 2 percent of households experienced out-of-pocket expenses in excess of 50 percent of their before-tax income. (This probably underestimates the true distribution because the initial sample comprised institutionalized households.) By 2004, this fraction had risen to 9 percent, with an additional 9 percent paying between 25–50 percent of income. These estimates do not reflect unpaid bills written off by hospitals, or patients who fail to comply with their prescription drug regimens or clinic appointments because of difficulty in paying.

The future course of out-of-pocket expenditures is more worrisome. Figure 4 shows projected medical expenditures in 2019 based on 1993–2004 real annual growth rates in income (1.2 percent) and a modest 4 percent annual real growth in out-of-pocket expenditures.12 The fraction of households spending more than one-half of their income in out-of-pocket expenditures is projected to rise to 9 percent. In another study, median out-of-pocket health care expenditures for retiree couples were predicted to rise from $5,560 in 2000 to $10,400 in 2019, or 85 percent of their future after-tax income (Johnson and Brenner, 2004).

Past trends may not predict the future. The Medicare drug benefits are likely to reduce the burden of out-of-pocket medical expenditures, but the connected loss in retiree health benefits, and the hike in Part B (physician) premiums for high-income households (Roter and Clemens, 2006), will exacerbate it. Certainly, the prospect of an uninsured (but deductible) five-year nursing home stay for the widow of our hypothetical household in Table 2 leads to a hike of more than $80,000 in target wealth at retirement, as shown by comparing row 12 with row 8, albeit one that can in part can be cushioned by saving more (row 13).

Rising health care costs in the presence of a Medicare "safety net" could have quite heterogeneous effects on people currently working. Some might respond to future health care costs by increasing retirement saving rates in anticipation of higher out-of-pocket health care expenses. But others would prefer not to save against these future contingencies and rely instead on government social insurance programs, particularly those such as Medicaid and Supplemental Security Income (SSI) that are only available to people with low wealth (Hubbard, Skinner, and Zeiden, 1995). But Medicaid and SSI are not in themselves the most appealing of options. For example, Medicaid requires the dollar amount of resources one can

Figure 4
Out-of-Pocket Medical Expenditures as a Percentage of Before-Tax Household Income, Age 75–84, in 1993, 2004, and 2013 (Predicted)

<table>
<thead>
<tr>
<th>Year</th>
<th>1993</th>
<th>2004</th>
<th>2013 (Predicted)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 10%</td>
<td>60%</td>
<td>65%</td>
<td>68%</td>
</tr>
<tr>
<td>10–35%</td>
<td>20%</td>
<td>15%</td>
<td>12%</td>
</tr>
<tr>
<td>35–60%</td>
<td>10%</td>
<td>5%</td>
<td>3%</td>
</tr>
<tr>
<td>&gt; 60%</td>
<td>5%</td>
<td>5%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Note: N = 1,728 (1993) and N = 1,356 (2004 and predicted 2013). All dollar amounts adjusted by the GDP deflator and reweighted using population weights. Observations excluded if household income is less than $350 in 2004 dollars. The 2004 measure utilized the prior two years of spending; in one-half the reported amount is presented. For the prediction, a real growth rate of 3.2 percent for income and 6.6 percent for out-of-pocket expenditures are assumed.

Conclusions

The question of how much one should be saving for retirement touches on many issues in economics, psychology, and health. While there is much that we don’t know, and much that may be unknowable, the literature does offer several lessons. First, greater accuracy in calculating required saving rates or assets can only be a good thing, even if it means wrestling with child equivalence scales, retirement dates, household

Footnotes:

13 For an example of adaptive equipment not allowed by the Wisconsin Medicaid program, see http://citizensofwillows.com/medicaid/upfront/2006/2006_75.html, accessed May 23, 2006.
14 While many nursing-home residents rely on Medicaid, you’ll most likely have a much easier time finding an available bed in the nursing home of your choice if you’ve lived one can at least pay for the first six months or your out-of-pocket. In "Nursing Homes Don’t Come Cheap." FOXNews.com, 2008.)
structure, future interest rates, and other values. In using ESPlanner, I was struck by how many factors—far more than just the standard economic variables—had enormous effects on target wealth. Even a simple spreadsheet program can engender that critical wake-up call to think more about planning for retirement.

But the best laid plans can be undone by a再多 divorce, a disabling disease, or a stock market crash. In theory, one could use dynamic programming models in a world of risk to solve for the optimal saving plan, but doing so would simply drive home the point that it’s never possible to be entirely prepared for retirement. One wants to avoid that sense of futility and avoidance expressed in a 1997 New Yorker cartoon by Roz Chast: “Who can plan, like, next week? Because an asteroid could smash into the Earth tomorrow, so what’s the point?”

Second, planning to smooth household expenditures through retirement is a reasonable target, particularly given that wealth requirements for Baby Boomers can be substantially greater than those of their parents. As noted above, saving incrementally more each year is a good strategy, because it both reduces wealth accumulation, and makes it easier to sustain consumption in the future. Substantial evidence exists that saving programs run through employers—like IRA and 401k accounts—can be redesigned in a number of ways to encourage greater participation and wise portfolio choices (Benzace and Thaler, this issue).

Third, planning for consumption smoothing doesn’t mean one has to maintain consumption spending through retirement. One could plan on getting by with less just after retirement (as in Aguiar and Hurst, 2000), while leaving some assets unallocated for future contingencies. Housing wealth is ideal for this type of risk, since equity in the home can be directly transferred to purchase an apartment in an assisted living development, or to help pay nursing home bills. These considerations may explain why households might sensibly hold on to their housing wealth longer than is predicted under standard life-cycle models (Sun, Trier, and Webb, 2000). A more modest goal is to keep enough assets to install a walk-in shower or wheelchair-accessible ramps, but to rely on the government for extended long-term care.

One also wants to guard against obsessive oversaving—saving for years only to die before enjoying it—and the difficult part of retirement planning is in finding that balance. Nor will the barriers be the same for every household; retirement planning should mirror individual psychological preferences or even biological differences in brain functioning reflecting tradeoffs between the thrill of shopping today and the impulse to save for the future (McCune, Lathem, Loewenstein, and Cohen, 2004; Anker, Rick, Wimmer, Prelec, and Loewenstein, 2007).

Fourth, retirement planning is complex and uncertain even in the absence of fundamental changes in public policy. Short of asteroids, there are likely to be major changes in Social Security and health care insurance during the next few decades (Fish and Emanuel, 2005). A movement towards universal health insurance coverage could lead us closer to the utopia of care in the United Kingdom, where the ability to pay for private health care allows patients to jump the queues.
and get their hip replacements sooner (Aaron and Söwartz, 2005). Thus, private wealth may become even more valuable should health care reform provide universal basic coverage with the extra.

Finally, the best hope for Secure retirees prospecs lies in strong and equitable macroeconomic income growth, coupled with moderation in health expenditures and a favorable fiscal balance to fund Social Security and Medicare obligations. Of course, even with these favorable trends, a healthy 401(k) plan won’t ensure a happy retirement, but it’s certainly a good place to start.

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