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Managing Misbehavior

RATIONAL CHOICE IN AN UNCERTAIN RETIREMENT

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and Avi Sharon, PhD*



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ABSTRACT

Behavioral science has helped encourage better behaviors for many investors who are accumulating savings for retirement. This paper investigates the application of behavioral science to decumulation to help investors make better choices and maintain quality of life in retirement. We conducted a proprietary research study, collecting more than 750 responses from affluent and high-net-worth investors in the United States age 55 and older. The results identify key behavioral influences linked to retirement decisions, including overconfidence, loss aversion, the relevance of nonmarket risks, and the treatment of legacy goals. The study also explored potential nudges that might incline retirees to naturally fall into more optimal investing and spending behaviors, such as having reliable cash flows, spending flexibility, and dual portfolios. Finally, we reflect on how these connections inform our approach to retirement decumulation and how a behaviorally compatible plan can help investors balance important trade-offs to more fully enjoy and maximize retirement.

INTRODUCTION

After a lifetime of work, retirement should be a time to focus on more personally rewarding activities. However, retirees confront a complex financial burden. For many, the transition from working and saving to retirement and spending is difficult, both emotionally and financially. Decisions about how much market risk to take or how much one can safely spend are complicated by the uncertainty of one's health and longevity. We call these challenges the decumulation dilemma. All too often, it leads individuals to make suboptimal investment decisions. The consequences of such "misbehavior" can be costly.

Although insights from behavioral science have been successfully applied to help workers accumulate retirement savings, much less is known about how behavioral science insights can be applied to decumulation. The purpose of this paper, and the proprietary research it's based upon, is to help develop a behaviorally grounded understanding of these dynamics and how they may affect quality of life during retirement, with a specific focus on the period of transition from accumulation to decumulation.

Over the past 30 years, academic finance has been questioning rationality and its core presumptions. Indeed, *homo economicus* (Thaler 2015), the perfectly rational investing hominid, is increasingly seen as a mythical species dwelling only in the models of classical economic theory. These "econs" need only be concerned with risks related to financial markets because their incomes are predictable, their self-control and mathematical abilities are infinite, and they fully understand their own mortality, including the probable ages of death for both themselves and their spouses.

We call these challenges the decumulation dilemma. All too often, it leads individuals to make suboptimal investment decisions. The consequences of such "misbehavior" can be costly.

In stark contrast, human beings operate under what is known as bounded rationality, constrained by limited time, information, resources, and myriad unknowns (Simon 1957). As a result, investors are, for the most part, highly and repeatedly susceptible to predictable human biases. That's especially the case in decumulation, where "good" behavior can pay even larger dividends than in traditional accumulation contexts.

In the period of accumulation, or saving for retirement, a number of behavioral guardrails or nudges have been established by regulators, employers, and even asset managers to encourage better saving strategies. These include the development of target date set-it-and-forget-it strategies, the obligatory opt-in to a 401(k) early in one's working life, automatic escalation of savings contributions, and various accelerants for retirees' later years (such as catch-up contributions), as well as impediments to taking money earmarked for retirement as early withdrawals or loans.

But for those in or about to enter retirement—as they transition from saving to spending, or decumulation—it's mostly a blank

Table
1

RESPONDENT CHARACTERISTICS

(n = 758)	% (n)
Retirement Status	
Entering retirement	35% (262)
Not retired	(189)
Early retirement (55-65)	(73)
Mid-late retirement (66+)	65% (496)
Age 55-64	18.1% (137)
Age 65-74	61.6% (466)
Age 75-84	19.2% (144)
Age 85-91	1.5% (11)
Median	Age 70
Household Investable or Disposable Assets	
\$500,000 to \$749,999	15.2% (115)
\$750,000 to \$999,999	18.5% (140)
\$1,000,000 to \$1,999,999	35.9% (272)
\$2,000,000 to \$2,999,999	15.3% (116)
\$3,000,000 or more	15.2% (115)
Median	\$1,000,000 to \$1,999,999
Household Income (Last 12 Months)	
\$124,999 or less	55.7% (429)
\$125,000 or more	43.3% (329)
Household Size	
1 adult	21.6% (164)
2 adults	71.6% (543)
3-5 adults	6.7% (51)
Children: Yes	3.7% (28)
Median	2 adults
Gender	
Male	66.8% (506)
Female	33.2% (252)
Education	
High school	3.4% (26)
Some college, AA degree, or vocational training	21.5% (136)
Bachelor's degree	32.6% (247)
Some graduate school	9.6% (73)
Graduate degree	36.4% (276)
U.S. Region	
Northeast	22.6% (171)
Midwest	21.9% (166)
South	30.9% (234)
West	24.7% (187)
Health	
Rather poor	2.6% (20)
Fair	20.7% (157)
Rather good	53.6% (406)
Very good	23.1% (175)

Source: PIMCO Retirement Decumulation Study

slate. There's little regulatory guidance, no single-product solution, and only a handful of practitioner rules of thumb to guide planning.

Of course, the best strategy or solution is not helpful if it cannot be implemented. That is why we conducted a study to examine the decision-making of affluent investors nearing or in retirement: to better understand the decumulation dilemma from a behavioral perspective.

Applying behavioral insights and providing clear guardrails to predispose retirees to better behavior are at the center of our decumulation planning approach. They are at the core of our framework, which seeks to connect research and practice to decumulation solutions aligned with both classical and behavioral finance.

In the following sections, we summarize our findings and conclusions, and their impact on our approach to retirement. We outline evidence of pernicious biases, including overconfidence and loss aversion, as well as some steps investors can take to mitigate these risks. Then we explore the influences of nonmarket risks and planning for legacy wealth, and we detail some strategies that may help investors balance these priorities to more fully enjoy retirement.

THE STUDY

We designed the study, which The Harris Poll conducted online in December 2020. The study polled 758 U.S. adults age 55 and older, including 255 individuals with \$500,000-\$999,999 in assets and 503 with more than \$1 million in assets. Table 1 provides a breakdown of the respondents' characteristics. Because the survey is not based on a probability-weighted sample, the findings should not be generalized to other populations, e.g., the general public.

Our goal was to better understand the complex array of investor personalities and characteristics, and uncover how these interconnect and influence retirement-oriented decisions. We asked investors about fundamental retirement decisions, such as when to claim Social Security benefits and how they approach withdrawing from savings and investments. We took measure of individual situations, including their sense of their own health and longevity, financial literacy and investing skill, risk priorities, and desire to make a bequest. Additionally, respondents rated how confident they were that their retirement-spending plans would be sufficient to ensure that needs are met in the future.

Respondents completed three short tasks designed to illuminate behavioral issues relevant to retirement decumulation decision-making¹: loss aversion bias (emotional reactivity to risk that drives suboptimal financial decisions), present bias² (impatience—"Why save for tomorrow what I can spend

today?”), and heuristic thinking³ (the tendency to rely more on intuition and experience than on analysis and deliberation; the general extent to which they are prone to bias). Then we explored the correlation among these factors, probing the psychological mechanisms that drive these relationships. More information on our measures and analytic approach is available in the appendix.

RESULTS AND CONCLUSIONS

Confidence, overconfidence, and self-awareness

As noted, there is a high degree of complexity and unpredictability in retirement decumulation. Nonetheless, our study indicated that affluent and high-net-worth retirees feel relatively secure. More than four out of five respondents (83 percent) to the survey are confident or very confident about their ability to meet retirement-spending needs. Respondents also are very confident in their investing knowledge and skill, with 89 percent rating themselves as above-average investors.

Confidence with merit is perfectly acceptable, even desirable, but this did not appear to be the norm. On the contrary, we find a concerning level of overconfidence among our respondents.

Therefore, we begin with an important caution to investors: Owners of a large retirement nest egg must not be lulled into a false sense of security, because successful accumulation does not automatically guarantee successful decumulation.

Indeed, investors face a far greater threat of failure in decumulation (when one’s portfolio must support ongoing spending) versus accumulation. The most direct way to illustrate this is to examine the phenomenon known as sequence of returns risk. In a portfolio that is being spent down, as in retirement, the assets

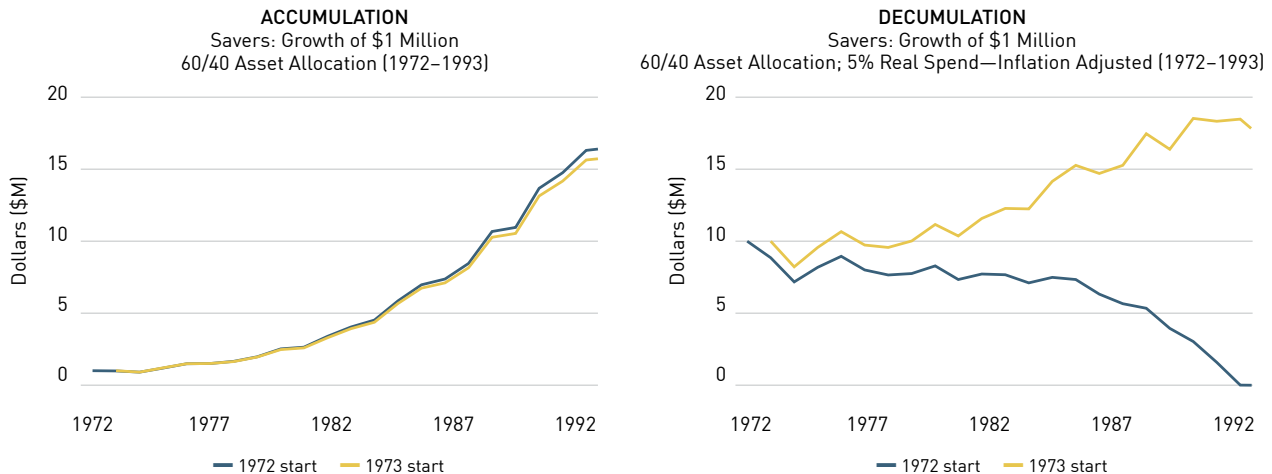
are far more vulnerable: They are exposed to the impact of market shocks and persistent spending, and to the size and timing of both. The earlier and deeper the market decline, the greater the damage can be.

Confidence with merit is perfectly acceptable, even desirable, but this did not appear to be the norm. On the contrary, we find a concerning level of overconfidence among our respondents.

Consider identical investors depicted in figure 1, with identical portfolios (60-percent equities and 40-percent bonds, rebalanced annually) but starting out just 12 months apart. As savers, they have an almost identical investment journey: Both portfolios, over that period, enjoy almost identical average annualized returns. In retirement, however, they experience strikingly different paths—one nearly doubling portfolio assets over a 30-year period and the other exhausting assets just 20 years in. The difference is in the interaction between inflation-adjusted spending and the sequence of the market’s returns to the portfolio, where one bad year can make the difference between success and failure.

It is situations like these—and scenarios as unfortunate as the above, or worse, which have occurred more than 10 times in the past century—that make it so important for retirees to be armed with a thoughtful retirement-spending plan. Yet we find that more than half of the respondents (55 percent) seem to have

Figure 1 THE DANGERS OF AN UNTIMELY RETIREMENT



Source: Bloomberg, Global Financial Data and PIMCO. Note: Starting wealth of \$1 million, allocated 60 percent to the S&P 500 and 40 percent to Treasuries (50 percent to 10-year maturities and 50 percent to T-bills), rebalanced annually. Spenders draw down pro rata from the total portfolio at a 5-percent annual rate, inflation adjusted, over 20 years. Hypothetical example for illustrative purposes only.

CONFIDENCE, OVERCONFIDENCE, AND SELF-AWARENESS

FINDINGS

Most respondents either have no decumulation plan or plan to ignore their assets completely. Yet they are equally or more confident they will meet their retirement goals than those who have made a plan.

PROBLEM

Investors who are not comfortable spending assets risk needlessly holding back from enjoying retirement, and those who blindly spend without a plan risk their portfolio running out.

APPROACH

Work with advisors and professionals to make grounded, behaviorally aware retirement decumulation plans.

plan are the least likely to plan for a long retirement (38 percent, a statistically significant interaction, as shown in figure 2). The confidence this cohort displays is inconsistent with the degree of risk and complexity involved in decumulation planning. Given that so many respondents expect to fund about three decades of spending, a thoughtfully designed, behaviorally compatible plan is critically important to avoid common retirement pitfalls and ensure the longevity of one's assets.

Second, even for those who claim to have a retirement plan, strategies are relatively limited. Nearly a third (31 percent) plan to withdraw a consistent amount or percentage, and 13 percent list their plan as "other." But for many, the "plan" is to essentially ignore their assets: 21 percent would spend only from savings and investments in an emergency, and 15 percent would spend only income (i.e., gains, dividends, or interest). Here, too, we find a high degree of confidence, especially among investors planning to withdraw income only; exactly half of this group endorses the maximum level of confidence on our scale. That is, one out of every two in this group is 100-percent confident they will meet spending needs in retirement; this is a higher rate than all of the other groups (and statistically significant). Given the simplicity and optimism in this decumulation plan—rather, this lack of a plan—we can't help but be concerned about the well-known risks that accompany overconfidence.⁴ And although it may be true that respondents are unlikely to exhaust their portfolios, their confidence still carries real costs: The most confident investors are spending only income and are unwilling to spend down assets. They are resigned to have a lower standard of living than they would with a safe and thoughtfully designed decumulation strategy.

In certain circumstances, one can justify spending down principal somewhat slowly to ensure retirement goals are met (Klein 2020a, b). However, as humans' bounded rationality meets the complexity of retirement decumulation planning, the reasons for planning to spend at a certain rate may not be entirely rational. Instead, behavioral impulses, such as wishful thinking, can bias decision-making.

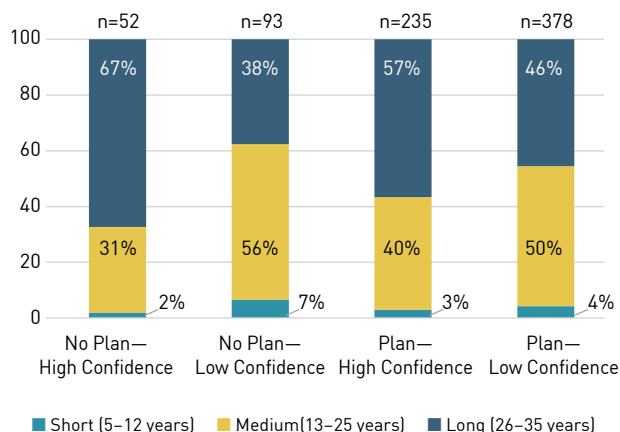
Overconfident investors mistake familiarity for deep understanding; they equate quantity with quality of information; and they misinterpret correlation as causation. It's possible that our investors' confidence stems from personal experience, with the markets doing well over most of their working lives, and that they are extrapolating success in accumulation to decumulation. Overconfidence dissuades investors from recognizing that the dynamics of decumulation are unique and complex or that they're at the mercy of uncontrollable, unpredictable market events and mistakes, such as mistiming the start of their journey.

Fortunately, the majority of investors appear to be aware of their own behavioral biases and to welcome targeted nudges

Figure 2

(LACK OF) PLANNING FOR A LONG RETIREMENT

Expected retirement length grouped by income planning and confidence levels



Source: PIMCO Retirement Decumulation Study

unrealistic and likely overconfident retirement-spending plans, which we break into two related but distinct groups.

First, about one in five (19 percent) respondents have no specific plan for withdrawing from their savings and investments. Alarmingly, these investors with no plan are just as confident about meeting retirement-spending needs as those who are prepared with a plan (any plan). Even more concerning, investors who are both confident in their retirement and have no plan whatsoever expect their assets to last the longest, even longer than those prepared with a plan, with two-thirds of this group anticipating a long retirement (26-35 years). In contrast, less-confident counterparts who also have no withdrawal

that encourage good behavior. Our study included a retirement-income preference task in which respondents were told to imagine they were just about to enter retirement. Then they read about two income frameworks (in a randomized order), both designed to grow and distribute wealth over the course of retirement. One was a “theory-oriented” approach with a single fixed allocation portfolio and a stable, consistent withdrawal percentage rebalanced annually; and the other was a “behavior-oriented” approach with separate near-term spending and long-term growth portfolios rebalanced only when markets are doing well.

Respondents were asked which approach they would prefer, as well as which they thought would help them avoid bias and reactionary adjustments to their retirement strategy. In both cases, more than half preferred the modern behavioral framework (58.2 percent and 55.7 percent, respectively). Thus, it appears that most investors recognize that in decumulation their portfolios are governed by new laws of gravity and exposed to greater levels of uncertainty. With this awareness, there are likely material benefits to tapping into behavioral science to mitigate investor overconfidence and better control loss aversion, anxiety, and overreaction to market movements.

LOSS AVERSION

Overconfidence is not the only behavioral bias influencing retirement planning. Loss aversion is the powerful emotional response evoked when losses loom larger than gains. Loss aversion appears to be linked to challenges investors have with some features of retirement, in particular, respondents’ disapproval of spending from savings during retirement.

At the risk of stating the obvious, the point of saving for retirement is to spend that money in retirement. However, once it is time to spend, people struggle to part with their assets.

Spending down savings feels like a loss. Simply put, people get emotionally attached to their assets. So after a lifetime of scrimping and saving to build a retirement nest egg, it hurts to let any of it go. Indeed, this is just what we find. On average, loss-averse investors want to hold on to a larger proportion of their wealth than do those who are not loss averse. The difference is statistically significant, albeit in the small range.⁵ But what’s telling is that the average proportions of wealth fall on either side of the 50-percent mark. That is, loss-averse investors are more likely to plan on retaining more than half of their wealth, i.e., spending less than 50 percent in retirement, whereas those with low loss aversion expect to spend down a little more than half of their wealth in retirement.

The problem is that it may not be feasible for individuals to simultaneously maintain their standard of living and avoid spending from their assets in retirement. Spending only

LOSS AVERSION

FINDINGS

Many respondents are particularly susceptible to loss-aversion bias, but loss aversion tended to be lower among those entering retirement with a source of cash flow.

PROBLEM

Loss-averse investors perceive wealth and financial market movements through a filter of strong emotions (optimism, fear, hope, regret, envy). This emotional reactivity to financial risks can result in suboptimal decisions.

APPROACH

A reliable cash flow may help investors to blunt emotional reactivity and weather temporary market disruptions. Investors may feel even more secure if those assets are safe and separate from remaining assets aimed at long-term growth.

portfolio income or selecting an arbitrary proportion of wealth to withdraw, e.g., 50 percent, can result in a substantially lower standard of living than one can afford. Beyond this, loss-averse investors could experience considerable emotional distress if they must spend more than they had hoped.

Unfortunately, spending discomfort is probably the least of the loss-averse investor’s problems. A second issue that stems from loss aversion is emotional reactivity to risks, and a large body of research has shown how these impulses underlie suboptimal investing biases.⁶ Such biases can cause serious damage to an investor’s financial prospects. Loss aversion is behind the classic behavioral mistake that often ensues in the face of steep market declines—a reflexive capitulation to market volatility and a shift to a lower risk allocation. This can have devastating effects on one’s success in retirement because such a move can crystallize losses and forestall potential future gains, perhaps even risking an outcome where one’s life savings will be depleted.

Importantly, the degree of reactivity to risk varies from person to person. To gauge susceptibility to loss-aversion bias, we measured responses to a hypothetical gambling task in which respondents indicated whether they would accept or reject each in a series of wagers where gains and losses were possible.⁷ The response patterns correspond to values that represent how high the potential gain needs to be to offset the potential loss.⁸ The higher the value, the stronger the emotional response to risk and susceptibility to bias. A conventional estimate is 2.25, which means that, on average, people tend to require that the potential gain be at least 2.25 times higher than the potential loss before they’re willing to tolerate the risk (Hastie and Dawes

2010, chapter 12). Another way to put it is that a loss tends to feel about twice as painful as the equivalent gain feels good. Again, although this loss-aversion bias is a common rule of thumb, it doesn't apply to everyone. We find that about one in three respondents are particularly susceptible to loss-aversion bias, receiving a score of 2.25 or higher for the task.

It's likely that there are effective nudges to help counter these behavioral tendencies; one in particular may be the reassurance of a regular income stream. It is well known that retail investors regularly exhibit a preference for income in their security selection, timing, and spending behavior. Thus, the presence of steady, reliable income may help retirees feel better-equipped to weather temporary market disruptions and avoid de-risking at exactly the wrong times.

Our study reinforces this view. We find that among the respondents entering retirement, those with some source of cash flow over the preceding 12 months are about 1.9 times less likely to react emotionally in the gambling task than all of the other groups (a statistically significant result). Thus, we find that a reliable cash flow is associated with lower emotional reactivity to risks precisely when it is most valuable.

Additionally, cash flow is linked to higher confidence in both those currently transitioning to retirement and those already in retirement. Individuals with a cash flow are nearly twice as likely as those without one to have high confidence in their retirement-spending plan's ability to meet their goals (statistically significant). In summary, these results suggest that maintaining a cash flow during the transition to retirement is one way investors can, perhaps, fend off the emotions from uncertainty and loss aversion that contribute to suboptimal financial choices.

CONCERNS BEYOND THE MARKETS

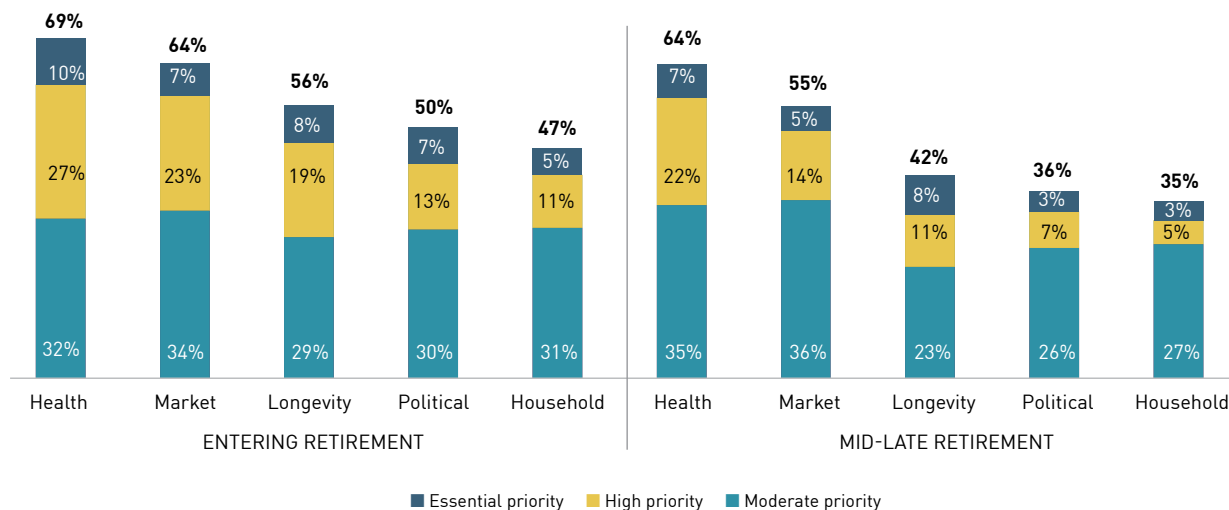
Not surprisingly, one of the reasons retirees feel losses so acutely is that they simply don't know what the future holds. They don't know how long a retirement they will need to fund, and they don't know how much they will need to spend. This uncertainty can be overwhelming, holding investors back from fully enjoying retirement.

We asked respondents about the importance of managing five key risks when making a retirement-income plan. Collapsing across all the groups, health risks (e.g., unforeseen medical expenses) are the most common, rated as a priority by 65 percent of respondents. The majority (58 percent) said that market risks (e.g., volatility, inflation, insufficient returns) are a priority. A significant minority also prioritize longevity risk (46 percent), political risk (e.g., policy changes, tax rates; 42 percent) and personal/household risk (e.g., other non-health-related expenses; 39 percent). Unsurprisingly, investors are most concerned at the beginning of the retirement journey.⁹ That's when anxiety about the transition is at its peak, as shown by the relative risk ranking by retirement group in figure 3.

Market risks and longevity are concerns we expect and are heavily emphasized by advisors, but the data tell us uncertainty and risk around one's state of health—the likelihood that an onset of disease would spur associated costs and family consequences—ranked persistently high (statistically significant, small effect size). Previous research has shown that healthcare expenses, particularly long-term health costs not covered by Medicare, rise quickly with age, and concerns about these potential costs contribute significantly to increased precautionary saving, slower spend-down rates in mid- to late retirement, and an otherwise irrational fear of spending down assets

Figure 3

RANKING RETIREMENT RISKS



Source: PIMCO Retirement Decumulation Study

RISKS AND SPENDING

FINDINGS

The highest-rated risks in retirement planning are not related to the markets or even longevity, but to health care.

PROBLEM

Financial products do not address these needs. Instead, investors may be compelled to hold onto assets for unpredictable nonmarket costs, such as health care.

APPROACH

Retirees need more control and flexibility to adjust spending up or down to meet unanticipated expenditures with fully liquid assets. This flexibility could greatly improve asset longevity, and it should be incorporated into a complete decumulation plan.

(Di Nardi et al. 2010; Klein 2020a). This worry about large future expenses is one explanation for why people regularly forgo even well-above-market returns, such as those afforded to retirees who defer Social Security benefits (Sapra and Moore (2019)).¹⁰

Clearly, a retirement plan needs to be able to meet large, uncertain expenditures like those for health care, particularly later in life. One way to alleviate these anxieties is to increase spending flexibility. In fact, one's natural inclination to "belt tighten" following uncooperative markets and allow "raises" when markets recover is both quite intuitive and spectacularly effective in managing the vagaries of markets. Very small adjustments can have an outsize impact on retirement portfolios, given the centrality of spending as a key gravitational weight on portfolio growth.

In our study, 60 percent of respondents said they are willing or very willing to cut back their retirement-spending budgets to cope with a difficult period in the markets. The rate is even higher among those most concerned about longevity risk: 74 percent of these respondents indicate they are willing or very willing to embrace flexible spending. Retirement-income frameworks that allow investors and advisors to adjust both spending and asset allocation up or down in line with their goals and changing circumstances could enable greater (justified) confidence in retirement plans. It's this kind of increased control and flexibility that can help retirees feel more freedom to indulge in the joys of retirement.

CONCERNS BEYOND THE SELF

This kind of flexibility is also critical to one of the most commonly expressed goals among our survey population: leaving some form of financial legacy behind. In the fortunate cases

BEQUESTS

FINDINGS

Many investors plan on leaving assets for the next generation, and they are willing to reduce spending and alter their risk profiles to fund future bequests.

PROBLEM

Retirees prioritizing legacy goals have to weigh important trade-offs, because assets for future generations merit a different investment profile from those intended for retirement spending.

APPROACH

Two portfolios—one for near-term spending and one aimed at long-term growth—can help clarify this trade-off and support a plan fit for the retiree and heirs.

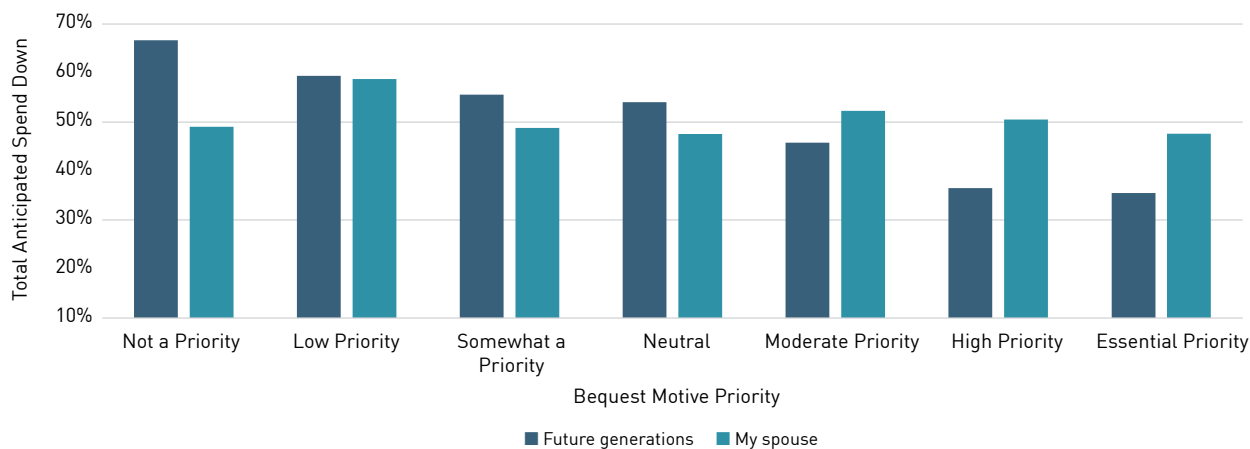
where unforeseen expenses are minimal, this excess wealth is not wasted; it lives on in the form of bequests.

Our study's focus on affluent and high-net-worth investors makes it well suited to examine the role of bequests on savings behavior. Bequests are rare outside of the top percentiles of net worth.¹¹ This makes it difficult to measure and study such effects in more general populations, but it is a natural topic for research among our sample. Only one in five respondents said they have no legacy goals in their retirement-spending plans. The first target for these bequests is a spouse (64 percent say it is a priority), with future generations a close second (54 percent), followed more distantly by the funding of charitable goals (21.5 percent). The respondent's age is significantly correlated with bequest motives for future generations and philanthropy: The desire to leave wealth to future generations sees a small increase with age, and the desire to leave wealth to charitable goals sees a small decrease with age.

To allow for bequests, most investors are willing to pull the levers at their disposal, from reducing spending to increasing equity allocations.¹² The link between anticipated spending and bequest motives was stronger than any other and almost three times stronger than the influence of risk priorities, i.e., health, household, longevity, market and political risks.¹³ The effect of bequests on anticipated spending was primarily driven by the desire to leave wealth to future generations and, to a lesser extent, charities. As shown in figure 4, the difference for future generations was most dramatic: Those who say it's not a priority expect to spend down 67 percent of their wealth in retirement. On the other end, those saying it's an essential priority expect to spend down only 35 percent of their total wealth (statistically significant).

Figure
4

SAVING WEALTH FOR OTHERS



Source: PIMCO Retirement Decumulation Study

Asset allocation is affected as well. We find that respondents who hold more in equities tend to have stronger bequest motives, indicating that investors are acting on desires to generate future growth. But here, too, there are differences among the legacy goals, specifically family versus philanthropy. The results reveal no link between asset allocations and the desire to leave wealth to charities, but there are small links with both spouse and future generation legacy goals. The proportion of investors endorsing a spousal legacy goal increases from 35 percent of those with all bonds in their portfolios to 59 percent of those with a 50-50 allocation to 63 percent of those with all stocks (statistically significant). The pattern is the same for the future generation legacy goal, increasing from 22 percent of those with all bonds in their portfolios to 46 percent of those with a 50-50 allocation to 53 percent of those with all stocks (statistically significant).

Our ongoing research shows us that investors planning to leave bequests hold different portfolios and spend assets differently. This reflects an interaction between the desire to make a bequest and tolerance for risk and uncertainty. Those who are more worried about future risks and plan on giving a bequest hold much safer assets on behalf of their heirs. Those who are less worried about uncertainty and just planning on a bequest prefer slightly more risk.

OUR APPROACH

The importance of behavioral biases in finance is clear. Predictable behavioral biases regularly appear in investors' decision-making and can materially affect their wealth. This study provides insights to identify potential ways to help nudge retirees to naturally fall into better behaviors. These include easy-to-understand, thoughtfully grounded plans. Reliable, dedicated cash flows can help retirees avoid running for the exits when the markets invariably underperform. Small, easy-to-implement changes in spending behavior can complement

active portfolio management to greatly improve asset longevity. This perspective—through the lens of behavioral science—has reinforced many findings from our existing research and allowed us to extend them by better understanding investors' mindsets and the role of individual motivations, traits, and circumstances.

Several of these key findings buttress our approach to retirement decumulation. Addressing behavioral biases may be one of the best ways to replace common overconfidence with more-realistic planning. First, we dedicate a portion of the client's existing fixed income allocation to "paycheck replacement."¹⁴ The idea is to deliver the capital required to support the retiree's annual spending with a high degree of certainty—essentially seeking to replace the lifeline of a paycheck's regular income stream. This mental accounting can be easy to understand, and we know that the presence of reliable income is correlated with a reduction in both loss-aversion bias and the bad behaviors that can result.

Investments in this portfolio consist of low-volatility assets designed to support short- and medium-term spending, such as laddered bonds geared to mature and deliver principal and interest each year for the next five, seven, or 10 years, or a portfolio of low-risk bond mutual funds with predictable income. Meanwhile, funding for more-distant future expenses—predictable or not—is addressed by a different mental account, the growth portfolio, which is oriented toward higher-risk investments and a longer investment horizon. These assets are meant to build additional wealth over time, and over inflation, and can be used for any purpose the retiree desires.

In our behavioral approach to retirement planning, the near-term or paycheck portfolio defines and maintains a retiree's annual spending. It gives confidence that spending needs can be met, but it does not constrain spending. Importantly, this

structure gives retirees full flexibility to adjust income up or down at any time to meet needs, without restrictions, surrender fees, or contractual transaction costs. The uncertainties embedded in future spending needs can be met with fully liquid assets. We find that when there is (warranted) greater confidence in a retirement plan focused on delivering near-term income, risk-taking with the remaining portfolio is likely to be more readily tolerated.

A behaviorally compatible retirement plan allows for straightforward but thoughtful allocation of bequests. No longer must retirees spend only the income from their portfolios and leave the balance to heirs. Instead, legacy planning mirrors the clear trade-offs between the two portfolios. Saving more assets for the future suggests a smaller paycheck portfolio and a larger growth one, whether those assets are earmarked for one's own consumption or that of future generations. ●

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ENDNOTES

- See, for example, Benartzi (2010) and Knoll (2011).
- Also commonly known as time-preference inconsistency or hyperbolic temporal discounting. Note that the structural equation model revealed no significant relationships with this variable, and thus it is not discussed further.
- This variable is not discussed further, because the structural equation model revealed only one small association with respondents' opportunity to save in the past 12 months, i.e., income was less than consumption: Compared to intuitive thinkers, analytic thinkers were more likely to have had the opportunity to save (effect size = very small, see endnote 5 for information on how effect sizes were interpreted throughout the paper).
- Studies have shown that overconfident investors fail to recognize and adequately prepare for risks, rely on incomplete information and unsupported assumptions, and overestimate their abilities and degree of control in financial markets—all of which can result in missed opportunities, slow recovery from setbacks, going in on bad calls, or mistiming the market.
- Effect sizes are interpreted in line with the guidelines of Cohen (2013), which are conventional in behavioral science.
- For notable examples, see Thaler et al. (1997) on myopic loss aversion, Shefrin and Statman (1985) on the disposition effect, and Kahneman et al. (1990) on the endowment effect.
- For example, a 100-percent chance of winning \$0 or a 50-percent chance of losing \$50 and a 50-percent chance of winning \$110.
- The wagers were created using the traditional value function from prospect theory:

$$v(x) = \begin{cases} x & \text{if } x \geq 0 \\ -\lambda(-x) & \text{if } x < 0 \end{cases}$$
 where loss aversion is represented by the lambda parameter, which indexes the difference in slopes of the positive and negative arms of the value function (Kahneman and Tversky 1979).
- The difference between entering and mid-late retirement was statistically significant for all the risk priorities: health risks (small effect size), market risks (small effect size), longevity risk (small

effect size), political risks (small effect size), and personal/household risks (small effect size).

- What people are unlikely to do is buy insurance: The private long-term care (LTC) market is small and very expensive. Premium loads often exceed 30 percent, fewer than 15 percent of households are covered by private LTC insurance (Brown and Finkelstein 2011), and only 4 percent of all LTC costs in the United States are covered by private insurance (Brown and Finkelstein 2007).
- A limitation to the results noted by Di Nardi et al. (2010).
- A full 65 percent were willing to make at least one financial change to enable higher bequests: 39 percent were willing to tolerate spending fluctuations, 34 percent were willing to spend less in retirement, and 27 percent were willing to allocate assets differently.
- In the full structural equation model, the bequest motives path carried more weight ($\beta = -0.40$) than the risk priorities path ($\beta = 0.13$) in accounting for differences in reports of anticipated spending.
- For example, with a laddered bond portfolio, such as a target-maturity (also known as a defined-maturity) bond portfolio designed to mature and pay out principal (minus defaults) after a specific number of years. Investment products contain risk and may lose value. There is no guarantee that an investment product will be successful in producing income. Investors should consult their investment professionals before making investment decisions.
- Some measures are not described in this appendix because they did not have significant relationships in the models: the Federal Reserve's measure of household opportunity to contribute to savings, short-term spending time horizon, maximum loss that can be withstood in retirement, retirement-income solution feature preferences, gender, ethnicity, marital status, and previous experience or formal education in finance.

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APPENDIX

STUDY DESIGN AND PROCEDURE

Respondents within the United States were recruited using an online panel, i.e., the survey was posted on a forum to a pool of potential participants. The survey took approximately 20–30 minutes to complete, and respondents were compensated for participating. Respondents were informed that the purpose of the study was to understand how retirement goals affected plans for spending down savings during decumulation. They were reminded that their participation was completely anonymous and voluntary, and that they could withdraw at any time without penalty. Then they answered basic demographic and screening questions to determine their eligibility for inclusion based on age and assets. Responses were eligible for inclusion only if the respondent passed a variety of attention-check measures embedded in the survey.

The main survey comprised three sections. The first focused on respondents' retirement planning and decumulation decisions. The second section was a retirement-income preference task where all were told to assume that they were just about to begin retirement, then each was randomly assigned to one of three market conditions (experimental manipulation): (1) fear, i.e., informed that although the economy has been strong, experts are expecting an imminent decline; (2) pain, i.e., informed that the market declined 30 percent in the previous year, compromising retirement portfolios; or (3) no market information control condition. Next, they read about two retirement-income strategies (in random order) and selected their preferences.

Each strategy had a short summary, excerpted below, with an optional rollover that included more detail. One strategy, referred to generally as “theory-based,” described modern portfolio theory:

A theory-based approach to retirement investing: It involves a single, combined portfolio that includes a fixed allocation to stocks and bonds along with automatic annual rebalancing of the portfolio back to the original, fixed allocation.

The other strategy, referred to as “behavior-based,” described a dual portfolio framework:

A behavior-based approach to retirement investing: It involves two separate but integrated investment portfolios: A bond allocation structured to deliver a target level of income annually to support near-term spending needs and a separate stock-oriented allocation for longer-term growth. The long-term growth portfolio will replenish the near-term spending portfolio only when the markets are doing well.

The third section of the survey had three short tasks designed to illuminate well-known behavioral issues, including loss-aversion bias, present bias, and thinking disposition.

ANALYTIC STRATEGY

This was a correlational, largely exploratory research survey. We employed a statistical analysis framework called structural equation modeling that is common in behavioral science. Our model included a mixture of observed and latent variables described in detail in the next section. Then we conducted additional targeted independent samples, t-tests, analysis of variance, and regression models to further explore the significant relationships that emerged among these variables.

SELECTED VARIABLES¹⁵

Liquid wealth: Responses were collected from about 250 investors with investable or disposable household financial assets, e.g., bank accounts, retirement accounts, stocks, bonds, and mutual funds, of between \$500,000 and \$999,999, and about 500 investors with assets of \$1 million or more. Respondents selected a wealth bracket from eight options.

Income framework preference: After reading about each retirement-income strategy, respondents chose either the theory-based or the behavior-based strategy as the approach that would be more likely to help them stick to a retirement-income plan and avoid bad investment decisions, such as panic selling when facing market adversity.

Spending comfort: Respondents rated how comfortable they were with the thought of spending down their retirement portfolios over time to meet retirement needs on a 1 (not at all) to 7 (very) scale.

Anticipated spend-down: Respondents indicated the total percentage of liquid wealth, i.e., cash or anything that can be readily converted to cash, that they're expecting to spend down to help finance retirement from 0–100 percent.

Confidence: Respondents rated how confident they were that their retirement-spending plans will be sufficient to ensure that needs are met in the future on a 1 (very unconfident) to 7 (very confident) scale.

Retirement status: Respondents' age and employment status were recoded into two groups, either 1 = entering retirement, for those who were not yet retired or had retired and were in the 55–66 age range, i.e., the transition period; or 2 = mid-late retirement.

Loss-aversion bias: Respondents were scored either 1 = low bias or 2 = high bias based on their response pattern in a series of six hypothetical wagers with different gain/loss trade-offs. The wagers were presented in a fixed order, with the gain-loss ratio increasing in each wager. Respondents chose either to accept or reject each wager, i.e., take the risk or sit out.

Present bias (hyperbolic time preference or temporal discounting): Respondents were scored either 1 = consistent or 2 = inconsistent (biased) based on response pattern. They made hypothetical decisions about a tax refund that they could choose to receive at an early date or wait to receive at a later date with a certain amount of interest added. There were six option pairs in a fixed sequence that increased the time frames and interest rates.

Thinking disposition (heuristic thinking tendency): Respondents were scored from 0 to 3, earning one point for each correct answer to the three-item cognitive reflection test (Frederick 2005; Toplak et al. 2011). Each item is essentially a riddle in which an intuitive but incorrect answer is immediately apparent. However, participants who take just a little extra time to think it through will recognize the correct answer. Zero or 1 score = tendency toward an intuitive/heuristic thinking disposition; a score of 2 or 3 = an analytical thinking disposition.

Willingness to take financial risks: Respondents answered one question about their willingness to take risks with financial investments that were dedicated to long-term growth and not needed for near-term spending, and another question asking the same about investments dedicated to supporting near-term spending on a scale from 1 (very unwilling) to 7 (very willing).

Asset allocation: Respondents indicated the general ratio of stocks to bonds in their financial portfolios on a scale from 1 (all stocks, no bonds) to 7 (all bonds, no stocks).

Information sources: Respondents indicated all the ways that they have tried to figure out how much their households would be able to withdraw from savings every year to best meet spending goals in retirement, choosing from a drop-down list of seven options, with an additional option to state that they hadn't tried to figure out how much they could withdraw each year. The optimal model fit grouped the options into three main categories: friends and family, self-assisted, and financial advisor.

Self-reported financial skill: Respondents rated their financial understanding and investment skill in general and specifically for retirement on a scale from 1 (very low) to 7 (very high). Respondents also rated their ability to work with numbers, e.g., fractions and percentages. For some analyses, these items were combined into a composite score, with a higher score indicating higher self-reported skill.

Risk priorities: Respondents rated a list of five potential risks that retirees often need to manage when making a spending plan—market, longevity, political, health, and household/personal—in terms of how highly they prioritize managing each on a scale from 1 (not a priority) to 7 (essential priority).

Legacy goals: Respondents rated a list of three potential legacy goals/bequest motives that retirees often need to manage when making a spending plan—future generations, spouse, and philanthropy—in terms of how highly they prioritize managing each on a scale from 1 (not a priority) to 7 (essential priority).

Enabling bequests: Respondents indicated whether they were willing or unwilling (binary) to make changes to enable larger bequests from a list of five options: allocate my assets differently, spend less during my retirement, tolerate some spending fluctuations, something else (open response), or N/A (not willing to do any of these).

Spending flexibility willingness: Respondents showed their willingness to cut back their spending budgets during difficult periods in the financial markets, indicating an increased tolerance for risk and variability on a scale from 1 (very unwilling) to 7 (very willing).

Withdrawal approach: Respondents were asked which of five options best described their approach to withdrawing money from savings and investments each year in retirement: regularly withdraw a consistent amount or percentage; withdraw only gains, dividends, or interest; withdraw money only in emergencies; no specific approach; or other (open response).

Age at retirement: Respondents shared the age at which they retired or planned to retire on a sliding scale from 30 to 120 years.

Age to claim Social Security benefits: Respondents shared the age at which they claimed or planned to claim Social Security benefits on a sliding scale from 62 to 70 years. They also shared how many months after leaving the workforce they claimed or expected to claim Social Security benefits on a scale of 0–90 months.

Longevity: Respondents indicated about how many years of spending in retirement they were planning for, i.e., how

long a retirement they were expecting, on a sliding scale from 5 to 35 years. Responses were grouped into three categories: short (5–12 years), medium (13–25 years), or long (26–35 years).

Health status: Respondents were asked to describe their general health on a scale from 1 (very good) to 5 (very poor).

Important Information

A bond ladder or “targeted maturity” bond portfolio is only one potential income strategy and may not be the best solution or appropriate for all investors. Income replacement needs may vary by household. An investor should consider and discuss how best to address their income needs with their financial and tax professionals.

The retirement allocation framework presented here is based on what PIMCO believes to be generally accepted investment theory. It is for illustrative purposes only and may not be appropriate for all investors. The retirement allocation framework is not based on any particularized financial situation, or need, and is not intended to be, and should not be construed as, a forecast, research, investment advice or a recommendation for any specific PIMCO or other strategy, product or service. Individuals should consult with their own financial and tax advisors to determine the most appropriate allocations for their financial and tax situation, including their investment objectives, time frame, risk tolerance, savings and other investments. Fixed income is only one possible portion of an investor’s portfolio, which can also include equities and other products. Investors should speak to their financial advisors regarding the investment mix that may be right for them based on their financial situation and investment objectives.

The analysis contained in this paper is based on hypothetical modeling. Hypothetical performance results have many inherent limitations, some of which are described below. No representation is being made that any account will or is likely to achieve profits or losses similar to those shown. In fact, there are frequently sharp differences between hypothetical performance results and the actual results subsequently achieved by any particular trading program or strategy. One of the limitations of hypothetical performance results is that they are generally prepared with the benefit of hindsight. In

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All investments contain risk and may lose value. Investing in the bond market is subject to risks, including market, interest rate, issuer, credit, inflation risk, and liquidity risk. The value of most bonds and bond strategies are impacted by changes in interest rates. Bonds and bond strategies with longer durations tend to be more sensitive and volatile than those with shorter durations; bond prices generally fall as interest rates rise, and low interest rate environments increase this risk. Reductions in bond counterparty capacity may contribute to decreased market liquidity and increased price volatility. Bond investments may be worth more or less than the original cost when redeemed.

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