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Sustainable withdrawal rates in retirement: The importance of customization

- In the discussion of the sustainable withdrawal rate (SWR) from a retirement portfolio, it is standard practice to assume that investors do not plan for bequests, that they have a balanced asset allocation, and that they share the same success threshold (risk tolerance). In this paper, we focus on these standard assumptions and examine their role in determining an SWR.
- An SWR depends on investor-specific input and the return outlook for assets. Our analysis shows that what constitutes a reasonable SWR can vary widely. With a baseline return outlook, it can be as low as 0.9% for a very conservative retiree with a strong bequest motive. On the other hand, an investor with no bequest motive and a strong desire to maximize spending in retirement may withdraw as much as 3.7% annually.
- Given the modest stock and bond return outlook for the next decade, the importance of asset allocation in determining the SWR is diminished. Bequest motives and the success threshold, on the other hand, become more important in customizing a suitable SWR for an investor in retirement.

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As investors have increasingly come to depend on investment portfolios for generating retirement income, advisors have developed rules of thumb to estimate a portfolio's sustainable withdrawal rate. Nearly three decades ago, William P. Bengen introduced and popularized the "4% rule" (1994). Examining data from 1926 to 1992, Bengen found that inflation-adjusted withdrawals equal to 4% of the portfolio's initial balance would have limited the risk of portfolio depletion in any 30-year period.

Fast-forward three decades since its introduction: What started out as a rule of thumb has spawned voluminous literature (see Kitces, 2014, for a review) and become a standard-bearer in the discussion of the SWR.

In 2022, as we examine this topic amid a muted return outlook, two issues stand out as particularly relevant for today's retirees.

First, the 4% rule is primarily backward-looking, drawing inferences from the return environments of the past, and may not provide a useful benchmark for the coming decades. In a recent contribution, Khang, Pakula, and Clarke (2022) address this issue and establish a new range for the SWR, between 2.8% and 3.3%, to account for the prospective return environment.

Second, because the 4% rule is a broad rule of thumb, it requires customization in practice. A common practice is to build a "layer cake" (Bengen, 2006) to adjust the attributes where the investor differs from the simplified general assumptions and arrive at a customized SWR. Thanks to the contributions post-Bengen (1994), we have estimates along the following dimensions: asset allocation, investment expenses, taxes, time horizons, spending rules, success threshold, menu of investment options, and bequest motives. Our concern is that many of these estimates rely on the backward-looking view of the return environment. Against the more muted return outlook in 2022, some of the key customization estimates may differ from earlier estimates.

In this paper, we focus on three levers and their impact on the SWR in light of the forward-looking return environment: bequest, success threshold (or risk tolerance), and asset allocation. These levers are chosen because of their relevance to the vast majority of investors with retirement wealth in financial accounts.

As we show later in the paper, how these levers affect the SWR varies by return environment. Accordingly, we believe that it is worth considering their impact on the SWR in the context of the prospective return environment. In their portfolio withdrawal behavior, individual investors show significant differences in the SWR that they appear to be anchoring to (Madamba and Utkus, 2019). By explicitly and jointly accounting for these factors in the SWR, our paper may also help determine how much deviation from the rule of thumb may be reasonable to shape expectations for today's retirees.

In the next section of the paper, we provide a detailed description of the set-up for our empirical analysis; we also describe how we generate historical and prospective return environments. In the three sections that follow that description, we explore how each of the three levers—bequest motive, likelihood of depletion (success threshold), and asset allocation—affects the SWR in isolation (that is, holding the other two constant). Our final section combines all three levers and sheds light on the range of preferences on these three levers that can be supported by the prospective return environment.

Empirical set-up

We define the SWR as the rate that, when multiplied by the investor's beginning balance at age 65 and adjusted yearly by inflation, ensures a given probability (e.g., 85%) of ending with a positive balance after 30 years. The SWR is independent of the size of the portfolio and therefore provides a reasonable benchmark for all types of investors, regardless of the size of their retirement portfolios. The SWR is a safety measure, a rate that should not be increased, or else the investor runs the risk of fully depleting the portfolio.

We start with the standard assumptions for the three levers below. Later in the paper, we vary each lever and examine its impact on SWR closely.

1. **Bequest motive:** No bequest is planned.
2. **Success threshold:** The likelihood of not depleting the portfolio over a 30-year period is 85%.
3. **Asset allocation:** We assume that the portfolio is evenly invested between U.S. equities and U.S. bonds.

Another key input in the SWR computation is a return environment. For historical return environments, we follow Khang, Pakula, and Clarke (2022) and use a time-varying-parameter Bayesian vector autoregressive (TVP-BVAR) framework to separate the capital market history since 1960 into three distinct environments.

As shown in **Figure 1**, the three environments—1960–1980, 1981–1996, and 1997–2020—are very different from one another. The 1960–1980 period had subdued real returns and a positive stock-bond correlation, reflecting the tumultuous inflation trajectory throughout the 1970s. In contrast, the 1997–2020 period saw stronger real returns and a negative stock-bond correlation, accompanied by low secular inflation with little volatility. For each return environment, we use the TVP-BVAR estimates in Figure 1 to simulate the return environment, assuming the environment lasted for the entire 30-year period.

FIGURE 1.

Historical return environments according to TVP-BVAR

			Correlation		
	Median returns	**Volatility**	**Stock**	**Bond**	**Inflation**
1960–1980					
Stock	7.0%	17.8%	1.00		
Bond	5.1%	4.4%	0.21	1.00	
Inflation	3.6%	2.3%	–0.09	0.08	1.00
1981–1996					
Stock	15.3%	17.7%	1.00		
Bond	10.3%	8.1%	0.32	1.00	
Inflation	2.8%	1.9%	–0.08	0.03	1.00
1997–2020					
Stock	8.0%	18.4%	1.00		
Bond	4.8%	4.6%	–0.15	1.00	
Inflation	1.4%	0.8%	–0.03	0.02	1.00

Note: Authors' calculations are based on quarterly data from Robert Shiller's website: www.econ.yale.edu/~shiller/data.htm.

Source: Vanguard.

Performance data shown represent past performance, which is not a guarantee of future results. Note that hypothetical illustrations are not exact representations of any particular investment, as you cannot invest directly in an index or fund-group average.

For prospective SWRs, we create three return scenarios using the forecasts from the Vanguard Capital Markets Model® (VCMM)—a proprietary forecasting tool that provides future expected returns for a wide range of asset classes.[1,2] The three scenarios are presented in **Figure 2**.

The baseline scenario derives mean returns (on stocks and bonds) and inflation rates from the median trajectories of these variables. The upside scenario assumes that stocks and bonds appreciate along the top 25th percentile VCMM projections, while inflation is realized along the bottom 25th percentile forecast. The downside scenario assumes the reverse—stock and bond returns track the bottom 25th percentile forecast and inflation tracks the 75th percentile.

FIGURE 2.

Three return scenarios

Prospective return scenarios	Description
Upside	• Mean stock and bond returns come from the top 25th percentile trajectory of the 30-year distribution. • Mean inflation comes from the bottom 25th percentile trajectory of the distribution.
Baseline	• Mean returns and inflation come from the median trajectory of the distribution.
Downside	• Mean stock and bond returns come from the bottom 25th percentile trajectory of the 30-year distribution. • Mean inflation comes from the top 25th percentile trajectory of the distribution.

Source: Vanguard.

Figure 3 displays key statistics underlying the three prospective return scenarios. As of March 31, 2022, the VCMM projected a range of long-term (30-year) returns for U.S. equities with a median projection of 5.5% in our baseline scenario. Our downside forecast for U.S. equities is 4.5% and our upside forecast is 6.6%. All three scenarios are forecasting muted short-term returns over the next 10 years, followed by a gradual reversion to higher returns; this is a feature all three scenarios share. All returns are in nominal terms and are forecasted on a yearly basis.

Following Khang, Pakula, and Clarke (2022), we also input different correlations and volatilities into these scenarios. Specifically, the upside scenario assumes bond market volatility of 2.7%, inflation volatility of just over 1%, and a stock-bond correlation of –0.13. It resembles the 1997–2020 period in its generally placid bond market volatility and a negative stock-bond correlation. The baseline assumes more elevated volatility in both the bond market and inflation, and a positive stock-bond correlation of 0.22. Finally, the downside scenario assumes historically high volatility for both bonds (8.4%) and inflation (3.0%) and a historically high stock-bond correlation of 0.32. These differences (in volatility and correlation) create an additional distinction among the scenarios, above and beyond those attributable to mean return and inflation differences.

Having pinned down six separate return environments—three historical and three prospective scenarios—we are now ready to examine the impact of the three levers on the SWR through various return environments.

1 A more detailed examination of the VCMM appeared in Davis et al. (2014).

2 For a recent forecast, see Davis et al. (2021).

FIGURE 3.

Forward-looking simulation of returns based on VCMM

	10-year median	20-year median	30-year median	30-year volatility	30-year correlation		
					Stock	Bond	Inflation
Downside							
Stock	0.9%	2.7%	4.5%	18.7%	1.00		
Bond	2.3%	2.5%	3.0%	8.4%	0.32	1.00	
Inflation	3.3%	2.8%	2.6%	3.0%	−0.11	0.05	1.00
Baseline							
Stock	3.6%	4.2%	5.5%	18.4%	1.00		
Bond	2.9%	3.2%	3.6%	4.7%	0.22	1.00	
Inflation	2.4%	2.2%	2.1%	2.4%	−0.08	0.08	1.00
Upside							
Stock	6.2%	5.8%	6.6%	18.7%	1.00		
Bond	3.6%	3.9%	4.3%	2.7%	−0.13	1.00	
Inflation	1.6%	1.5%	1.6%	1.1%	−0.03	0.07	1.00

Source: Vanguard.

Notes on risk

IMPORTANT: The projections and other information generated by the Vanguard Capital Markets Model® (VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Distribution of return outcomes from the VCMM are derived from 10,000 simulations for each modeled asset class. Simulations are as of March 31, 2022. Results from the model may vary with each use and over time. For more information, see Appendix.

Investments are subject to market risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. Bond funds are subject to the risk that an issuer will fail to make payments on time, and that bond prices will decline because of rising interest rates or negative perceptions of an issuer's ability to make payments. Investments in stocks issued by non-U.S. companies are subject to risks including country/regional risk, which is the chance that political upheaval, financial troubles, or natural disasters will adversely affect the value of securities issued by companies in foreign countries or regions; and currency risk, which is the chance that the value of a foreign investment, measured in U.S. dollars, will decrease because of unfavorable changes in currency exchange rates. Stocks of companies based in emerging markets are subject to national and regional political and economic risks and to the risk of currency fluctuations. These risks are especially high in emerging markets. Funds that concentrate on a relatively narrow market sector face the risk of higher share-price volatility. Prices of mid and small-cap stocks often fluctuate more than those of large-company stocks. U.S. government backing of Treasury or agency securities applies only to the underlying securities and does not prevent share-price fluctuations. Because high-yield bonds are considered speculative, investors should be prepared to assume a substantially greater level of credit risk than with other types of bonds. Diversification does not ensure a profit or protect against a loss in a declining market.

Lever One: Bequest motive

The bequest motive is quite common among retirees and is found even among those without children (Kopczuk and Lupton, 2007). It is especially prevalent among wealthier retirees (Lockwood, 2018). Investors with a bequest motive typically tend to spend down their financial wealth less aggressively in retirement.[3] Despite how common the bequest desire is, attention to this topic has remained muted since the initial discussion by Bengen (2006), who found that the bequest motive would not call for a significant change to the 4% rule.

Does this conclusion still hold in the face of a muted return environment? Does it vary depending on the size of an intended bequest?

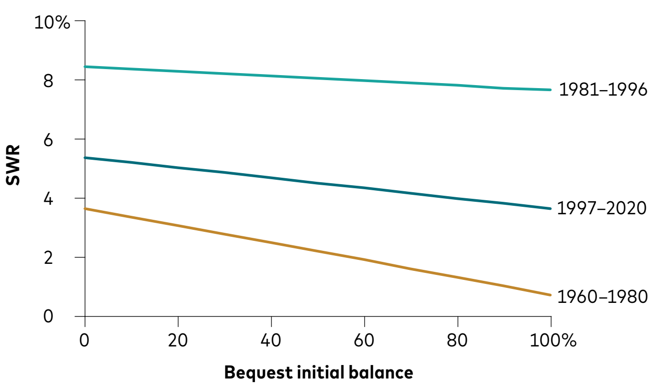
We explore these questions by accounting for the impact of the bequest motive[4] on the SWR. Specifically, we depart from the standard assumption of no bequest and allow the investor to plan for a specific amount of bequest at the end of the 30-year period. In our set-up, the bequest motive can take on any value between 0% and 100% of the beginning balance of the investor's retirement portfolio. A simulation is deemed successful if, at the end of the 30-year period, the remaining balance is greater than the desired bequest amount adjusted for 30 years of inflation. We keep asset allocation and the success threshold—the other two levers—to standard values at 50% stocks/50% bonds for the asset allocation and 85% for the success threshold.

Figure 4 shows how the SWR changes in response to the growing desire for bequest.

FIGURE 4.

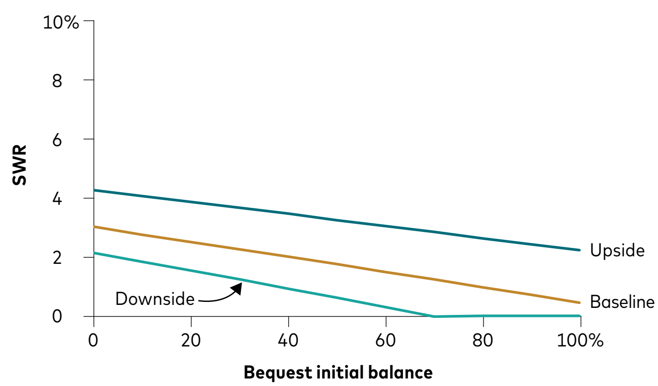
SWR and bequest motive by return environment

a. Historical environments



Notes: The panel assumes a 30-year time horizon, a 50% equity/50% fixed income asset allocation, and an 85% success threshold.
Source: Vanguard.

b. Prospective scenarios



Notes: The panel assumes a 30-year time horizon, a 50% equity/50% fixed income asset allocation, and an 85% success threshold.
Source: Vanguard.

3 Another motive that would lead to a similar spending/withdrawal pattern is the desire to self-insure against substantial late-in-life health care expenses in retirement; see De Nardi, French, and Jones (2010), Ameriks et al. (2011), and Ameriks et al. (2020).

4 As mentioned earlier, for the purpose of quantifying an SWR that seeks to leave behind a certain amount, the bequest motive will have a similar impact on the investor's savings rate/withdrawal behavior as the precautionary savings motive (to self-insure against health expenses soaring late in life), especially in the beginning of retirement.

Figure 4a shows the SWR's sensitivity to different levels of planned bequest by historical return environment. All curves are downward sloping, reflecting an intuitive finding that a higher level of desired bequest translates to a lowering of a viable SWR.

The general pattern across the three curves is as follows: The lower the standard SWR with no bequest motive (0%), the steeper the required decline in the SWR for greater bequests. On one end of the extreme, 1981–1996 starts with a record-high SWR of 8.44% with a 0% bequest and ends with 7.64% even for a 100% bequest, thanks to a shallow slope of the curve. On the other end of the extreme, in 1960–1980, the SWR starts out at 3.63% with no bequest and declines rapidly to 0.73% as the bequest rises toward 100%.

These historical SWRs shed light on the earlier finding by Bengen (2006) on the same topic: To leave 100% of the retirement portfolio as a bequest would cost only about a 0.2% reduction in the SWR. Specifically, Figure 4a indicates that the 0.2% estimate by Bengen (2006) may have been driven by the above-average return environment (i.e., 1980–1996) realized during the historical period examined.

These observations put the bequest-adjusted SWR projections in Figure 4b in perspective. Starting out at 4.3% with no bequest, the upside scenario's SWR is only marginally higher than that of 1960–1980. Accordingly, the SWR declines rapidly to end at 2.24% as the bequest motive reaches 100%; the slope is a 20-basis-point decline in the SWR results from each 10% increase in bequest compared with 29 basis points in 1960–1980. (A basis point is one-hundredth of a percentage point.)

For the more-adverse baseline and downside scenarios, the takeaway is bleaker. Not only do they start out at lower SWR values with no bequest, but they also decline more precipitously (at 26 basis points for baseline and 31 basis points for downside, for each 10% increase in bequest) with a rising bequest motive. Combining the two effects (of starting low and declining faster), the SWR reaches 0% for the downside scenario at a desired bequest beyond 70% of the initial balance in the retirement fund. Collectively, these observations suggest that, in the face of a lower-return outlook, substantial bequests may become a luxury for many retirees.

Of course, it is ultimately up to the investor to decide what is an acceptable SWR and what is not, and how the planned bequest amount possibly affects the SWR. Figure 4b can help shed light on this as a starting point.

Lever Two: Success threshold

Given the amount of attention the SWR discussion has generated since Bengen (1994), one might expect that most retirees anchor their withdrawal rate to around 4%. However, empirical results suggest that the reality may be more complicated.

In a report studying relatively wealthy retirees (those with at least $100,000 in financial accounts), Madamba and Utkus (2019) find that only about 14% of them regularly withdraw 3% to 5% annually from their financial accounts. Over 50% withdraw less than 3%, while the rest withdraw more than 5%. Of course, there may be a number of reasons behind this dispersion of withdrawal rates. The reasons may include declining spending needs in retirement (Hurd and Rohwedder, 2012), which allows for a higher SWR in the beginning; having other sources of retirement income to supplement the financial accounts, such as defined benefit plans (Poterba, Venti, and Wise, 2011a); or postponing withdrawal from financial accounts for income to the later part of retirement (Poterba, Venti, and Wise, 2011b).

This leads us to focus on the success threshold as an important lever. Defined as the likelihood that the portfolio will not be depleted at the end of a 30-year period, the success threshold reflects the risk attitude that retirees may have toward their retirement portfolio. And, naturally, the risk attitude will be investor- and context-specific. For example, if an investor relies on the withdrawal from the retirement portfolio for most of his basic spending needs (e.g., food and health care expenses), he would be extremely averse to the risk of premature depletion. Typically, this will warrant a very conservative threshold, such as a threshold of 90% to 95%.

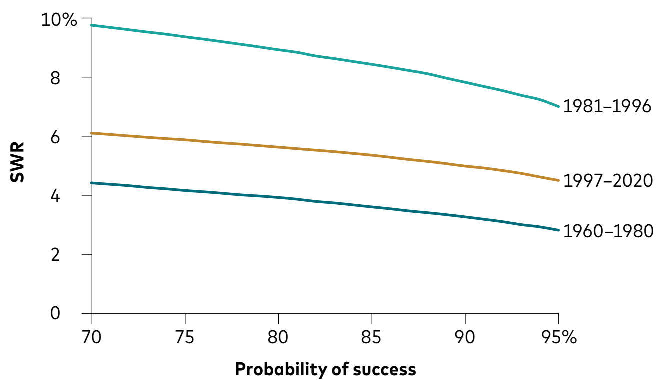
On the other hand, if the withdrawal is mostly used to fund discretionary spending (e.g., an annual monthlong vacation to Europe for the 10 years from the retiree's mid-60s to mid-70s), there may be more room to take risk with the SWR. This retiree may not feel it is important that the success rate be higher than 70% since she does not anticipate traveling as frequently in the second half of retirement.

We consider how the SWR changes in response to a wide range of success thresholds. As before, we hold the other levers constant, i.e., a 50% stock/50% bond asset allocation and no bequest motive, in computing the SWR. **Figure 5a** shows the SWR's sensitivity in three historical return environments and **Figure 5b** displays the sensitivity for the three prospective scenarios.

FIGURE 5.

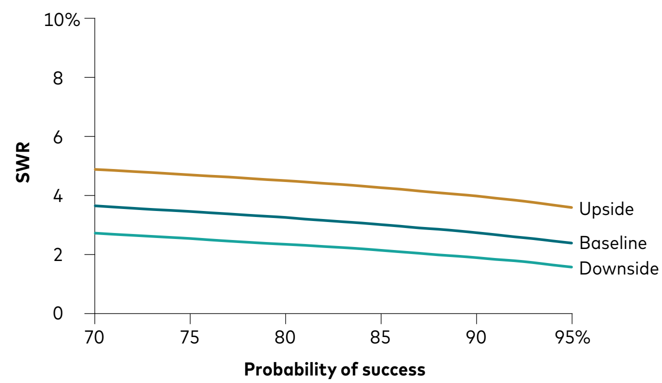
Success threshold and the SWR

a. Historical: 1960–2020



Notes: The panel assumes a 30-year time horizon, a 50% equity/50% fixed income asset allocation, and a 0% bequest motive.
Source: Vanguard.

b. Prospective: Three scenarios



Notes: The panel assumes a 30-year time horizon, a 50% equity/50% fixed income asset allocation, and a 0% bequest motive.
Source: Vanguard.

Figure 5 shows an intuitive pattern in which higher success thresholds lead to lower SWRs, while lower success thresholds lead to higher SWR values. Two additional observations are worth noting.

First, in Figure 5a, the 1981–1996 environment shows a noticeably steeper decline than the other two environments. This difference for 1981–1996 is primarily driven by the unusually high bond market volatility during this environment. (Bond market volatility averaged 8.1% during 1981–1996 compared with roughly 4% in the other two environments.) In a 50% stock/50% bond portfolio, the low volatility for bonds (relative to volatility for equities) is an increasingly important driver of the SWR as the success threshold rises toward 100%. Higher bond market volatility in the 1981–1996 period makes it more costly (in terms of the SWR) to achieve the same level of assurance for success; the higher the success threshold, the more the SWR must be reduced because the higher bond market volatility makes depletion more likely than in other return environments.

Second, the analysis indicates a steeper decline in the curves when the success threshold is set very high. Specifically, the slope gets steeper between 85% and 90% of the success threshold. This speaks to the importance of aligning the success threshold with the nature of retirement spending associated with the withdrawal. As mentioned earlier, a high success threshold is necessary for those who depend on the withdrawal for funding basic living expenses, whereas a somewhat lower threshold may be more suitable for funding discretionary spending in retirement. Historically, changing the success threshold from 80% to 95% led to a decline in the SWR of between 1% and 1.8%. Prospectively, a success threshold increase from 80% to 95% is likely to result in about a 1% decline in the SWR—a magnitude less than earlier estimates from Spitzer, Strieter, and Singh (2007) and Cooley, Hubbard, and Walz (2011).

In addition, the success threshold may have an important practical implication for retirement spending flexibility. A retiree starting with a low SWR, driven by a high success threshold, may not have enough flexibility to reduce the withdrawal rate when market returns are poor. In the same vein, if a retiree is willing to accept a lower-than-the-baseline probability of success (starting with a high SWR), then there may be more flexibility with the withdrawal rate when faced with an adverse sequence risk. Khang and Clarke (2020) show the importance of having sufficient flexibility, especially in bear markets.

Lever Three: Asset allocation

The last lever we analyze is asset allocation. Of the three levers we examine in this paper, asset allocation is one of the more actively studied in the SWR literature (e.g., Bengen, 1996, and Cooley, Hubbard, and Walz, 1998). However, most of the findings on the SWR and asset allocation are from long-term historical returns that span multiple decades, so are less suitable for determining prospective SWRs.

Using the framework introduced by Khang, Pakula, and Clarke (2022), we are now able to examine the importance of asset allocation in the SWR that is *specific* to a distinct return environment. **Figure 6** shows how the SWR changes with a different equity/bond mix by historical and prospective return environments. "Maximum SWR" indicates the allocation point when the curve reaches its maximum SWR. As before, we fix the other levers at standard levels (no bequest and success threshold of 85%).

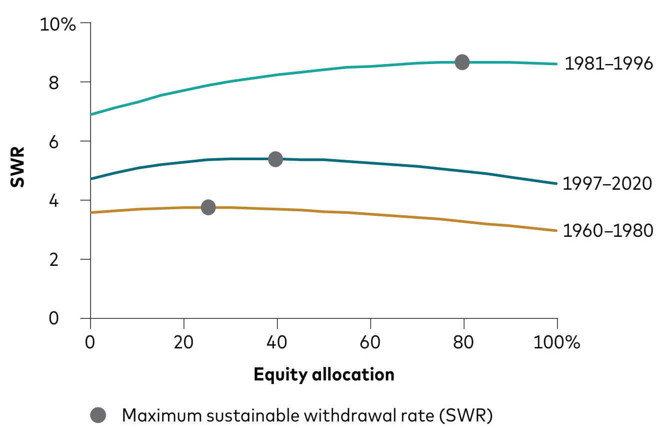
Figure 6a illustrates a novel finding. Optimal allocation that leads to the highest SWR varies *widely* over return environments. Notably, an 80%/20% allocation between equity and bonds would have been optimal in the 1981–1996 return environment, whereas roughly 25/75 (or 40/60) would have been optimal in the other two historical environments.

This bifurcation again may be attributed to the return environment differences across the three periods. Compared with the other two periods, 1981–1996 boasted a very high equity risk premium of 5% (excess equity return over bonds) and explains the higher equity allocation. At the same time, compared with the other two environments, bond market volatility and the stock-bond correlation were significantly higher during 1981–1996. These made bonds less attractive as a diversifier and a source of stability in times of volatility. Collectively, all these forces worked in the same direction: More equity was desirable so a lower allocation to bonds was optimal in 1981–1996.

FIGURE 6.

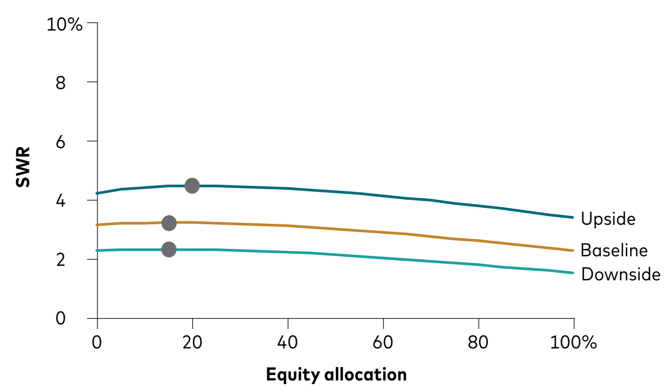
Asset allocation and the SWR

a. Historical environments: 1960–2020



Notes: The calculations assume a 30-year time horizon, an 85% success threshold, and 0% bequest motive.
Source: Vanguard.

b. Prospective scenarios



Notes: The calculations assume a 30-year time horizon, an 85% success threshold, and 0% bequest motive.
Source: Vanguard.

Figure 6a also shows that the materiality of the differences in allocation depends greatly on the return environment. For instance, whereas the range of the SWR based on allocation differences is on the order of 2% in 1981–1996, it is around 0.5% for the 1960–1980 period, when the returns and the SWRs were low. Our analysis in Figure 6b suggests that we are expecting a 1960–1980-style trade-off between the SWR and asset allocation. In the prospective return environment, expected equity risk premium is not high enough, suggesting that investors may want to consider a lower allocation to equity. Also, given the muted return outlook, the difference in the SWR that can result from allocation differences appears quite compressed.

As we share these findings, it is important to note that we are not recommending a particular asset allocation to achieve a maximum SWR. Considerations other than the SWR may (and frequently do) enter the decision-making process for one's asset allocation. Instead, we view the findings to be a useful input to consult (as one of, potentially, many considerations) when determining the SWR in the retirement planning process. Specifically, regardless of one's preferred asset allocation, it is helpful to know that the next decade looks quite different from the 1981–1996 period, and asset allocation is not expected to make a significant difference in the SWR.

Prospective SWRs for the 2020s

What do our findings mean for the retirees and soon-to-be retirees who are looking for an actionable rule of thumb that is more customized to their circumstances? How much can they withdraw safely given their unique bequest motive, tolerance for depletion (or standard for success), and asset allocation?

Having studied each lever and its impact on the prospective SWR separately, we now consider them jointly and explore the range of SWRs that may be considered reasonable for the majority of retirees. Specifically, we explore a number of hypothetical cases where the bequest motive and success threshold vary jointly as in **Figure 7**. We do not vary asset allocation since our prior section established that its impact is not expected to be significant in most cases.

FIGURE 7.
Case definitions

Investor type	Decision
A	50% bequest and 95% definition of success
B	25% bequest and 85% definition of success
C	0% bequest and 85% definition of success
D	0% bequest and 70% definition of success

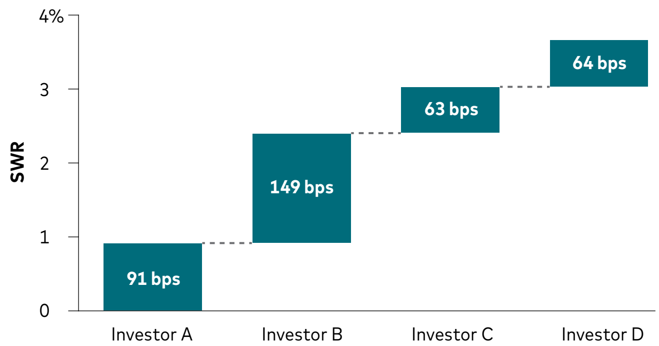
Source: Vanguard.

Investor type A represents someone who cares deeply about securing a bequest with a high degree of certainty. The high bequest coupled with a high success threshold puts this investor on the very conservative end of the spectrum. Investor type D is on the other end of the spectrum, with no bequest motive and an acceptable, but certainly riskier, success threshold of 70%. Investor type D represents someone who wants to withdraw generously in retirement, perhaps because of the ability and willingness to cut spending in adverse markets. Investor types B and C are more moderate versions of A and D, respectively.[5]

5 Relative to investor A, investor B has a positive, but meaningfully lower, bequest motive of 25% and a conservative, but less certain, success threshold of 85%. Investor C has the same success threshold of 85%—a much more conservative threshold than investor D's 70%.

Figure 8 shows the SWRs for the four investor types under the baseline prospective return scenario.

FIGURE 8.
Cost of higher bequest motive and success threshold

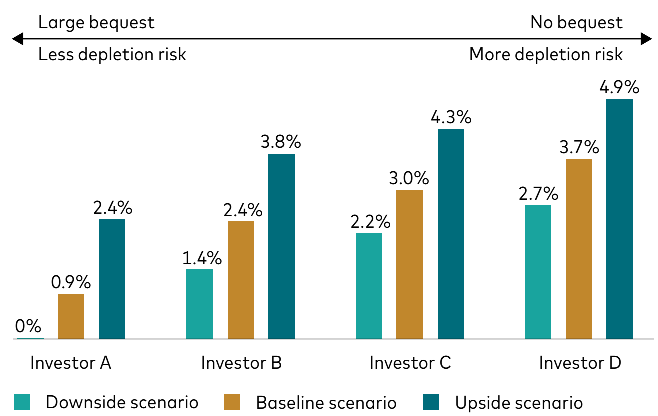


Source: Vanguard.

Starting with investor type C—our standard assumption—the prospective SWR is about 3%, broadly in line with findings in earlier work by Khang, Pakula, and Clarke (2022) and other forecasts (e.g., Benz, Ptak, and Rekenthaler, 2021, and Finke, Pfau, and Blanchett, 2013). Moving left, a 25% increase in bequest motive lowers the viable SWR by about 60 basis points, to 2.4%; moving further left, increasing the bequest motive by an additional 25% and the success threshold by an additional 10% requires the SWR to decline further by 1.5%. On the other hand, comparing investor types C and D, the SWR can be raised by 64 basis points if the retiree is willing to accept a lower chance of success.

As shown in **Figure 9**, this trade-off between a higher SWR and a greater bequest and/or a higher success threshold across these four investor types remains largely the same across the three return environments. It also shows that, especially for those who are more risk-averse and would like to be prepared for a downside scenario, both substantial bequest motive and ultra-conservatism on the success threshold are likely prohibitively costly; at around 2% or below, the SWR would simply be too low for many retirees if the retirement portfolio is their main source of retirement income. The figure also shows that retirees may do well to reconsider withdrawing more than 5% a year, *even if* they subscribe to a more optimistic view of the return environment.

FIGURE 9.
SWR customization across investor types



Note: The illustration assumes a 30-year time horizon.
Source: Vanguard.

Conclusion

The question "How much can I safely withdraw from my portfolio without outliving it?" remains a critical one for retirees. The sustainable withdrawal rate is the primary measure for answering this question. Tracing its origin to Bengen's 4% rule of thumb, much of the discourse continues to have a one-size-fits-all undertone—much like a hammer that treats every retirement planning consideration as a nail.

Taking into account the significant differences among individual investors, and the vastly diverse ways in which the retirement portfolio funds the retirement income, we show how the basic SWR framework can be modified around three levers for greater customization for today's retirees. Specifically, we consider how bequest motive, success threshold, and asset allocation change the SWR in both historical and prospective return environments.

Our investigation yields a number of actionable insights for retirees who are facing the uncertain return environment in 2022. First, against the backdrop of muted equity risk premium, asset allocation is not likely to move the dial on the SWR much. Second, a sizable bequest and a high level of conservatism may no longer be within the reach of many retirees who cannot afford to withdraw less than 2% from their portfolio. Third, an SWR greater than 4% is reserved only for retirees with no plan to leave a bequest and high risk tolerance, provided that the upside return scenario is realized.

Even taking all these observations into account, 2% to 5% is a wide range to choose from. Our research shows the importance of taking the three levers into consideration to further customize the SWR for the individual investor. A customized SWR can better inform the investor's spending capability in retirement and can put the investor in a better position to meet retirement goals. This is especially important for new retirees, who face an era of muted return outlook.

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Appendix

About the Vanguard Capital Markets Model

The projections and other information generated by the Vanguard Capital Markets Model® (VCMM) regarding the likelihood of various investment outcomes are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. VCMM results will vary with each use and over time.

The VCMM projections are based on a statistical analysis of historical data. Future returns may behave differently from the historical patterns captured in the VCMM. More importantly, the VCMM may be underestimating extreme negative scenarios unobserved in the historical period on which the model estimation is based.

The VCMM is a proprietary financial simulation tool developed and maintained by Vanguard's primary investment research and advice teams. The model forecasts distributions of future returns for a wide array of broad asset classes. Those asset classes include U.S. and international equity markets, several maturities of the U.S. Treasury and corporate fixed income markets, international fixed income markets, U.S. money markets, commodities, and certain alternative investment strategies. The theoretical and empirical foundation for the VCMM is that the returns of various asset classes reflect the compensation investors require for bearing different types of systematic risk (beta). At the core of the model are estimates of the dynamic statistical relationship between risk factors and asset returns, obtained from statistical analysis based on available monthly financial and economic data from as early as 1960. Using a system of estimated equations, the model then applies a Monte Carlo simulation method to project the estimated interrelationships among risk factors and asset classes as well as uncertainty and randomness over time. The model generates a large set of simulated outcomes for each asset class over several time horizons. Forecasts are obtained by computing measures of central tendency in these simulations. Results produced by the tool will vary with each use and over time.

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