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The State of Retirement Income: 2022

A look at how higher bond yields, lower equity valuations, and inflation affect starting safe withdrawal rates

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Contents

Christine Benz
Director of Personal Finance and Retirement Planning
christine.benz@morningstar.com

Jeffrey Ptak
Chief Ratings Officer, Morningstar Research Services
jeffrey.ptak@morningstar.com

John Rekenthaler
Director of Research
john.rekenthaler@morningstar.com

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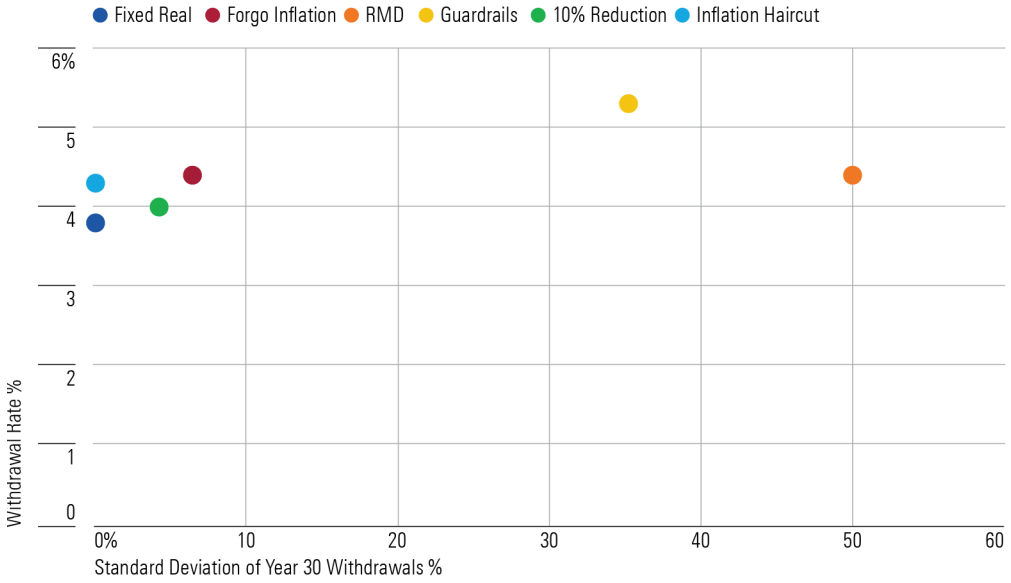
Key Takeaways

- For retirees who seek a fixed real withdrawal from their portfolio in retirement, a starting withdrawal rate of 3.8% is safe in Morningstar's model over a 30-year time horizon, assuming a 90% success rate (defined here as a 90% likelihood of not running out of funds) and a balanced portfolio.
- That is appreciably higher than the 2021 figure, which was 3.3% for a balanced portfolio with a 90% success rate.
- Employing a more aggressive equity allocation does not meaningfully improve safe starting withdrawal rates.
- Investors with shorter time horizons of 10 to 15 years can employ a higher withdrawal rate if using a conservative portfolio mix than they can with a more equity-heavy one.
- Dynamic withdrawal strategies may help retirees consume their portfolios more efficiently, factoring in both portfolio performance and spending, but they also add variability to retiree spending that may or may not be acceptable to the individual.
- Of the dynamic strategies we tested, the "guardrails" system does the best overall job of balancing higher withdrawals alongside cash-flow-volatility considerations.
- The right level of flexibility in a retiree's spending system will depend on the individual's situation—the extent to which fixed expenses are covered by nonportfolio income sources.

Exhibit 1 Safe Withdrawal % and Volatility (Standard Deviation) of Cash Flows for Balanced Portfolios Over a 30-Year Period, 90% Success Rate



Source: Morningstar.

Exhibit 1 summarizes this paper's findings. It shows the highest starting withdrawal rate (future withdrawals may be different) permitted by the base case of fixed real withdrawals, plus five alternative strategies, assuming a 90% success rate for the trials in Morningstar's model. The exhibit also shows the standard deviation of the dollar amounts of the Year 30 withdrawals, which fluctuate greatly for some of the dynamic strategies.

As the figures demonstrate, variable withdrawal-rate strategies enable significantly higher starting withdrawal rates than simply spending the same amount each year, adjusted for inflation. The flexibility of dynamic strategies affords greater spending opportunities. However, dynamic strategies also create uncertainty. If market conditions are poor, retirees using such strategies may find themselves able to spend significantly less during the latter stages of their retirements than they had hoped. Also, because variable strategies encourage more-efficient portfolio consumption, they often lead to lower ending balances.

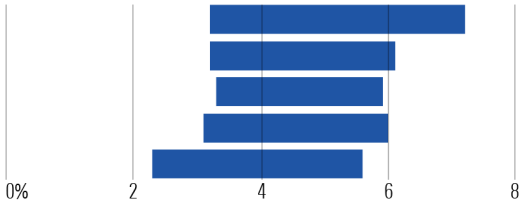
Section I: What Is a Safe Withdrawal Rate for the Future?

History demonstrates that the "right" withdrawal rate depends on three key variables: the asset allocation of the portfolio, the market environment that prevails over a retiree's drawdown period, and the length of the drawdown period. As shown in Exhibit 2, the starting safe withdrawal rate for 50% stock/50% bond portfolios during rolling 30-year periods from 1930 through 2019 ranged from 3.7% for the worst 30-year period to 6% 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. In general, portfolios that maintained balanced or more equity-heavy asset allocations delivered higher returns and, in turn, higher withdrawals than those with more-conservative positioning.

The results vary widely. As shown in Exhibit 2, the starting safe withdrawal rate for 50% stock/50% bond portfolios during rolling 30-year periods from 1927 through 1992 ranged from 3.3% for the worst 30-year period to 5.9% for the best. But in less-forgiving environments, such as the one that prevailed in the second half of the 1960s and early 1970s, even a 4% starting withdrawal could have been dangerous. (In real life, 4% withdrawal rates did succeed even through the most perilous of times, but Morningstar's model, which simulates 1,000 possible market environments, showed that failure was a realistic possibility.)

Exhibit 2 Highest and Lowest Starting Safe Withdrawal %, by Asset Allocation
(Rolling 30-Year Periods, Starting From 1927-1992, 90% Success Rate

	Safe Withdrawal Rates	
Equity Allocation %	Worst	Best
100	3.2	7.2
75	3.7	6.1
50	3.3	5.9
25	3.1	6.0
0	2.3	5.6



Source: Morningstar.

The results make clear that one period's results cannot be used to predict those of the next period. Bond yields change, stock valuations shift, and inflation rates rise and fall. Each has a strong effect on both portfolio performance and safe withdrawal amounts.

Looking Forward

To provide withdrawal-rate guidance that considers current yields, valuations, and inflation, we turned to our colleagues in Morningstar Investment Management. Like many firms, 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.

Notably, the return assumptions we used for this year's study were appreciably higher than what we employed when we conducted similar research late last year. That is not unexpected given that 2022's broad-market selloff has lowered equity valuations and increased bond yields. For example, MIM's 30-year forward equity-return assumptions as of Sept. 30, 2022, ranged from 9%-12%, depending on the subasset class. By contrast, the equity-return assumptions in our 2021 research ranged from 6%-10.5%. U.S. large-company stocks, which form the bulk of the equity portfolio, were at the low end of that range.

Similarly, the 30-year fixed-income-return assumptions were also appreciably higher than what we employed in last year's research. Thanks to today's higher yields, which are highly correlated with future fixed-income returns, MIM's return assumptions for U.S. investment-grade and non-U.S. bonds are roughly 5% for Sept. 30, 2022. In our 2021 research, we assumed that returns from high-quality fixed-income investments would be less than 3%.

Exhibit 3 compares the market assumptions used in this year's study to those used in last year's.

Exhibit 3 Projected 30-Year Asset-Class Return % and Inflation % Assumptions, 2021 vs. 2022

Broad Asset Class	Asset Class	2021	2022
Equity	Large Growth (U.S. Stocks)	6.25	9.65
	Large Value (U.S. Stocks)	7.97	8.96
	Small Growth (U.S. Stocks)	10.17	10.58
	Small Value (U.S. Stocks	10.53	12.40
	Foreign	8.41	10.00
Bond	U.S. Investment-Grade Bond	2.68	4.51
	Foreign Bond	2.81	5.12
Cash	U.S. Treasury Bill	1.43	2.69
Inflation		2.21	2.84

Source: Morningstar.

Less happily, MIM's inflation assumption has also increased, somewhat dulling the benefits of higher returns. Whereas Morningstar's model used a 2.21% inflation assumption for the 2021 research, that number increased to 2.84% for the 30-year period that began in October 2022. That is, this year's study assumes that new retirees in 2022 will encounter 2.84% average annualized inflation over their drawdown horizons. That higher figure puts downward pressure on starting safe withdrawal rates, whereas higher bond- and equity-return expectations help to raise them.

When inflation occurs in retirement is also important: If higher inflation occurs during the early years of retirement, that will boost the base withdrawal amount over more years, thereby enlarging lifetime withdrawals. (We discuss the issue of sequence risk—encompassing the timing of market returns and the timing of inflation—in Section III.)

Now for the details of the portfolio forecasts. 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 at all. 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% 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 in each of the subportfolios. (The annual returns are arithmetic averages, presented in nominal terms.)

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

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	9.65	19.06
	Large Value U.S. Stocks	30	8.96	15.81
	Small Growth U.S. Stocks	10	10.58	24.71
	Small Value U.S. Stocks	10	12.40	20.60
	Foreign Stocks	20	10.00	18.32
Bond	U.S. Investment-Grade Bond	80	4.51	5.39
	Foreign Bond	20	5.12	9.03
Cash	U.S. Treasury Bill	100	2.69	1.74
Inflation			2.84	

Source: Morningstar.

Exhibit 5 depicts the 30-year expected returns and standard deviations for each of the portfolio mixes.

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

Portfolio Weighting	Portfolio Weighting % Equity	Bond	Cash	Expected 30-Year Return % *(Arithmetic)*	Expected 30-Year Standard Deviation % *(Arithmetic)*
Equity Portfolio					
100% Equity	100	0	0	9.88	16.64
90% Equity	90	0	10	9.16	14.97
80% Equity	80	10	10	8.64	13.43
70% Equity	70	20	10	8.11	11.92
60% Equity	60	30	10	7.59	10.45
50% Equity	50	40	10	7.06	9.04
40% Equity	40	50	10	6.54	7.72
30% Equity	30	60	10	6.01	6.55
20% Equity	20	70	10	5.49	5.62
10% Equity	10	80	10	4.96	5.06
0% Equity	0	90	10	4.44	5.01
Inflation				**2.84**	

Source: Morningstar.

The Methodology

Armed with estimates of the expected returns and volatility of various asset mixes, as well as an inflation estimate, we used Monte Carlo simulations to vary the sequence of returns that a retiree might experience over a 30-year horizon. For 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 used to test the withdrawal rates, with a 90% success rate defined as being 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 2.84% inflation rate, the retiree would withdraw $40,000 from the portfolio in Year 1, $41,136 in Year 2, $42,304 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, 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

Exhibit 6 shows the safe withdrawal rates when using the specified portfolio projections and a fixed real withdrawal system. It depicts 11 asset allocations, ranging from 100% stock to 0% stocks. In addition to the standard 30-year time horizon, it also provides the safe withdrawal rates for six other time periods, ranging from 10 to 40 years.

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

Equity Weighting %	10 Years	15 Years	20 Years	25 Years	30 Years	35 Years	40 Years
100	8.5	5.9	4.7	3.9	3.5	3.3	3.1
90	8.7	6.1	4.9	4.0	3.6	3.3	3.1
80	8.9	6.2	4.9	4.1	3.7	3.3	3.1
70	9.1	6.3	5.1	4.2	3.7	3.4	3.2
60	9.3	6.5	5.2	4.3	3.8	3.4	3.2
50	9.5	6.6	5.2	4.3	3.8	3.4	3.2
40	9.6	6.7	5.3	4.4	3.8	3.4	3.2
30	9.7	6.7	5.3	4.3	3.8	3.4	3.1
20	9.7	6.7	5.2	4.3	3.7	3.3	3.0
10	9.7	6.6	5.1	4.1	3.5	3.1	2.8
0	9.4	6.4	4.8	3.9	3.3	2.9	2.6

Source: Morningstar.

Thanks to the higher return assumptions, the projected safe withdrawal rates are meaningfully closer to the oft-cited 4% rule of thumb for retirement withdrawals than was the case in our 2021 research. For a 50% equity/50% bond portfolio, for example, Morningstar's model regards a starting withdrawal rate of 3.8% over a 30-year horizon as being safe. By contrast, our 2021 research identified 3.3% initial withdrawal rate as a safe starting point under those same conditions. Exhibit 7 compares starting safe 30-year withdrawal rates for this year's study, compared with last year's:

Exhibit 7 30-Year Starting Safe Withdrawal % by Equity Allocation, 2021 vs. 2022, 90% Success Rate

Equity Weighting %	2021	2022
100	2.9	3.5
90	3.0	3.6
80	3.1	3.7
70	3.2	3.7
60	3.3	3.8
50	3.3	3.8
40	3.3	3.8
30	3.3	3.8
20	3.2	3.7
10	3.0	3.5
0	2.7	3.3

Source: Morningstar.

Over normal retirement time horizons of 25 to 30 years, balanced asset allocations support the highest starting withdrawal amounts—higher than equity-heavy allocations. In fact, an investor could dial the portfolio's equity allocation all the way down to 30% of assets, with the remainder in fixed income and cash, employ a 3.8% starting withdrawal with annual inflation adjustments thereafter, and still have a 90% chance of not outliving the money over a 30-year period. (However, as discussed later, taking the more conservative path would likely reduce the portfolio's final value when the 30-year period concluded.)

Over shorter time horizons—10 and 15 years, for example—bond-heavy allocations support higher starting withdrawals than do equity-heavy ones. Bonds' now-stronger return expectations (thanks to their higher yields), along with their lower volatility relative to equities, are the key reason that balanced-to-conservative asset allocations support higher withdrawal rates.

Caveats

These findings come with several caveats. First and foremost, because rising interest rates in 2022 have punished stock and bond prices, most investors' portfolio balances have declined. Thus, even though the starting safe withdrawal rate for a new retiree in 2022 is higher than was the case in 2021, the starting safe withdrawal amount is likely lower.

To use a simple example, let's say a retiree with an $800,000 portfolio invested 50% in stocks and 50% in bonds in autumn 2022. Had she taken the starting withdrawal rate of 3.3% that was recommended in last year's paper, she would have withdrawn $26,400 in her first year of retirement. However, had she delayed the start of retirement until Oct. 1, 2022, her portfolio balance would have declined to $640,000. Consequently, her 3.8% initial withdrawal in 2023 would be $24,320. Thus, even though her percentage withdrawal has increased, her dollar withdrawal is less than her payday if she had started retirement spending in autumn 2022, when her balance was elevated. In other words, this year's higher starting

safe withdrawal rates will likely lead to lower safe withdrawal amounts, as they are computed on lower portfolio values.

On a positive note, the calculations use a 30-year time horizon, while adjusting each year's withdrawal amounts fully for inflation. These assumptions are conservative. Most retirees have a shorter time horizon than 30 years. In addition, their spending may not need to fully keep pace with inflation. (Most retirees spend less, in real terms, during the middle to later stages of their retirements, a scenario that we discuss in Section II.) In practice, therefore, retirees may find that they are able to spend considerably more than Morningstar's base-case estimate of 3.8%.

Also, because this paper defines success as surviving 90% of simulation trials, withdrawal rates that are moderately above the stated guidelines will also have high success probabilities. For example, although the calculated withdrawal rate for the 30-year projection is 3.8% for a 50% stock/50% bond portfolio with a 90% success rate, a 4.1% initial withdrawal rate over the same 30-year period with the same 50% stock/50% bond asset mix shows an 86% probability of success. By this paper's standard, that percentage is too low. But many investors may be willing to tolerate that lower probability of success in exchange for higher starting withdrawal amounts.

Finally, our base case is a fixed real withdrawal system, whereas the retiree calculates X% of his portfolio value in Year 1 of retirement and then inflation-adjusts that dollar amount thereafter to account for inflation. In other words, the retiree makes withdrawals without regard for the portfolio's value or market performance. That system has the benefit of delivering a steady "paycheck equivalent" throughout retirement, but many retirees might naturally engage in some belt-tightening during market downdrafts. Doing so can improve both starting and lifetime withdrawals over many market environments. Revisiting safe withdrawal rates with dynamic strategies is the subject of Section II.

Section II: How Dynamic Withdrawal Strategies Can Help

The preceding research demonstrates that retirees who require a fixed real withdrawal amount from year to year will need to keep their starting withdrawals below 4% if they want to lock in a 90% probability that their portfolios will last over a 30-year time horizon. Given that many portfolios have recently slipped in value, that recommendation may be unwelcome.

As in last year's research, we wanted to explore the impact of more-flexible withdrawal approaches than the fixed real withdrawal system that underlies our base case. In other words, if retirees are willing to change their withdrawal amounts from year to year—taking lower withdrawals in weak market environments and perhaps higher paydays in very strong ones—will that support higher withdrawal rates?

Prior research clearly indicates that more-flexible strategies can indeed be effective in that context. Flexible strategies are effective because they help to prevent retirees from overspending in periods of portfolio/market weakness, while giving them a raise in strong portfolio/market environments.

Adjusting withdrawal rates based on portfolio performance can also help ensure that retirees consume their portfolios efficiently. For retirees with no interest in leaving a legacy, for example, but who instead aim to maximize consumption 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.

Yet as much as flexible strategies may help to improve retirees' lifetime portfolio payouts, 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. While most variable withdrawal strategies do help enlarge retirees' lifetime payouts, they may also subject retirees to swings in their standards of living. Consequently, retirees may find flexible schemes unacceptable.

For example, taking a fixed percentage withdrawal (for example, 4% per year regardless of portfolio balance) entirely solves the problem of not 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 investment 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 is inefficient because it fails to 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 and/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. We tested the following:

- Method 1: Forgoing inflation adjustments following annual portfolio loss. This is a fixed real withdrawal strategy but with a twist. Whereas the standard 4%-style guideline entails annual adjustments (usually upward) to reflect inflation, this method involves forgoing those upward adjustments following years in which the portfolio has declined in value.
- 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. However, it also leads to highly variable cash flows: Even though a retiree can increase withdrawals over time to account for ever-shortening life expectancy, changes in the portfolio's value may lead to big swings in annual withdrawal amounts.
- Method 3: Guardrails. This method, developed by financial planner Jonathan Guyton and computer scientist William Klinger, aims to incorporate some variability based on market performance but sets an upper boundary on how much comes out in good markets and a lower boundary around withdrawals in down markets.
- Method 4: 10% reductions following annual portfolio losses. This method uses a fixed real withdrawal system as its baseline but adjusts withdrawals downward by 10% in the year following a year in which the portfolio has declined in value. Once the portfolio generates a positive annual return again, withdrawals resume their previously scheduled amounts.
- Method 5 (new for 2022): Inflation increases less than the actual inflation rate. To better replicate actual retirees' spending patterns, which show that retirees do not usually increase annual spending in line with inflation, we tested a fixed real withdrawal system with inflation adjustments that were 1 percentage point less than the actual inflation rate.

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 in 90% of trials over 30-year time horizons—fared on a few key metrics. We employed a 50% equity/50% bond portfolio as the baseline case but also looked at other asset allocations.

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 2.84% 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 them for heirs or charity.

Comparing the Methods: Big Picture

As explained later in the paper, each method entails its own set of trade-offs. Below, we offer big-picture observations for 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 8 depicts how each method fared on each metric, assuming 50% stock/50% 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 8 Spending Methods Summary, 50% Equity/50% 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)
Fixed Real	3.8	3.8	**0.0**	**1.9**
10% Reduction	4.0	3.9	6.9	1.8
Forgo Inflation	4.4	4.0	6.4	1.6
Guardrails	**5.3**	4.8	35.2	0.8
RMD	4.4	**5.4**	50.0	0.2
Inflation Haircut	4.3	3.7	**0.0**	**1.9**

Source: Morningstar.

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 9. But the guardrails method supports the highest starting safe withdrawal rates across every asset allocation. This reflects the nature of the approach, which can support higher initial withdrawals by making potentially significant year-to-year adjustments to dollar withdrawals, including throttling spending down at inopportune times. With the exception of the RMD method, starting safe withdrawal rates are highest in balanced allocations like 50% stocks/50% bonds and tended to be lowest in less-diversified allocations like 100% stocks.

Exhibit 9 30-Year Starting Safe Withdrawal Rate % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method					
Portfolio Weighting %	Fixed Real	10% Reduction	Forgo Inflation	Guardrails	RMD	Inflation Haircut
Equity Portfolio						
100	3.5	3.8	4.1	**5.2**	4.4	3.9
90	3.6	3.8	4.1	**5.3**	4.4	4.0
80	3.7	3.9	4.2	**5.5**	4.4	4.1
70	3.7	4.0	4.3	**5.5**	4.4	4.2
60	3.8	4.0	4.3	**5.4**	4.4	4.3
50	3.8	4.0	4.4	**5.3**	4.4	4.3
40	3.8	4.0	4.3	**5.2**	4.4	4.3
30	3.8	3.9	4.2	**5.0**	4.4	4.3
20	3.7	3.8	4.1	**4.7**	4.4	4.2
10	3.5	3.7	3.9	**4.5**	4.4	4.0
0	3.3	3.4	3.7	**4.3**	4.4	3.7

Source: Morningstar.

Lifetime Withdrawal Rate

Each flexible spending approach boasts 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 the forgo-inflation and 10%-reduction methods offer only modestly higher levels of lifetime income than the baseline fixed real withdrawal approach. The method of increasing inflation by less than the inflation rate delivers the lowest level of lifetime income—not surprising, given that the strategy means that the retiree consistently spends less than the actual inflation rate. Notably, equity-heavy allocations under the RMD and guardrail 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 10 30-Year Lifetime Withdrawal % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method					
Portfolio Weighting %	Fixed Real	10% Reduction	Forgo Inflation	Guardrails	RMD	Inflation Haircut
Equity Portfolio						
100	3.5	3.6	3.7	6.3	**8.1**	3.4
90	3.6	3.6	3.7	5.9	**7.3**	3.5
80	3.7	3.7	3.8	5.6	**6.8**	3.6
70	3.7	3.8	3.9	5.3	**6.3**	3.7
60	3.8	3.8	3.9	5.0	**5.9**	3.7
50	3.8	3.9	4.0	4.8	**5.4**	3.7
40	3.8	3.9	4.0	4.5	**5.1**	3.7
30	3.8	3.8	3.9	4.3	**4.7**	3.7
20	3.7	3.7	3.8	4.1	**4.4**	3.7
10	3.5	3.6	3.7	3.9	**4.1**	3.5
0	3.3	3.3	3.5	3.7	**3.9**	3.2

Source: Morningstar.

Year 30 Cash Flow Standard Deviation

Here the trade-offs demanded by the RMD and guardrails methods become apparent. Their far greater standard deviations of annual withdrawal amounts demonstrate the variability of their spending patterns. Such unpredictability is a natural byproduct of their rules, which can dictate higher or lower spending under certain circumstances. Thus, a retiree enticed by these methods' high withdrawal rates must also reckon with the substantial uncertainty they can impose. By contrast, the forgo-inflation and 10%-reduction methods entail relatively little year-to-year spending change, making them more useful to retirees who prize stability and predictability.

Exhibit 11 Year 30 Cash Flow Standard Deviation % by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method					
Portfolio Weighting %	Fixed Real	10% Reduction	Forgo Inflation	Guardrails	RMD	Inflation Haircut
Equity Portfolio						
100	**0.0**	8.0	7.0	88.2	99.7	**0.0**
90	**0.0**	8.0	7.0	79.2	88.1	**0.0**
80	**0.0**	7.9	7.0	68.6	77.6	**0.0**
70	**0.0**	7.6	6.9	57.3	67.8	**0.0**
60	**0.0**	7.3	6.7	45.8	58.5	**0.0**
50	**0.0**	6.9	6.4	35.2	50.0	**0.0**
40	**0.0**	6.4	6.3	26.6	42.3	**0.0**
30	**0.0**	5.9	5.9	20.7	35.6	**0.0**
20	**0.0**	5.5	5.7	17.5	30.5	**0.0**
10	**0.0**	5.5	5.7	16.3	27.4	**0.0**
0	**0.0**	6.2	6.1	17.6	27.3	**0.0**

Source: Morningstar.

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 approach of not fully adjusting spending for the effect of inflation produced the highest Year 30 values. At the other extreme, the RMD method resulted in the lowest ending values. That 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 12 Median Ending Value at Year 30 ($Mil) by Withdrawal Method and Asset Allocation, 90% Success Rate

	Method					
Portfolio Weighting %	Fixed Real	10% Reduction	Forgo Inflation	Guardrails	RMD	Inflation Haircut
Equity Portfolio						
100	**5.0**	4.8	4.6	2.1	0.4	4.9
90	**4.0**	4.0	3.7	1.7	0.3	4.0
80	3.4	3.4	3.1	1.4	0.3	**3.5**
70	**3.0**	2.8	2.6	1.2	0.3	2.8
60	2.3	**2.3**	2.0	1.0	0.3	2.3
50	**1.9**	1.8	1.6	0.8	0.2	1.9
40	**1.5**	1.4	1.2	0.7	0.2	1.5
30	**1.1**	1.2	1.0	0.6	0.2	1.1
20	**0.9**	0.9	0.7	0.5	0.2	0.9
10	**0.8**	0.7	0.6	0.4	0.1	0.7
0	0.4	0.7	0.5	0.4	0.1	**0.6**

Source: Morningstar.

Dynamic Spending Methods: A Closer Look

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. Here is a closer look at each of these dynamic systems, including their key benefits, drawbacks, and the type of retiree for whom they would be most suitable.

Method 1: Forgoing Inflation Adjustments Following Annual Portfolio Loss

Methodology: 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 in 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 modest, are cumulative. That is, the effects of such cuts ripple into the future, as such changes permanently reduce the retiree's spending pattern.

Starting Safe Withdrawal Rate: Forgoing inflation adjustments following losing years enabled this approach to deliver a meaningfully higher starting safe withdrawal percentage than fixed real withdrawals. A 50% equity/50% bond portfolio maintained with this approach would support a 4.4% starting withdrawal (Exhibit 9). By contrast, the fixed real-dollar approach can only support a 3.8% rate with the same portfolio. The simple tweak of forgoing inflation adjustments helped deliver a higher withdrawal rate for every asset allocation than would be the case for investors employing fixed real withdrawals. Starting safe withdrawals under this system were also higher than with the strategy of reducing withdrawals by 10% in the year following losses.

Lifetime Portfolio Withdrawal Rate: The pattern persisted for lifetime withdrawal rates. Forgoing inflation adjustments helps deliver a lift in lifetime payouts relative to a fixed real withdrawal system or the system of cutting spending by 10% following a losing year. However, this strategy delivered lower lifetime withdrawal rates than either the RMD method or the guardrails method.

Exhibit 13 Lifetime Withdrawal % With Forgoing Inflation Adjustment Following Portfolio Loss, 30-Year Horizon and 90% Success Rate

Equity Weighting %	Lifetime Withdrawal Rate %
100	3.7
90	3.7
80	3.8
70	3.9
60	3.9
50	4.0
40	4.0
30	3.9
20	3.8
10	3.7
0	3.5

Source: Morningstar.

Year 30 Cash Flow Standard Deviation: This method produced cash flow volatility that was higher than the base case and in line with the method of taking a 10% pay cut after portfolio losses. Cash flows were much more stable than with the guardrails or RMD methods, however.

Median Ending Value at Year 30: This method tended to result in a healthy median balance at Year 30, with the more equity-heavy portfolio mixes resulting in the highest median ending balances. However, median balances at Year 30 are slightly lower than with three other methods: 1) fixed real withdrawals, 2) the 10% reduction method, and 3) increasing spending by less than the actual inflation rate. At the same time, the median ending values were meaningfully better than the guardrails or RMD approaches, both of which entail upward and downward adjustments.

Conclusion: For retirees who seek a "paycheck equivalent" approach that is likely to support a slightly higher starting and lifetime withdrawal percentage than a basic system of fixed real withdrawals, this strategy is a decent starting point. While lifetime withdrawals under this system are lower than some of the other flexible strategies, they are higher than with a pure fixed real dollar approach. Moreover, the retiree's cash flows are relatively stable. Not surprisingly, safer asset allocations led to fewer years in which the portfolio declined in value, necessitating a freeze on the inflation adjustment, but the trade-off is that the safer portfolio mixes require a lower starting withdrawal percentage.

Method 2: Required Minimum Distributions

Methodology: This method consists of portfolio value divided by life expectancy as of the preceding year-end. 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" in that it is designed to ensure that a retiree will never deplete the portfolio, because the withdrawal amount is always a percentage of the remaining balance. Moreover, an RMD system incorporates two key variables for retirement-spending plans—remaining life expectancy and remaining portfolio value. However, by the same token, the fact that the portfolio updates annually to reflect its prior-year performance adds substantial volatility to cash flows.

Starting Safe Withdrawal Rate: An RMD-style system supported a higher starting withdrawal rate than the base case but not as high as the guardrails method, which offers the highest starting withdrawal rate of any approach that we tested. Assuming a 22.9-year life expectancy at the beginning of the time horizon translated to a 4.35% starting safe withdrawal (1/22.9 = 4.35%) rate at every asset allocation.

Lifetime Portfolio Withdrawal Rate: As it factors in both portfolio value and life expectancy, an RMD system efficiently maximizes lifetime payouts. Although the starting withdrawal rate was the same across different allocations, the lifetime withdrawal rates varied widely. As shown in Exhibit 14, the lifetime withdrawal rate ranged from 4% to more than 8% (the 100% equity allocation), with the 50% stock/50% bond portfolio allowing for a 5.4% lifetime withdrawal. The higher equity allocations provided for larger "raises" following good years and enlarged lifetime payouts. This was the highest of any of the methods we tested. The trade-off, however, is that lifetime cash flows were substantially more volatile and provide limited opportunities for retirees to leave a bequest. (That may be fine with some retirees, less fine with others.)

Exhibit 14 Lifetime Withdrawal % With RMDs, 30-Year Horizon and 90% Success Rate

Equity Weighting %	Lifetime Withdrawal Rate %
100	8.1
90	7.3
80	6.8
70	6.3
60	5.9
50	5.4
40	5.1
30	4.7
20	4.4
10	4.1
0	3.9

Source: Morningstar.

Year 30 Cash Flow Standard Deviation: The RMD method's efficient approach to portfolio consumption comes at the expense of consistency in retiree cash flows. Indeed, the RMD method led to the greatest variability in year-to-year cash flows of any of the withdrawal methods we tested. Not surprisingly, the portfolios with higher equity allocations—and therefore more variability in year-to-year results that in turn determine each year's withdrawals—had the greatest cash flow volatility. Moreover, RMD-based withdrawals do not do a very good job of keeping up with inflation. A retiree with a balanced portfolio using the RMD method would see withdrawals fail to keep up with inflation about half the time, while retirees with more conservatively positioned portfolios would lose out to inflation at least two thirds of the time.

Median Ending Value at Year 30: By definition, the RMD method tightly aligns the retiree's spending with the portfolio value. As a result, median ending values were lower with this strategy than any of the other approaches.

Conclusion: The RMD method is simple and efficient but perhaps not very livable, especially for retirees with balanced portfolios or even higher equity allocations and/or tighter budgets. Not only must retirees using this method contend with extreme fluctuations in spending, but balances are also very low later in life when expenses sometimes increase because of high out-of-pocket healthcare costs. Importantly, using a single life expectancy RMD table to guide withdrawals, as we did in our test, could also lead some retirees to overspend. Retirees who have longer-than-average life expectancies and/or younger spouses should be more conservative. An RMD-style withdrawal system will be most appropriate for retirees who have much of their fixed living expenses coming from nonportfolio income sources such as Social Security or a pension.

Method 3: Guardrails

Methodology: 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—$41,136, based on a 2.84% inflation rate. Dividing that amount by the current balance—$1.4 million—tests for the percentage. $41,136 is just 2.9% of $1.4 million. As that 2.9% figure is 27% less than the starting percentage of 4%, the retiree qualifies for an upward adjustment of 10%. The new withdrawal amount becomes $45,256—the scheduled amount of $41,136 plus the additional 10% of $4,120.

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 $700,000 at the beginning of Year 2. The Year 2 withdrawal would be $41,136 on a pretest basis. But because $41,200 from $700,000 is a 5.9% withdrawal rate—more than 20% higher than the initial 4%—the retiree would need to reduce the scheduled $41,136 amount by 10%, to $37,016.

Importantly, the Guyton-Klinger method scraps the cutback rules (following portfolio declines) in 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.

Starting Safe Withdrawal Rate: For retirees with balanced portfolios, the Guyton-Klinger guardrails approach delivered the highest safe withdrawal percentages of any of the withdrawal methods we tested. For a 50% equity/50% bond portfolio, the average safe starting withdrawal rate was 5.3%.

Lifetime Portfolio Withdrawal Rate: The guardrails' lifetime withdrawal rate was also among the highest we tested—4.8% for a 50% equity/50% bond portfolio and above 6% for a 100% equity allocation. That is because the course corrections help ensure that the retiree does not withdraw too much (or too little) following market rallies and selloffs. The lifetime withdrawal rate of this method was a bit lower than the RMD method but substantially higher than this report's other withdrawal methods.

Exhibit 15 Lifetime Withdrawal Rate % With Guardrails, 30-Year Horizon and 90% Success Rate

Equity Weighting %	Lifetime Withdrawal Rate %
100	6.3
90	5.9
80	5.6
70	5.3
60	5.0
50	4.8
40	4.5
30	4.3
20	4.1
10	3.9
0	3.7

Source: Morningstar.

Year 30 Cash Flow Standard Deviation: The guardrails approach, which puts boundaries on withdrawals in good and bad markets, also helped to stabilize cash flows on a year-to-year-basis, relative to an RMD system. The standard deviation of year-to-year withdrawals for a 50% equity/50% bond portfolio was appreciably lower than for the RMD method. However, it was significantly higher than for strategies that entail forgoing inflation adjustments or taking a 10% reduction following a year in which the portfolio has declined. Also, portfolios with higher-equity allocations tended to have bigger swings in annual cash flows than more-conservative portfolios.

Median Ending Value at Year 30: The guardrails approach was highly efficient, as the periodic course corrections help the retiree consume more of the portfolio in up markets but not too much in bad ones. The trade-off of that efficiency, however, is a lower median ending balance. Although the strategy resulted in more leftovers at Year 30 than was the case with the RMD method, especially for more equity-heavy portfolios, the guardrails system would tend to be most appropriate for retirees who prioritize maximizing spending over leaving a bequest to family or charity.

Conclusion: For retirees aiming to wring more from their portfolios without radical adjustments to their standards of living, the guardrails system strikes a pleasing balance. While cash flow volatility is certainly higher than with a fixed real withdrawal approach or the two strategies that involve taking less after a losing year, it is substantially lower than the RMD method. Because the approach results in smaller final balances than most of the other strategies (only the RMD method had a lower median ending value), it will tend to be less suitable for retirees with a strong bequest motive. Finally, like all variable systems, the guardrails system requires ongoing calibration of the withdrawal amount. In contrast with a fixed real withdrawal system, the guardrails approach does not permit retirees to "set it and forget it."

Method 4: 10% Reductions Following Annual Portfolio Loss

Methodology: This approach employs a schedule of fixed real withdrawals, as with the base case, but makes 10% downward adjustments in years following investment losses. That is, if a retiree's portfolio loses money in Year 1, then during Year 2 the retiree withdraws 90% of Year 1's amount. This process continues until the portfolio makes money during a calendar year, at which time the spending reverts back to its original schedule.

Starting Safe Withdrawal Rate: For 50% stock/50% bond portfolios, this approach delivered a slightly higher starting safe withdrawal rate (4%) than our base-case fixed real withdrawal system (3.8%). However, that amount was substantially lower than those provided by either the RMD or guardrails methods. The other simple methods that we tested—forgoing the inflation adjustment following a down market and increasing the payout adjustment by less than the inflation rate—also delivered higher starting safe withdrawal rates.

Lifetime Portfolio Withdrawal Rate: This approach slightly improved upon the lifetime withdrawal rate associated with a system of fixed real withdrawals. However, lifetime withdrawals with this method are lower than lifetime withdrawals from the strategy of forgoing inflation increases following losing years and appreciably lower than the RMD or guardrails methods.

Exhibit 16 Lifetime Withdrawal Rate % With 10% Reduction Following Annual Portfolio Loss, 30-Year Horizon and 90% Success Rate

Equity Weighting %	Lifetime Withdrawal Rate %
100	3.6
90	3.6
80	3.7
70	3.8
60	3.8
50	3.8
40	3.9
30	3.8
20	3.7
10	3.6
0	3.3

Source: Morningstar.

Year 30 Cash Flow Standard Deviation: For limiting cash flow volatility, this approach was superior to the RMD and guardrails methods, but it was slightly worse than forgoing inflation adjustments following losing years. Additionally, cash flow volatility for this approach rose for more-aggressive asset allocations. That is because holding more equities leads to frequent 10% reductions and also because, following a downward adjustment, the withdrawal amount "snaps back" to its level before the downward adjustments.

Median Ending Value at Year 30: This approach led to the highest median ending values than any of the approaches we tested, save for the fixed real withdrawal system and the method of not increasing spending by the full amount of inflation.

Conclusion: This approach is simple and easy to implement and improves both the starting and lifetime withdrawal rates provided by the fixed real withdrawal system. It also tends to result in ample median balances at Year 30, and that was true across asset allocations. As such, it may be appropriate for retirees in search of a simple approach that delivers a higher withdrawal percentage than a fixed real withdrawal system, while also incorporating bequests or building in a buffer for a longer-than-expected life span.

Method 5: Decreasing Spending by Less Than the Inflation Rate

Methodology: Most retirees do not spend a fixed real amount throughout retirement. Rather, as retirement researcher David Blanchett has noted in his studies of spending across the retirement life cycle, retirees tend to reduce spending in the middle and later years of retirement (although in some instances their spending increases later in life due to higher healthcare costs). To incorporate this trend in spending over the retirement life cycle, we assume that the hypothetical retiree does not adjust annual spending by the full amount of inflation but instead by 1 percentage point less than the annual inflation rate. For our 2022 research, therefore, we assume that the retiree's spending increases by 1.84% annually, rather than the inflation rate of 2.84%.

Starting Safe Withdrawal Rate: By assuming ongoing inflation adjustments that are below the actual inflation rate, this method delivered a lift to starting withdrawal rates relative to our base case—a 4.3% initial payday versus 3.8% for the fixed real withdrawal system. As such, it delivered a higher payday in the early years of retirement—often dubbed the "go-go years" – when retirees are likeliest to spend the most.

Lifetime Portfolio Withdrawal Rate: As Exhibit 17 demonstrates, the trade-off of higher spending during the early years is that lifetime spending is reduced. In fact, this method delivered the lowest lifetime spending rate of any of the methods we tested—just 3.7% for balanced portfolios.

Exhibit 17 Lifetime Withdrawal Rate % With Decreasing Spending by Less Than the Inflation Rate, 30-Year Horizon and 90% Success Rate

Equity Weighting %	Lifetime Withdrawal Rate %
100	3.4
90	3.5
80	3.6
70	3.7
60	3.7
50	3.7
40	3.7
30	3.7
20	3.7
10	3.5
0	3.2

Source: Morningstar.

Year 30 Cash Flow Standard Deviation: Because this system assumes fixed real withdrawals, albeit with inflation adjustments that are less than the actual inflation rate, there is no uncertainty about the level of future spending. Thus, it is appropriate for retirees who seek a paycheck equivalent in retirement, and it also promises a higher payday early on.

Median Ending Value at Year 30: In line with the base case and the two other less dynamic strategies (forgoing inflation adjustments and taking 10% cuts following portfolio declines), this approach did a good job of preserving capital for two reasons. First, the retiree never receives a raise after portfolio gains. Second, withdrawals do not keep up with inflation, which helps portfolio growth.

Conclusion: This approach aims to reflect actual retiree spending patterns—specifically, the tendency of most retirees to spend more in the early years of retirement and less as they age. Thus, it delivers its highest paydays, in real terms, early in retirement, with real spending trending down through the middle years of retirement. As with the base case of fixed real withdrawals, this system results in a high degree of cash flow predictability. The trade-off, however, is that lifetime spending is the lowest of any of the approaches we tested.

Takeaways

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 reduces spending modestly after a losing year—either by forgoing inflation or cutting spending by 10%—moderately increases lifetime withdrawals versus a fixed real withdrawal system without greatly increasing cash flow volatility. It is also straightforward to implement. Alternatively, retirees who believe that their actual spending 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 increasing inflation adjustments by less than the actual inflation rate.

Section III: Sequence Risk and 2022

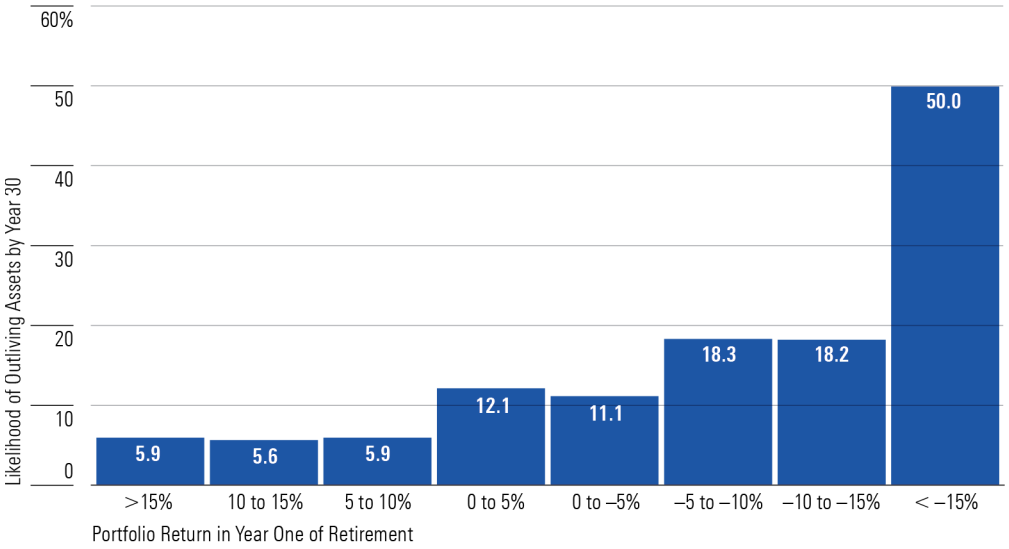
As previously noted, recent retirees must grapple with the tripartite challenges of a losing stock market, declining bond prices, and high inflation. This has shrunk their retirement nest eggs and reduced their spending power just as they are embarking on retirement, creating sequence-of-returns risk in the process.

What is sequence-of-returns risk? In simple terms, it is the risk of running out of money in retirement caused by losses in the early retirement years. Early losses increase the probability of portfolio exhaustion for two reasons. First, they forestall 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.

High inflation has accentuated that risk in 2022, as retirees employing a fixed real spending approach are scheduled to increase their spending by an amount that approximates recent price increases. While this inflation adjustment ensures that spending remains the same in real terms, it further ratchets up the pressure on retirement funds and permanently elevates the spending "floor" to which future inflation adjustments will be made.

Exhibit 18 draws from last year's study to estimate how often a retiree would have run out of funds by Year 30 of retirement, depending on how the portfolio performed in Year 1. As with this year's study, we simulated 1,000 trials in which the market followed a random walk. Assuming a 3.3% starting withdrawal rate (that is, the withdrawal rate that succeeded across 90% of trials in last year's study) and 2.2% annual inflation, 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.

Exhibit 18 Likelihood of Outliving Assets by Year 30 of Retirement Based on Portfolio Return in Year 1



Source: Morningstar.

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. It also reflects the rather conservative stock and bond return projections we incorporated into last year's study (those forecasts have since improved).

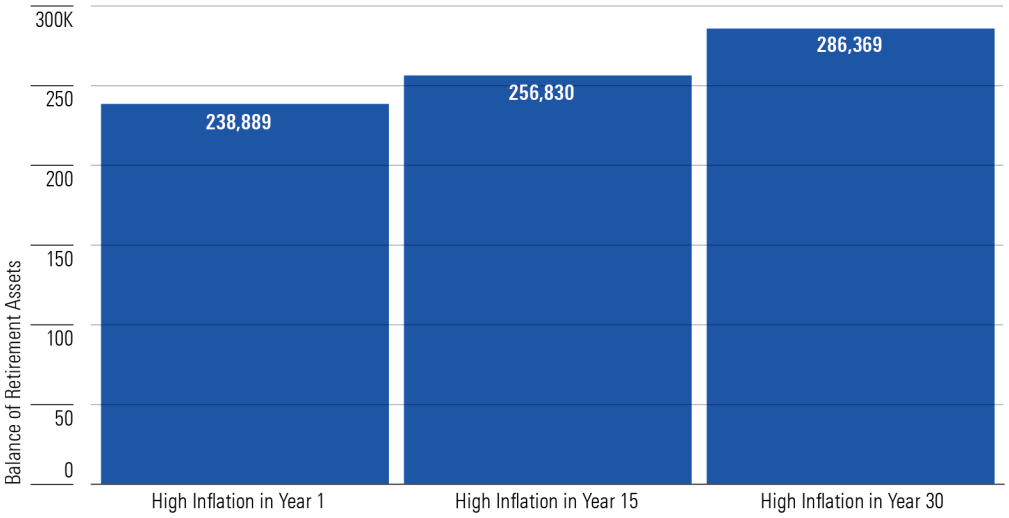
The Role of Inflation

Nevertheless, retirees enter 2023 not only facing hefty stock and bond market losses but also much higher inflation than we had assumed in last year's study. One underappreciated danger of high inflation is that it can also pose sequence risk in much the same way that market losses can. This stems from how 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 the following three inflationary scenarios where we assumed the retiree earned no market return and withdrew 1.5% of an initial $1 million retirement balance, adjusting withdrawals for inflation thereafter:

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



Source: Morningstar.

As this 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 annual rate of inflation was the same across the three scenarios, at 3.2%.

Changing Success Rates

Such issues beg the question: How have the odds changed for retirees who invested according to the findings of last year's paper? That is, what are the odds that someone who retired late in 2021 or early in 2022 will exhaust savings at the end of a 30-year horizon, assuming 3.3% was withdrawn (which was the initial withdrawal recommended in last year's study for a portfolio consisting of 50% stocks and 50% bonds) at the onset of retirement and further assuming that spending was increased by 7.7% in 2023 to offset the inflation encountered in 2022. To answer that question, we ran a modified version of this year's study in which we assumed the following:

- The retiree is entering Year 2 of retirement and thus has a 29-year time horizon
- The retiree withdrew 3.3% of $1 million in retirement savings in her first year of retirement, or $33,300
- The retiree invested in a 50% stocks/50% bonds portfolio that lost 18.7% in the year ended Sept. 30, 2022
- The retiree is entering Year 2 of retirement with a balance of $785,927, which reflects the effects of market depreciation and her $33,300 withdrawal in Year 1 of retirement
- The retiree increases spending by 7.7% to $35,864 in Year 2, with the increase approximating actual inflation over the past year. On average through 1,000 simulations, the retiree will earn the stock and

bond returns as provided by this year's updated forecasts over the remaining 29-year horizon, while inflation will moderate in future years to the assumed 2.8% long-term rate.

Under these conditions, the retiree shows a 78% chance of having money left by the end of a 30-year period. In other words, the odds of success have eroded since last year's study because of the toll of market losses and higher inflation. That damage has been somewhat mitigated, though, by the higher expected stock and bond returns and moderate inflation projection incorporated into this year's analysis.

How would the retiree's odds have differed if more or less was taken than an assumed 3.3% starting withdrawal earlier this year? The exhibit below sets forth the success rates at various assumed starting withdrawal rates between 2% and 5% after incorporating the assumptions listed above.

Exhibit 20 Retirement Success Rates at Various Initial Withdrawal Rates (Fixed Real Withdrawal Method)

Initial Withdrawal Rate %	Success Rate %
2.0	100
2.5	97
3.0	88
3.5	70
4.0	46
4.5	25
5.0	12

Source: Morningstar.

In summary, those who retired late in 2021 or early in 2022 and who limited their starting withdrawal to no more than 3% of retirement assets continue to enjoy excellent odds of success, notwithstanding the challenging market conditions of the past year. But those who withdrew 4% or more are facing a sobering outlook, where the odds of success are not in their favor. Indeed, new retirees who took a 4% initial withdrawal last year are likelier than not to outlive their savings based on our analysis, assuming they continue to spend 4% of savings per year in inflation-adjusted terms through Year 30.

How could a retiree grappling with sequence-of-returns risk improve the odds of not outliving their savings? One option is to temporarily reduce spending in the year following a portfolio loss. To illustrate, let's return to the scenario above, where the retiree initially withdrew 3.3% of retirement assets. But this time, let's assume spending was reduced by 10% to $29,970 from $33,300. Under that scenario, the individual has an 84% chance of still having money left by the end of retirement. True, that is lower than the 90% odds of success faced at the onset of retirement, before encountering high inflation and a bear market for investments. But it is slightly better than the 78% success rate if the retiree continued to withdraw 3.3% of inflation-adjusted retirement assets per year, irrespective of market conditions.

The following exhibit compares the success rates of this 10%-reduction approach with those of the fixed real withdrawal approach at various initial withdrawal rates.

Exhibit 21 Comparing Retirement Success Rates at Various Initial Withdrawal Rates Under Fixed Real and 10%-Reduction Methods

Initial Withdrawal Rate %	Success Rate % of Fixed Real Method	Success Rate % of 10 % Reduction Method
2.0	100	100
2.5	97	98
3.0	88	91
3.5	70	79
4.0	46	54
4.5	25	32
5.0	12	16

Source: Morningstar.

Although temporarily reducing spending in this manner demands sacrifice, it can help mitigate sequence-of-returns risk, with recent retirees retaining good odds of maintaining their inflation-adjusted spending through Year 30 of retirement provided their initial withdrawals were less than 4% of assets.

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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.

22 West Washington Street
Chicago, IL 60602 USA

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