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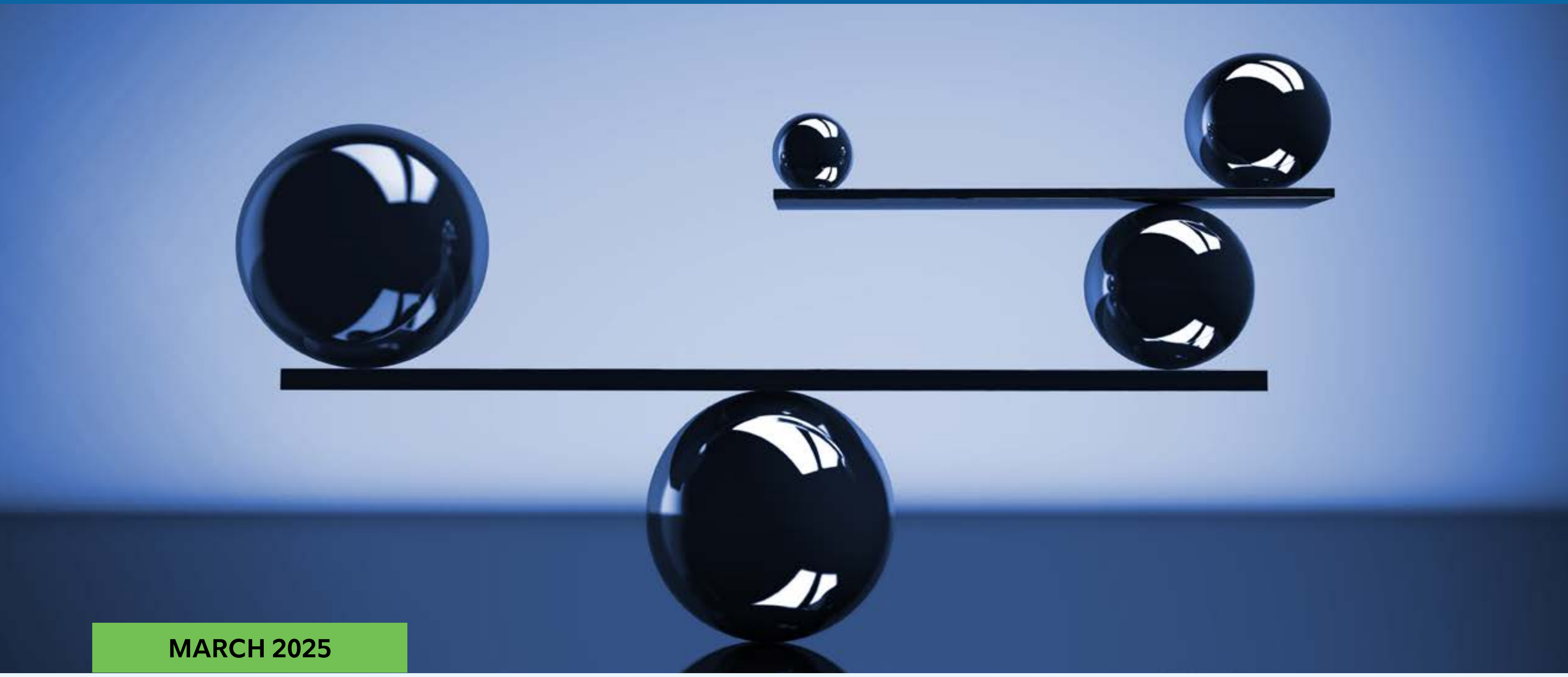
Purpose-driven investing for DB pension plans



MARCH 2025

A new investment framework to balance risk and growth

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- Overseas investments will be affected by movements in currency exchange rates.
- Investments in emerging markets can be more volatile than other more developed markets.
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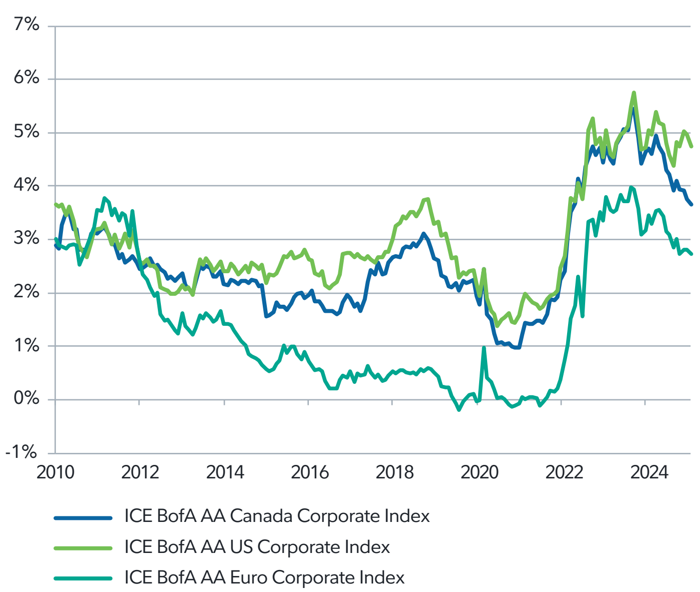
Interest rate movements present a narrowing window of opportunity.

Interest rates are currently still well above their averages from the post-financial crisis era, despite recent rate cuts from the Bank of Canada, the U.S. Federal Reserve and the European Central Bank (ECB). This presents defined benefit (DB) pension plans with the opportunity to de-risk at attractive levels in a historical context. However, opportunities can be short-lived.

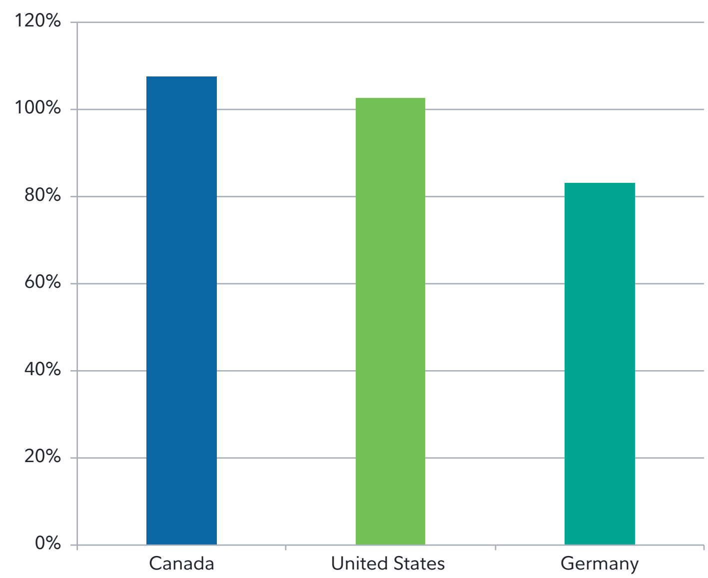
The low interest rates of the 2010s imposed a huge challenge for pension plans due to increasing pension liabilities. However, following interest rate rises in 2022 and 2023, the funding status of many DB plans has improved (albeit partially offset by interest rate decreases in 2024), offering an opportunity to lock in some of the "liability gains" and reduce risk with the benefit of attractive market conditions. Pension obligations that are valued based on market rates (e.g., accounting obligations measured under International Financial Reporting Standards (IFRS) or U.S. GAAP) are significantly lower than in 2020 (all other things being equal). As a result, funding levels are at all-time highs in many countries (and some are even in a surplus).

Figure 1: The rise in interest rates has led to a significant improvement in IFRS funding levels across countries.

Yield AA corporate bonds



IFRS funding level 2024



Despite interest rate cuts in 2024 and 2025 (through date of publication), the current interest rate environment still gives DB pension plans the opportunity to de-risk at a favourable cost and align their portfolios more closely with their liabilities. But as central banks continue to cut rates, the current window of opportunity might be closing.

Source: Fidelity International, Bloomberg, Aon and Mercer. Yield data shown from December 2009 to February 2025. Canada: S&P/TSX Composite Index. U.S.: S&P 500. Germany: DAX40.

Although market conditions are still favourable for DB pension plans to de-risk, we believe they could benefit from a more holistic asset and risk management approach that helps to control the risk position of a pension plan whilst being able to earn the required return.

This paper provides an overview of traditional risk management practices for DB pension plans, namely cash-flow-driven investing (CDI) and liability-driven investing (LDI). It then introduces Fidelity's new holistic and integrative investment framework – purpose-driven investing – designed to help manage the trade-off between risk management (CDI and LDI portfolio) and required return (growth portfolio), the so called "funnel of doubt." A case study illustrates how pension plans can apply purpose-driven investing to define their investment policy.

What is de-risking, and what traditional approaches are available?

De-risking simply means reducing risk – but which risks, exactly? There are many different risks that pension plans need to consider. There is the economic and fundamental risk that the pension plan's assets are insufficient to pay promised benefits such as pensions to retirees. This would lead to an extraordinary burden on the operating business. From an accounting perspective (e.g. IFRS), pension-related risk factors can also refer to balance sheet risk – the extent to which the funding level fluctuates – which impacts important corporate finance measures such as shareholders' equity and balance sheet leverage ratios.

Both economic and balance sheet risks can be quantified at regular intervals using Monte-Carlo simulations within an asset-liability management (ALM) study. An ALM study is typically the starting point to derive suitable pension asset and risk management strategies, test their impact on economic and balance sheet risks, and, ultimately, align investment strategy with overarching corporate objectives.

At a high level, reducing pension risk typically involves investing in assets that have characteristics that more closely match those of pension liabilities. This often means moving from higher-returning risk assets such as equities into assets with contractual cash flows, such as bonds. The current interest rate environment reduces the trade-off between the required return and the cost of de-risking, offering pension plans the opportunity to align investments more closely with obligations at historically favourable market conditions. In this paper, we discuss two approaches that enable pension plans to efficiently manage some of the largest risks they are exposed to: cash-flow-driven investing (CDI) to address the risk of forced selling and liability-driven investing (LDI) to address interest rate and inflation risk.

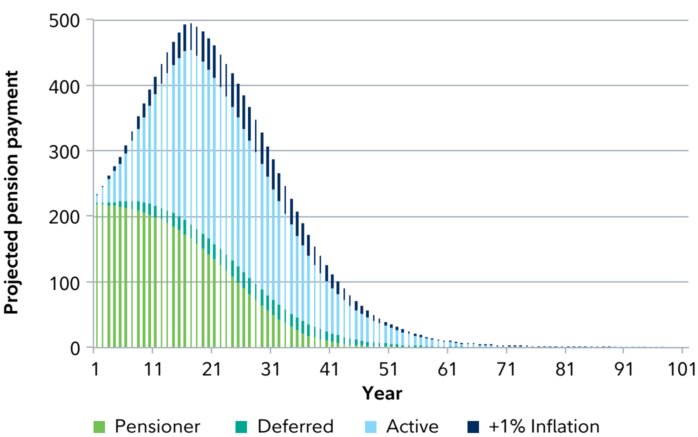
Figure 2: Cash flow and sensitivity matching: Two approaches for de-risking

From pension payments to the accounting of pension liabilities, what can be hedged?

Cash flow perspective: Projected pension payments

Basis for actuarial projections of pension payments

- **Defined benefit pension promise.**
- **Biometric assumptions:** Probabilities of death, disability, etc.
- **Actuary in consultation with the auditor:** Assumptions of salary and pension trends.



Cashflow-Driven Investing → Liquidity management to mitigate forced-selling risk

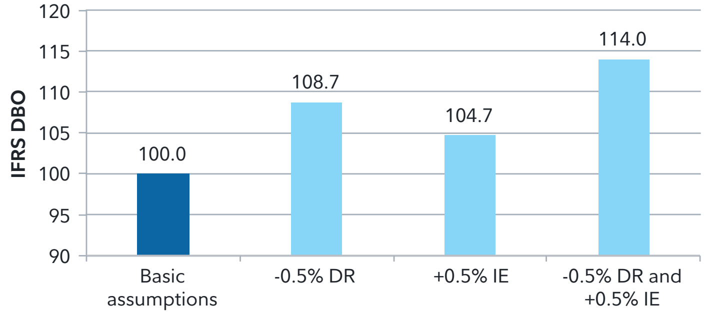
Accounting perspective: Pension liabilities and their sensitivities

Assumptions to determine the present value of pension liabilities

- **Salary and pension trends** (inflation expectations, short IE).
- **Discount rate** (DR) as per financial reporting requirements:
  - **IFRS** – Yield on high-quality corporate bonds
  - **Local GAAP**

Sensitivities of pension liabilities to changes in assumptions:

- **Duration** – Weighted average of payment dates, in years
- **PV01** – Δ Pension liability at discount rate ±0.01%
- **IE01** – Δ Pension liability at inflation expectation ±0.01%



Liability-Driven Investing → Immunizing the balance sheet against changes in valuation parameters

Source: Fidelity International, 2025. For illustrative purposes only. DBO = Defined Benefit Obligation.

Cash-flow-driven investing

One approach to de-risking is cash-flow-driven investing (CDI). While this strategy is relatively new in the pension space, it is commonplace in the asset allocation of insurers. The approach allows pension plans to invest in a similar way to insurers, only more efficiently from a regulatory perspective, due to the lack of regulatory capital requirements. CDI involves the construction of a portfolio with contractual cash flows (e.g., a diversified buy-and-maintain fixed income portfolio) structured to match future expected pension payments. The aim of a CDI portfolio is to improve the resilience of a pension plan through better liquidity management. Pension plans without CDI are either exposed to the risk of holding excessive cash (which reduces the overall expected return) or to the risk of forced selling (selling investments at an inopportune point in time in order to pay pensions, for instance after a sell-off in equity markets). While the primary objective of a CDI portfolio is to provide sufficient liquidity to match pension payments, it also enhances the risk-reward profile of growth assets because risk premia tend to be more stable over a longer investment horizon.

The actuarial projection of pension payments is based on various assumptions such as biometrics (mortality rates, disability, etc.) and salary and pension trends. For a sufficiently large population in a pension plan, actual pension payments are relatively predictable. However, the smaller the population, the less accurate the forecasting becomes. Depending on the reliability of the forecast, the CDI portfolio typically prioritizes cash flows up to 20 years into the future rather than ultra-long cash flows, which is also beneficial from an "affordability" perspective, as a "fully matched" portfolio ties up a significant amount of plan assets. The number of years for which cash flows can be matched to pension payments to a relatively high degree of precision depends on plan-specific liability characteristics, which determine how closely pension payments follow the actuarial projections. Lastly, focusing on the more liquid segment of the bond market increases cost efficiency as (ultra-) long bonds tend to have wider bid-ask-spreads.

A CDI portfolio is based on physical instruments and does not include leverage. Investment-grade government and corporate bonds typically form the core of a CDI portfolio, but it can also contain allocations to private debt and high yield if certain requirements are met (e.g., "buy and maintain" eligibility, cash flow certainty).

Liability-driven investing

Another approach to de-risking is liability-driven investing (LDI). LDI aims to (partially) immunize a pension plan sponsor's balance sheet against changes in liability valuation factors (e.g., IFRS discount rates or salary and pension trends). Put simply, the sensitivity of plan assets to changes in interest rates (or inflation) is aligned to respective changes in the present value of pension liabilities to a predefined extent, the so-called "hedge ratio." This lowers the volatility of the pension plan's funding level and ultimately its balance sheet.

Due to the focus on sensitivities (rather than cash flows), interest rate and inflation derivatives can be included (and therefore leverage introduced) in the investment universe of the LDI portfolio, which can help navigate the trade-off between the LDI and the return-seeking allocation - the pension plan can invest in higher-yielding asset classes and reduce funding level volatility at the same time. When incorporating derivatives, it is important to focus on those that are sufficiently liquid, such as Canadian dollar interest rate swaps or Canadian Consumer Price Inflation (CPI) inflation swaps.

An additional point pension plans must consider when using derivatives is hedge precision. The IFRS discount rate refers to the yield of high-quality corporate bonds, where the yield can be decomposed into the "risk free"' and the "credit spread" (i.e., AA-rated corporate, A-rated corporate and provincial bonds) components. However, interest rate swaps are only a proxy for the "risk free" component, leaving the "credit spread" component unhedged.

Additionally, pension plans should analyze carefully how much leverage they can afford. When using leverage, pension plans must consider to what extent and at what cost assets can be transformed to "top up" collateral if required, even in extreme scenarios. The turbulence witnessed in U.K. government bonds in the fall of 2022, for example, demonstrated that excessive leverage and inadequate collateral management can lead to forced selling of other assets. Pension plans must be aware of the risks when choosing leverage, and an appropriate pool of collateral assets (including a so-called "collateral waterfall") is crucial to be able to maintain strategic asset allocations even in adverse scenarios. Pension plans with high allocations to illiquid investments should be particularly cautious when considering leverage.

Choosing the right approach

Whether CDI or LDI (or a combination of both) is optimal depends on a number of factors, including the status quo, overarching objectives and restrictions of the pension plan. However, there are a few decision parameters that pension plans can use as a guide.

Figure 3: LDI or CDI?

The below guide is not exhaustive but based on our discussions with pension plans.

LDI	Decision parameters	CDI
IFRS	← Valuation basis for liabilities →	Economic (but can be structured IFRS-friendly)
>70%	← IFRS funding level →	>90%
Not applicable	← Cash flows →	Pension payments > Contributions (or pension payment reimbursements)
Higher when using derivatives (e.g. ISDA agreements incl. CSA terms)	← Implementation complexity →	Lower

Pension plans do not need to make an either/or decision between LDI and CDI, because a combination of both is possible (and often preferable). The design of de-risking solutions depends on the pension plan's status quo, as well as the investment objectives and restrictions.

Source: Fidelity, 2024. For illustrative purpose only.

The IFRS funding level reference points in Figure 3 are derived from observations we have made of pension plans when they have explicitly included LDI and CDI in their investment strategy for the first time. However, pensions plans can consider LDI or CDI earlier in their de-risking journey. When empirically analyzing the state of de-risking, the neutral hedging positions tend to fluctuate around the IFRS funding level, even at funding levels below 70%.

Purpose-driven investing: Liability risk management and growth portfolio

A pension plan's ultimate goal is to fulfill its pension promise to its members. This involves long-term savings and payout processes where various risk factors can lead to a high degree of uncertainty, both on the liability and asset side, meaning that a pension plan's "funnel of doubt" is broad.

In addition to the economic and balance sheet risk factors that we have described in the previous section, pension plans also need to take other criteria into account when deriving an appropriate asset and risk management strategy, such as residual risk and required rate of return. "Purpose-driven investing" is Fidelity's holistic ALM framework that analyzes and manages this "funnel of doubt" to achieve company- and plan-specific investment objectives with a higher probability of success.

Purpose-driven investing includes a liability risk management portfolio (LRMP) consisting of CDI and LDI and a growth portfolio. Bottom-up stock selection is used for the LRMP, and top-down portfolio optimization is used for the growth portfolio. Dependencies between the two are considered to ensure a high level of diversification not only within the portfolios but also between them. This investment framework enables us to design and implement tailored solutions that meet investors' unique requirements.

Figure 4: Purpose-driven investing: Liability risk management and growth portfolio

Bottom-up selection and top-down portfolio optimization

	Liability risk management portfolio (LRMP)		
	CDI portfolio	**LDI portfolio**	**Growth portfolio**
Purpose	**Pay** pensions	**Hedge** unwanted risks (e.g. changes in IFRS discount rate)	**Grow** assets (in excess of liability discount rate)
Optimization	Bottom-up: Coverage ratios* *(considering restrictions such as credit ratings, ESG, etc.)*	Bottom-up: Hedge ratios *(considering restrictions such as instruments, leverage, collateral sufficiency, etc.)*	Top-down: Risk-return *(considering restrictions such as asset classes)*
Addressed pension risks	Forced selling	Valuation risk due to changes in discount rates and inflation expectations	Residual risks, e.g. longevity
Remaining pension risks	Credit default risk	Downgrade + Credit default risk + collateral insufficiency (when deploying leverage)	Market risk
	Diversification necessary		
	Depending on the design: sustainability risk		

* Coverage ratios = Number of years of liability cash flows matched by the CDI portfolio.

Source: Fidelity, 2025. For illustrative purpose only.

The LRMP is optimized based on a wide range of restrictions, including instruments, credit ratings, ESG requirements, leverage limits and collateral sufficiency, among others. However, the primary objectives of the CDI portfolio and the LDI portfolio are different: the CDI portfolio is optimized according to years of liability cash flows matched, while the LDI portfolio is optimized according to hedge ratios. In the optimization, individual securities are selected with the help of Fidelity's multi-factor credit model and ESG research, and a customized portfolio is constructed. The optimization and subsequent portfolio management are carried out using our proprietary tool Fidelity Optimus, which won the Celent Model Buy Side Award in the NextGen Portfolio Construction and Management category in 2024.

Key risks can be addressed through the LRMP, such as funding level volatility and forced selling risk, but some other risks are not, and may need to be managed. On the one hand, mismatches between the LRMP and actual pension payments, as well as sensitivities, can arise. On the other hand, downgrades and credit defaults in the LRMP can lead to deteriorating funding levels or the inability to pay pension payments in full from the LRMP. Fidelity utilizes its own forward-looking fundamental research as part of its credit risk management.

Default, basis, and other residual risks (e.g., longevity) must be compensated for by the growth portfolio over the long term. The growth portfolio is a risk-return-efficient portfolio that is derived from a top-down process using Fidelity's forward-looking capital market assumptions. From an investment perspective, the growth portfolio should be diversified in itself, but it should also differ from the CDI and LDI portfolios, so that in the event of a risk crystallizing in the LRMP, the growth portfolio is not affected.

Monte-Carlo simulations can be used to test the extent to which (and the probability that) the objectives can be achieved for various investment strategies and their impact on economic and balance sheet pension risk. We use long-term stochastic capital market scenarios for this purpose.

De-risking in practice

This case study illustrates how we use the purpose-driven investing framework to deliver a customized investment strategy. During the development of the investment strategy, we have a continuous dialogue with the plan sponsor to critically discuss the results, incorporate feedback, and ensure the feasibility of the investment strategy. In addition, a transfer of knowledge is facilitated.

The case study is an illustrative example with the following starting assumptions:

- A pension plan has IFRS pension obligations totalling CAD 250 million. The plan assets amount to CAD 268 million. This results in an IFRS funding ratio of 107% (or an IFRS surplus of CAD 18 million).
- The plan assets pursue a simple asset-only investment strategy and are invested 60% in global equities and 40% in global bonds.
- Funding strategy: Pension payments are reimbursed from the plan assets and service costs are contributed. This corresponds to a net withdrawal of CAD 7.5 million in the first year, increasing over time. The pension plan is therefore cash-flow negative.

The pension plan has benefited from the sharp rise in interest rates. The funding ratio has improved significantly, and the pension plan is now overfunded on an IFRS-basis.

The pension plan would like to take advantage of its current position and has the following investment objectives:

- maintain fully funded status over the long term
- reduce balance sheet volatility
- improve liquidity management to mitigate forced-selling risk

The pension plan imposes conservative investment guidelines:

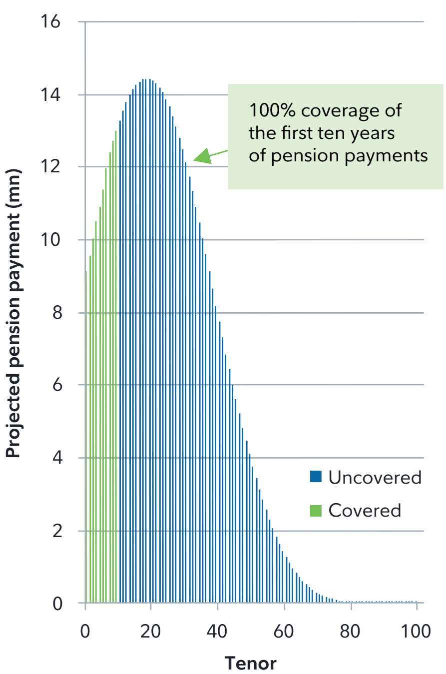
- **CDI portfolio:** Canadian dollar-denominated corporate bonds with high credit quality (A or higher rating).
- **LDI portfolio:** No leverage, Canadian dollar-denominated provincial bonds with high credit quality (AA or higher rating).
- **Growth portfolio:** Liquid only (due to size) and globally diversified. If a pension plan prefers, the investment strategy can have exposure to alternative investments markets and a domestic equity bias.

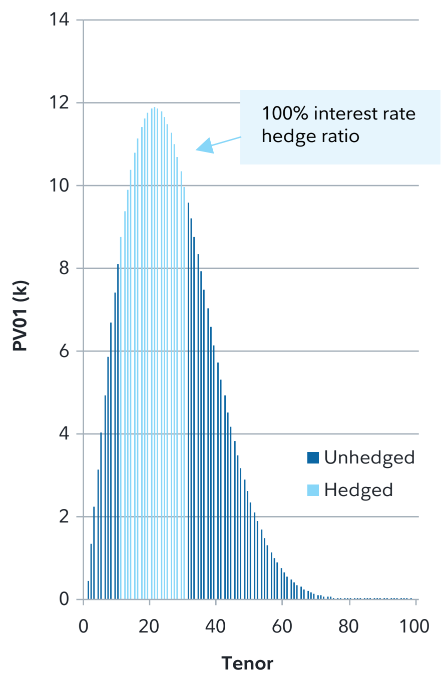
The restrictions in the CDI and LDI portfolio (credit quality, precision, no leverage) mean that the dual investment objective of high-liability cash-flow coverage and hedge ratios can only be achieved with high allocations to the LRMP. The restriction to physical instruments also means that the sensitivities for very long-dated pension payments can only be approximated for tenors beyond the maturity of government bonds. In our view, interest rate sensitivities with maturities of up to 30 years can be immunized with physical instruments.

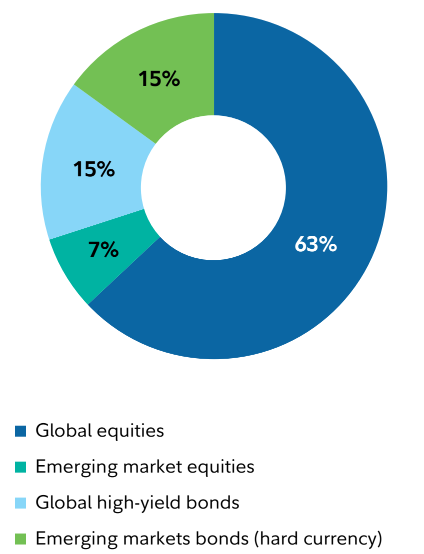
The focus on physical instruments only in the LRMP means that a trade-off between the liability cash-flow coverage and hedge ratios and the allocation to the growth portfolio must be discussed. As the coverage and hedge ratios increase, the allocation to the growth portfolio decreases. This means that the growth portfolio might not be able to sufficiently compensate for mismatches in the LRMP, credit risk and residual risks such as longevity. In this case, the analysis resulted in an "ideal" allocation to the growth portfolio of 20%, which limits the hedge ratios in the LDI portfolio. Nevertheless, an interest rate hedge ratio of ~65% can be achieved with the investment strategy.

Figure 5: The customized investment strategy is more aligned to the liabilities through the CDI and LDI portfolios.

CDI portfolio	LDI portfolio	Growth portfolio







Start allocation

35%	45%	20%

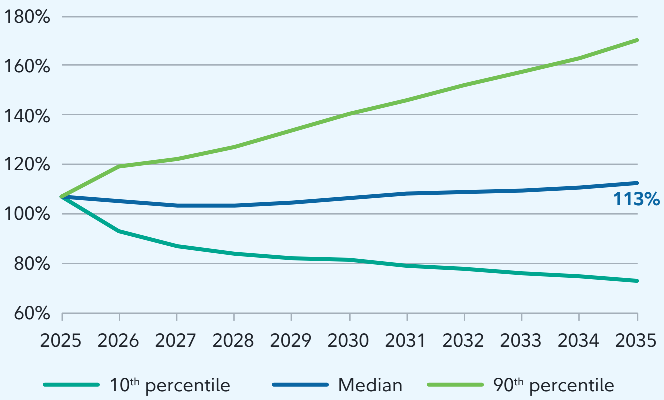
Source: Fidelity, 2025. For illustrative purposes only. Initial allocations of the CDI and LDI portfolios are based on the market values of the two portfolios. The allocation to the growth portfolio is a residual figure.

We deliberately chose an extreme example for this case study to show the impact of substantial de-risking on the long-term IFRS funding level and balance sheet volatility (measured by the 90% deficit value-at-risk over three years). As shown in Figure 6, the investment objectives of the pension plan are more likely to be achieved with the customized solution: while the expected values of the IFRS funding level and deficit are comparable, the distribution of the "funnel of doubt" is much narrower, indicating that the probability of meeting the objectives has increased.

Figure 6: A stronger alignment between assets and liabilities can significantly stabilize the IFRS funding level.

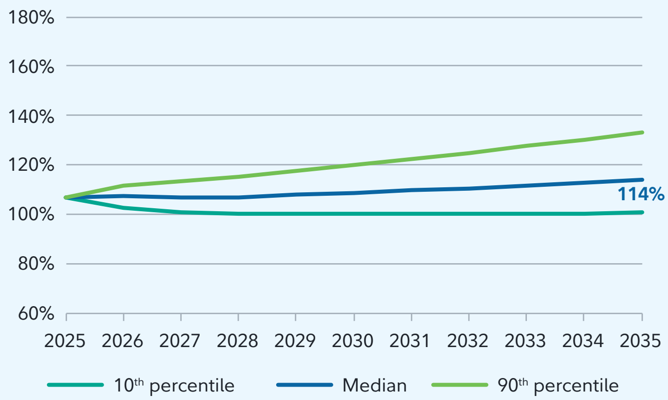
Current investment strategy

IFRS funding Level

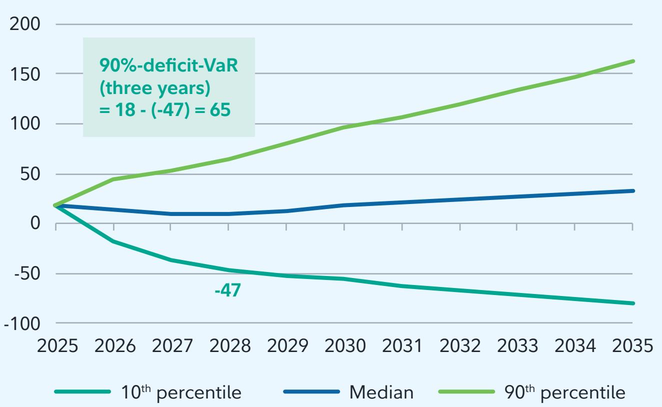


Proposed investment strategy

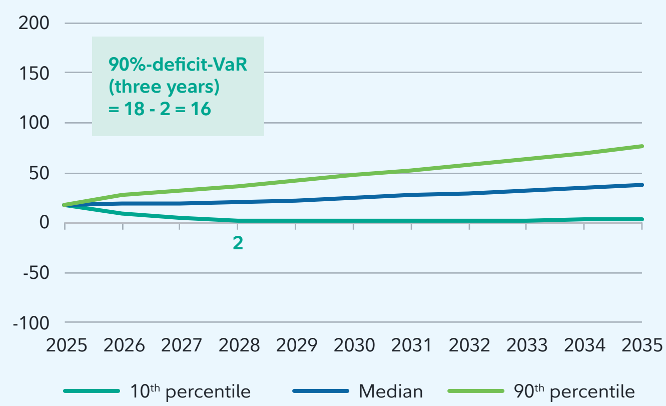
IFRS funding level



IFRS surplus (CAD, m)



IFRS surplus (CAD, m)



Source: Fidelity, 2025. For illustrative purposes only. Figures are based on proprietary models and reflect the views of investment professionals at Fidelity. Capital market scenarios are based on Fidelity's proprietary capital market assumptions as at September 2024. The analysis has been conducted at the asset class level and does not incorporate alpha or fee considerations.

A rare opportunity to de-risk

The current market environment offers an attractive opportunity for pension plans to rethink their investment strategy and deploy solutions that effectively manage the trade-off between required return and the appropriate amount of risk. The ultimate objective is to increase the likelihood of delivering the "pension promise" by analyzing and managing the "funnel of doubt."

Fidelity has the expertise to help pension plans solve their investment challenges, from advising on the design to the implementation and management of customized solutions. Pension plans benefit from our research, which covers individual securities (including environmental, social and governance (ESG)), short- and long-term macroeconomic outlooks, portfolio construction and glidepath planning, to ensure the investment strategy remains fit for purpose as objectives and market conditions change.

For more information

If you would like to further explore de-risking with Fidelity, please contact your Fidelity representative.

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