TD Global Investment Solutions

Investor Knowledge 20 Minutes

Managing Sequence of Return Risk for Foundations and Endowments

Cameron Stoddard
CFA, Vice President, Portfolio Manager, Institutional Asset Allocation

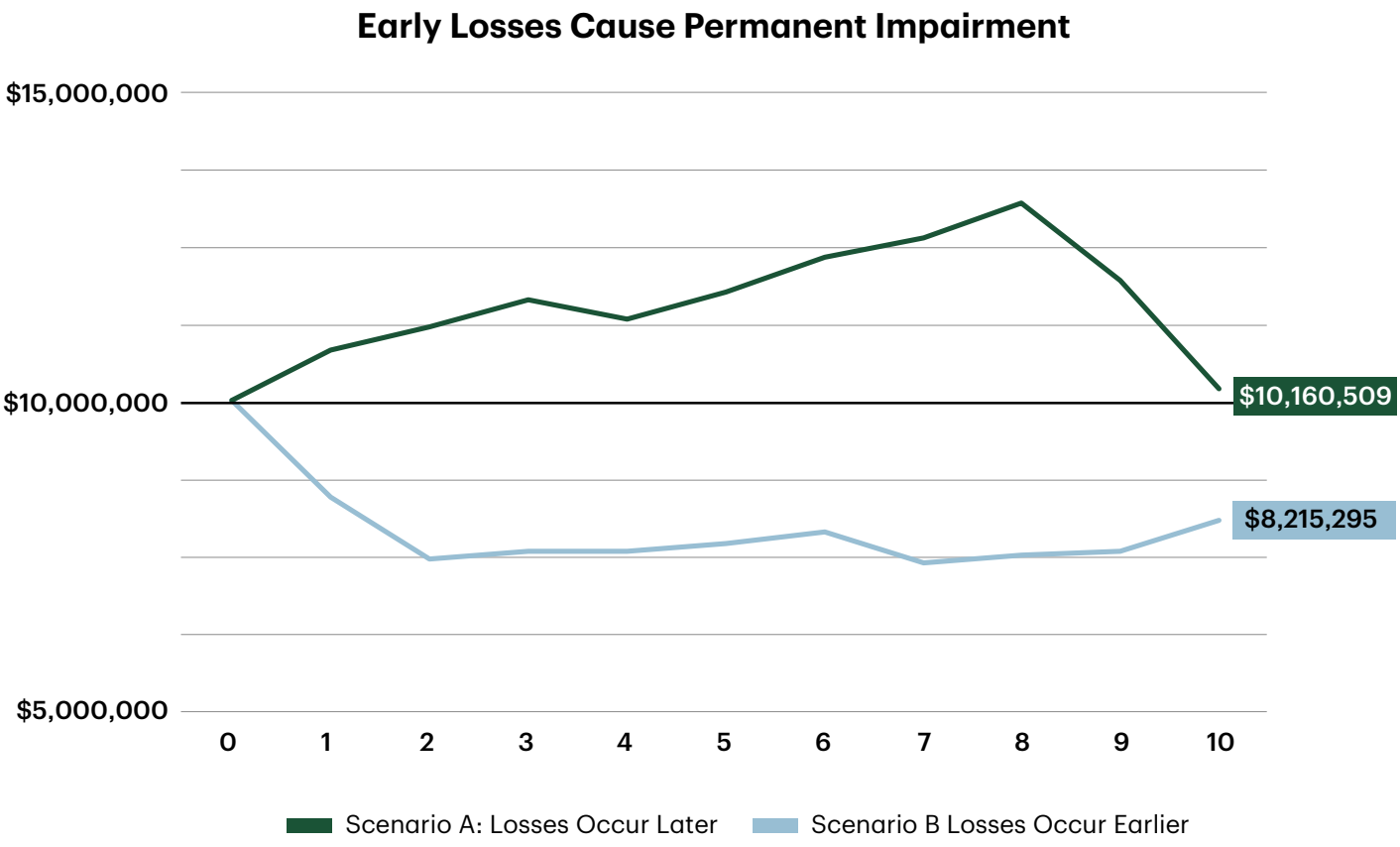
The charitable sector provides vital support to the communities we live in – support that would not be possible without the funding which assets held by charities, foundations and endowments generate. Good stewardship of these assets requires an understanding of the unique risks faced by the charitable sector. One key risk which can impair charitable organizations' funding levels, striking at the heart of their very raison d'être, is sequence of return risk. To manage this risk, it's important to understand how it interacts with the Disbursement Quota (DQ) - the minimum amount an endowment or foundation is required to spend annually on its programs or on gifts to qualified donees, such as other charities.

What is Sequence of Return Risk?

Sequence of return risk is the risk to an investment portfolio arising from the inopportune timing of negative returns. If a portfolio suffers losses early on and the charity is required to make a disbursement, its capital base may be permanently impaired.

To illustrate this, consider the simplified example below of a $10 million portfolio with annual disbursements of $500,000 and an average return of 5.0%. In the two scenarios shown in the chart, the portfolio experiences the same average (simple mean) annualized return and has the same set of calendar year returns for each of 10 years, but in reverse order. In Scenario B, market losses in the first two years cause the portfolio to sustain a significant erosion in its value. So, same return for the entire 10-year period, same standard deviation, but two wildly different outcomes – all due to sequence of return risk.

Figure 1: Impact of Sequence of Returns on Portfolio Value



	1	2	3	4	5	6	7	8	9	10
Scenario A: Losses Occur Later	14.0%	8.0%	9.0%	1.5%.	9.0%	9.0%	7.0%	9.0%	-6.0%	-11.0%
Scenario B Losses Occur Earlier	-11.0%	-6.0%	9.0%	7.0%	9.0%	9.0%	1.5%	9.0%	8.0%	14.0%

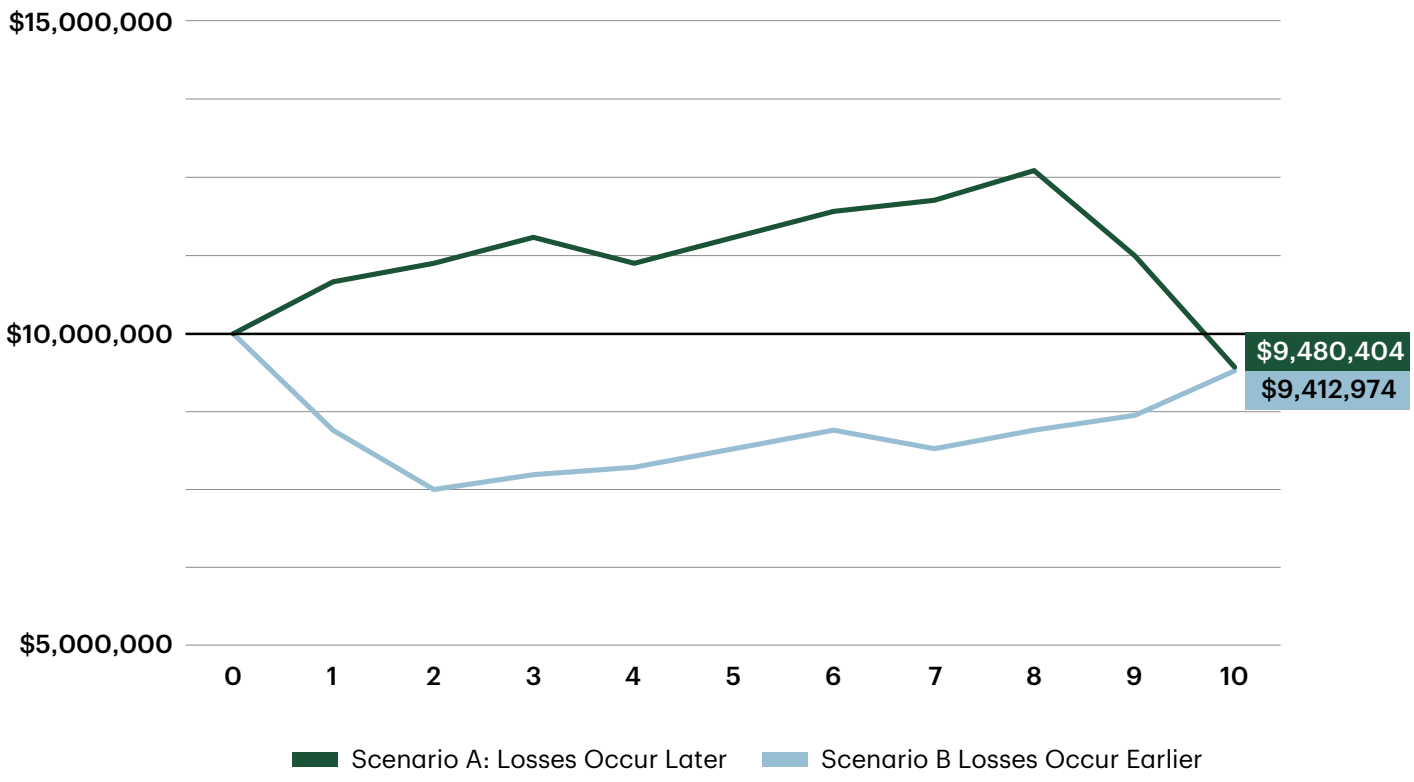
Smoothing Formulas Are Your Friend...But There's a Catch

The good news for foundations and endowments is that the impact of sequence of return risk is muted because the DQ is based on a percentage of assets, not a fixed dollar amount - and because organizations can smooth the asset value used as the basis for the standard 5% disbursement. The DQ can be based on average market value of assets over 24 months.

The ability to employ a smoothing formula means that if the plan has suffered heavy losses due to market movements, the average asset level will be reduced, resulting in fewer dollars needed to meet the 5% DQ. Provided the organization has no spending commitments over and above what the 5% DQ requires, this helps to protect the plan value from sequence of return risk.

The chart below shows how these two measures help reduce sequence of return risk. We use the same portfolio and return scenarios from **Figure 1**, but instead of withdrawing a fixed sum of $500,000 annually, we withdraw 5% of the plan's assets, calculated based on the plan's average asset value over 24 months. This time, the impact of early heavy market losses is much more muted, with both scenarios resulting in a similar terminal value for the plan, not far below its starting value of $10 million.

Figure 2: Basing Funding on Percentage of Assets and Applying a Smoothing Formula Reduces the Impact of Sequence of Return Risk on Portfolio Value



	1	2	3	4	5	6	7	8	9	10
Scenario A: Losses Occur Later	14.0%	8.0%	9.0%	1.5%	9.0%	9.0%	7.0%	9.0%	-6.0%	-11.0%
Scenario B Losses Occur Earlier	-11.0%	-6.0%	9.0%	7.0%	9.0%	9.0%	1.5%	9.0%	8.0%	14.0%

How is the average market value calculated when employing a smoothing formula?

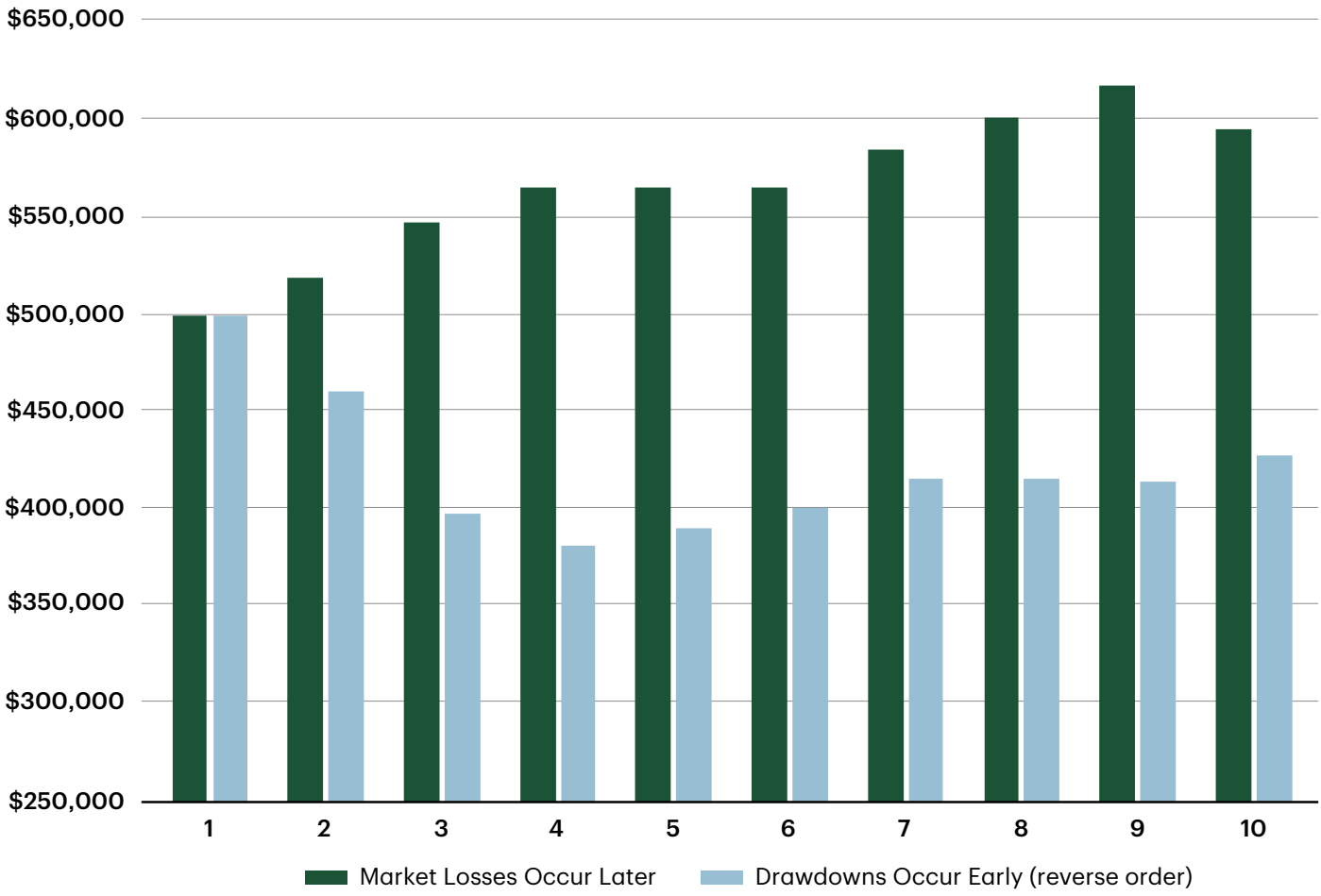
There is no stipulated number of valuation dates, but the values used to calculate the average over 24 months must be at even intervals (annually, semi-annually, quarterly, etc.). The more frequent the valuation points used for the average calculation, the greater the smoothing effect.

Sequence of Return Risk and Funding Challenges

While the DQ and ability to employ a smoothing formula afford organizations a measure of protection against the impact of sequence of return risk on plan value, they do so at the expense of providing stable funding.

In **Figure 3**, we repeat the example shown in **Figure 2** – i.e., our $10 million model portfolio, with annual withdrawals based on a 5% DQ calculated using the portfolio's average value over 24 months, under the two return scenarios – but this time, instead of the portfolio's terminal value, we look at the funds it disburses each year based on DQ requirements. Over the 10-year period, Scenario B results in 35% less funding being disbursed to charities, despite the same average annual return on investments. In a world where every dollar provided by a foundation or endowment is so urgently needed, it is alarming to think that such an enormous disparity in funding essentially comes down to luck – i.e., in what order did a plan experience higher versus lower returns, and how did that timing coincide with withdrawals?

Figure 3: Funds Disbursed by a Portfolio Earning 5% Average Returns



Sequence of returns risk can threaten the ability of charitable organizations to maximize their impact on the communities they support. By going one layer deeper and understanding how portfolio characteristics impact sequence of return risk we can develop strategies to help organizations achieve their objectives.

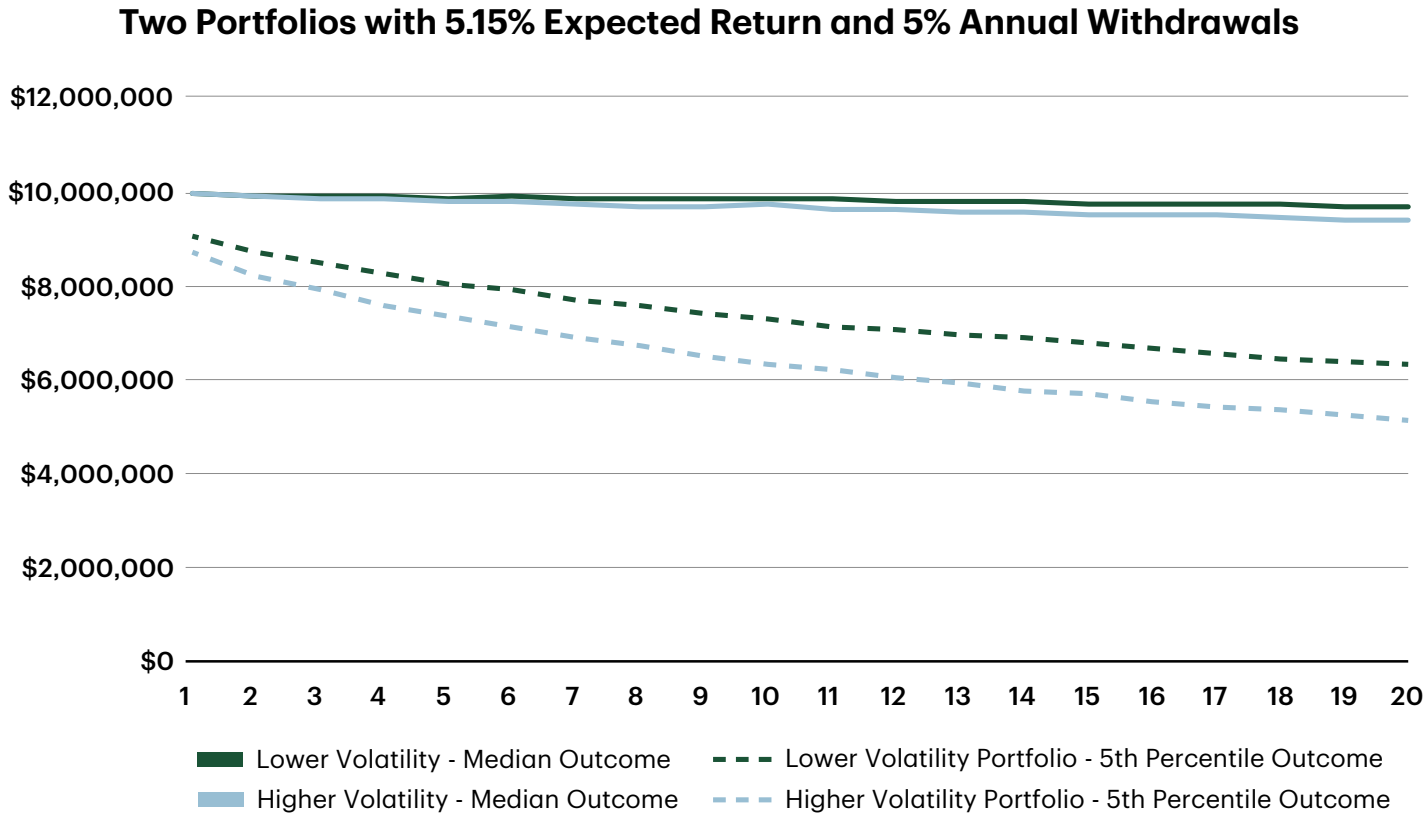
Volatility Matters - Modelling Sequence of Return Risk

To examine the impact of portfolio characteristics on sequence of return risk, we have modelled two portfolios that generate the same expected returns but have different risk profiles. We then ran a series of 10,000 Monte Carlo simulations on these portfolios over a 20-year span. Each simulation represents a separate random walk, wherein the expected returns, volatility and cross-correlations of underlying investments are simulated on a portfolio year after year. A 5% withdrawal is made from each portfolio every year. We then break these 10,000 simulations into percentiles: the 100th percentile represents the highest ending portfolio value from the simulations, while the 1st percentile represents the lowest value. To eliminate extreme outliers, we focus on what happens between the 5th and 95th percentile of outcomes.

In this exercise, we have two different balanced portfolios, each with an expected 5.15% return, but one has a higher level of risk, with a standard deviation of 7.9, while the other is more diversified and has a lower level of risk, with a standard deviation of 5.6. Looking at the results of the Monte Carlo simulations below, we can make several observations about the relationship between sequence of return risk and volatility.

First, we see that in both cases, there is a significant chance of substantial erosion of capital over time: in the worst-case outcome (5th percentile), the more volatile portfolio nearly halves in value, despite having a mean expected return of 5.15%. Greater volatility means there is a greater chance of higher losses early on.

Figure 4: Higher Volatility Creates Greater Sequence Risk



The second observation is that the median outcome for these portfolios still sees a slight erosion of capital over time, with both portfolios ending the 20-year period slightly below their $10 million starting point, despite an expected return (5.15%) in excess of the 5% annual disbursement requirement. The more volatile portfolio has the lower median outcome of the two. If we compare the ex-ante expected returns to the ex-post geometric mean return on the 10,000 simulations, we can see the impact of sequence of return risk more clearly. The geometric returns consider the impact of compounding, including the timing and size of cashflows.

Portfolio Type	Ex-Ante Expected Mean Return	Ex-Post Geometric Mean (Simulated)
Lower Volatility Portfolio	5.15%	5.11%
Higher Volatility Portfolio	5.15%	4.93%

For endowments and foundations, which must withdraw funds from their portfolio each year to meet their DQ requirements, sequence of return risk means that it is especially important to be compensated for any incremental increase in volatility. In fact, given the drag that volatility creates for portfolios with cash-outflows, many charitable organizations will need higher returns than the DQ.

Solving for Sequence Risk

The Institutional Asset Allocation team at TD Asset Management Inc. can help endowments and foundations reduce sequence of risk in two ways: through resilient asset mixes and cash flow management.

Resilient Asset Mixes

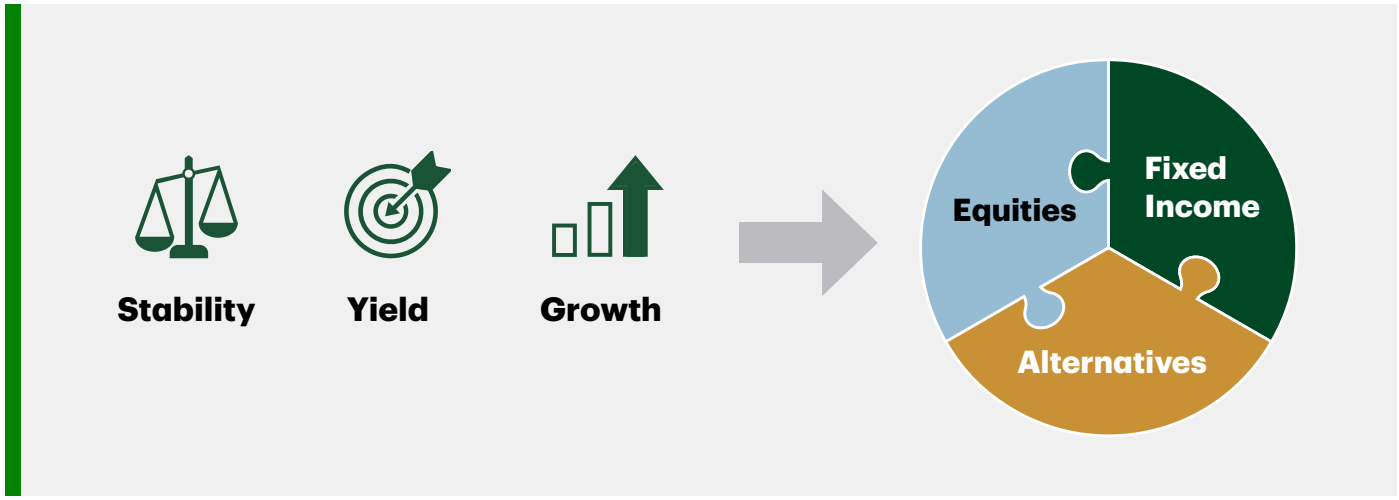
Building a resilient asset mix begins with studying a plan's liquidity needs, time horizon, spending requirements, and contribution and growth expectations, all of which will have a bearing on the optimal investment policy. The objective is to construct an asset mix that meets each of these objectives, while minimizing sequence of return risk by muting volatility and maximum drawdowns.

Optimization techniques – such as Monte Carlo simulations, which account for the cross-correlations between asset classes – are an effective way to build a resilient asset mix. As part of the analysis, it's important to recognize that correlations are unstable over time. For instance, the correlation between bonds and equities has been negative in most historic environments (providing good diversification), but it can turn strongly positive, particularly in a rising yield environment (providing poor diversification), as we saw in 2022.

We work with investment committees to explore the inclusion of alternative assets, such as private real estate, infrastructure and commodities, to provide a critical additional source of diversification. Depending on the size of a plan, private alternatives are accessible directly or via a pooled fund designed with the needs of foundations and endowments in mind.

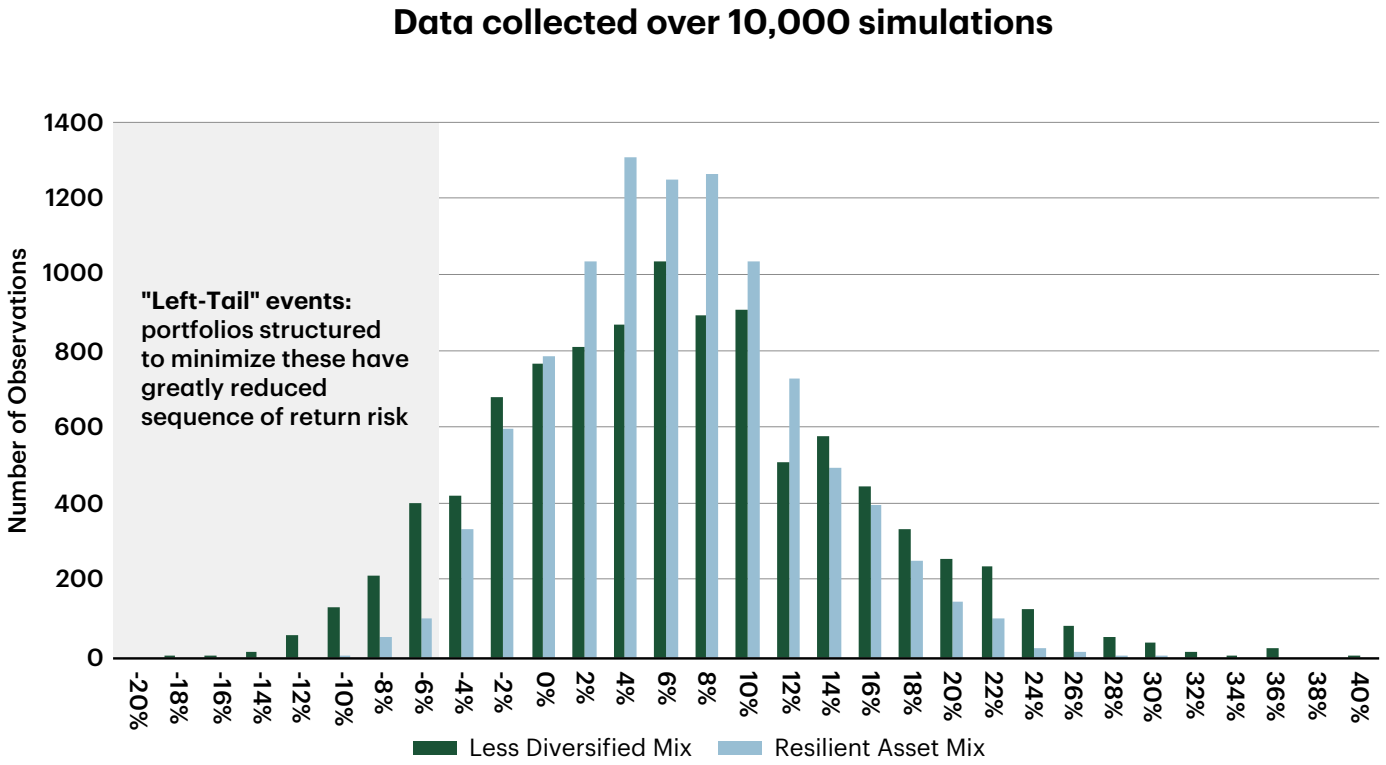
A forward-looking approach to managing sequence risk should also include a deep understanding of factor exposures. Ensuring that portfolios are not unintentionally overloaded on any one factor helps make them more resilient across market regimes, potentially reducing maximum losses and thereby lowering sequence of return risk. (For a detailed look at the importance of understanding factor exposures and how to extract value through tactical management, check out our recent paper **An Asset Allocators Guide to Multi-Strategy Equity Portfolios >**.)

Figure 5: Which Factor Exposure Does Each Piece of Your Portfolio Contribute?



To illustrate the value of a resilient asset mix, consider the return distribution from the simulations ran for the portfolios in **Figure 4**. The more diversified portfolio, which includes alternatives, has a narrower distribution of annual returns with fewer extreme outcomes. Critically, the maximum drawdown, a key component of managing sequence of return risk, was -18.7% for the less diversified portfolio versus -11.5% for the more diversified one. When looking at the distribution of returns in **Figure 6**, it is easy to understand how controlling for volatility and maximum drawdowns can potentially limit sequence of return risk.

Figure 6: Distribution of Returns for Two Portfolios Returning 5.15%



Cash Flow Management and the Value of Tactical Asset Allocation

A critical, but often overlooked, way to minimize sequence risk is good communication between clients and investment managers about cash flow needs. Regular touch points and a proactive dialogue can help ensure that investment managers are aware of the size and timing of upcoming withdrawals. Securities can be sold over a period of time, taking advantage of market movements to raise cash in advance of the withdrawal and minimizing the risk of facing a major market drawdown immediately before the withdrawal must be made.

This can be further enhanced by active tactical management which recognizes that a thoughtful approach to considering what assets to sell in order to fund a withdrawal can have an enormous impact, especially following a period of steep market declines. For example, if equities suffered sharp declines in the period leading up to a withdrawal, it may be wise to avoid locking in losses and fund the withdrawal primarily through cash or bonds rather than through selling equities. Conversely, after strong market returns, a withdrawal can be used as an opportunity to take profits on equities and rebalance the portfolio. Tactical asset allocation that considers client needs, plan guidelines and the market environment can help to improve outcomes.

Conclusion

We have seen that sequence of return risk poses a significant challenge to endowments and foundations. Not only can it erode plan values over time, but, more significantly, it can also greatly reduce the amount of funding a plan can disburse in support of its activities. Reducing the impact of sequence of return risk can help endowments and foundations provide stable funding and grow their assets over time. Building resilient asset mixes that include diversification beyond stocks and bonds, managing proactively ahead of upcoming cash flows, and employing tactical management are all valuable ways in which the charitable sector can help safeguard the stability of funding. ■

Strategy

(0223)