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The State of Retirement Income: 2023

Stronger fixed-income returns boost starting safe withdrawal percentages to 4%, their highest level in three years.

Portfolio and Planning Research
13 November 2023

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Key Takeaways

- Morningstar's 2023 research suggests that 4.0% is the highest safe starting withdrawal rate for retirees spending from an investment portfolio (assuming a 90% probability of having funds remaining at the end of an assumed 30-year retirement period).
- That figure is the highest starting safe withdrawal percentage since Morningstar began creating this research in 2021. (The highest starting safe withdrawal rate for a 30-year horizon with a 90% probability of success was 3.3% in 2021 and 3.8% in 2022.)
- The increase in the withdrawal percentage since 2022 owes largely to higher fixed-income yields, along with a lower long-term inflation estimate.
- The highest starting safe withdrawal percentage comes from portfolios that hold between 20% and 40% in equities and the remainder in bonds and cash.
- Portfolios with different equity allocations than 20% to 40% have slightly lower starting safe withdrawal rates. In compensation, portfolios with higher equity weightings provide higher median residual balances at the end of the 30-year period than do bond-heavy portfolios.
- Dynamic withdrawal strategies may help retirees consume their portfolios more efficiently, factoring in both portfolio performance and spending. However, they also add variability to cash flows, which not all retirees will find acceptable.
- Another approach for achieving a higher withdrawal rate than the base case of 4.0% is to build a ladder of Treasury Inflation-Protected Securities, or TIPS. Doing so provided a 4.6% withdrawal rate, with a 100% probability of success, at the time of this paper's publication. However, using that strategy also liquidates the portfolio by Year 30, under all conditions.
- Based on studies of actual spending during retirement, retirees often decrease their inflation-adjusted spending over time, a pattern that can also lead to considerably higher safe withdrawal rates.
- The right level of flexibility in a retiree's spending system will depend on the individual's situation, including the extent to which fixed expenses are covered by nonportfolio income sources.

Exhibit 1 depicts the study's key findings, showing the interplay between starting safe withdrawal percentages, ending portfolio values, and cash flow volatility. (For this exercise, and all other such exercises in the paper, the starting portfolio balance is $1 million.) Strategies that allow for a steady inflation-adjusted paycheck (that is, no volatility in portfolio cash flows from year to year, in inflation-adjusted terms) either support the lowest starting withdrawal percentages, as with the base case, or leave the lowest median final balance, as with the TIPS ladder.

Exhibit 1 Key Findings (Based on 40% Equity/60% Fixed-Income Portfolio Over a 30-Year Period, 90% Success Rate)

Method	Starting Safe Withdrawal Rate %	Median Year 30 Ending Value ($ millions)	Year 30 Cash Flow Standard Deviation %
Base case	4.0	**1.5**	**0.0**
TIPS ladder (100% success rate)	4.6	0.0	**0.0**
Forgo inflation adjustment	4.4	1.4	5.4
RMD	4.4	0.2	43.7
Guardrails	**5.2**	0.8	29.4
Actual spending	5.0	1.4	**0.0**

Source: Morningstar. Data as of Sept. 30, 2023.

Meanwhile, systems that vary spending amounts based on portfolio performance lend themselves to higher starting withdrawals, at the cost of introducing variability into the retiree's spending patterns. As in our 2022 research, the guardrails strategy—which will be explained in Section II—supported the highest starting safe withdrawal percentage, albeit with significant cash flow volatility.

Also, because variable strategies encourage more-efficient portfolio consumption, they often lead to lower ending balances than does the base case. That occurs because when the financial markets perform well, thereby building the portfolio's value, variable strategies typically increase the spending rate. In contrast, the base case maintains a constant spending rate (aside from the annual inflation adjustment). Doing so permits the portfolio's wealth to grow during bull markets.

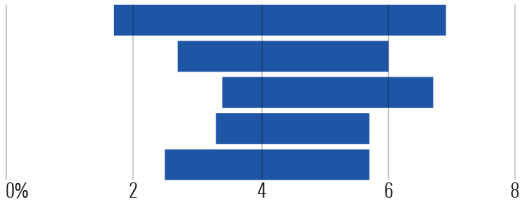
Section I: What's a Safe Withdrawal Rate for the Future?

History and Its Limits

History demonstrates that the "right" withdrawal rate depends on three key variables: the market environment that prevails over a retiree's drawdown period, the length of the drawdown period, and the portfolio's asset allocation. As shown in Exhibit 2, the starting safe withdrawal rate for 50% stock/50% fixed-income portfolios during rolling 30-year periods from 1926 through 1993 ranged from 3.4% for the worst 30-year period to 6.7% for the best. Those figures assume a fixed real withdrawal system and a 90% likelihood that a retiree would not run out of money over the 30-year time horizon.

Exhibit 2 Highest and Lowest Starting Safe Withdrawal % by Asset Allocation (Rolling Monthly 30-Year Periods, Starting from 1926-93, 90% Success Rate)

	Safe Withdrawal Rate %	
Equity Allocation %	Worst	Best
100	1.7	6.9
75	2.7	6.0
50	3.4	6.7
25	3.3	5.7
0	2.5	5.7



Source: Morningstar. Data of Dec. 31, 2022.

In general, portfolios that had higher equity asset allocations delivered superior returns and, in turn, higher withdrawal rates than those with more-conservative positioning. The results vary widely, though. Portfolios with 100% equity weightings delivered the highest starting safe withdrawal percentage over any 30-year period in history, at 6.9%. But in less-forgiving environments, even a 2% starting withdrawal could have been dangerous.

(Note: These figures were obtained by entering real-life investment returns and inflation rates into Morningstar's simulation model, which tests 1,000 possible market environments. Consequently, the model's findings differ somewhat from the historical results, which measure only a single possibility.)

Looking Forward

To provide withdrawal-rate guidance that considers current yields, valuations, and inflation, we turned to our colleagues in Morningstar Investment Management for forecasts on those variables. Like many investment-research groups, the MIM team develops forward-looking asset-class return assumptions as well as assumptions about the expected volatility of each asset class and future inflation levels. We then extrapolate 30-year forecasts based on MIM's assumptions.

Exhibit 3 Projected 30-Year Asset Class Return % and Inflation % Assumptions, 2023 vs. 2022

Broad Asset Class	Asset Class	2023	2022
Equity	Large Growth (U.S. Stocks)	8.64	9.65
	Large Value (U.S. Stocks)	8.87	8.96
	Small Growth (U.S. Stocks)	10.30	10.58
	Small Value (U.S. Stocks)	12.87	12.40
	Foreign	9.57	10.00
Bond	U.S. Investment-Grade Bond	4.93	4.51
	Foreign Bond	5.15	5.12
Cash	U.S. Treasury Bill	3.31	2.69
Inflation		2.42	2.84

Source: Morningstar. Data as of Sept. 30, 2023.

The capital markets assumptions (which are expressed as arithmetic means) employed in this paper have changed only modestly since 2022. Perhaps most important is that the inflation forecast has dropped slightly: We use a 2.42% forecast this year, versus 2.84% in 2022.

Now for the details. All portfolios are formed with varying combinations of stocks and bonds, in 10% increments. That is, the most aggressive portfolio consists of 100% equities, the next most aggressive holds 90% in equities, and so forth, until the final portfolio, which possesses no equities. We assume a diversified basket of investments within each asset class, holding those suballocations constant regardless of the broad asset-class exposures. For example, the stock portion of each portfolio consists of 30% in U.S. large-growth stocks, 30% in U.S. large-value stocks, 20% in foreign stocks, 10% in U.S. small-growth stocks, and 10% in U.S. small-value stocks. The fixed-income portion consists of 80% in U.S. bonds and 20% in non-U.S. bonds. Each portfolio holds a 10% cash position, except for the 100% stock portfolio.

Exhibit 4 provides the 30-year annual return and standard deviation estimates for each of the asset classes, along with their weightings within each sub-portfolio.

Exhibit 4 Projected 30-Year Asset-Class Return % and Standard Deviation %

Broad Asset Class	Asset Class	**Portfolio Weighting %**	Expected 30-Year Return % *(Arithmetic)*	Expected 30-Year Standard Deviation % *(Annual)*
Equity	Large Growth U.S. Stocks	30	8.64	18.93
	Large Value U.S. Stocks	30	8.87	15.96
	Small Growth U.S. Stocks	10	10.30	24.26
	Small Value U.S. Stocks	10	12.87	21.20
	Foreign Stocks	20	9.57	18.51
Bond	U.S. Investment-Grade Bond	80	4.93	5.51
	Foreign Bond	20	5.15	8.82
Cash	U.S. Treasury Bill	100	3.31	1.74
Inflation			2.42	

Source: Morningstar. Data as of Sept. 30, 2023.

Exhibit 5 depicts the forecast 30-year annual return and standard deviations for each of the portfolio mixes, ranging from 100% equity to 0% equity.

Exhibit 5 Projected 30-Year Portfolio Return % and Standard Deviation %

Portfolio Weighting %			Expected 30-Year Return % *(Arithmetic)*	Expected 30-Year Standard Deviation % *(Arithmetic)*
Equity	Bond	Cash		
100	0	0	9.41	17.10
90	0	10	8.86	15.39
80	10	10	8.41	13.82
70	20	10	7.96	12.28
60	30	10	7.51	10.77
50	40	10	7.06	9.33
40	50	10	6.61	7.97
30	60	10	6.16	6.76
20	70	10	5.71	5.79
10	80	10	5.26	5.18
0	90	10	4.81	5.08

Source: Morningstar. Data as of Sept. 30, 2023.

The Methodology

After estimating the expected returns and volatility of various asset mixes, we used Monte Carlo simulations to vary the sequence of potential investment returns. We selected a 30-year time horizon for the base case, but also tested withdrawal rates over shorter and longer time horizons. With each asset-class combination, Morningstar's model created 1,000 hypothetical return patterns, calculated from the

portfolio's expected annual returns and standard deviation. These return patterns were then used to seek the highest possible withdrawal rate, with a 90% success rate defined as when at least 900 of the 1,000 trials funded the specified spending amounts, throughout the 30-year period.

In addition, we assumed the following:

- A total return approach to cash flow sourcing: Rather than invest solely for income, thereby not spending the portfolio's capital, the retiree funds withdrawals through a combination of income and capital consumption. That is, if the portfolio's income equals or exceeds the planned withdrawal amount, then the retiree uses only the income, placing any excess back into the portfolio. If, however, income alone cannot fund the withdrawal amount, then the shortfall is covered by selling the requisite amount of portfolio principal.
- A fixed real withdrawal strategy for the base case (this assumption was altered for the variable spending scenarios discussed in Section II). The annual portfolio withdrawals are adjusted for inflation to maintain a constant real income. That is, assuming a $1 million initial investment, a 4% stated withdrawal rate, and a 2.42% inflation rate, the retiree would withdraw $40,000 from the portfolio in Year 1, $40,968 in Year 2, $41,959 in Year 3, and so forth.
- A 90% success rate: If, at the conclusion of the scheduled time period (30 years for the base case), at least 900 of the 1,000 trials are able to fund every year's scheduled withdrawal without creating a negative portfolio balance, then the assessed withdrawal rate is deemed to have passed the test. The final "safe withdrawal" rate for each allocation is therefore the highest withdrawal rate that achieves at least a 90% success rate.

Note: As is standard with retirement-income research, this approach considers only whether a portfolio can fund its scheduled withdrawals, not its final value. If a portfolio spends its last dollar during Year 30 to meet its withdrawal, with not a penny remaining, then the trial is considered successful. As we shall see, though, this is rarely the case. By definition, the trials near the 90th percentile create low final values. However, the ending balance for the median trial is often quite high.

The Findings

The starting safe withdrawal rate for a balanced portfolio over a 30-year time horizon was slightly higher than our finding in the 2022 research: 4.0% for a 40% equity/60% cash and bond portfolio and 3.9% for a 50% equity/50% bond and cash portfolio. (In our 2022 research, we arrived at a 3.8% starting safe withdrawal rate for both of those allocation mixes.) The highest safe withdrawal rate of 4.0% corresponded with equity allocations of 20%-40%.

Exhibit 6 shows the starting safe withdrawal rates over varying time horizons and with varying degrees of equity exposure in each portfolio.

Exhibit 6 30-Year Starting Safe Withdrawal Rate %, by Asset Allocation, 90% Success Rate

Equity Weighting %	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years	40 Years
100	8.3	5.8	4.6	3.8	3.3	3.1	2.9
90	8.6	6.0	4.7	4.0	3.5	3.2	3.0
80	8.9	6.2	4.8	4.1	3.7	3.3	3.2
70	9.2	6.4	5.1	4.3	3.8	3.5	3.2
60	9.4	6.5	5.2	4.4	3.9	3.5	3.3
50	9.6	6.7	5.4	4.5	3.9	3.6	3.4
40	9.8	6.8	5.4	4.5	4.0	3.6	3.4
30	9.9	6.9	5.5	4.6	4.0	3.6	3.4
20	10.0	6.9	5.5	4.5	4.0	3.6	3.3
10	9.9	6.9	5.4	4.4	3.9	3.4	3.2
0	9.7	6.7	4.2	4.3	3.6	3.2	2.9

Source: Morningstar. Data as of Sept. 30, 2023.

Why the Asset Allocation is Conservative

The highest available starting safe withdrawal rate in Morningstar's model, 4.0%, came from portfolios with modest equity weightings of between 20% and 40%. This result underscores that point that the model's "base case" is conservatively generated. For one thing, its equity-return assumptions, especially for U.S. growth stocks, are below their historical averages (reflecting the fact that valuations are high by historical standards). For another, it targets a success rate of 90%.The steeper the success rate, the more that the recommendation will favor the less-volatile assets of bonds and cash.

Finally, the base case assumes that the investor's spending needs are inflexible. That requirement also steers the model toward fixed-income investments. As is demonstrated in Section II of this paper, relaxing that requirement favors equities, because with flexible spending approaches retirees can better take advantage of equities' higher expected returns, by adjusting their spending rates in response to the stock market's performance.

Although conservative portfolios modestly improve the starting safe withdrawal rates, they do so at the cost of potential future wealth. Portfolios with equity weights between 20% and 40% supported the highest starting safe withdrawal percentage, but they also recorded lower median balances at Year 30 than did portfolios with more equity exposure. Exhibit 7 depicts the interplay between asset allocation, starting safe withdrawal rates, and the possibility for "leftovers" for heirs and/or charitable bequests at Year 30.

Exhibit 7 30-Year Starting Safe Withdrawal Rate % and Median Ending Balance at Year 30, by Asset Allocation, 90% Success Rate

Equity Weighting %	Withdrawal %	Median Balance at Year 30 ($ Millions)
100	3.3	4.5
90	3.5	3.8
80	3.7	3.2
70	3.8	2.8
60	3.9	2.3
50	3.9	2.0
40	4.0	1.5
30	4.0	1.2
20	4.0	0.9
10	3.9	0.8
0	3.6	0.7

Source: Morningstar. Data as of Sept. 30, 2023.

Our base case simulation also employs conservative return assumptions, especially for stocks. Employing return assumptions in line with historical norms, rather than assuming some reversion to the mean for U.S. growth stocks over the next two decades as MIM's return forecasts do, enlarges starting withdrawal percentages. For balanced portfolios, for example, using the long-term historical average return for investment assets, rather than MIM's forward-looking projections increases the safe withdrawal rate to 4.5%.Exhibit 8 depicts 30-year starting safe withdrawal percentages based on historical returns across varying asset mixes.

Exhibit 8 Historical Safe Withdrawal Rate %, Using Average Asset-Class Returns Based on 1926-2022 Data (30-Year Time Horizon, 90% Success Rate)

Equity Weighting %	Withdrawal Rate %
100	4.8
90	4.8
80	4.7
70	4.7
60	4.6
50	4.5
40	4.5
30	4.3
20	4.1
10	3.8
0	3.5

Source: Morningstar. Data as of Sept. 30, 2023.

The Role of Spending Patterns

In addition to employing conservative return assumptions, our research also adopts a conservative strategy for portfolio withdrawals. Specifically, we assume that retirees seek a "paycheck equivalent" in retirement and therefore aim to withdraw the same amount, adjusted upward to account for inflation, for 30 years. That is the convention used in William Bengen's original research[1] on safe withdrawal rates.

In reality, the retiree may not spend that way. Spending may level off in the middle to later years of retirement, for example—a pattern depicted in retirement researcher David Blanchett's survey of actual retiree spending patterns[2], as well as other research from the Employee Benefits Research Institute. We incorporated the latter findings in a new series of tests for this year's study labeled "actual spending" in Section II using spending patterns that match empirical data allows for a starting safe withdrawal rate of 5.0%, the second-highest of any method we tested.

The Role of Success Rates

Finally, our research is conservative in that it sets 90% as the target success rate for our base case. That means that for a given withdrawal percentage to be deemed a success, it must have funded each year's scheduled withdrawal in 900 of 1,000 trials. At first blush, retirees might be inclined to gravitate to a 100% success rate, but doing so reduces starting withdrawal percentages significantly. Correspondingly, reducing the target success rate by even 5 or 10 percentage points—to 85% or 80%—has meaningful implications for starting withdrawals. Exhibit 9 depicts starting safe withdrawal percentages for varying asset allocations with success-rate targets ranging from 50% to 100%.

Exhibit 9 30-Year Starting Safe Withdrawal Rate % by Asset Allocation With Varying Success Rates

Equity Weighting %	50%	60%	70%	80%	85%	90%	100%
100	6.2	5.6	5.0	4.3	3.9	3.3	0.9
90	6.0	5.5	5.0	4.4	4.0	3.5	1.1
80	5.9	5.5	5.0	4.4	4.1	3.7	1.4
70	5.8	5.4	5.0	4.5	4.2	3.8	1.6
60	5.6	5.3	4.9	4.5	4.2	3.9	1.9
50	5.5	5.2	4.9	4.5	4.3	3.9	2.2
40	5.3	5.0	4.8	4.5	4.3	4.0	2.4
30	5.1	4.9	4.7	4.4	4.2	4.0	2.6
20	4.9	4.7	4.5	4.3	4.2	4.0	2.8
10	4.6	4.5	4.3	4.2	4.0	3.9	2.8
0	4.4	4.2	4.1	3.9	3.8	3.6	2.6

Source: Morningstar. Data as of Sept. 30, 2023.

1 Bengen, W.P. (2007). "Determining Withdrawal Rates Using Historical Data." Journal of Financial Planning Vol. 7, No. 4, P. 171-180.

2 Blanchett, D. (2014). "Exploring the Retirement Consumption Puzzle." Journal of Financial Planning Vol. 27, No. 5, P. 34-42.

Targeting a success rate lower than 90% or 100% might seem too risky. However, retirees and their advisors have a valuable tool in their toolkits: the ability to ratchet down withdrawals if they encounter a poor market environment. Research from Derek Tharp[3] explores the relationship between starting withdrawal percentages, success rates, and flexibility in spending. It concludes that retirees could reasonably start with a success rate as low as 50%—and a correspondingly higher starting withdrawal percentage—as long as they are prepared to make downward adjustments in weak market environments. Systems that tether portfolio withdrawals to portfolio performance—and the implications for starting and lifetime withdrawals, residual balances in Year 30, and cash flow volatility—are the subject of Section II of this paper.

3 Tharp, D. 2021. Jan. 6, 2021. " Why 50% Probability Of Success Is Actually A Viable Monte Carlo Retirement Projection." https://www.kitces.com/blog/monte-carlo-retirement-projection-probability-success-adjustment-minimum-odds/

Section II: How Dynamic Withdrawal Strategies Can Help

Section I demonstrates that retirees who require a fixed real withdrawal amount from year to year will need to keep their starting withdrawals at 4.0% or lower if they want to lock in a 90% probability of success over a 30-year time horizon. Given that many portfolios may still be recovering from 2022's bear market, that recommendation may be unwelcome.

As in last year's research, we also explore the impact of more flexible withdrawal strategies. An approach that involves changing withdrawal amounts from year to year—taking lower withdrawals in weak market environments and perhaps higher paydays in very strong ones—typically allows for higher withdrawal rates. Flexible strategies are effective because they help to prevent retirees from overspending in periods of market weakness, while giving them a raise in stronger market environments.

Adjusting withdrawal rates based on portfolio performance can also help ensure that retirees consume their portfolios efficiently. For retirees who aim to maximize consumption (which may encompass charitable giving and lifetime gifts to loved ones) during their own lifetimes, flexible strategies provide opportunities for spending increases when market performance is strong. Moreover, it is worth noting that, for nearly all retirees, portfolio withdrawals will compose just a portion of the household's cash flow needs: Income from Social Security, a pension(s), and/or an annuity will supply some or even most of the household's spending. As a result, changes in portfolio spending imposed by a flexible system will affect only a portion of the retiree's cash flows.

Variable strategies do entail trade-offs—specifically, the tension between a higher lifetime withdrawal rate afforded by periodic withdrawal adjustments and the volatility those adjustments create in the retiree's cash flows, which may also subject retirees to swings in their standards of living. Consequently, some retirees may find flexible schemes unacceptable.

For example, taking a fixed percentage withdrawal (for example, 4% of the portfolio balance per year)entirely solves the problem of running out of money, but it does so at the expense of the retiree's standard of living being buffeted by changes in the value of the portfolio. Also, should the markets perform badly, the withdrawal amount could end up being trivially low.

At the opposite extreme, the fixed real withdrawal system that serves as this paper's base case nicely addresses a retiree's desire to have stable portfolio cash flows, much like a paycheck in retirement. But taking fixed real withdrawals can be inefficient because it does not link consumption to portfolio values.

If the starting withdrawal is too low and the portfolio outperforms expectations, the retiree will leave behind a large sum, which may not be a goal. If, on the other hand, the initial withdrawal is too high, the retiree will consume too much too early and risk running out prematurely or having to engage in dramatic belt-tightening later in life.

To help identify how flexible strategies balance lifetime income with considerations of quality of life and the volatility of cash flows, we tested some of the most widely used flexible strategies, benchmarking them against a system of fixed real withdrawals. The four methods are described below.

- **Method 1: Forgoing inflation adjustments following annual portfolio loss.**
  This method, advocated by (among others) T. Rowe Price, begins with the base case of fixed real withdrawals throughout a 30-year time horizon. However, to preserve assets following down markets, the retiree skips the inflation adjustment for the year following a year in which the portfolio has declined in value. This might seem like a modest step, but the cuts in real spending, while small, are cumulative. That is, the effects of such cuts ripple into the future, as these changes permanently reduce the retiree's spending pattern.

- **Method 2: Required minimum distributions.**
  This is the same framework that underpins required minimum distributions from tax-deferred accounts like IRAs. In its simplest form, the RMD method is portfolio value divided by life expectancy. For life expectancy, we used the IRS' Single Life Expectancy Table and assumed a 30-year retirement time horizon, from ages 65 to 94. (We employed the updated RMD calculations that went into effect in 2022.) This method is inherently "safe" and designed to ensure that a retiree will never deplete the portfolio because the withdrawal amount is always a percentage of the remaining balance. However, an RMD system incorporates two key variables for retirement-spending plans: remaining life expectancy and remaining portfolio value. While changes in life expectancy are gradual, the fact that the remaining portfolio value can change significantly from year to year adds substantial volatility to cash flows.

- **Method 3: Guardrails.**
  Originally developed by financial planner Jonathan Guyton and computer scientist William Klinger, the guardrails method sets an initial withdrawal percentage, then adjusts subsequent withdrawals annually based on portfolio performance and the previous withdrawal percentage. The guardrails attempt to deliver sufficient—but not overly high—raises in upward-trending markets while adjusting downward after market losses. In upward-trending markets, in which the portfolio performs well and the new withdrawal percentage (adjusted for inflation) falls below 20% of its initial level, the withdrawal increases by the inflation adjustment plus another 10%.

  To use a simple example, let's say the starting withdrawal percentage is 4% of $1 million, or $40,000. If the portfolio increases to $1.4 million at the beginning of Year 2, the retiree could automatically take $40,000 plus an inflation adjustment—$40,968, based on a 2.42% inflation rate. Dividing that amount by the current balance—$1.4 million—tests for the percentage. The amount of $40,968 is just 2.9% of $1.4 million. As that 2.9% figure is 28% less than the starting percentage of 4%, the retiree qualifies for an

upward adjustment of 10%. The new withdrawal amount becomes $45,065—the scheduled amount of $40,968 plus the additional 10% of $4,097.

The guardrails apply during down markets, too. Specifically, the retiree cuts spending by 10% if the new withdrawal rate (adjusted for inflation) is 20% above its initial level. For example, let's say the retiree withdrawing 4% ($40,000) of the $1 million portfolio in Year 1 immediately strikes an investment iceberg, losing 30% of the portfolio value in Year 1. The portfolio drops to just $672,000 at the beginning of Year 2. The Year 2 withdrawal would be $40,968 on a pretest basis. But because $40,968 from $672,000 is a 6.1% withdrawal rate—far above the initial 4%—the retiree would need to reduce the scheduled $40,968 amount by 10%, to $36,871.

The Guyton-Klinger method scraps the cutback rules (following portfolio declines) during the final 15 years of retirement, in acknowledgement of the fact that weak returns are especially dangerous early in retirement but less so later on. Guyton-Klinger also includes some portfolio-management rules related to the spending of various assets—for example, if the equity allocation exceeds its target allocation because of strong performance, the excess equity exposure is sold and added to cash. However, for this exercise, we focused exclusively on changes to the withdrawal rate rather than including the portfolio management rules.

- **Method 4 (new for 2023): Spending declines in line with historical data.**[4]
  We also tested a strategy that incorporates the average decline in spending that occurs over the retirement life cycle. In past studies, we incorporated this spending pattern by assuming that the hypothetical retirees did not adjust their annual withdrawals by the full amount of inflation but instead by 1 percentage point less than the annual inflation rate.

  In this year's study, we further refined this method by incorporating more specific patterns observable in retiree spending at various life stages. Research from the Employee Benefits Research Institute[4] demonstrates that inflation-adjusted household spending has historically fallen by 19% from age 65 to 75, 34% from age 65 to 85, and 52% from age 65 to 95. We adjusted the annual spending numbers to match up with these longer-term declines. To reflect this, Method 4 assumes that real retirement spending declines by 1.9 percentage points per year between age 65 and 75; 1.5 percentage points per year between 75 and 85; and 1.8 percentage points per year between 85 and 95.

Assessing Variable Withdrawal Strategies

For each strategy, we used stochastic (Monte Carlo) modeling to test how successful withdrawal systems—meaning that a given system ensured that a retiree did not run out of money over a 30-year time horizon—fared on a few key metrics. As with the base case, we defined success as not running out of money in 90% of the random trials. We employed a 40% equity/60% fixed-income portfolio as the baseline case but also looked at other asset allocations.

4 Banerjee, S. "Expenditure Patterns of Older Americans, 2001–2009," EBRI Issue Brief, No. 368, February 2012.

The metrics were as follows:

Starting Safe Withdrawal Rate: What starting withdrawal rate would have been supported for 30-year periods with a 90% probability of success (with "success" defined as a positive account balance at the end of the 30-year horizon)?

Lifetime Portfolio Withdrawal Rate (Internal Rate of Return): What was the average lifetime withdrawal amount, factoring in any upward or downward adjustments that the flexible strategy entailed, that would have been supported for 30-year periods with a 90% probability of success? We calculate this as the average value of the annual withdrawals (discounted by the 2.42% inflation rate) for the 1,000 simulated trials.

Year 30 Cash Flow Standard Deviation: To what extent did withdrawals vary on a year-to-year basis? To approximate this variance, we examine the standard deviation of the withdrawals that take place in Year 30 across the 1,000 simulated trials. The higher the standard deviation, the greater potential variation in spending across the retirement horizon.

Median Ending Value at Year 30: What is the median portfolio balance that remains at the end of the 30-year period? To arrive at this figure, we find the median balance for the 1,000 trials remaining at the end of the 30-year periods. This metric is critical for those who wish to maintain (or even grow) their assets to leave something behind for heirs or charity.

Comparing the Methods

Each method entails its own set of trade-offs. Below, we compare each method based on the four analyzed metrics: starting safe withdrawal rates, lifetime portfolio withdrawal rates, Year 30 cash flow standard deviation, and median ending value at Year 30. Exhibit 10 depicts how each method fared on each metric, assuming 40% stock/60% bond portfolios, a 30-year spending horizon, and a 90% success rate. The spending method that delivers the best outcome is noted in bold.

Exhibit 10 Spending Methods Summary, 40% Equity/60% Bond Portfolio, 30 Years, and 90% Success Rates

Method	Starting Safe Withdrawal Rate %	Lifetime Withdrawal Rate %	Year 30 Cash Flow Standard Deviation %	Median Year 30 Ending Value ($ millions)
Base case	4.0	4.0	**0.0**	**1.5**
TIPS ladder (100% success rate)	4.6	4.6	**0.0**	0.0
Forgo inflation adjustment	4.4	4.1	5.4	1.4
RMD	4.4	**5.4**	43.7	0.2
Guardrails	**5.2**	4.8	29.4	0.8
Actual spending	5.0	3.9	**0.0**	1.4

Source: Morningstar. Data as of Sept. 30, 2023.

Starting Safe Withdrawal Rate

Each flexible spending method supports a higher initial safe withdrawal rate than the fixed real withdrawal method, as shown in Exhibit 10. But the guardrails method supports the highest starting safe

withdrawal rates across most asset allocations. This reflects the nature of the approach, which can support higher initial withdrawals by making potentially significant year-to-year adjustments to dollar withdrawals, by throttling spending down at inopportune times.

For the other methods, starting safe withdrawal rates are generally highest with equity allocations ranging from 20%-40% and tended to be lowest in less-diversified allocations like 100% stocks. However, because our expectations for fixed-income returns (primarily cash) have ticked up while assumptions for equity returns have edged down, less equity-heavy allocations come out looking better than they did in last year's study.

Exhibit 11 30-Year Starting Safe Withdrawal Rate % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method				
Equity Weighting %	Base case	Forgo inflation adjustment	RMD	Guardrails	Actual spending
100	3.3	3.8	4.4	**4.9**	4.2
90	3.5	4.0	4.4	**5.1**	4.4
80	3.7	4.1	4.4	**5.4**	4.6
70	3.8	4.2	4.4	**5.5**	4.7
60	3.9	4.3	4.4	**5.5**	4.8
50	3.9	4.4	4.4	**5.3**	4.9
40	4.0	4.4	4.4	**5.2**	5.0
30	4.0	4.4	4.4	**5.0**	**5.0**
20	4.0	4.3	4.4	4.8	**5.0**
10	3.9	4.2	4.4	4.6	**4.9**
0	3.6	4.0	4.4	4.5	**4.6**

Source: Morningstar. Data as of Sept. 30, 2023.

Lifetime Withdrawal Rate

Most flexible spending approaches boast a higher lifetime withdrawal rate than the fixed real withdrawal method, across the asset-allocation spectrum. The RMD and guardrails methods support the highest lifetime withdrawal rates, while forgoing an inflation adjustment in the year following a portfolio loss also offers slightly higher levels of lifetime income than the baseline fixed real withdrawal approach. Notably, equity-heavy allocations under the guardrails and RMD methods support higher lifetime withdrawal rates than bond-heavy allocations. That is because the portfolios with higher equity allocations provided larger "raises" in annual withdrawals following good years, thereby enlarging lifetime withdrawal amounts. As always, though, there are trade-offs, as the increases in portfolio spending reduce the portfolios' ending values.

Exhibit 12 30-Year Lifetime Withdrawal Rate % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method				
Equity Weighting %	Base case	Forgo inflation adjustment	RMD	Guardrails	Actual spending
100	3.3	3.4	**8.1**	6.2	3.3
90	3.5	3.6	**7.5**	5.9	3.4
80	3.7	3.7	**7.0**	5.7	3.6
70	3.8	3.8	**6.6**	5.5	3.7
60	3.9	3.9	**6.1**	5.2	3.8
50	3.9	4.1	**5.8**	5.0	3.8
40	4.0	4.1	**5.4**	4.8	3.8
30	4.0	4.1	**5.1**	4.6	3.9
20	4.0	4.1	**4.8**	4.4	3.9
10	3.9	4.0	**4.5**	4.2	3.8
0	3.6	3.8	**4.3**	4.0	3.6

Source: Morningstar. Data as of Sept. 30, 2023.

Year 30 Cash Flow Standard Deviation

With this measure, the trade-offs demanded by the RMD and guardrails methods become apparent. Both approaches have far greater variability in their annual withdrawal amounts. Such unpredictability is a natural byproduct of their rules, which can dictate higher or lower spending under certain circumstances. Thus, retirees who are attracted to these methods' high withdrawal rates must also reckon with the substantial uncertainty they can impose. By contrast, the forgo-inflation and actual spending methods entail relatively little year-to-year spending change, making them more useful to retirees who prize stability and predictability.

Exhibit 13 Year 30 Cash Flow Standard Deviation % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method				
Equity Weighting %	Base case	Forgo inflation adjustment	RMD	Guardrails	Actual spending
100	**0.0**	6.1	103.9	88.0	**0.0**
90	**0.0**	6.1	91.5	81.6	**0.0**
80	**0.0**	6.0	80.5	71.8	**0.0**
70	**0.0**	6.0	70.3	60.9	**0.0**
60	**0.0**	5.8	60.6	50.0	**0.0**
50	**0.0**	5.6	51.8	38.5	**0.0**
40	**0.0**	5.4	43.7	29.4	**0.0**
30	**0.0**	5.1	36.8	22.0	**0.0**
20	**0.0**	4.9	31.4	17.4	**0.0**
10	**0.0**	4.8	28.0	15.6	**0.0**
0	**0.0**	5.0	27.6	16.4	**0.0**

Source: Morningstar. Data as of Sept. 30, 2023.

Median Ending Value at Year 30

The base case of taking fixed real withdrawals creates some of the highest median balances at Year 30. In other words, retirees using such a strategy may well underspend during their lifetimes. That attribute depresses potential spending but may appeal to bequest-minded retirees. Among the flexible withdrawal methods, the actual spending method and the forgo inflation method produced the highest Year 30 values, on average. At the other extreme, the RMD method resulted in the lowest ending values. This result is because it spends down most of the retirement capital by design. The guardrails approach splits the difference between a more aggressive, freer-spending method like RMD and thriftier methods that curtail, but never increase, spending.

Exhibit 14 Median Ending Value at Year 30 ($ Mil.) by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method				
Equity Weighting %	Base case	Forgo inflation adjustment	RMD	Guardrails	Actual spending
100	**4.5**	4.2	0.3	2.0	4.2
90	**3.8**	3.5	0.3	1.7	3.6
80	**3.2**	3.1	0.3	1.3	3.1
70	**2.8**	2.6	0.3	1.2	2.6
60	**2.3**	2.1	0.3	1.0	2.2
50	**2.0**	1.7	0.2	0.8	1.8
40	**1.5**	1.4	0.2	0.8	1.4
30	**1.2**	1.1	0.2	0.6	1.2
20	**0.9**	**0.9**	0.2	0.6	**0.9**
10	**0.8**	0.7	0.2	0.5	0.7
0	**0.7**	0.6	0.1	0.4	0.7

Source: Morningstar. Data as of Sept. 30, 2023.

Dynamic Spending Methods: Key Takeaways

The preceding section detailed how each of the dynamic spending methods fared on each of the four metrics: starting safe withdrawal rate, lifetime withdrawal rate, Year 30 cash flow standard deviation, and median ending value at Year 30. The table below summarizes the pros and cons of each approach, as well as the type of retiree for whom they would be most suitable.

Exhibit 15 Pros and Cons of Dynamic Spending Methods

Approach	Pros	Cons	Best For
Fixed Real (Base Case)	▸ Delivers steady "paycheck equivalent" throughout retirement ▸ Lowest cash flow volatility of any method ▸ Highest ending portfolio value	▸ Doesn't maximize lifetime withdrawal rates ▸ May leave too much money on the table for retirees who don't want to leave a legacy to heirs	Retirees who value a predictable income stream and want to maximize the ending portfolio value as a bequest
TIPS Ladder	▸ 100% success rate ▸ Delivers steady "paycheck equivalent" throughout retirement ▸ Lowest cash flow volatility of any method, along with base case	▸ No upside; withdrawal rate can never be increased without future decreases ▸ Ending portfolio values are lowest of any method	Retirees who seek a relatively high withdrawal rate with 100% assurance, while not being worried about either longevity risk or bequeathing a legacy
Forgo Inflation Adjustment	▸ Cuts in real spending, while modest, are cumulative and allow for meaningfully higher starting withdrawal rates ▸ Typically results in healthy ending portfolio value	▸ Delivers lower lifetime withdrawal rates than most other methods	Retirees who seek a "paycheck equivalent" approach that allows for slightly higher starting withdrawal percentage than the basic system of fixed real withdrawals
RMD	▸ Supports the highest lifetime withdrawal rate of any method ▸ May save time since retirees still need to calculate RMD amounts and take distributions for RMDs even if they follow another method	▸ Leads to the highest cash flow volatility of any method ▸ Ending portfolio values are lower than most other methods	Retirees with shorter-than-average life expectancies and/or those who can cover most of their fixed living expenses from nonportfolio income sources such as Social Security or a pension
Guardrails	▸ Supports the highest starting safe withdrawal rates across most allocations ▸ Lifetime withdrawal rates are also substantially higher than other methods	▸ More complicated than other methods ▸ Results in far higher cash flow volatility than most other methods ▸ Typically leads to lower ending portfolio value than most other methods	Retirees who prioritize maximizing spending over leaving a bequest to family or charity
Actual Spending	▸ Results in second-highest ending portfolio value ▸ Delivers higher paychecks early in retirement when retirees are likely to spend the most ▸ Very low cash flow volatility	▸ Doesn't maximize lifetime withdrawal rates	Retirees who want to spend more in the early years of retirement and are looking for a high degree of cash flow predictability

Source: Morningstar. Data as of Sept. 30, 2023.

The guardrails system—flexible withdrawals with parameters, or guardrails, that prevent withdrawals from being either too high or too low—does the best job of enlarging payouts in a safe and livable way. For those seeking a simpler approach that provides more predictable withdrawal amounts, a fixed real withdrawal system that forgoes inflation adjustments after a losing year moderately increases lifetime withdrawals, without greatly increasing cash flow volatility. It is also straightforward to implement. Alternatively, retirees who believe that their spending needs will not keep up with inflation over their drawdown period—an assumption borne out by the data on how retirees actually spend—might consider the simple system of making slight reductions to their annual spending over time.

Section III: The Role of Guaranteed Income

This paper addresses how retirees can convert their investment portfolios into a spending rate. That is, it evaluates strategies for non-guaranteed income. However, almost all retirees receive at least one form of guaranteed income. This section discusses the primary considerations for those sources of income, and how they might be combined with portfolio-based strategies.

Guaranteed income may be obtained through investments, pensions, or insurance contracts.

Investments: TIPS Ladders

Retirees seeking to generate guaranteed income within an investment portfolio can do by purchasing either nominal bonds, such as conventional Treasuries, or bonds providing yields that are adjusted for changes in inflation. As the former are already incorporated in this paper via the various portfolio allocations tested, this discussion will address only the latter option: Treasury Inflation-Protected Securities, or TIPS.

One way for retirees to use TIPS is as substitutes for nominal bonds in their investment portfolios. Because Morningstar's forecast for long-term TIPS returns matches its forecast for long-term returns on high-quality nominal bonds, adopting that approach does not alter this paper's previous conclusions. The suggested safe withdrawal rates remain the same, regardless of what version of Treasuries the retiree purchases.

However, retirees can achieve meaningfully different results by building a TIPS ladder. A TIPS ladder is a self-liquidating portfolio, existing during a specific time horizon. For this paper, we will consider a 30-year ladder, which matches the assumed retirement period. A 30-year TIPS ladder buys TIPS of various maturities, from one year through 30 years, then achieves a consistent real withdrawal rate by combining the yield paid by those TIPS with sales of the investor's original capital. When the 30-year period expires, so does the portfolio. TIPS ladders are designed to liquidate at the end of the investment period.

By self-liquidating, TIPS ladders differ from the other withdrawal strategies covered in this paper, save for the RMD method, which also (nearly) exhausts the retiree's investment. This feature, of course, is not appealing. But TIPS ladders deliver two major offsetting benefits. First, they provide a 100% success rate. While the withdrawal rates cited for every other strategy cited in this paper are calculated to

succeed on 90% of occasions, per the simulation model, payments from TIPS ladders are fully secured. They not only are guaranteed by the United States government, but are also immune to inflation's ravages, as their payments are structured in real terms.

(To be sure, the prices of TIPS bonds can fluctuate sharply in response to inflation, as demonstrated in 2022, when long-term TIPS suffered steep capital losses. But changes in market prices are irrelevant for TIPS ladders, because they own all their investments until their maturity dates.)

The other benefit offered by TIPS ladders is that, if the yields on TIPS are sufficiently attractive, their safe withdrawal rates can exceed those provided by other investment portfolios. As of Sept. 30, 2023, the date from which this paper's data was derived, that was the case: A 30-year TIPS ladder delivered an annual withdrawal rate of 4.6%, in inflation-adjusted terms. Meanwhile, the highest yield available for the base-case portfolios was 4.0%.

The current 30-year TIPS ladder rate is unusually high by recent standards.

Exhibit 16 Historic 30-Year TIPS Ladder Safe Withdrawal Rate, Calculated on Sept. 30 of Each Year

Year	Safe Withdrawal Rate %
2014	3.8
2015	4.1
2016	3.5
2017	3.7
2018	3.8
2019	3.5
2020	3.0
2021	3.2
2022	4.2
2023	4.6

Source: Morningstar. Data as of Sept. 30, 2023.

A 4.6% withdrawal rate with 100% safety certainly appears better than the 4.0% withdrawal rate with a 90% success rate that arises from this paper's base case There are, however, some catches. One drawback has already been mentioned: Whereas the TIPS ladder possesses no ending value, by definition the base-case strategy finishes Year 30 with a positive balance in 90% of the simulations. The median ending value for the 40% equity portfolio, in fact, is $1.5 million. The base-case strategy is therefore much better suited for retirees who want their investments to last more than 30 years, either for their own use should they outlive that period, or to leave as a bequest.

The other drawback with TIPS ladders is that they are entirely inflexible. Although the base-case scenario is modeled as being inflexible, under the assumption that retirees will not adjust their spending strategies along the way, they can in practice be altered. Not so with TIPS ladders. Retirees who start

down that path must either finish it, as planned, or accept that changes they make along the way will irrevocably ripple for the rest of the retirement period.

One way to alleviate these concerns is to supplement a TIPS ladder with an equity kicker. With that strategy, retirees would place less than the entire portfolio into a TIPS ladder, investing the remaining assets into equities. The TIPS ladder would then be spent down through annual withdrawals, while the equity position would be held untouched. When the 30 years conclude, the equity position will likely have substantially appreciated, thereby replacing some or perhaps even all of the assets that were spent on the TIPS ladder.

Exhibit 17 shows the median ending value after Year 30 for this TIPS-ladder-plus-equities strategy, assuming various effective withdrawal rates and the same long-term equity return assumption that is employed throughout this paper. The starting equity weightings for the portfolios range from 35% for the portfolio that provides a 3.5% withdrawal rate, to 2% for the portfolio with a 45% withdrawal rate.

Exhibit 17 TIPS Ladders Plus Equities, Safe Withdrawal Rate % and Median Ending Values at Year 30 ($ Mil.)

Safe Withdrawal Rate %	Median Ending Values at Year 30 ($ Millions)
3.5	2.2
3.6	2.0
3.7	1.9
3.8	1.6
3.9	1.4
4.0	1.2
4.1	1.0
4.2	0.8
4.3	0.6
4.4	0.4
4.5	0.2
4.6	0.0

Source: Morningstar. Data as of Sept. 30, 2023.

Social Security

Retirees who live in the U.S. may receive guaranteed income through pensions either as Social Security payments, or through a traditional defined-benefit program. This section will address only Social Security, as most prospective retirees will not qualify for defined-benefit payments.

The U.S. Social Security Administration encourages retirees to postpone the date at which they claim their benefits. Not only does the administration penalize retirees who file before the official "full" retirement age (currently 67 for people born in 1960 and after), but it rewards those who delay by substantially increasing their benefits. The chart below shows the current benefit-payment schedule.

Exhibit 18 Social Security Benefit % by Claiming Age, Birth Year 1960 or Later

Age	Percentage
62	70
63	75
64	80
65	87
66	93
67	100
68	108
69	116
70	124

Source: Social Security Administration. Data as of Sept. 30, 2023.

Those who file early for Social Security enjoy an initial advantage because they receive income while others do not. However, the payment schedule's increase is aggressive enough to overcome that gap, for those with average-or-longer lifespans. For example, by the time retirees reach age 79, those who filed for Social Security at their full benefit age of 67 will have collected more money from their benefit than those who started at age 62.

The payoff for postponing the decision past the full benefit age is less clear, as those who delay filing until age 70 must wait until they are 84 to collect more than those who started at age 67. That said, retirees who view Social Security primarily as insurance against the possibility of outliving one's money, rather than as an investment opportunity, will probably decide to wait. After all, the longer that retirees postpone their claim, the higher their insurance payout, should they have an extended lifespan.

There are times when retirees will not wish to delay filing for Social Security. Most commonly, the retiree needs the money immediately. In that instance, Social Security payments are not part of a broader retirement-spending strategy, but are instead essential for paying for basic living expenses. Such investors cannot afford delay. Another consideration is if the retiree has unusually poor health, in which case it's usually wiser to collect the bird at hand rather than wait for the two in the bush.

The advantage that accrues from postponing Social Security becomes considerably larger for those who also postpone tapping into their investment portfolios. Doing so increases the safe withdrawal rate for two reasons. First, working longer reduces the length of the expected retirement period. Second, doing so creates a larger investment portfolio, both because the existing portfolio appreciates along with the financial markets, and because the investor continues making contributions to retirement savings and may also benefit from tax-sheltered compounding. For each additional year worked, the safe withdrawal rate at the 90% success level for the 40% equity portfolio with a 30-year time horizon increases by one tenth of a percent per year, as shown below.

Exhibit 19 Safe Withdrawal Rate % by Retirement Age

Retirement Age	Safe Withdrawal Rate %
65	4.0
66	4.1
67	4.2
68	4.3
69	4.4
70	4.5

Source: Morningstar. Data as of Sept. 30, 2023.

Immediate Annuities

Annuity contracts sold by insurance companies come in many forms. The most appropriate annuity version for retirees seeking guaranteed income consists either of 1) immediate lifetime annuities, which distribute monthly payouts for the remainder of the retiree's life, starting when they are purchased; or 2) deferred annuities, which begin their payments at a specified later date.

Effectively, annuities are the opposite of TIPS ladders. Whereas TIPS ladders fully protect against inflation risk but are vulnerable to longevity risk because of their scheduled termination dates, the features for annuities are reversed. Their payouts are customarily nominal, making them vulnerable to high inflation. However, as annuity payouts persist throughout the retiree's life, they protect against longevity risk.

Consequently, a guaranteed-income strategy that combines TIPS ladders and immediate annuities may be worth considering. Such a discussion lies outside the scope of this year's paper, but the topic will be addressed in future editions.

Section IV: The Lingering Effects of Inflation and Market Downturns

The headline numbers from this year's study are positive. Safe withdrawal rates for both the base case of fixed real withdrawals and flexible withdrawal strategies are more generous than the numbers we cited in the two previous editions of this paper.

But it's not all sunshine and roses for retirement income, as recent retirees must contend with ongoing challenges from higher inflation and the 2022 bear market.

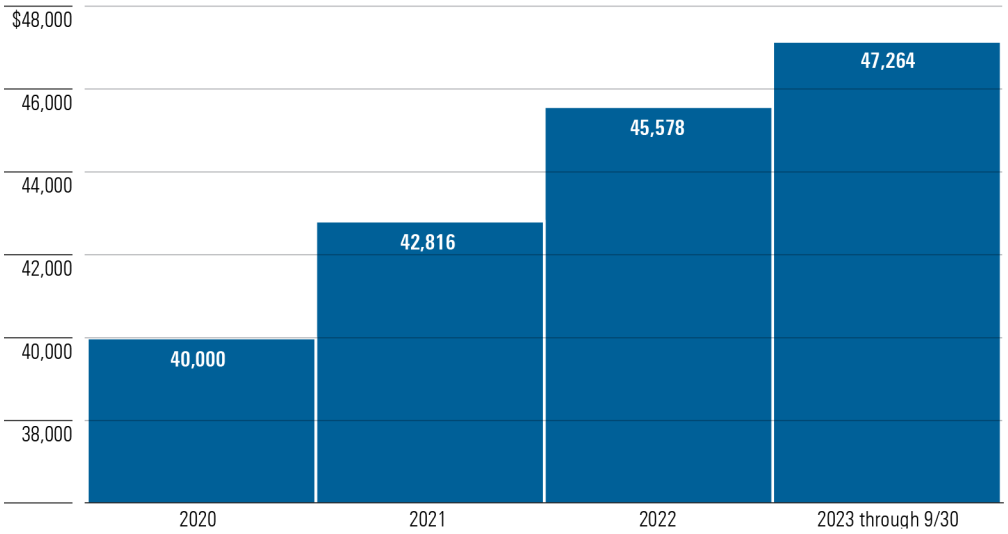
The Challenge of Inflation

As of this writing in October 2023, inflation appears to be moderating. The most recent inflation report showed a year-over-year increase of 3.7%, which is still above the Federal Reserve's 2% target but well below the 9.1% peak in June 2022.

However, even if inflation continues to ease, it still creates significant challenges for recent retirees. This is because past inflation typically creates a permanent increase in the baseline cost of required spending. The rate of inflation may slow (disinflation), but price declines (deflation) are rare. In fact, the U.S. has not experienced a sustained period of price deflation since 1954, when high inflation amid the post-Korean War recession led the Federal Reserve to raise interest rates, resulting in weaker demand for products and services.

Thanks to elevated inflation rates in recent years, the cost of essential goods such as food, clothing, shelter, and gasoline is now significantly higher than it was a few years ago. An annual "consumption basket" priced at $40,000 as of the end of 2020 would cost about $47,300 by Sept. 30, 2023.

Exhibit 20 Growth in Cost of $40,000 Consumption Basket Since 2020



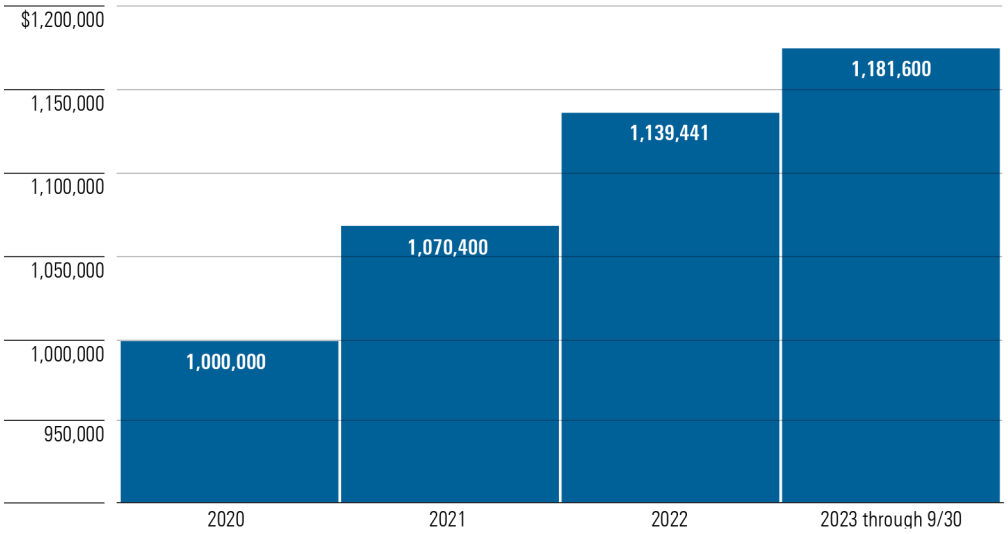
Source: Morningstar. Data as of Sept. 30, 2023.

This upward price trend does not present a problem for retirees who rely on Social Security as their sole source of retirement funding; their paychecks include an annual cost of living adjustment to keep pace with inflation. But for individuals who use portfolio withdrawals to cover additional expenses, it can create a significant challenge.

Indeed, the nearly 18% cumulative inflation rate since the end of 2020 means that those who have not yet retired must save considerably more to match the purchasing power modeled in the first version of this paper, published in 2021.

To illustrate this, we can use the maximum 4.0% safe withdrawal rate as a starting point for calculating the required size of a retirement nest egg. The 4.0% figure is equivalent to withdrawing 1/25th of the starting portfolio value each year, so we can estimate a required portfolio value by multiplying the annual spending amount by 25. At the beginning of 2021, this math worked out to a required portfolio value of just over $1 million for someone planning on annual spending of $40,000. But with the increase in costs, it now takes nearly $1.2 million in portfolio value to support the same spending level that used to require $1 million.

Exhibit 21 Growth in Size of Required Retirement Nest Egg Since 2020



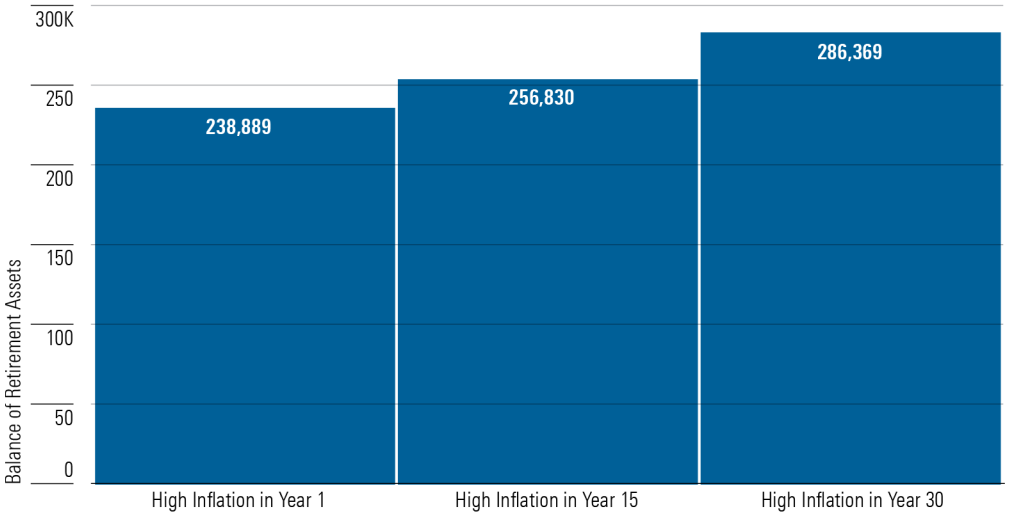
Source: Morningstar. Data as of Sept. 30, 2023.

A common concern among prospective retirees is "sequence risk:" the possibility that either just before they retire, or shortly after, a bear market ensues. Suffering severe investment losses while coming out of the gate can hamper the entire retirement strategy. The same principle applies to inflationary shocks. Inflation that arrives early in retirement years elevates future spending, whereas inflation further along in retirement has a more-muted impact.

To illustrate, we ran a test (originally introduced in last year's paper) assuming retirees earned no market return, while withdrawing 1.5% each year of an initial $1 million retirement balance, adjusting their withdrawals for the effect of three inflationary scenarios:

- 10% inflation in Year 1 followed by 3% annual inflation until the end of the assumed 30-year retirement horizon;
- 3% annual inflation in Years 1 through 14, 10% inflation in Year 15, followed by a return to 3% annual inflation through Year 30;
- 3% annual inflation in Years 1 through 29 followed by 10% inflation in Year 30.

Exhibit 22 Balance at End of Year 30 Assuming Three Inflation Paths ($1 Mil. Starting Balance, 0% Market Return, 1.5% Initial Withdrawal Rate, 90% Success Rate)



Source: Morningstar. Data as of Sept. 30, 2023.

As this admittedly simplified illustration shows, the timing of inflation matters significantly for retirement outcomes. The retiree who experienced higher inflation early in retirement finished with a 7% lower balance than the retiree who encountered it midway through retirement and almost 17% less than the retiree who didn't encounter high inflation until the final year of retirement. Note that these differences occurred even though the assumed inflation rate was the same across the three scenarios, at 3.2%.

Sequence-of-Returns Risk

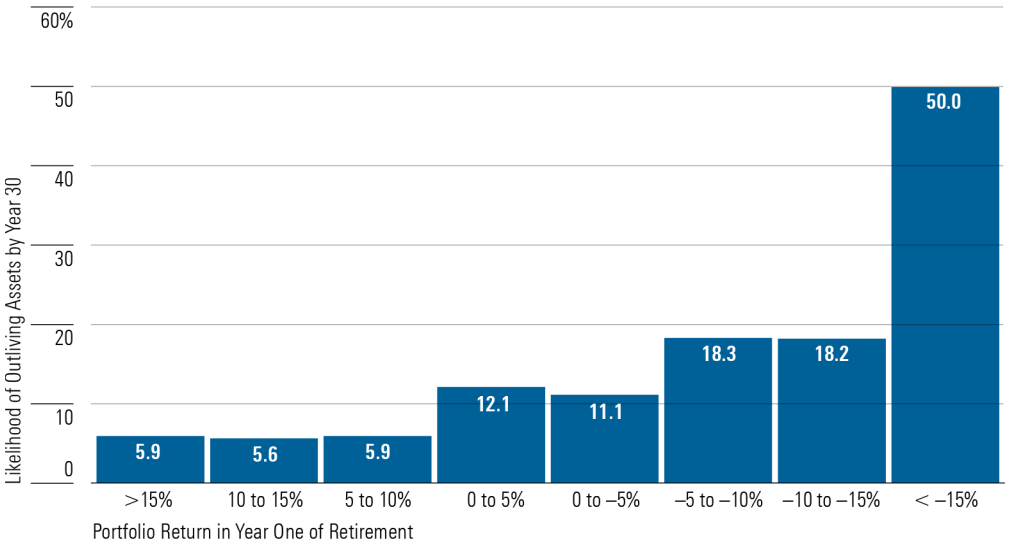
As discussed above, portfolio losses occurring right before or shortly after investors enter retirement increase the chances of portfolio exhaustion, for two reasons. First, they delay the stock and bond gains needed to maintain and enlarge retirement funds over time. Second, they can force retirees to sell assets to support their spending at inopportune times—when stocks and bonds boast more-attractive expected returns.

Sequence risk has been on full display in recent years. Because a portfolio balanced between stocks and bonds lost 15.5% of its value in 2022, a person who retired at the end of 2021 with a $1 million portfolio with 50% stocks and 50% bonds and used our recommended withdrawal rate of 3.3% would have finished the year with a portfolio value of about $811,000. While the equity market has made a partial rebound so far in 2023, the portfolio would still be well below its starting level as of Sept. 30, 2023.

Last year's market results were slightly worse than the bear-market scenario we tested in last year's paper: a 15% loss in the first year of retirement. Using the same approach of running 1,000 trials in which the market followed a random walk, we found that the retiree had a 50% chance of running out of money by the end of Year 30 if the 50% stock/50% bond portfolio lost at least 15% in Year 1. Making

matters worse, that test was based on an assumed inflation rate of 2.2% per year. If inflation remains above that level, the odds of success would be even lower.

Exhibit 23 Likelihood of Outliving Assets by Year 30 of Retirement Based on Portfolio Return in Year 1



Source: Morningstar. Data as of Sept. 30, 2023.

Put another way, the retiree who saw a 15% or greater loss in Year 1 of retirement was more than 6 times as likely to outlive her savings by Year 30 as the retiree who earned a positive return. Of course, that finding assumes that the retiree who encounters big losses in Year 1 of retirement sticks with a system of fixed real withdrawals without adjusting spending. As we discussed in Section II, variable withdrawal strategies can support significantly higher spending rates.

Still, the ongoing negative effects of higher inflation and the 2022 bear market are a sobering counterpoint to the generally positive findings from this year's study.

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Morningstar Portfolio and Planning Research provides independent, fundamental analysis on topics like portfolio construction, retirement planning, personal finance, and investment strategy. The analysis seeks to frame the critical choices that investors face in designing and implementing a financial plan and offers practical solutions covering areas like setting goals, allocating assets, selecting investments, and withdrawing retirement income. The research takes various forms, including articles on Morningstar's flagship research platforms as well as in-depth studies of topics that are particularly relevant to investors seeking to build cohesive portfolios or achieve other financial goals like retirement security.

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