



## EDITOR'S CORNER

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### After 70 Years of Fruitful Research, Why Is There Still a Retirement Crisis?

"A hundred a year would make [my sisters] all perfectly comfortable."

His wife hesitated: . . . "It is better than [giving them] fifteen hundred pounds at once."

"But then, if Mrs. Dashwood should live fifteen years, we shall be completely taken in."

"Fifteen years! my dear Fanny; her life cannot be worth half that purchase!"

"Certainly not; but if you observe, people always live for ever when there is any annuity to be paid them; and she is very stout and healthy, and hardly forty. An annuity is a very serious business; it comes over and over every year, and there is no getting rid of it. . . . I am sure I would not pin myself down to the payment of one for all the world."

—Jane Austen, *Sense and Sensibility*<sup>1</sup>

Even in 1797, the 22-year-old author Jane Austen, patron saint of annuitants, understood why *issuers* of lifelong income promises might be unhappy about their side of the deal and why *beneficiaries* of such income guarantees are presumably happier. Austen understood time risk and longevity risk—the principal risks that individuals saving for retirement should be concerned about—better than most of today's would-be retirees and some of today's economists. Clearly, the problem of saving and investing for retirement is not new; neither are some of the solutions.

Yet, today—more than two centuries later and despite thousands of scholarly and practical articles (many of which have appeared in the *Financial Analysts Journal* over the years) and much earnest effort by researchers, financial product designers, pension plan sponsors, advisers, legislators, regulators, and individual investors—we still have a retirement crisis.

Retirees and those saving for retirement continue to struggle with the same challenge as in Austen's time: funding lifetime income. How can this be?

The contents of this special retrospective issue on retirement strongly suggest that we have both the intellectual tools to avoid a retirement crisis and many (not all) of the needed institutional arrangements. But there is a broad consensus that many of today's retirees and those saving for retirement have seldom been in worse shape—with abandoned defined benefit (DB) plans, low savings or low defined contribution (DC) plan balances, poor investment returns, and no workable strategy for converting assets into income.

### Causes of the Retirement Crisis

What went wrong? We can locate the most important causes of the retirement crisis in human nature:

- Low saving rates: Many people prefer living for today over saving for tomorrow.
- Agency costs: Some of the people entrusted with other people's money keep as much as possible for themselves or simply do not know how to do their jobs.
- Lack of knowledge: Accustomed to having employers save on their behalf, employees who must now provide for themselves do not know how much to save, how to invest, or how much to spend.
- Longevity: People are living longer but not necessarily working longer.

Most of the other causes of the retirement crisis concern market circumstances and policy errors:

- Poor market returns: Since 2000, markets have mostly disappointed, but those responsible for pension and retirement planning have generally assumed strong returns and have budgeted their contributions accordingly.
- Ordinary costs: Conventional investment management and advice are expensive, and indexing has only recently caught on as a near-majority strategy.

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- Unskillful investing: Many investors buy when asset prices are high, after market gains, and then, in a panic, sell low in the next downturn to avoid further losses. They also chase manager alpha unsuccessfully, buying funds after they have performed well and experiencing the inevitable deterioration.
- Ill-advised regulations and taxes: In the United States, for example, tax laws favor DB plans, which allow a large fraction of income to be tax deferred. Meanwhile, caps on DC plan tax deferrals are set so low that most participants cannot realistically retire on tax-deferred balances alone. US tax laws also favor certain types of employee benefits over others, regardless of what is best for the employee, and thus many individual investors face high marginal taxes on savings.
- Poorly defined property rights: With DB pension assets and liabilities (benefits) not clearly belonging to anyone, they become a political football and an object of financial maneuvering.

That's quite a gauntlet for workers seeking retirement security, through either DB plans or individual investing, to run! It's no wonder that a sufficient and reliable retirement income is elusive.

## A Historical Perspective

The modern problem of retirement income generation is very new in human history. In Jane Austen's time, life expectancy was around 40 (as her narrative suggests) and for the lucky few who lived to an old age, retirement resources were provided through such private channels as living with one's children. A few wealthy people consumed assets or received annuities.

By 1889, when the German chancellor Otto von Bismarck established the first public retirement system, wealth had increased greatly because of the Industrial Revolution and because life expectancies were rising, but few people lived long enough to collect benefits. Even in 1935, when President Franklin Roosevelt's Social Security system was adopted in the United States, life expectancy was only 62, and so those surviving to collect payments were a minority.

Since then, medical advances and economic growth have enabled many to live past 100 (with life expectancy around 80), but the ability and incentive structures to work longer have not increased correspondingly. So, retirement saving and investing have become a challenge for which few are prepared. Fortunately, sustained economic growth has increased the amount of wealth available to devote to retirement, making it easier, at least conceptually, to provide for consumption 40 or more years in the future.

The main reason that 70 years of retirement research have not produced easy and generally accepted solutions is the newness and difficulty of the challenge we face. But we are making progress.

## 70 Years of Research Relevant to Retirement Investing

In scouring hundreds of issues of the *Financial Analysts Journal* from the last 70 years for articles germane to the challenges facing today's investors saving for retirement, I found that an astonishingly wide variety of articles had at least some relevance. This is because individual investing for retirement is perhaps the most general and the most challenging investment problem. It requires understanding of long-run rates of return, diversification, time risk, longevity risk and annuities, demographics, taxes, DB plans, laws and regulations, and investor behavior. In choosing articles for this retrospective issue, I tried to cover most of these topics. Still, the number of important and valuable articles left out is many times the number included.

### Bookstaber and Gold: Equities in the Liability.

I decided to begin in the late 1980s, a time when the literature on DB pension management was extraordinarily rich. (Although there are important *FAJ* articles before then, I omitted them from this issue to save trees.) It looked as though the retirement problem had been solved, at least in principle. Employers made pension promises to their employees on the basis of salary and length of service. The challenges were to expand the DB system to include the roughly half of workers who were uncovered, to protect against inflation, and to achieve greater portability (benefit formulas greatly favored long-service employees over those who moved from job to job).

Against this backdrop, Richard Bookstaber and Jeremy Gold's 1988 article "In Search of the Liability Asset"<sup>2</sup> shows that the pension liability contains not only bonds (the obvious choice) but also equities. The presence of equity in the liability comes from the sensitivity of the liability to economic growth and wage growth in the long term. This sensitivity arises because as workers become more productive and earn higher real wages in the future (trust me, they will), retirees need to be able to compete with workers to buy the same goods.

Since the early 1800s, US productivity, as measured by real GDP *per capita*, has grown at nearly a 2% annual rate. So, over a 20-year retirement, real *per capita* wealth can be expected to rise by almost 50%! Thus, if retirement incomes rise only with consumer price inflation, retirees' relative standard of living will fall. Their incomes need to rise at roughly the

rate of productivity and wage growth. And equities are the only asset class that moves with long-run changes in productivity.

Bookstaber and Gold's article was originally intended to apply to DB plans, but in that context, their argument applies to a plan's full economic liability—particularly the part in excess of the accumulated benefit obligation (ABO) or benefit security portion of the liability (which can be hedged, in principle, with bonds).<sup>3</sup> So, it is debatable whether their recognition of the equity component in the larger liability is relevant to setting the DB plan sponsor's investment policy. In the new DC world, however, the authors' argument becomes central, because the saver's portfolio is set against her whole economic liability and thus should usually contain equities as well as "safe" assets.

**Kritzman: Pros and Cons (but Mostly Cons) of Time Diversification.** In his 1994 article,<sup>4</sup> Mark Kritzman solves a riddle that had pitted thinkers as distinguished as Paul Samuelson, Zvi Bodie, and Jeremy Siegel against one another for years. Time diversification is the idea that risky assets, such as stocks, are less risky if held for a long time than if held for a short time. If time diversification exists, then retirement investors, who don't need their money back for a long time, can engage in a kind of time horizon arbitrage against short-term investors, whose aversion to price fluctuations causes the equity risk premium to be high. By this logic, long-term investors can ignore the fluctuations and safely capture the premium.

Kritzman shows that under simplified conditions, this arbitrage does not exist. Long-term investors face at least as much risk from risky assets as do short-term investors.

However, if stock returns are mean reverting, with good returns followed by bad ones and vice versa, there may be some benefit to time diversification. In a related article,<sup>5</sup> Zvi Bodie, Robert Merton, and William Samuelson pointed out that young investors have more human capital than do old investors, enabling them to take more risk because they can make up for investment losses by working harder or longer. Kritzman agrees with this position. Investors should consider these arguments carefully, because so many of them invest large amounts in equities, behaving as though time diversification is a "real thing" when, under most circumstances, it isn't.

**Bernstein: The Repeatable Return to Equities and Bonds.** Knowing what returns to expect from each major asset class is critical to deciding how much to save, what assets to invest in, and how much to spend. The legendary author and historian

Peter Bernstein spent much of his career studying this question.

Writing near the peak of the bull market in the late 1990s, Bernstein studied past returns and valuation levels to determine what "basic" or repeatable rate of return would have been earned in the stock and bond markets if valuation levels had not changed.<sup>6</sup> He showed that stocks earned an arithmetic mean real annual "basic" return of 5.7% whereas bonds earned a "basic" return of 2.7%.

Bernstein thus concluded that the equity risk premium (over bonds, not cash) is 3%, lower than the estimate reached by many other authors but still positive to an economically significant degree. Bernstein's 3% realized equity premium is the market's reflection of long-term real economic growth, consisting of the productivity growth of 2% mentioned earlier plus labor force growth of around 1%. Although an optimist, Bernstein cautioned that "there is a difference between an optimist and a believer in the tooth fairy." "Tooth fairy" pension calculations and assumptions have ruined DB plans and now threaten individual savers.

**Bodie: Putting Life-Cycle Finance into Practice.** A formal theory of life-cycle finance has been part of the literature of economics since 1930, when Irving Fisher observed that people smooth their consumption relative to their income, borrowing and saving as needed to do so.<sup>7</sup> Zvi Bodie has been a key contributor to this literature, which has become normative (how to choose an investment policy so as to smooth consumption) as well as positive (whether people smooth consumption). Bodie's sometime co-author, the Nobel Prize-winning economist Robert Merton, made key contributions to life-cycle finance as early as the late 1960s and early 1970s.<sup>8</sup> Bodie's 2003 article,<sup>9</sup> reprinted in this issue, simplifies Merton's work for the practitioner and introduces several new types of financial instruments intended to help in financial planning.

Bodie's main point, which has influenced almost all subsequent retirement research, is that "lifetime consumption of goods and leisure," not "end-of-period wealth," is what retirement savers care about. Consequently, for those saving for retirement, the riskless asset is not cash—as Harry Markowitz would have it—but, rather, a portfolio of laddered bonds or TIPS (Treasury Inflation-Protected Securities), with each cash flow from the portfolio matched to a consumption need. Two articles in this issue—one by Stephen Sexauer, Michael Peskin, and Daniel Cassidy and one that I co-authored with Barton Waring—build on this idea.

In his article, Bodie also suggests two financial products that, if properly developed, would make the provision of retirement income easier. The first product, an escalating life annuity, tracks the performance

of a portfolio of equity call options. This suggestion fits well with Bookstaber and Gold's observation that there is equity in a retirement liability.

The second product, also described by Mark Warshawsky,<sup>10</sup> bundles together longevity annuities,<sup>11</sup> which appeal to the healthy, and nursing home insurance, which appeals to the sick. By offering both types of protection in one product, the adverse selection that affects both products is mitigated and many more people are covered (and at lower cost).

I now turn to some policy articles by Keith Ambachtsheer and Don Ezra, originally published in the January/February 2007 special pension issue of the *Financial Analysts Journal*.

**Ambachtsheer: Calling for a Pension Revolution.** In a brief and farsighted polemic,<sup>12</sup> Keith Ambachtsheer suggests that the "DB or DC" dilemma is misstated and that "neither DB nor DC" is the path to a better pension system. The system he favors, modestly called TOPS (The Optimal Pension System), involves DC-like contributions that are used preferentially to buy life annuities but that can also be used to make non-annuitizing investments. If this sounds a lot like TIAA-CREF, the US private pension plan for college teachers, it's intentional: Ambachtsheer proposes that organization as a model, with some modifications, for a universal retirement system. (Later in this editorial, I argue that there is no single optimal solution but that if we must agree on one, TIAA-CREF is a very good solution.)

Ambachtsheer also brings other countries' pension systems into the discussion. He admires the Dutch and Australian systems and notes that at the time of writing (2007), the United Kingdom was considering enrolling the entire uncovered part of its work force (i.e., not covered by a traditional pension scheme) in a TOPS-like plan.<sup>13</sup>

**Ezra: How Pensions Were Destroyed, and How to Bring Them Back.** Don Ezra begins by telling the true story of how the DB system was destroyed.<sup>14</sup> Funding targets were originally set *above* the economic present value of the pension liability, providing a cushion in case of bear markets. However, "in the 1980s, when inflation subsided, actuaries lowered the salary assumption but left the return assumption high" so that pensions could be legally (but not economically) funded with "70-cent dollars." That is, every 70 cents in the pension fund was deemed to offset a dollar of liability, because every 70 cents, invested in stocks, was expected to grow to \$1 over time. What economic folly! Yet, this practice persisted and enabled corporate raiders in the 1980s and afterward to "buy" pension assets at a discount, often closing the plans.

As one might guess, the near demise of the DB system was not intentional; it was the consequence of a set of historical accidents, coincidences, and misbehaviors.

Arguing in a footnote (he and I disagree on this point) that the US Pension Protection Act of 2006 eliminates the ability to say that 70 cents is worth a dollar, Ezra presents an intriguing DB plan design for the future.<sup>15</sup> Fully funded by law, Ezra's plan is "nonpenalizing" in the sense that short-service employees get as large a pension benefit per employer-contributed dollar as do long-service employees. Thus, the system is portable—and fairer than in current practice.

Ezra also suggests a fix for DC plans: They should use auto-enrollment, auto-escalation (the "Save More Tomorrow" plan of Thaler and Benartzi),<sup>16</sup> and auto-conversion into annuities, either at retirement or upon achieving one's life expectancy. The latter choice makes it possible to capture much of the benefit of annuitization without losing all of one's liquidity at retirement.

**Scott: An Annuity for Everyone.** Annuities! Everybody loves them on paper—they replace DB income streams and capture the huge gains from pooling longevity risk—but nobody buys them. Even Jane Austen would probably shun annuities today, given their inflexibility, high fees, adverse selection, and lack of a transparent market.

Observing that almost no one puts all his wealth into annuities—nor should he—Jason Scott has developed an optimization method for deciding what annuities to buy and how much.<sup>17</sup> The answer is shockingly simple. The key is to break up an annuity promise into year-by-year promises—income in one's 65th year, 66th year, and so forth.

Let's say that an investor believes the longest she might possibly live is 107 years. Then, working backward, she should buy a deferred income annuity for years 107, 106, 105, and so forth, until she runs out of money that she is willing to commit to an annuity portfolio. Aggregating the different years, the investor buys a deferred income (longevity) annuity that starts its payout somewhat late in life—say, age 85—and that continues until death.<sup>18</sup> Only the rare investor willing to commit her *entire* wealth to annuities should buy an immediate annuity, one that covers all the years of planned retirement.

**Reichenstein, Horan, and Jennings: After-Tax Returns Are What Count.** Although much advice to investors is rendered without considering taxes, "taxes exist," as William Reichenstein, Stephen Horan, and William Jennings remind us, and can consume a huge slice of retirement savings.<sup>19</sup> This concern especially affects savers who have most of their assets in

tax-deferred accounts, because they have not yet paid any tax on the amount saved. A retirement plan or benefits structure that minimizes taxes thus adds a significant “alpha,” one that does not require a beat-the-market strategy and that is, from the retiree’s perspective, a needless waste of money if *not* achieved.

The authors’ analysis produces an asset allocation that does not ignore taxes. Moreover, the analysis produces a substantially different *asset location*, the practice of holding each asset in the type of account that produces the highest after-tax present value. Investors, advisers, and plan sponsors who are not paying attention to asset location had better start.

**Sexauer, Peskin, and Cassidy: More Savings, More Annuitization, Less Risk.** How much do you need to save for retirement? Many would-be retirees seem baffled by this question, because it’s hard—or impossible—to forecast market returns. By assuming riskless investing, Stephen Sexauer, Michael Peskin, and Daniel Cassidy have eliminated the need to make such a forecast and have arrived at a “retirement multiple” that enables investors to set an asset accumulation target.<sup>20</sup> To keep the multiple from growing unmanageably large, the authors assume that retirement income after age 85 will be funded by a deferred income annuity.

In a world where inflation is an ongoing risk, riskless investing means building a ladder of TIPS, which currently offer very low interest rates. In fact, at the time of writing (2012), the authors assumed a *zero* real rate, so the first 20 years of retirement (65 to 85) would need to be funded by 20 years’ required post-retirement income. The deferred income annuity, however, is surprisingly cheap—an additional 1.5 years’ income—so one needs to save only 21.5 times the yearly real income requirement (over and above Social Security benefits) to guarantee one’s income for life.

The authors acknowledge that few investors will want to invest entirely risklessly, with most preferring to hold stocks and other risky investments to get to their “retirement multiple” with less savings and more investment return. But investors who don’t mind taking risk need a benchmark. The TIPS-plus-deferred-annuities strategy can thus be regarded as a benchmark against which other retirement investment strategies (those that include risky investments, such as stocks) can be judged—a benchmark easily used by practitioners as well as individual investors for their own portfolios or to judge a pension promise made by an employer.

**Waring and Siegel: How Much to Spend So You Never Run Out.** I co-authored (with Barton Waring) the new article “The Only Spending Rule Article You Will Ever Need” and will keep my summary of it here brief. Each year, one should spend (at most) the

amount that a freshly purchased annuity—at then-current portfolio values, interest rates, and number of years of required cash flow remaining—would pay out in that year.<sup>21</sup> Investors who behave in this way will experience consumption that fluctuates with asset values, but they can never run out of money.

## A Retirement Template for the Future

With the benefit of 70 years of research, what conclusions can we draw—what recommendations should we make—about the future of retirement saving and investing?

Unlike some researchers, I don’t believe the retirement puzzle has One True Solution. As with most economic arrangements in a free society, different people will want, and should have access to, different retirement solutions or (this is key) combinations of solutions. We can begin with Robert Merton’s observation that would-be retirees should seek to build income guarantees—not to accumulate assets.<sup>22</sup> Assets are just a steppingstone or type of financial intermediation between income earned from work and consumption many decades later in retirement.

Keeping in mind the DB/DC distinction—best re-characterized as a distinction between income promises and guarantees (DB) and asset accumulation and decumulation (DC)—let us review some of the options.

**DB Only.** DB plans “work”—that is, provide a secure retirement without bankrupting the provider—if the plan is fully funded by design, sponsors have resources to “top up” plans that become less than fully funded, plans are portable (or people don’t leave their jobs), plan assets are not subject to capture, and benefits are sufficiently generous that people don’t need to save separately.<sup>23</sup> Those are a lot of conditions, and they are expensive to comply with, but they are essential to obtaining the tremendous benefit of lifetime income guarantees.<sup>24</sup> DB plans also achieve longevity-risk pooling through their inherent structure, an advantage that is costly to replicate in non-DB environments.

In the United States, Social Security, a type of DB plan, is widely criticized, but its flaws can be repaired. Meanwhile, it serves as a template for what can be accomplished using a DB structure: People over 65, once the poorest Americans, are now among the richest, and Social Security has cut off the left tail of the distribution, virtually eliminating extreme poverty in retirement.

Following this logic, William Goetzmann has proposed “More Social Security, Not Less”—the idea that the government should sell Social Security–like guaranteed income streams at actuarially fair

prices.<sup>25</sup> Retirement savers could then buy their own DB plans much more easily. Insurance companies, nonprofit organizations, and mutual benefit societies could also offer DB plans so long as they followed relatively simple hedging and full-funding rules, and traditional DB plan sponsors could offer retirement benefits to people outside their current beneficiary population. It's an engineering problem—not a profound economic challenge—and the solutions already exist, many of them documented in this journal.

**DC Only.** Asset accumulation/decumulation works well for people who save enough, invest at low risk (or take risk successfully), don't spend the money before retirement, and withdraw using a sensible spending rule. Bequests are possible. To expand the population for whom DC-only plans work well, saving rates could be mandatorily high or other strategies could be used to incentivize high voluntary savings.<sup>26</sup>

**Neither DB nor DC.** Here, I'm echoing Keith Ambachtsheer in saying that a hybrid program combining the best aspects of DB and DC plans can be very effective. Contributions—which are high, consistent, and pretax to the extent permitted by law—are used to buy life-annuity units. The participant has some discretion over the shape of the annuity—individual or spousal, some resources saved for a bequest, and so forth. TIAA-CREF is the best example. Under current US law, the provider of such an arrangement must be an insurance company.

**Both DB and DC.** This is the best solution. Counting Social Security as a DB plan, it is what most people have, but they don't have enough of it. By "both DB and DC," I mean that it is highly desirable to have a DB plan *in addition to* Social Security, as well as a DC plan: a three-legged stool. This is the direction

I hope retirement investing will take. Adding a DB plan, even if modest in size, to a DC benefit makes the participant's retirement income less reliant on strong markets, takes some of the burden of saving away from the participant, and brings longevity-risk pooling directly and costlessly back into the retiree's arsenal of tools. Institutional incentives and legal structures need to be revised so that employers will again be motivated to undertake the planning and management tasks involved in converting every worker's current income into lifetime income.

## Conclusion

If the future of retirement evolves as I hope it will, employees will be able to choose from among these structures, weighing the size and "shape" of the retirement benefits of a given job or business activity against its other characteristics. Employers will innovate to attract and retain talented workers. Retirement arrangements that are unrelated to employment should also be encouraged. Most people will find a combination of DB and DC benefits to be more attractive than other choices. However, because the combination is more expensive to provide, employees will have to sacrifice more of their current income than they do for other retirement deals. They should also be able to change their minds (e.g., leave a job with a DB plan for one with a DC plan) without losing the benefits they have already earned.

The challenge of providing retirement income over a very long period is not trivial, and we have understandably stumbled in trying to create the best system or combination of systems for doing so. Let us sincerely hope, however, that we won't still be experiencing a retirement crisis 70 years from now. Given the resources in this issue of the *Financial Analysts Journal* and elsewhere, there's really no excuse for one.

## Notes

1. Set in England in the 1790s, when the author wrote it, *Sense and Sensibility* was first published in 1811; this excerpt is from page 13 of the 1908 edition published by Cassell & Company, London.
2. Richard Bookstaber and Jeremy Gold's "In Search of the Liability Asset" was originally published in the *Financial Analysts Journal*, vol. 44, no. 1 (January/February 1988): 70–80, 62.
3. The economic liability is the present value of all benefit payments expected to be made by the plan, including benefits for future service.
4. Mark Kritzman's "What Practitioners Need to Know... About Time Diversification" was originally published in the *Financial Analysts Journal*, vol. 50, no. 1 (January/February 1994): 14–18.
5. Zvi Bodie, Robert C. Merton, and William Samuelson, "Labor Supply Flexibility and Portfolio Choice in a Life-Cycle Model," *Journal of Economic Dynamics and Control*, vol. 16, no. 3–4 (July–October 1992): 427–449.
6. Peter L. Bernstein's "What Rate of Return Can You Reasonably Expect... or What Can the Long Run Tell Us about the Short Run?" was originally published in the *Financial Analysts Journal*, vol. 53, no. 2 (March/April 1997): 20–28.
7. Irving Fisher, *The Theory of Interest: As Determined by Impatience to Spend Income and Opportunity to Invest It* (New York: Macmillan, 1930). For further discussion, see Waring and Segel's "The Only Spending Rule Article You Will Ever Need" in this issue.
8. Robert C. Merton, "Lifetime Portfolio Selection under Uncertainty: The Continuous-Time Case," *Review of Economics and Statistics*, vol. 51, no. 3 (August 1969): 247–257; Merton, "Optimum Consumption and Portfolio Rules in a Continuous-Time Model," *Journal of Economic Theory*, vol. 3, no. 4 (December 1971): 373–413.
9. Zvi Bodie's "Thoughts on the Future: Life-Cycle Investing in Theory and Practice" was originally published in the *Financial Analysts Journal*, vol. 59, no. 1 (January/February 2003): 24–29.

10. Mark J. Warshawsky, "The Life Care Annuity," in *The Future of Life-Cycle Saving and Investing*, edited by Zvi Bodie, Dennis McLeavey, and Laurence B. Siegel (Charlottesville, VA: Research Foundation of CFA Institute, 2007): 103–106.
11. For further discussion of the longevity annuity, also called a deferred income annuity (DIA) or advanced life deferred annuity (ALDA), see the article by Sexauer et al. and the article by Waring and Siegel in this issue.
12. Keith Ambachtsheer's "Why We Need a Pension Revolution" was originally published in the *Financial Analysts Journal*, vol. 63, no. 1 (January/February 2007): 21–25.
13. Much of the UK plan as described by Ambachtsheer was adopted in the Pensions Act of 2008. Unfortunately, withdrawals under all circumstances at ordinary tax rates became permissible in 2014, making it that much harder to get people to leave their money alone until they retire.
14. Don Ezra's "Defined-Benefit and Defined-Contribution Plans of the Future" was originally published in the *Financial Analysts Journal*, vol. 63, no. 1 (January/February 2007): 26–30.
15. By stipulating a discount rate formed from stale (not current) Aa rated corporate bond yields, the Pension Protection Act continues to allow 70 cents to be called a dollar.
16. Richard H. Thaler and Shlomo Benartzi, "Save More Tomorrow: Using Behavioral Economics to Increase Employee Saving," *Journal of Political Economy*, vol. 112, no. S1 (February 2004): S164–S187.
17. Jason S. Scott's "The Longevity Annuity: An Annuity for Everyone?" was originally published in the *Financial Analysts Journal*, vol. 64, no. 1 (January/February 2008): 40–48.
18. I hope that a more complete, transparent, and fairly priced market in deferred annuities develops so that investors can put Scott's advice into practice more easily. Investors also need to be able to hedge against inflation, making deferred real annuities highly desirable.
19. William Reichenstein, Stephen M. Horan, and William W. Jennings's "Two Key Concepts for Wealth Management and Beyond" was originally published in the *Financial Analysts Journal*, vol. 68, no. 1 (January/February 2012): 14–22.
20. Stephen C. Sexauer, Michael W. Peskin, and Daniel Cassidy's "Making Retirement Income Last a Lifetime" was originally published in the *Financial Analysts Journal*, vol. 68, no. 1 (January/February 2012): 74–84.
21. Instead of using a life annuity, we use a fixed-term annuity—say, one designed to make payouts for 30 years—to illustrate this principle, but it also works with life annuities.
22. Robert C. Merton, "The Crisis in Retirement Planning," *Harvard Business Review*, vol. 92, no. 7–8 (July–August 2014): 43–50.
23. See M. Barton Waring, *Pension Finance* (Hoboken, NJ: John Wiley & Sons, 2011).
24. See Don Ezra, "Retirement Income Guarantees Are Expensive," *Financial Analysts Journal*, vol. 61, no. 6 (November/December 2005): 74–77.
25. William N. Goetzmann, "More Social Security, Not Less," *Journal of Portfolio Management*, vol. 35, no. 1 (Fall 2008): 115–123.
26. Because most Americans, and many in other countries, are probably stuck with DC-only plans (plus Social Security) while these problems are being worked on, we might as well figure out how to use DC effectively to generate desirable levels of retirement income. For a discussion of how to replace 70% (or any desired number) of pre-retirement income with a DC-only program and low-risk investing (the key is high saving rates), see Stephen C. Sexauer and Laurence B. Siegel, "A Pension Promise to Oneself," *Financial Analysts Journal*, vol. 69, no. 6 (November/December 2013): 13–32.