Retirement— A Risky Business

by **Kenneth F. Hohman** | *Findley*

Henry Adams famously described politics as a systematic organization of hatreds. Retirement could be described as a systematic organization of risks. The risks posed against accumulating a sufficient retirement income are numerous. Some are intuitively obvious, but others are less apparent and can be difficult for all but financial sophisticates to understand. This is particularly true in the 401(k) retirement world in which we now live. In a defined benefit world, the majority of the risks are assumed by the employer (in essence becoming the pathogen that has nearly killed these plans). But in our 401(k) environment, the risks

are transferred to the individual. All the retirement stakeholders—employers, employees, government and the retirement industry—have struggled with a simple question: How do we equip individuals to confront the risks?

Retirement Risks

Let's first identify some of the risks related to retirement. This is by no means an exhaustive list, but it details the more crucial concerns faced by a 401(k) plan participant. The significance of each risk is highly dependent on the situation of the individual, so this list is presented in alphabetical order and does not attempt to order the risks by importance.

- **Contribution risk.** This is the risk that contributions (made either by the employee or employer)—and the expected investment returns on those contributions—are not sufficient to provide the necessary retirement income.
- **Early retirement risk.** This risk comes from the employee needing to (or choosing to) retire before accumulating enough in retirement savings. Retirement may be caused by layoff or health concerns.
- **Inflation risk.** This risk comes into play when the purchasing power of invested dollars declines. Risks related to interest rates and investment can be significantly affected by inflation.
- **Insurance company solvency risk.** This is the risk that after a participant purchases an annuity, the insurance company issuing the annuity fails.
- **Investment risk.** This risk stems from uncertainty due

AT A GLANCE

- Employers have done an effective job of educating employees on accumulating assets for retirement, but more education is needed on the decumulation phase of retirement.
- Retirement risks include contribution, early retirement, inflation, insurance company solvency, investment, leakage and longevity risks.
- The three biggest risks of the decumulation period are inflation, investment and longevity. It is also worth noting that decumulation risks are highly specific to an individual's unique situation as well as complicated and difficult to explain.
- While conventional wisdom suggests that equity exposure should be decreased as age increases, a new analysis shows that a reevaluation of investment risk should be conducted every year, based on current asset value relative to the retirement benefit needed for the coming year.

to the variability in returns resulting from fluctuations in the overall market. Investment risk includes a wide range of factors exogenous to underlying securities, such as recessions, wars, structural changes in the economy and changes in consumer preferences.

- **Leakage risk.** This risk occurs when assets that are set aside for retirement are instead diverted for other uses.
- **Longevity risk.** This is the risk of individuals outliving their assets or living on less-than-desired retirement income and leaving a large retirement balance upon death.

Retirement Phases

Retirement is split into two distinct phases—the preparation phase, which has come to be known as the *accumulation period*, and the actual period of retirement, referred to as the *decumulation period*. While the effect of the above risks are felt in the decumulation period (i.e., retirement), the risks may be addressed in only one of the phases or may overlap both phases.

The Accumulation Period Risks

When people think about saving for retirement, they primarily consider the contributions being made and investing those contributions as the keys to the accumulation period. Contribution risk has always been borne by the individual, even where a defined benefit pension exists. The employer assumes risk related to the contributions made

directly to the pension plan, but the individual needs to make sure that additional retirement monies are set aside if the defined benefit plan and Social Security will not satisfy all of his or her retirement needs.

The basic equation for retirement financing is: *Contributions + Investment Earnings = Retirement Benefits.*

For this purpose, I am netting investment and retirement advice expense from the investment earnings. Clearly, if contributions are deficient in obtaining the desired retirement income, then either investment earnings must be maximized or retirement benefits must be reduced (or a combination of the two). This simple formula demonstrates the counterbalancing pressure among the three components. If a desired level of retirement benefits, in combination with an acceptable level of contribution, requires a relatively high level of investment earnings, investment risk will necessarily come into play. All securities have some exposure to investment risk, but equities are generally recognized to possess greater risk than most fixed income securities. Investing with greater risk has the potential for reward but also the potential for financial ruin.

While contributions and investment risks are critical components of preparation for retirement, there are other risks inherent in the preretirement phase. Leakage is an insidious devil. During the accumulation period there is always some other financial concern that is more pressing than saving for retirement; there's buying the larger house, paying for kids' college,

replacing the hot water heater and, of course, buying a prestigious car or getting that WaveRunner you've always needed. The conventional wisdom from the beginning of 401(k) plans has been that people will not save for their own retirement unless they can quickly get to their money if needed. Thus were born plan loans and hardship distributions. Leakage also occurs at job jumps. Often, when employees in their 20s change jobs and are offered a distribution from their 401(k) plans, they can easily convince themselves that the $5,000 account balance is not meaningful to their retirement and could be better spent on current needs. (We Baby Boomers and those who have come after us seem to have a difficult time distinguishing *needs* from *wants*.)

I place early retirement risk as an accumulation period risk, but it is unique in that it creates a premature end to that period and initiates an earlier-than-anticipated decumulation period. Many people dream of early retirement, but those dreams make the assumption that it occurs on their own terms. When it's not on an individual's own terms, the dream can become a nightmare. Despite all of the regulations against age discrimination, it can be extremely difficult for a 60-year-old to find comparable employment following a layoff, a plant closing or a firing, particularly in times of moderate or high unemployment. An even more treacherous situation occurs when unemployment is due to a disability, and reemployment options are severely limited.

The Decumulation Period Risks

The *big three* of the decumulation period risks are inflation, investment and longevity. For those of us who were around for the 1970s and early 1980s, the effect of inflation on retirement will forever be seared in our brains. During the ten-year period from January 1, 1973 through December 31, 1982, the Consumer Price Index for All Urban Consumers averaged an 8.7% annual increase (compared with 1.6% for 2008-2017). Of course, that was still part of the defined benefit era, and most defined benefit plans did not come equipped with cost-of-living adjustments (COLAs). We continually heard about retirees on fixed incomes whose retirement benefits were being devalued by inflation. It was also difficult for Social Security (which does provide COLAs) to keep up financially with the large benefit increases, thus leading to legislation raising the Social Security normal retirement age. If inflation is 2% per year, the buying power of a dollar will be reduced by 18% after only ten years and by one-third after 20 years, so even if the Federal Reserve Board of Governors keeps inflation at its target, the impact is consequential.

Inflation risk may appear to be less of a concern in our 401(k) world on the theory that investment returns will keep up with inflation. It is true that if bonds are bought at the right time, coupon rates should incorporate the inflation rate at time of purchase. But rising inflation will have a negative impact on bond values (should the retiree be forced to sell the bond), and we have witnessed the stock market panic that ensues from the mere suggestion that inflation may be on the rise. The tie-in between inflation risk and investment risk is obvious.

The influence of longevity on these other two risks is perhaps not so intuitive. My definition of *longevity risk* makes it a double-edged sword. When most people think about longevity risk, they are concerned about the probability of outliving their assets. The other edge of the sword is that if people reduce their standard of living to accommodate their assumed life expectancy but do not live as long as anticipated, they will end up living well below their means.

The Society of Actuaries (SOA) has frequently warned that people generally underestimate their life expectancy. In a 2015 survey, SOA found that 46% of retirees and 49% of preretirees predicted their life expectancy to be at least five years less than the actuarial estimate.[1] Of course, some of those surveyed may have better underwriting information than the general actuarial mortality tables, such as family history of heart disease or a diagnosis of diabetes. But the more likely explanation is that people don't understand the trends in mortality improvement.[2] Outliving one's assets is the sharpest edge of our two-edged sword, and it is exacerbated by erroneously anticipating a shorter lifetime. In addition, increasing life expectancy provides more time for inflation to diminish buying power in retirement, which places more pressure on investments.

Insurance company solvency risk pales in comparison with the big three risks in the decumulation period, but its visibility was heightened by the 2008-2009 financial crisis. The purchase of annuities is one way to mitigate the inflation-investment-longevity risk triumvirate. Prior to 2008, most people gave little thought to the risk that the insurance company from which they bought an annuity might become bankrupt. People now think of such possibilities. Placing all of your risk-avoidance hopes on an annuity product can be devastating if the annuity provider goes belly-up. Fortunately, state insurance guarantee funds make the probability of this occurrence relatively small; however, the full amount of the annuity may not be guaranteed.

Retirement Readiness—Accumulation Period

While most retirement experts agree that retirement savings are far from sufficient,[3] it is my contention that the government, the retirement industry and employers have done a reasonably good job of educating the public regarding the accumulation period risks. Most people know what they should be doing to secure their retirement, even if they don't always do it.

Examining surveys is generally the only means of judging trends in retirement risk management, but this can be dicey since different surveys attract different respondents and ask questions differently. That said, we see a relatively steady increase in participation rates in 401(k) plans (i.e., the percentage of those eligible to participate in the plan who actually do participate) and in deferral rates (i.e., the rate of pay that participants contribute to the plan). For example, annual surveys by the Profit Sharing Council of America indicate that

the participation rate increased from 76.9% in 2010 to 84.9% in 2016, while deferral rates rose from 6.2% to 6.8%.[4]

The best example of how government, the retirement industry and employers have attacked contribution risk is the introduction of automatic features to 401(k) plans. This started with autoenrollment. Participation in 401(k) plans is voluntary, and the evolution of these plans started with employees having to opt into the plan to start deferring. Autoenrollment took lessons learned from behavioral science and automatically enrolled new employees into the plan at a set deferral rate, requiring them to *opt out* if they did not wish to participate. According to the Bureau of Labor Statistics, 5% of 401(k) plans (and other thrift plans) employed autoenrollment in 2003, but that number had grown to 38% by 2015.[5] Other surveys strongly suggest that the percentage has risen dramatically since 2015.[6]

Autoenrollment has helped increase plan participation rates, but many large 401(k) vendors discovered that average deferral rates dropped as autoenrollment was introduced due to low (generally 3%) deferral rates for individuals being automatically enrolled.[7] As a result, the first-year autoenrollment deferral rates have risen, and autoescalation provisions have been introduced to increase the deferral rate each year for a person automatically enrolled.

Similarly, investment risk has been attacked to help 401(k) plan savers invest more prudently. When 401(k) plans were introduced, participants tended to be excessively risk-averse

with their investments, often having the majority (or all) of their 401(k) balances invested in money market or stable-value funds. By 2015, 66% of 401(k) assets were invested in equities.[8] This is a direct result of coordinated educational communications from investment advisors, employers and the retirement industry regarding the need to accept more investment risk inside 401(k) plans as well as the advent of target-date and other managed funds that constitute the default investment funds for autoenrolled participants.

As noted earlier, when 401(k) plans were first introduced, most plans provided for plan loans and hardship distributions. In the early years, many 401(k) plans looked like glorified Christmas savings accounts. The government stiffened the requirements for these sources of leakage, and employers and the retirement industry again got the word out through the media about the significant loss of retirement income that can result from premature withdrawals, whether for hardship or cash out due to job change. While retirement assets continue to be lost due to such leakage, it has become much less of an issue.[9]

The 2008-2009 financial crisis convinced many Baby Boomers who were relying on 401(k) accounts for their retirement to delay their retirement date. Increasing retirement age helps on both sides of the basic retirement financing equation. It allows more time to accumulate contributions and investment earnings, while less time in retirement relates to lower retirement benefits; therefore, it appears there has been

progress in dealing with *voluntary* early retirement risk. A survey undertaken by the American Academy of Actuaries, the Australian Actuaries Institute, and the Institute and Faculty of Actuaries (in the United Kingdom)[10] found that only 32% of U.S. respondents plan to retire fully; of those who plan to retire, 27% expect to retire in their 70s, thus helping to reduce the pressure on retirement savings.

It appears, however, that the one area of accumulation period risk where people need additional education is the risk of *involuntary* early retirement risk. In the survey mentioned above, only 27% of the U.S. respondents felt they had saved sufficiently to handle an unexpected early retirement. Perhaps more disturbing is that more than 80% of U.S. respondents felt they had adequately planned for a potential drop in their retirement assets (e.g., a postretirement stock market crash), but the plan of nearly 50% of this group is to return to work. It would appear these individuals have not considered that they may be unemployable due to mental or physical limitations or that unemployment rates may be high (and thus employment opportunities low) after a market drop.

Retirement Readiness—Decumulation Period

While significant progress has been made in educating the public about accumulation period risks, or in pushing them into the means to manage those risks, the record is not so good with decumulation period risks. Why have people struggled with these risks? I can think of several possibilities, but I

believe the greatest factor is complexity. The risks are highly specific to an individual's particular situation—For example, in which end of the longevity gene pool do people swim? Other factors include health, spouse's health, investment acumen, legacy concerns (i.e., the desire to leave money to family, friends or charity) and the level of risk that allows people to sleep at night. Further, the codependency of these risks adds to the complexity.

Most people have difficulty dealing with single-variable equations, and multivariable equations send them scurrying for cover. Attacking decumulation period risks is a multivariable exercise. When people reach the decumulation period, the basic retirement financing equation can be rewritten as: *Assets + Investment Earnings = Retirement Benefits.*

People are no longer contributing toward retirement, and they must now focus on the pool of assets needed to see them through retirement.

We undertook a stochastic analysis around this basic equation to examine the interaction between the various risks, running 1,000 Monte Carlo simulations for each scenario.[11] The following variables were considered:

- **Assets** (the amount of money accumulated to provide retirement benefits). This is the net result of the accumulation period risks.
- **Investment earnings** (the amount of investment return on the assets). This is dictated by the investment risk undertaken, generally through asset allocation.
- **Inflation** (the increase in the cost of goods—i.e., the decrease in purchasing power). While inflation can directly affect investment earnings, we have considered only the effect on retirement benefits.
- **Retirement benefits** (the amount of retirement income required to maintain a specific lifestyle). For purposes of this analysis, we have removed Social Security from the equation.
- **Time** (the period over which retirement benefits are to be paid). This is directly tied to longevity risk.

Our analysis set a level of initial retirement benefits, that is, the amount of annual retirement benefit to be taken in Year One. That benefit was increased each year by an inflation factor. We then measured the probability of ruin—that is, the probability that the individual will run out of money.[12]

With the initial retirement benefit set—and time unlimited—the other variables were allowed to fluctuate as follows:

- **Assets.** Clearly, the asset value at the beginning of retirement has a significant effect on the probability of ruin. We set an initial asset value equal to ten times, 15 times and 20 times the initial retirement benefit (for example, for an assumed annual retirement benefit of $50,000, we established initial asset values of $500,000, $750,000 and $1 million, respectively).
- **Investment earnings.** We looked at asset allocations ranging from 100% fixed income to 100% equities in 10% increments. The equity exposure was allocated in the same percentages between international, large cap and small cap for all scenarios.[13]
- **Inflation.** We assumed a set inflation percentage for the duration of the projection: One scenario assumed a 2.5% annual inflation rate, and the second assumed 3% inflation. We could have varied the inflation rate based on historical patterns, but that was beyond the scope of this analysis. There is evidence that inflation is slightly higher for retirees than for the general population, primarily due to the higher incidence of medical care for older individuals.[14]

For purposes of this analysis, we considered only the probability of ruin after a number of years in retirement. But for the sake of discussion, let's assume that retirement takes place at the age of 65.

The amount of assets held at retirement, relative to the initial retirement benefit, has a significant impact on the probability of ruin, but it also suggests a change in the optimum level of investment risk to be assumed. With an asset value of ten times the initial retirement benefit, the probability of ruin increases as investment risk increases—assuming the money must last only eight to ten years (that is, death is expected to occur before the age of 75); however, beyond that number of years, the probability of ruin declines with higher equity investment. There is a 100% probability of ruin at the age of 85 if people invest 100% in fixed income securities and a 75.5% probability if they invested solely in equities (assuming a 2.5% rate of inflation). Of course, this is of little concern if an individual has only a slight chance of living to the age of 85. Keep in mind, however, that the probability

of a 65-year-old male of average health (nonsmoker) surviving to the age of 85 is 54%, and it is 65% for a 65-year-old female.[15]

While a higher level of investment risk was generally necessary at the low asset level to keep from exhausting assets, it becomes less clear with larger assets. If assets are 15 times the retirement benefit, adding investment risk raises the probability of ruin slightly if the assets must last 11 to 17 years. That is, if people expect to live only to the ages of 76-82, investing more than 50% of their assets in equities will increase the chance they will run out of money. However, the additional investment earnings from greater investment risk outweighs the longevity risk of living longer; that is, the longer a person lives, the more aggressive investing leads to lower probabilities of ruin (although the probability of ruin is very high at the age of 95).

An asset value of 20 times the retirement benefit shifts this dynamic ahead by about five years (i.e., 11 to 17 years is increased to 16 to 22 years). Adding 0.5% to the inflation assumption lowers the number of years by approximately one year. Unsurprisingly, the greater the assets at retirement (relative to the retirement benefit), the less investment risk people must take, but the more investment risk they are capable of withstanding.

Figures 1-3 highlight the results of our analysis, showing the probability of ruin at the ages of 75, 85 and 95.[16]

Conventional wisdom suggests that equity exposure should be decreased as age increases. Our analysis, however, suggests that a reevaluation of invest-
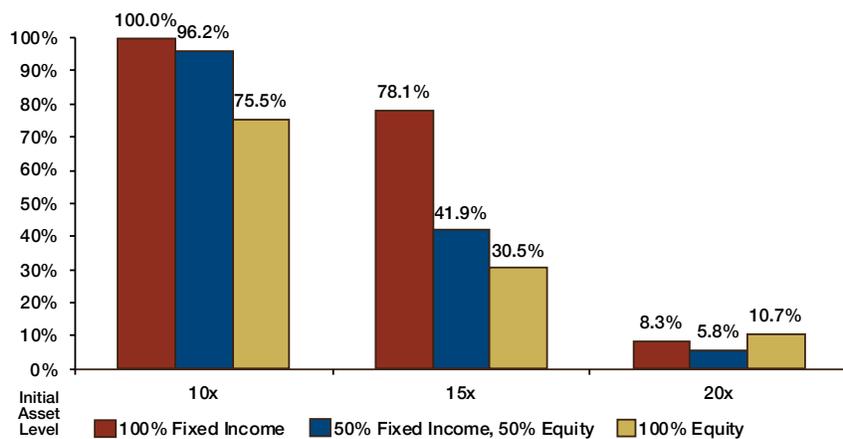
FIGURE 1

Probability of Ruin at the Age of 75
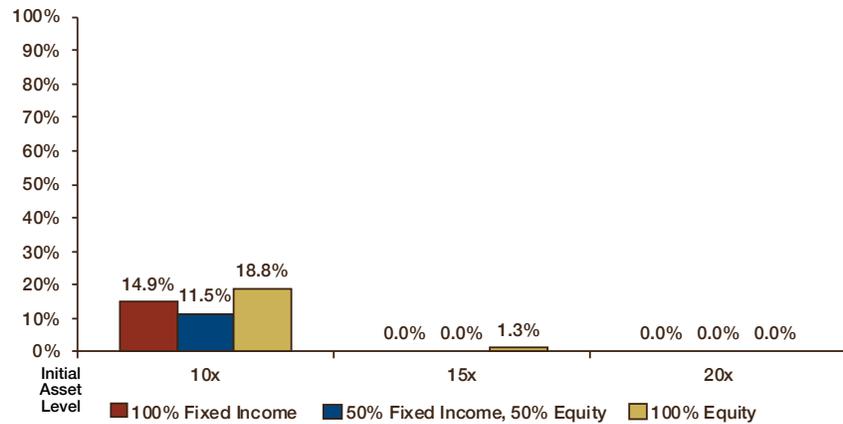
Note: Assumes retirement at the age of 65 and an inflation rate of 2.5%, and the initial asset level is a multiple of the initial annual retirement benefit.

FIGURE 2

Probability of Ruin at the Age of 85

Note: Assumes retirement at the age of 65 and an inflation rate of 2.5%, and the initial asset level is a multiple of the initial annual retirement benefit.

ment risk should be made every year, based on current asset value relative to the retirement benefit need for the coming year.

The standard solution to managing decumulation period risks is to lock into some source of guaranteed lifetime income. Social Security is certainly one such source. Defined benefit pension plans also provide this security (albeit, typically without postretirement inflation protection). The other source is an

FIGURE 3

Probability of Ruin at the Age of 95
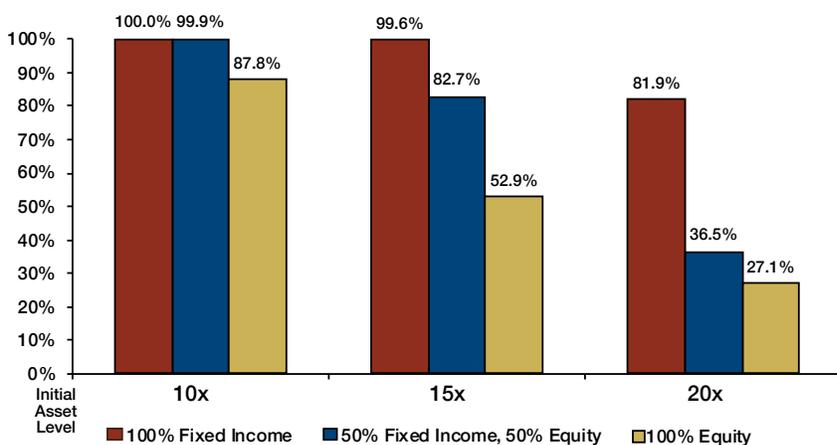
Note: Assumes retirement at the age of 65 and an inflation rate of 2.5%, and the initial asset level is a multiple of the initial annual retirement benefit.

annuity product issued by a financially secure insurance company (recall insurance company solvency risk). All of these sources have the benefit of pooling longevity risk over a large number of individuals, which allows protection against outliers (i.e., a few people living to extreme ages). By managing their own pot of retirement dollars, people are self-insuring this risk and must provide a contingency plan for living much longer than expected.[17] *Longevity annuities*—annuities commencing at a late age such as 85 or 90—can provide such protection, but while they are discussed frequently, they have yet to capture much of the retirement asset market. Annuity products represent a very conservative investment class; the insurance company is taking on the longevity risk and investment risk (and

inflation risk if there is a cost-of-living feature) and will price the product accordingly. From the above analysis, this type of conservatism is unlikely to generate positive outcomes when the asset level is low, but it may be appropriate at higher asset levels. The United Kingdom used to require a portion of defined contribution account balances to be annuitized; this was highly unpopular, particularly when applied to small balances or individuals with substandard longevity expectations, and it was eliminated with a change in the 2014 budget. This suggests that one-size-fits-all default solutions will be equally difficult to find in the United States.

Conclusion

After 40 or 50 years of work, most people are simply tired of working and

are ready to take it easy. But if people truly understood all the risks inherent in retirement, far fewer might leap into it. In the United States, there have been great strides in getting workers to understand the risks during the accumulation period, but little has been done to educate about the decumulation period risks. This is because decumulation period risks are highly specific to an individual's unique situation as well as complicated and difficult to explain. If you can tell me exactly when you are going to die, I can recommend a fairly secure process to manage your retirement risks, but we are seldom privy to this vital piece of information. The government, the retirement industry and employers can certainly do more to educate the public about decumulation period risks, but general education is destined to fall short of explaining how the risks affect an individual's specific condition and goals. Personal retirement planning might be the best source of assistance, but concerns of independence, cost and competency arise.

Albert Einstein once noted, "[A]ny fool can make things bigger, more complex and more violent. It takes a touch of genius—and a lot of courage—to move in the opposite direction." In this article, I have demonstrated that I am a fool when it comes to decumulation period risks. My hope is that some courageous genius will pick up the torch and find a way to make this complex subject more understandable. BQ

Endnotes

1. *Society of Actuaries 2015 Risks and Process of Retirement Survey Report of Findings*, authored by Greenwald & Associates and published in 2016.

2. There are a number of longevity calculators available on the Internet, but I would recommend the Actuaries Longevity Illustrator created by the American Academy of Actuaries and the Society of Actuaries at www.longevityillustrator.org.

3. A recent paper suggests that the current aggregate deficit for retirement asset accumulation is $4.1 trillion for all Baby Boomers and Gen Xers. Jack VanDerhei, "Retirement Savings Shortfalls," *The Journal of Retirement* (Fall 2015).

4. *60th Annual Survey of Profit Sharing and 401(k) Plans*, Plan Sponsor Council of America (PSCA). Earlier PSCA surveys indicated deferral rates of 4.2% in 1991, rising to 5.3% in 2000, but these rates were limited to non-highly compensated employees.

5. Bureau of Labor Statistics 2003 and 2016 *National Compensation Surveys*.

6. The PSCA *60th Annual Survey of Profit Sharing and 401(k) Plans* indicates a 14% increase in autoenrollment between 2011 and 2016 and an 18% increase in autoescalation.

7. For example, see *How America Saves: 2017* by Vanguard.

8. Employee Benefit Research Institute (EBRI) *Issue Brief No. 436*, August 3, 2017, "401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 2015," Jack VanDerhei, EBRI; Sarah Holden, ICI; Luis Alonso, EBRI; and Steven Bass, ICI.

9. In *How America Saves: 2017*, Vanguard indicates that only about 2% of aggregate plan assets were borrowed and only 1% of plan assets were taken as in-service withdrawals. In addition, only 3% of all plan assets that were eligible for cashout were distributed in cash (i.e., presumably removed from retirement savings).

10. *Retirement Readiness: A Comparative Analysis of Australia, the United Kingdom & the United States*, October 2017, by the American Academy of Actuaries, the Australian Actuaries Institute, and the Institute and Faculty of Actuaries.

11. My thanks to Jeffrey Thornton, EA, FSA, MAAA, with Findley for his assistance in structuring the stochastic analysis.

12. Another complicating variable in this analysis should be taxes, which we have ignored for this exercise.

13. For this purpose, we assumed the equity portfolio was allocated as follows: 10% international emerging markets, 15% international developed markets, 60% large cap, 15% small cap.

14. The Bureau of Labor Statistics examined the CPI for the Elderly (CPI-E) versus the CPI for All Urban Consumers (CPI-U) and found that the CPI-E increased 3.1% per year, compared with 2.9% for CPI-U, for the period 1982 through 2011. See *The Economics Daily* (TED), issued by the Bureau of Labor Statistics, March 2, 2012.

15. Based on output from the Actuaries Longevity Illustrator, developed by the American Academy of Actuaries and the Society of Actuaries. See www.longevityillustrator.org.

16. Again using the Actuaries Longevity Illustrator, the probability of attaining the age of 75 for a 65-year-old nonsmoker of average health is 83% for males and 89% for females, and the probability of attaining the age of 95 is 16% for males and 25% for females.

17. One paper suggests that approximately 45% of additional assets must be accumulated if the risk is self-insured as opposed to pooled. Jack VanDerhei and Craig Copeland, "ERISA at 30: The Decline of Private-Sector Defined Benefit Promises and Annuity Payments? What Will It Mean?" *EBRI Issue Brief* (2004).

AUTHOR

Kenneth F. Hohman, EA, FCA, FSA, MAAA, began working in the actuarial field in 1976 and then joined BPS&M (now Findley), opening the Louisville, Kentucky office of the firm in 1979. His primary area of expertise is in the design, funding, administration and regulatory compliance of qualified and nonqualified retirement plans. Hohman's clients comprise a variety of employers, including Native American tribes, governmental entities, not-for-profit employers and for-profit private employers. He has served as president of both the Conference of Consulting Actuaries and the American Academy of Actuaries. Hohman also has represented the United States in the International Actuarial Association for the last decade. He served as chair of the EA Meeting Program Committee. Hohman is a member of the American Academy of Actuaries, a fellow of the Society of Actuaries, a fellow of the Conference of Consulting Actuaries and an enrolled actuary. He also is a member of the ESOP Association (past vice president for Kentucky) and a member of the National Center for Employee Ownership. Hohman received B.A. and M.A. degrees in mathematics from the University of Louisville.

International Society of Certified Employee Benefit Specialists