CENTER FOR RETIREMENT RESEARCH AT BOSTON COLLEGE

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MAKING YOUR NEST EGG LAST A LIFETIME

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Introduction

Media attention on retirement security generally focuses on the need to save enough to enjoy a comfortable retirement. However, accumulating a nest egg is no longer the only significant challenge – the other is managing one's nest egg in retirement. In contrast to previous birth cohorts who often received a lifetime income from a defined benefit pension plan, in today's 401(k) world retirees must choose how to convert their accumulated savings into a monthly paycheck.

One straightforward solution to the drawdown challenge is an immediate annuity, which turns a lump sum of income into a lifelong payment stream. However, for various reasons, such annuities have not proven broadly popular.[1] Therefore, this *brief* examines several alternatives. All such strategies involve a trade-off between maximizing consumption and minimizing the risk of running out of money. Calculating the optimal strategy is really hard – maybe impossible. But, despite the complexity of the problem, some strategies are clearly superior to others.

This *Issue in Brief* is structured as follows. The first section evaluates three common "rule of thumb" strategies for asset decumulation. The second section explains why it is so hard to come up with a simple strategy that would be appropriate for most households. Given this difficulty, the third section makes the case for annuitizing enough wealth to cover at least basic living expenses. The final section concludes.

Plausible Rules of Thumb

Little is known about how households decide to draw down their savings during retirement. Behavioral economists argue that households practice "mental accounting," that they use rules of thumb to decide how much to consume, with money in the various mental accounts being set aside for designated purposes.[2] Three rules that households might plausibly adopt are: 1) spend the income, conserve the capital; 2) spend down over their estimated life expectancy; and 3) spend a fixed percent of their initial nest egg in each year.

* Anthony Webb is a Research Economist at the Center for Retirement Research at Boston College. The Center gratefully acknowledges financial support from the AARP for this research. This *brief* provides general guidance that may be useful in many circumstances. However, for any specific household, an investment or financial planning strategy should be based on the particular household's personal and financial circumstances. The author strongly recommends that households take appropriate financial advice prior to making any financial decisions.

Spend the Income, Conserve the Capital

A household using this rule would simply consume the interest and dividends, leaving the capital untouched.[3] This approach will certainly guarantee that the household does not outlive its wealth, but it nonetheless has a number of serious drawbacks.

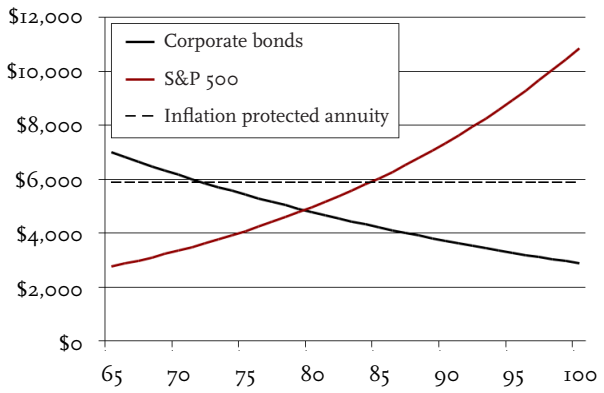
First, the household will die leaving its initial wealth, plus any capital gains, unconsumed. This outcome may be appropriate if the household has a strong bequest motive, but many might consider that this strategy unnecessarily restricts consumption.

Second, both the initial level and the time path of consumption depend not on the household's preferences, but are instead an unplanned consequence of the household's asset allocation. For example, a household investing mainly in bonds can expect a fairly high initial income, but can also expect that the real purchasing power of that income will be eroded by inflation. On the other hand, a household investing mainly in growth stocks can expect an income that is initially quite low, but increases in real terms over time. It is only by chance that either of these paths will coincide with the household's preferences.

Figure 1 shows the real income that a household might receive each year from age 65 to age 100 from $100,000 invested in either long-dated corporate bonds or the S&P 500 stock market index. For comparison, the figure shows the income obtainable from an inflation-protected real annuity. Although the investment in corporate bonds provides a higher initial income than the inflation-protected annuity, it declines quite rapidly. The dividend income from the stock portfolio is initially about half of that provided by the annuity, and only overtakes it after about 18 years. There is, of course, considerable uncertainty as to the rate of growth of real dividends.

Perhaps the most serious drawback of this strategy is its potential impact on asset allocation. The objective of the household's asset allocation strategy should be to achieve the optimal trade-off between risk and reward, not to meet a particular income target. A dollar bill buys the same amount of consumption whether it comes from interest or from a withdrawal of capital. The risk of adopting the "*spend the income*" strategy is that the household's consumption requirements start dictating its asset allocation. For example, a household seeking to maximize initial consumption might select a portfolio that is over-weighted in high-yield stocks, which will not be properly diversified, exposing the household to unnecessary risk.

Figure 1. Projected Real Income From $100,000 Using "Spend the Income, Conserve the Capital" Rule



Note: For assumptions used in this table, see footnote 4.
Source: Author's calculations.

Spend Down Over One's Life Expectancy

Some financial planning tools frequently assess the adequacy of a household's retirement savings in terms of whether the household has sufficient wealth to sustain its desired standard of living over its life expectancy (say) to age 85. A household that actually implemented a strategy of decumulating its wealth over its life expectancy would face an approximately 50-percent chance of surviving beyond its life expectancy and outliving its wealth. Indeed, a strategy of consuming one's wealth over any fixed period, even if flawlessly executed, has a probability of failure that equals the probability of surviving to the end of that period.

Spend a Fixed Percent Each Year

Some researchers argue, on the basis of Monte-Carlo simulations, that a household with a balanced portfolio of stocks and bonds can consume at a rate of 4 percent of its initial wealth and run a very low risk of outliving its wealth.[5]

A major problem with this strategy is that the withdrawal rate does not respond to movements in stock prices. Suppose that an individual retires at age 62 and the stock market declines by 50 percent between age 62 and 63. At age 63, the household is now consuming 8 percent of the current market value of its investment, compared with 4 percent for a household that happened to retire one year later.

Four percent and 8 percent cannot both be the right answer to the same decumulation problem. Indeed, at an 8-percent withdrawal rate, the household is on track to run out of money in only a few years.

The household should instead respond to the market decline by reducing consumption, adopting a formula that relates consumption to current wealth, not wealth at some arbitrary prior date.

Why Is It So Hard to Devise An Optimal Strategy?

Any decumulation strategy involves a trade-off between current consumption and consumption later in retirement. The optimal trade-off will vary from household to household, depending on the household's rate of time preference, attitude towards risk, and willingness to trade lower consumption later in retirement for higher consumption early in retirement, when it is more likely to be alive.

The optimal decumulation path is highly sensitive to two factors: 1) assumed asset returns; and 2) assumed preferences for consumption levels. With respect to asset returns, one approach is to assume the average returns experienced over the last 80 years. Over the period 1926 to 2005, stocks have yielded an annual average real return of 7.10 percent.[6] At that return, a married couple aged 65 that invests 50:50 in bonds and equities with annual rebalancing and adopts the 4-percent rule has a 7.2 percent chance of outliving its wealth.[7] But the risk of outliving one's wealth is sensitive to assumed asset returns. A substantial body of opinion believes that stock returns will be lower in the future. A 2005 survey of academic and Wall Street economists yielded a median long-term forecast of 4.6 percent.[8] Assuming this return for equities, the risk of outliving one's wealth increases to 15.1 percent.[9]

With respect to consumption preferences, economists typically assume that households prefer a consumption path that declines with age to a path with level real consumption throughout retirement, based on the premise that households prefer consumption in periods when they are more likely to be alive.[10] At the other extreme, a household might insist on being able to maintain the same level of consumption regardless of how long it lived. The extent to which the household is willing to accept declines in consumption with age (or even prefer increases in consumption, inclusive of medical costs) can have a huge impact on the optimal decumulation rate.[11] The practical difficulty is that it is by no means clear that households are capable of articulating their preferences for one consumption profile over another.

Even if the household can articulate its preferences, these preferences must then be translated into an asset allocation and decumulation strategy. Solving models of this type is computationally intensive. Although great progress has been made, it is still necessary to make simplifying assumptions regarding the range of asset classes available to the household and the financial risks it faces.[12]

The Case for Annuities

A household that decides not to annuitize at retirement must jointly determine an initial withdrawal rate and asset allocation, and then make periodic adjustments to the withdrawal rate in response to market fluctuations. This task is complex even for households that are financially sophisticated. It becomes even more complicated if the household also considers purchasing an annuity at some future date.

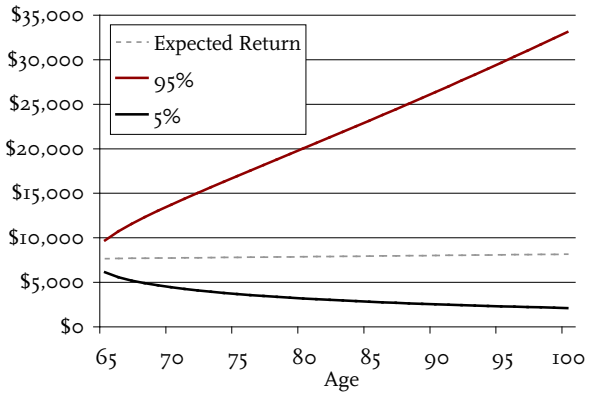
Older households should consider an annuity to cover at least basic living costs.

Although households may in theory do better by delaying the purchase of an annuity, there is a strong case for annuitizing sufficient wealth immediately on retirement to at least secure the household's required minimum standard of living, given the likelihood and consequences of error. The question then arises – what type of annuity? Given the importance of making proper provision for a surviving spouse, as a general rule, households should consider purchasing a joint life and survivor annuity, even though the initial income is less than that on a single life annuity. But what mix of nominal, inflation-protected, and variable annuities should the household choose? The payments on a nominal annuity are fixed in dollar terms. Nominal annuities offer the highest immediate income. But even at a 2.5 percent inflation rate, a couple aged 60 faces a 43.4 percent chance of surviving long enough to see the value of their payments from a nominal annuity halved in real terms.[13] As its name suggests, an inflation-protected annuity provides an income that is fixed in real, inflation-ad-

justed terms. The cost of this inflation protection is a lower initial income.[14] Variable immediate annuities provide an income that increases if the return on the underlying investments exceeds a target rate, typically between 3.5 and 5.0 percent, and which decreases if the return falls short of the assumed rate. They provide households with the opportunity to participate in the stock market, while at the same time having the guarantee that they will not outlive their income.

Figure 2 illustrates the 5th, 50th, and 95th percentiles of inflation-adjusted payments from age 65 to 100 from an initial investment of $100,000, assuming a 50:50 equity to bond allocation, and a 5-percent target rate of return. If the distribution of future investment returns turns out to be similar to those enjoyed in the past, then households can, on average, expect a real income that rises modestly in real terms. At the 95th percentile of stock returns, real income would have doubled by age 73. But there is also a small risk that the payments might decline by substantial amounts. There is a 5-percent risk of real income halving by age 73, and halving again by age 100. Variable immediate annuities are therefore unsuitable for funding basic living expenses. The optimal combination of the three annuity types discussed above depends not only on the household's attitude towards risk and its other sources of income, but also on whether it believes that stock market returns will be lower than those enjoyed in the past.

Figure 2. Inflation-Adjusted Annual Income from a $100,000 Variable Immediate Annuity



Note: For assumptions used in this table, see footnote 15.
Source: Author's calculations.

An important caveat is in order about the trade-offs of purchasing an annuity. Annuities involve a loss of liquidity. Clearly, it is desirable to have some financial assets available in liquid form, so households should probably not annuitize *all* their financial assets. Similarly, annuities are not appropriate for households that both desire and can afford to leave all of their current wealth as a bequest. But for households that have a more modest bequest motive, the optimal strategy may be to set aside the amount of wealth they wish to leave as a bequest, consuming only the income and capital gains on that part of their total wealth, and to annuitize the remainder.

Conclusion

Working-age households that miscalculate the savings they need to accumulate by retirement or suffer unexpectedly poor investment returns have at least some opportunity to remedy their situation by delaying retirement or increasing their savings rate. Retired households that miscalculate the decumulation of unannuitized wealth or experience poor investment returns face more limited and sometimes very unpalatable options.

Given the difficulties in managing the decumulation of unannuitized wealth and the severe consequences of mis-steps, all households approaching retirement should consider annuitizing sufficient financial assets to secure at least their minimum required standard of living.

Endnotes

1 Brown (2007).

2 Richard Thaler has contributed prominently to this literature. See, for example, Thaler (1990).

3 An alternative might be to consume interest, dividends, and also capital gains net of accumulated losses. This would result in a highly volatile consumption stream. For example, a household that retired in 1997 would have consumed very large capital gains in 1998 and 1999, and no capital gains thereafter, as stock markets have yet to return to their early 2000 highs.

4 The income from the inflation-protected annuity is based on a quotation for a joint life two-third survivor annuity, payable monthly in arrears, with no return of principal, obtained from a major provider on October 8, 2008. The initial bond yield is the average yield on AA rated corporate bonds as of the same date. The real income on the bond declines at a percentage rate that equals the long-term inflation forecast reported in the third quarter 2008 Federal Reserve Bank of Philadelphia Survey of Professional Forecasters. The S&P 500 yield is that of October 8, 2008. We assume that real dividends increase in line with projected real GDP growth of 3.0 percent, plus 1.0 percent for stock buybacks. Neither the level nor the rate of growth of dividends is guaranteed.

5 Bengen (1994). The methodology adopted by Bengen understates the risk of outliving one's wealth by assuming historical average returns in all periods subsequent to 1994.

6 This figure is a geometric return (see Ibbotson Associates 2006).

7 This calculation assumes: 1) population mortality for the 1943 birth cohort; 2) geometric average real returns on stocks and bonds of 7.10 percent and 2.58 respectively, the average for the period 1926-2005; 3) variances and covariances of those returns of 0.0412, 0.0099, and 0.0053 (Ibbotson Associates, 2006); and 4) withdrawals are made at the beginning of the year.

8 Schiller (2005).

9 This calculation assumes the same 2.58 percent real return on bonds and variance/covariance structure.

10 Technically speaking, economists typically assume constant relative risk aversion with a coefficient of risk aversion lying in the range of two to five. Assuming a risk-free asset, no pre-annuitized wealth (or, equivalently, that pre-annuitized wealth funds basic living expenses that do not enter into the utility function), and a rate of time preference that equals the rate of interest, consumption will decline at a rate that equals the annual mortality risk multiplied by the reciprocal of the coefficient of risk aversion.

11 In a simple model with a single risk-free asset, the optimal consumption rate is 16 percent higher at a coefficient of risk aversion of two than at a coefficient of risk aversion of five.

12 For example, one recent study (Horneff et al. 2007) assumed that the household could choose between risky stocks, risky bonds, and an immediate variable annuity, focusing on investment and longevity risk. In that study, the household chose in each period how much to consume, whether and how much to annuitize, and how to allocate its remaining wealth between stocks and bonds. But the choice set did not include a fixed immediate annuity.

13 Author's calculations based on Social Security Administration population mortality tables for the 1947 birth cohort.

14 In theory, households purchasing nominal annuities could protect themselves against inflation by saving part of their annuity income for the first few years, consuming it later in retirement. This strategy is not only complicated, but also leads to a dramatic reduction in income should the household survive long enough to exhaust the wealth accumulated in the first few years.

15 Assumed investment return is 5 percent. Fund is allocated 50-50 between stocks and bonds. We assume that the means, variances, and covariances of bond and stock returns equal those for the period 1926-2005. The household purchases a joint life and two-thirds survivor annuity, payable monthly in advance. Annuity yield is that quoted by a leading provider of variable immediate annuities on February 9, 2009.

References

Bengen, William P. 1994. "Determining Withdrawal Rates Using Historical Data." *Journal of Financial Planning* 7(4): 171-180.

Brown, Jeffrey. 2007. "Rational and Behavioral Perspectives on the Role of Annuities in Retirement Planning." Working Paper 13537. Cambridge, MA: National Bureau of Economic Research.

Federal Reserve Bank of Philadelphia. 2008. *Survey of Professional Forecasters (3rd Quarter)*. Philadelphia, PA.

Horneff, Wolfram J., Raimond H. Maurer, Olivia S. Mitchell, and Michael Z. Stamos. 2007. "Money in Motion: Dynamic Portfolio Choice in Retirement." Working Paper WP2007-07. Philadelphia, PA: University of Pennsylvania, Pension Research Council.

Ibbotson Associates. 2006. *Stocks, Bonds, Bills, and Inflation: 2006 Yearbook*. Chicago, IL.

Shiller, Robert J. 2005. "The Life-Cycle Personal Accounts Proposal for Social Security: An Evaluation." Working Paper 11300. Cambridge, MA National Bureau of Economic Research.

Thaler, Richard. H. 1990. "Saving, Fungibility and Mental Accounts." *Journal of Economic Perspectives* 4: 193-205.

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About the Center

The Center for Retirement Research at Boston College was established in 1998 through a grant from the Social Security Administration. The Center's mission is to produce first-class research and forge a strong link between the academic community and decision makers in the public and private sectors around an issue of critical importance to the nation's future. To achieve this mission, the Center sponsors a wide variety of research projects, transmits new findings to a broad audience, trains new scholars, and broadens access to valuable data sources. Since its inception, the Center has established a reputation as an authoritative source of information on all major aspects of the retirement income debate.

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