Looking Forward

Stress Testing Your Portfolio C

by | **Kendra Kaake**

Even prior to the pandemic, investors were concerned about uncertainties in trade and geopolitics as well as low returns and market volatility. As plan sponsors face a new normal, they can better manage risk by improving regular reporting and governance. This article also explores asset allocation considerations including client-specific goals, strategic business objectives, contractual obligations, risk tolerance, plan type, maturity, funding levels and return requirements.

and Backward–

an Improve Decision Making

When we turn to the specific challenges of today's markets, there's so much to cover. Even before the events of the past year, there was a lot of fear and uncertainty. Investors were concerned about uncertainties in trade, geopolitics and Brexit as well as the low-return environment and the general volatility of markets. What's more, throughout the past few decades, we've trended toward lowered interest rates, which has been particularly painful for everyone in the pension management business. Of course, 2020 has amplified this dynamic, with nominal interest rates reaching new lows across the yield curve. Real rates in many monetary systems are even trending negative. In short, the threats to a plan sponsor's ability to meet its obligations can take on many forms. Unexpected events that may not necessarily have been seen, like a repeat of the most recent downturn, are one such type of threat.

In the current environment, the only constant is change. Situations, relationships, people and markets are constantly evolving. So as plan sponsors face a new normal within financial markets, improvements in regular reporting and governance can work to provide a better, more robust approach to managing risk.

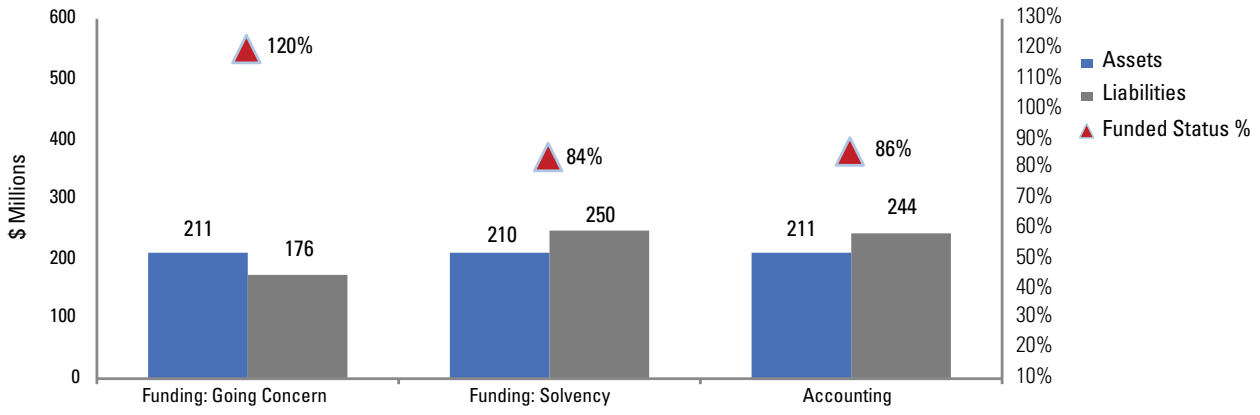
With little room to leave money on the table, organizations now require a new kind of discipline for success. As part of the new normal, investment committees are increasingly involved in the process. More than ever before, committees are assessing downside risk in anticipation of potential surprises—particularly with respect to unexpected contributions that tend to happen at exactly the wrong time. They're also looking at more specific risks to the broader organization. The relationship between an organization's pension plan and its capital structure is intricate and complex. Unexpected swings in the funded status of pension plans, for example, have forced plan sponsors to assess risk management through multiple liability lenses.

Pension Plan Objectives

Considerations essential to the asset allocation decision vary by organization, sometimes significantly, but generally include client-specific goals, strategic business objectives, contractual obligations, challenges and risk tolerance. Some of the higher level considerations that drive the asset allocation decision include plan type, maturity, funding level, risk appetite and return requirement.

Two investment approaches on opposite ends of the spectrum, for example, might include a return-enhancing strategy and a liability-driven strategy. The *return-enhancing strategy* is exactly as it sounds, where a bigger portion of the allocation would be devoted to assets expected to deliver returns *above* the interest cost of liability cash flows. The *liability-driven* approach is a risk management strategy with a bigger portion of the allocation devoted to assets expected to *match* the interest cost of liability cash flows. In the former, the focus is on returns. In the latter, the focus is on minimizing surplus and contribution volatility.

FIGURE 1



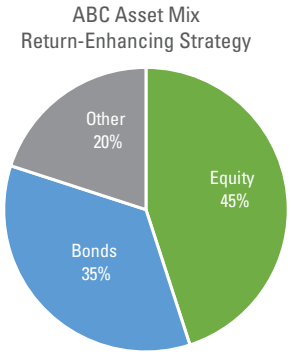
Source: SEI Investments. For illustrative purposes only.

FIGURE 2

Surplus Value at Risk (1 in 20 Downside Risk)

	Less Risk ← More Risk	Ten-Year Expected Returns: Assets	Liabilities
CDN Treasury Rates		0.2%	1.1%
Credit Spreads		0.4%	1.3%
Equity Beta		3.7%	
Other Assets		0.3%	
Currency			
Active Management		0.8%	
Diversification			
Total		5.4%	2.4%

($ Millions) -60 -40 -20 0 20 40 60



Source: SEI Investments. For illustrative purposes only. Not a representation of an actual portfolio or results.

FIGURE 3

Sponsor Impact

	Funded Status	Surplus/ Deficit $ Millions	Fund To: 105%	Fund To: 85%	Amortize 100% ($ Millions) 5 years	Amortize 85% ($ Millions) 5 years
As of September 30, 2020	84%	(39.9)	52.3	2.4	8.6	0.5
Risk Environment (Less Risk ← More Risk)						
Standard VaR	68%	(80.2)	92.7	42.8	17.2	9.2
Stressed VaR	59%	(101.3)	113.7	63.8	21.8	13.7
Historical Scenarios						
COVID-19	68%	(80.8)	93.3	43.4	17.4	9.3
2011 Debt Crisis	65%	(86.9)	99.4	49.5	18.7	10.6
Global Financial Crisis	69%	(76.6)	89.1	39.2	16.5	8.4
Tech Bubble	78%	(55.8)	68.3	18.4	12.0	4.0
Shock Scenarios						
100 bp Rate Drop	66%	(83.8)	96.3	46.4	18.0	10.0
10% Equity Decline	79%	(53.5)	66.0	16.1	11.5	3.5

($ Millions) 0 20 40 60 80

Source: SEI Investments. For illustrative purposes only.

Reporting for an Effective Risk Management Process

Making things even more interesting is that the legislative and regulatory guidelines for measuring liabilities can take on several different forms and vary significantly across Canadian jurisdictions, provinces and plan types, leading to different liability benchmarks and, in turn, definitions of *surplus*.

Although funding requirements may vary by region, they are consistent in their intent to ensure that contributions are made responsibly over time to protect the security of benefits. The challenge is that we have multiple lenses with which to contend when measuring funding levels. The ABC plan, as an example, has three separate funding ratios: going concern, solvency and accounting. Why the large difference in funding levels across these measures? There are several reasons, many of which are beyond the scope of this analysis, but the largest culprit is the discount rate used to determine the present value of future benefit streams.

Figure 1 outlines the assets, liabilities and corresponding funding ratios for the ABC pension plan. As of Sept. 30, 2020, the effective discount rate was 5% on a going concern basis, 2.5% on a solvency basis and 2.8% on an accounting basis.

Each liability metric has a plan duration between 15 and 20 years, corresponding to roughly a 15% to 20% increase in liabilities for every 1% drop in the discount rate. So, it's easy to do the math on how much of an impact the discounting function has, which makes this a very important element when stress testing portfolios, measuring risk exposures and monitoring contribution requirements.

Because the solvency position is typically driving contribution uncertainty and is also a proxy for the current economic position, our analysis will focus there.

Figure 2 illustrates the *surplus value at risk (VaR)*, or one in 20 downside risk, for the solvency funding balance of the ABC pension plan based on the return-enhancing investment strategy.[1]

In simple terms, the surplus VaR represents the worst possible amount of loss that ABC *should* be aware of over a one-year time horizon. In technical terms, when we ran a series of forecasts for the ABC plan, the funding deficit widened by this much or more in 5% of our scenarios. Put another way, for roughly 5% of the simulations we ran (so, 50 out of 1,000), the situation looked this bad or worse. The chart in Figure 2 shows that for the ABC plan, the one in 20 loss event equates to an additional solvency deficit of $39.9 million.

The chart also breaks down the surplus VaR into its component parts. It outlines the impact of treasury rates (most of which comes out of the liability side of the ledger), credit spreads, equity risk, alternatives (which include private infrastructure and real estate for the ABC plan), currency risk, active management and the material benefits of diversification. The return expectations for both assets and liabilities are illustrated as well, based on capital market forecasting assumptions, and are similarly broken down into component parts.

Figure 3 takes this one step further, evaluating risk in terms of financial measures while illustrating the impact that economic downside risks to the plan pose to the larger organization. It provides a snapshot of detailed metrics to help investment committees and plan sponsors anticipate plausible adverse scenarios, understand the risk-reward characteristics of current and/or potential asset allocations, and make timely or targeted corrections as needed.

Focusing on the top line, the ABC plan currently has a $39.9 million deficit and is 84% funded on a solvency basis. The total surplus VaR (represented in Figure 2 and labelled "Standard VaR" in Figure 3) outlines the one in 20 downside risk that would take the current deficit from $39.9 million to $80.2 million. Or, equivalently, it would reduce the funded ratio from 84% to roughly 68%. Reports can be customized for each plan, and the report for the ABC plan compares the standard scenario with a stressed VaR scenario, historical scenarios and forward-looking shock scenarios.

Importantly, these scenarios have been included not to suggest that they will happen again but instead to give plan sponsors and investment committees a feel for the types of downturns that have occurred in the past and how those events might impact the broader organization. The aim is to build awareness and ensure that sponsors are comfortable with their investment strategies.

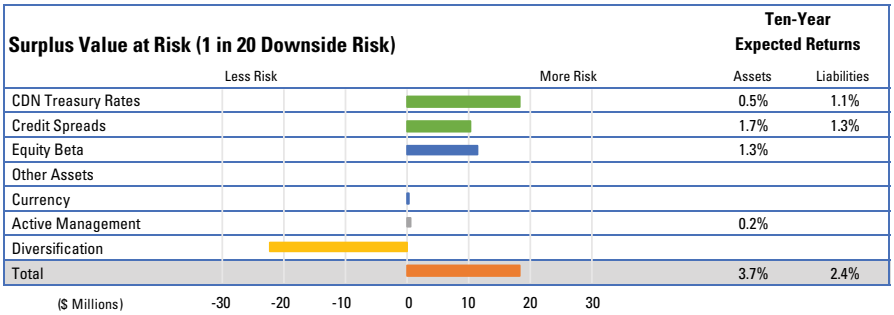
Figure 3 illustrates the financial impact of the contributions that might be required to restore the ABC plan to specified funding levels following financial market drawdowns. It also illustrates what it would look like for the ABC plan to amortize, on an annual basis, shortfalls over a specified time period.

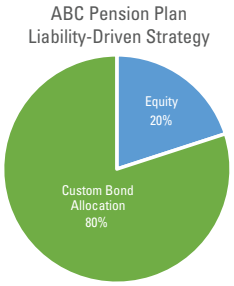
Looking at the most recent downturn, if the ABC plan were to suffer an event similar to the COVID-19 scenario and were required to fully fund the solvency position over five years, the annual cost would equate to roughly

Takeaways

- Investment committees should assess downside risk for unexpected surprises and look at more specific risks to the broader organization. Unexpected swings in the funded status of pension plans have forced plan sponsors to assess risk management through multiple liability lenses.
- Two investment approaches on opposite ends of the spectrum include a return-enhancing strategy and a liability-driven strategy. The *return-enhancing strategy* focuses on returns, whereas the *liability-driven approach* aims to minimize surplus and contribution volatility.
- Adding to the complexity is that legislative and regulatory guidelines for measuring liabilities can take on several different forms and vary significantly across Canadian jurisdictions, provinces and plan types, leading to different liability benchmarks and, in turn, definitions of *surplus*.
- Three separate funding ratios are going concern, solvency and accounting. It is important to understand the differences. Although funding requirements may vary by region, they are consistent in their intent to ensure that contributions are made responsibly over time to protect the security of benefits.
- With reporting tools to measure and manage risk from the broader enterprise level, plan sponsors and investment committees can help improve outcomes and reduce the risks of falling short on the pension promise. Alongside an effective governance system, robust reporting tools assist in maintaining a regular focus on key objectives.

FIGURE 4





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As of September 30, 2020	84%	(39.9)	52.4	2.5	8.6	0.5
Risk Environment (Less Risk / More Risk)						
Standard VaR	77%	(58.1)	70.6	20.7	12.5	4.5
Stressed VaR	72%	(69.9)	82.4	32.5	15.0	7.0
Historical Scenarios						
COVID-19	77%	(56.2)	68.7	18.7	12.1	4.0
2011 Debt Crisis	77%	(57.3)	69.7	19.8	12.3	4.3
Global Financial Crisis	78%	(55.0)	67.5	17.6	11.8	3.8
Tech Bubble	80%	(48.8)	61.2	11.3	10.5	2.4
Shock Scenarios						
100 bp Rate Drop	74%	(66.0)	78.4	28.5	14.2	6.1
10% Equity Decline	82%	(44.1)	56.6	6.7	9.5	1.4

($ Millions) 0 10 20 30 40

Source: SEI Investments. For illustrative purposes only.

$17.2 million per year. Putting that into perspective, the current annual service cost for the ABC plan is about $5 million. So, the *unexpected* impact on cash to the broader organization would be more than three times greater than the *expected* annual pension cost.

Figure 4 looks at the same analysis but instead assumes that the ABC plan has a robust liability-driven strategy,[2] versus the return-enhancing strategy previously shown. In this report, the allocation to custom liability-hedging bonds is assumed to be 80% of the total investment portfolio. This type of strategy is typically employed by more mature, closed and maybe even frozen plans. For example, an organization with a near-term objective to transfer its pension obligations to an insurance company might employ a strategy such as this.

In the case of the liability-driven strategy, the custom bond allocation, or liability hedging portion, works for the ABC plan to reduce surplus volatility. Whereas in the case of the return-enhancing strategy, the standard VaR event could cause a drop in funded status from 84% to 68%, the liability-driven strategy could see a less severe outcome with a drop in funded status to 77%.

However, the trade-off is clear when looking at the expected annual return on plan assets. The long-term (ten-year) return expectation has dropped from 5.4% per year (Figure 2) to 3.7% per year (Figure 4), which reduces the sponsor's ability to fund the current deficit with investment returns. Of course, markets don't always behave as expected. An important example in the context of pension investing has been the strong outperformance of long-duration bonds throughout the past few decades. As a result, many sponsors with liability-driven risk management strategies have enjoyed very strong asset returns stemming from persistent and sustained

drops in interest rates.[3] Similarly, liabilities that are sensitive to interest rates have increased significantly too, often resulting in increased contributions.

A Holistic Approach

In the financial world, many think of risk as residing within a specific investment portfolio. Plan sponsors should adopt a holistic approach to pension investing—one that goes beyond the traditional approach. With reporting tools to measure and manage risk from the broader enterprise level, plan sponsors and investment committees can help improve outcomes and reduce the risks of falling short on the pension promise. Alongside an effective governance system, robust reporting tools assist in maintaining a regular focus on key objectives.

At the end of the day, there will always be surprises in financial markets. Our role, therefore, is to help anticipate and prepare investors for unexpected events. And while these events may be difficult to foresee, there are steps we can take to reduce their impact. To the extent that enterprise-level risk metrics become a part of a committee's regular reporting and governance process, the goal is to build awareness of potential challenges and put plan sponsors in a position to turn those challenges into opportunities.

Endnotes

1. Return-enhancing asset mix assumes 45% equity, 35% Canadian universe bonds and 20% private infrastructure/real estate.
2. Liability-driven asset mix assumes 20% equity and 80% Canadian long-duration bonds.
3. Bonds have an inverse relationship to interest rates. When the cost of borrowing money falls, bond prices usually rise, and vice versa.

Appendix: SEI Simulated Risk Dashboard Supplemental Information

- All values are estimates and should not be relied upon for any regulatory or financial filing.
- Asset values are based on actual market values where available and are otherwise estimated.
- The value of the liability and its behaviour in different environments is estimated from the generalized pension plan cash flows, reported liability values, sensitivity to interest rates and information regarding the status of the plan. This data is typically provided by the client or the plan's actuary or derived from corporate financial statements.
- The alpha and tracking error assumptions used in this analysis are based on published expectations for the SEI funds in the portfolio. For investments outside of SEI funds, estimates are based on the SEI alpha assumptions for the asset class/strategy or have been provided by the client.
- Value at risk (VaR) calculation and decomposition is calculated following industry standards.
- Surplus VaR represents the one in 20 downside value at risk on a forward-looking, one-year basis. Calculations are based on return, standard deviations and correlations that are generated from non-normal asset class return distributions with fat tails as represented by SEI's capital market forecasts. VaR is calculated independently for individual components, with a diversification component balancing to total VaR.
- The VaR associated with the liabilities is captured within the treasury and credit spreads components. *Active management* is defined as the difference between the actual allocation and policy weights combined with alpha and tracking error expectations for active managers.
- *Ten-year expected return* is the expected return for each asset and liability component (SEI's capital market forecasts).
- The stressed VaR scenario ("2XVol/p~10") assumes standard deviations are two times SEI's current forecast. Correlations between asset classes are assumed to be 1.0, except for surplus calculations, where treasury returns are assumed to have correlations of -1.0 with other asset classes.

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- Scenario calculations are based on actual events defined as follows: COVID-19 (January 1, 2020 through April 30, 2020), Tech Bubble (March 31, 2000 through April 30, 2001), Global Financial Crisis (May 31, 2008 through March 31, 2009) and 2011 Debt Crisis (March 31, 2011 through September 30, 2011).

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BIO

Kendra Kaake, ACIA, ASA, CFA, FRM, serves as director of investment strategy for SEI's Institutional Group in Canada. She is part of a team responsible for overseeing investment strategy development and advice for SEI's institutional clients. Kaake partners with and provides ongoing support to the client portfolio managers' efforts in the development and delivery of specialized expertise, strategic advice and investment management solutions for institutional clients and prospects. She has extensive experience advising defined benefit, health care, insurance and nonprofit partners on all aspects of their investment programs, including governance, investment policy and strategy, asset allocation, risk management, asset class structure, manager selection and implementation. Kaake is an associate in the Society of Actuaries (ASA) and the Canadian Institute of Actuaries (ACIA) and a CFA charterholder with the CFA Institute. She earned a bachelor of science degree in mathematics and statistics from the University of British Columbia.