T. ROWE PRICE INSIGHTS
ON ASSET ALLOCATION

Asset Allocation in a New and Evolving Interest Rate Regime

Revised capital market assumptions create opportunities

September 2023

Lowell Yura, CFA, ASA
Head of Multi-Asset Solutions, North America

KEY INSIGHTS

- The period of low yields following the global financial crisis forced many public defined benefit plans to allocate to riskier asset classes.
- Higher interest rates and capital market return assumptions provide an opportunity to revisit sources of return and risk at the asset class and strategy levels.
- Sponsors may want to reevaluate the multiple roles that different segments of the fixed income universe can now play in their portfolios to make them more efficient.

Following the 2008–2009 global financial crisis (GFC), investors grappled with over a decade of 0% interest rate policies and the implications of ultralow rates for their portfolios across both traditional and alternative asset classes. However, in a short period of time, that economic backdrop has reversed course amid an accelerated repricing of rates and inflation expectations, and a reversal of easy monetary policy by the U.S. Federal Reserve and other major central banks.

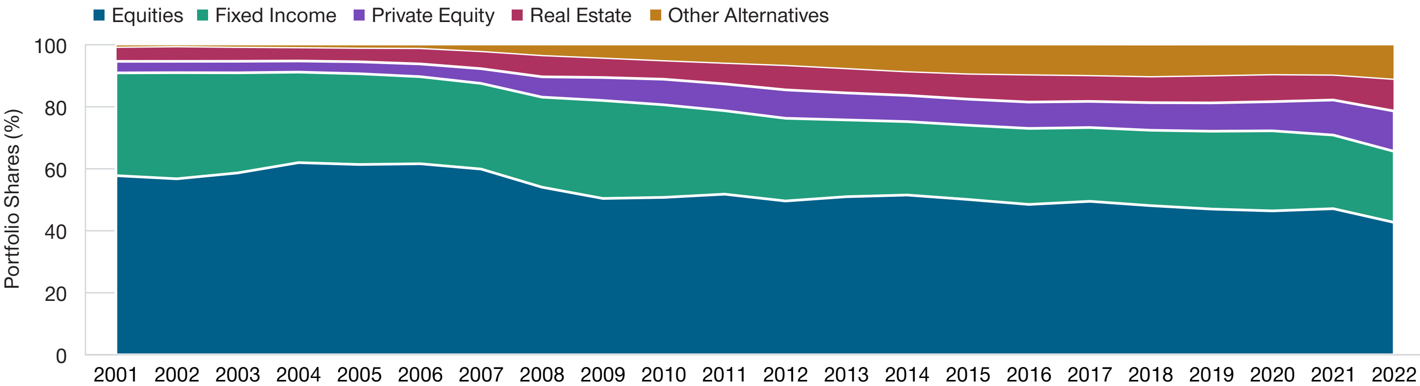
While the impact of this shift unfolds, many U.S. public defined benefit (DB) plans are now studying the implications of the current environment for their allocations, which looks very different from those that followed the GFC.

- For the first time since 2008, a number of asset classes, particularly non-core bonds, such as high yield, bank loans, and emerging market (EM) debt, have the potential to generate returns that are close to or above the expected return-on-asset assumptions of many plans.
- With real yields on core investment-grade bonds now meaningfully positive, the cost of diversification has declined. However, the correlation of stocks and bonds may be less certain.

In our view, increasing portfolio exposure to non-core bonds appears to be a particularly attractive option for plans seeking additional sources of return generation. Lengthening duration within fixed income also could help offset the lower exposures that may have resulted from the asset allocation changes since the GFC. And, given the limitations of long duration as a diversifier when stocks and bonds sell off together, we think plans may want to consider adding other sources of diversification to their portfolios.

The Evolution of Public DB Asset Allocation

(Fig. 1) Average asset allocation of U.S. state and local pension plans



As of December 31, 2022.

Sources: Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and the Government Finance Officers Association. Allocations sourced from public plans data, 2001–2022.

Where We Are, and How We Got Here

While each U.S. DB plan is unique, the low or near 0% interest rates that followed the GFC accelerated a structural allocation shift toward assets that offered higher expected returns (Figure 1). This shift to greater risk-taking was notable in several ways:

- On average, public DB plans increased their allocations to private market assets, particularly private equity.
- Average allocations to public fixed income assets dropped significantly (from 30% to 20%, on an asset-weighted basis). Allocations to private credit (with underlying floating rate loans) increased and likely reduced duration further unless duration was extended elsewhere in the portfolio.
- Many public DB plans also reduced their allocations to public equity. However, overall equity factor exposure has increased if we adjust for the higher equity beta for private equity and also include the equity beta often present in some other alternatives. Indeed, we estimate the average public DB plan's equity exposure is actually about 10% higher than the reported notional exposures to public and private equity allocations (Figure 2).

Following the GFC, easy monetary policy combined with a less volatile business cycle provided tailwinds for both fixed income and equity assets—typically boosting the overall performance of diversified portfolios regardless of the specific allocation mix. And, with a few exceptions, high-quality bonds typically provided effective diversification benefits when equities sold off meaningfully.

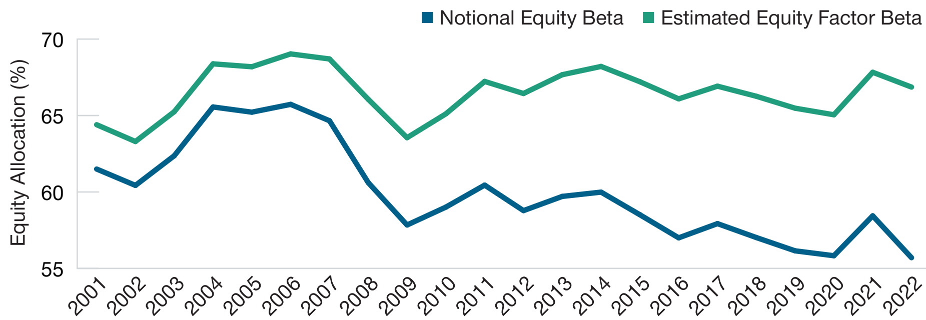
Where Do We Go From Here?

While there is plenty of room to debate when, and at what levels, interest rates will normalize, we believe 2022 marked the end of the long secular decline in rates that began in the early 1980s after the Federal Reserve, under former Chairman Paul Volcker, had raised U.S. rates to historically extreme levels to fight inflation.

For the first time in over 20 years, we believe public DB plans seeking to enhance portfolio returns now have options other than increasing their exposure to equity and liquidity risk.

Beware of "Hidden" Equity Beta

(Fig. 2) Equity allocation based on notional and estimated equity factor betas*



As of December 31, 2022

***Notional equity beta is the allocation to public and private equity without adjustment. Estimated equity factor beta makes an adjustment to private-equity allocations using an estimated beta of 1.2 and includes allocations to real estate, hedge funds, and other alternative asset categories adjusted by an equity factor of 0.4. The estimated betas do not represent a specific implementation and/or actual results and are not indicative of future results.**

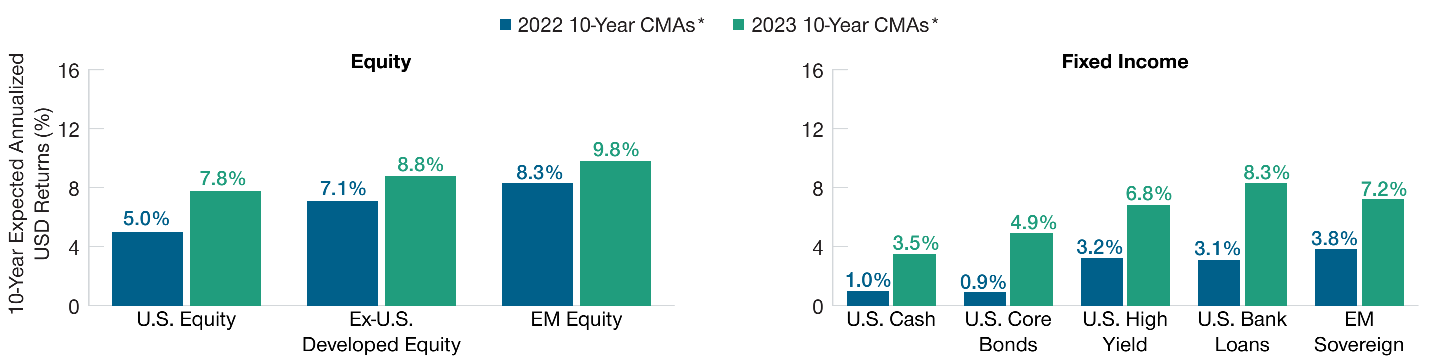
Sources: Center for Retirement Research at Boston College, MissionSquare Research Institute, National Association of State Retirement Administrators, and the Government Finance Officers Association. Allocations sourced from public plans data, 2001–2022.

Higher risk-free rates have led many investment managers, including T. Rowe Price's multi-asset team, to raise their long-term capital market assumptions (Figure 3). Specifically, our 10-year annualized return expectation for core investment-grade bonds is now at about 5%, while we expect returns on riskier, non-core bonds (high yield, bank loans, EM debt) to range from 7% to more than 8%. This means that public plans may be able to seek the same or higher returns at similar or lower levels of expected risk, rather than continuing the post-GFC trend of taking on more risk to offset the impact of lower expected returns.

Below are three notable steps that T. Rowe Price has taken in our own multi-asset portfolios that we believe warrant consideration for U.S. public DB plans.

Capital Market Assumptions Have Increased

(Fig. 3) T. Rowe Price 10-year capital market assumptions (CMAs)



T. Rowe Price 10-year capital market assumption methodology is consistent with the 5-year methodology with an extended horizon for valuation convergence.

*Source: T. Rowe Price. This information is not intended to be investment advice or a recommendation to take any particular investment action. Forecasts are based on subjective estimates about market environments that may never occur. See the Appendix for our capital market assumption modeling methodology, a representative list of indexes, and Important Information.

Expected returns are shown for asset classes without consideration of fees and expenses.

We believe plan sponsors may want to consider a total portfolio approach when funding non-core bond allocations.

1. Increasing Allocations to Non-core Bonds

In our view, higher-yielding fixed income, including high yield bonds, bank loans, and EM debt, can now play a larger role in generating returns. As of mid-2023, current yields in many non-core sectors were higher than the median expected return on assets (EROA) for U.S. public DB plans. Even adjusted for defaults and recovery rate expectations, we believe returns are likely to be attractive.

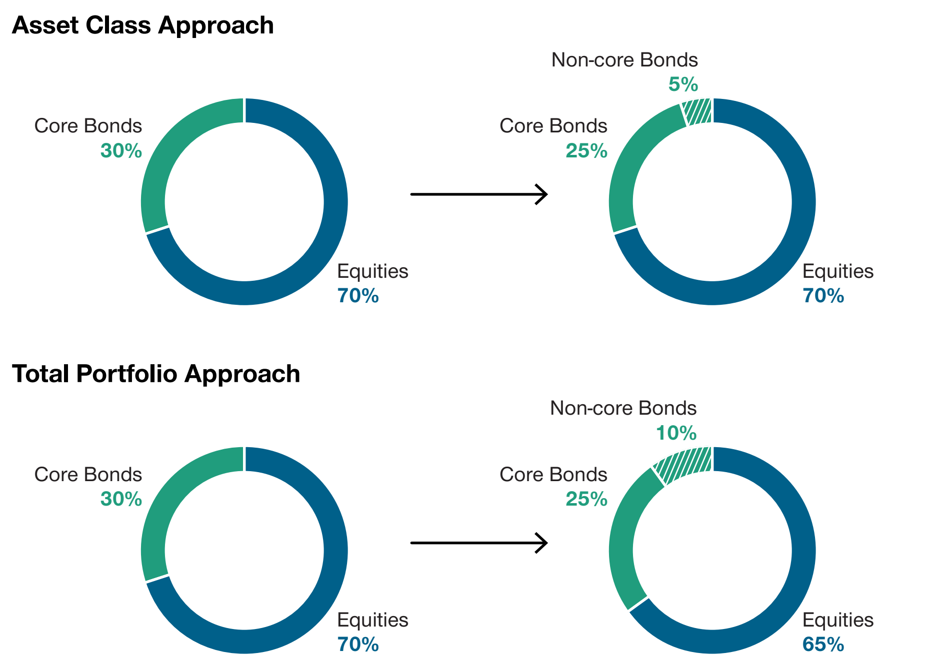
It is true that non-core bonds can be highly correlated with equities in extreme risk-on and extreme risk-off environments. However, they offer other meaningful diversification benefits that potentially make them strong complements to equities as sources of growth.

- Income is the primary, long-term source of expected return, rather than capital appreciation as is the case with equities.
- Bonds sit higher in the capital structure, offering an additional measure of potential protection in a financial crisis in exchange in for sacrificing the upside of equities.
- We believe non-core bonds will likely outperform in range-bound equity markets, due to the relatively low dividend yields offered by most equities.

We believe U.S. plan sponsors may want to consider a total portfolio approach when funding non-core bond allocations. This is particularly the case for plans that have lowered their core fixed income allocations to levels that make them impractical to use as a funding source. We believe a total portfolio solution that funds higher non-core bond allocations from a mix of both public equities and core bonds can provide more flexibility while maintaining the current level of risk but still capturing the potential diversification benefits outlined above (Figure 4).

Options for Funding Non-core Bonds

(Fig. 4) Asset class and total portfolio funding approaches



For illustrative purposes only. This is not intended to be investment advice or a recommendation to take any particular investment action. An individual plan's situation will vary.

Source: T. Rowe Price.

> We see several reasons for plan sponsors to lengthen the duration of their liquid fixed income allocations....

Funding higher non-core bond allocations entirely from existing core allocations could be expected to increase portfolio risk. While a shift toward non-core bonds also would tend to enhance fixed income return potential, some plan sponsors might deem this increase unnecessary for meeting their return targets.

2. Adding Other Sources of Diversification

While core fixed income assets largely failed to mitigate equity risk when correlations spiked during the 2022 market sell-off, we believe they still have a valuable role to play in mitigating downside risk. We expect this to be the case once the risk of persistent inflation subsides, giving policymakers room to cut rates in the face of a slowing economy. Unlike much of the past 15 years, the opportunity cost of this risk mitigation is meaningfully lower, in our view, as bonds now provide positive real yields.

That said, inflation risk remains persistent, and we believe plans may want to consider complementing core bonds with other strategies seeking to mitigate risk in market environments like the one seen in 2022. These could include:

- Less directional and more flexible bond strategies that seek absolute returns across the full global opportunity set.
- Equity strategies that aim to reduce volatility and drawdowns by incorporating a mix of low-volatility equities and a dynamic volatility overlay.

3. Extending Core Duration

Most public DB plans use the Bloomberg U.S. Aggregate Bond Index to guide the implementation and measure the performance of their core bond allocations. But we think plan sponsors may want to consider whether that index's characteristics, particularly its duration, are appropriate for them.

We see several reasons for plan sponsors to lengthen the duration of their liquid fixed income allocations and reconsider the sector mix in their core bond allocations:

- While duration has remained relatively stable in many U.S. public DB plan portfolios, dollar duration has declined significantly as allocations to public fixed income have declined.
- Many private credit strategies have relatively low duration because of their underlying exposure to floating rate loans.
- Lower duration and greater credit (and equity) exposure both have the potential to perform poorly during a risk-off event and a flight to quality, leaving plans more exposed to downside risk.
- The shift from public to private fixed income in plan portfolios is likely to have concentrated credit risk in corporate bonds. This creates a potential opportunity to diversify credit risk by raising exposure to other fixed income sectors, such as securitized bonds.

Additionally, since duration can be extended using derivative instruments, plans that have the ability to do so may want to consider redeploying capital into other strategies, such as the more flexible dynamic bond vehicles mentioned above.

Conclusions

In our view, there has never been a more important time for investors to reexamine their asset allocations to see if return targets can be achieved with more diversified portfolios. This is particularly true considering that many current allocation policies were influenced by an economic environment that is very different from the one we are in today.

We also believe that the asset allocation changes that have taken place over the past 15 years, combined with a wide range of implementation approaches, may warrant a total portfolio approach that looks across asset classes to capture equity and fixed income exposures that may reside outside their respective asset classes. In our view, taking these steps will allow for more precise measurement of key exposures, thus reducing the likelihood of unexpected outcomes regardless of how asset classes perform going forward.

Appendix: Models Used to Forecast Most Asset Classes[1]

T. Rowe Price Capital Market Assumptions

Equity Returns

Return = Expected Inflation + Expected Dividend Yield + Average Real EPS Growth + Valuation Impact + Currency Impact

- Inflation, dividend, and real earnings expectations provided by T. Rowe Price investment professionals.
- Valuation changes converge linearly over five-year time horizon.
- Currency impact assumes unhedged exposure.

Fixed Income Returns

Return = Average Yield + Rolldown + Average Spread × Spread Capture + Valuation Impact + Currency Impact

- Cash yields, term premia estimates, average spreads, and spread capture forecasts provided by T. Rowe Price investment professionals.
- Valuation impact reflects changes to both underlying government yields and spreads.
- Currency impact reflects hedging costs and/or yield pickup for some asset classes.

Alternatives Returns

Return = Cash + Alpha + Extimated Beta to Risk Premia × Forecasted Premia

- Cash yields and alpha estimate forecasts provided by T. Rowe Price investment professionals.
- Asset classes such has hedge funds and private equity/real estate derive a significant amount of their value proposition from active management alpha, which includes the illiquidity premium.
- Premia return estimated using estimates of equity risk premium, small-cap premium, emerging markets premium, investment-grade credit premium, and duration premium.

[1] Forecasts for certain asset classes, such as real asset equity, gold, and U.S. Treasury inflation protected securities follow slightly different processes to incorporate the uniqueness of the asset classes.

Representative Indexes—Capital Market Assumptions

	Asset Class	Representative Index
Equity	Ex-U.S. Developed Equity	MSCI World ex-USA Index
	U.S. Equity	Russell 3000 Index
	EM Equity	MSCI Emerging Markets Index
Fixed Income	U.S. Cash	Bloomberg 1-3 Month Treasury Bill Index
	U.S. Core Bonds	Bloomberg U.S. Aggregate Bond Index
	U.S. High Yield	Bloomberg U.S. Corporate High-Yield Bond Index
	U.S. Bank Loans	Morningstar LSTA Leveraged Performing Loan Index
	EM Sovereign	J.P. Morgan EMBI Global Diversified

Important Information

T. Rowe Price Capital Market Assumptions: The information presented herein is shown for illustrative, informational purposes only. Forecasts are based on subjective estimates about market environments that may never occur. This material does not reflect the actual returns of any portfolio/strategy and is not indicative of future results. The historical returns used as a basis for this analysis are based on information gathered by T. Rowe Price and from third-party sources and have not been independently verified. The asset classes referenced in our capital market assumptions are represented by broad-based indices, which have been selected because they are well known and are easily recognizable by investors. Indices have limitations due to materially different characteristics from an actual investment portfolio in terms of security holdings, sector weightings, volatility, and asset allocation. Therefore, returns and volatility of a portfolio may differ from those of the index. Management fees, transaction costs, taxes, and potential expenses are not considered and would reduce returns. Expected returns for each asset class can be conditional on economic scenarios; in the event a particular scenario comes to pass, actual returns could be significantly higher or lower than forecast.

For more explanation on our methodology, see our 2023 publication: *Capital Market Assumptions Five-Year Perspective.*

INVEST WITH CONFIDENCE℠

T. Rowe Price focuses on delivering investment management excellence that investors can rely on—now and over the long term.

T. Rowe Price®

Additional Disclosures

Bloomberg® and Bloomberg Indices are service marks of Bloomberg Finance L.P. and its affiliates, including Bloomberg Index Services Limited ("BISL"), the administrator of the index (collectively, "Bloomberg") and have been licensed for use for certain purposes by T. Rowe Price. Bloomberg is not affiliated with T. Rowe Price, and Bloomberg does not approve, endorse, review, or recommend T. Rowe Price Capital Market Assumptions. Bloomberg does not guarantee the timeliness, accurateness, or completeness of any data or information relating to T. Rowe Price Capital Market Assumptions.

ICE Data Indices, LLC ("ICE DATA"), is used with permission. ICE DATA, ITS AFFILIATES AND THEIR RESPECTIVE THIRD-PARTY SUPPLIERS DISCLAIM

ANY AND ALL WARRANTIES AND REPRESENTATIONS, EXPRESS AND/ OR IMPLIED, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, INCLUDING THE INDICES, INDEX DATA AND ANY DATA INCLUDED IN, RELATED TO, OR DERIVED THEREFROM. NEITHER ICE DATA, ITS AFFILIATES NOR THEIR RESPECTIVE THIRD-PARTY SUPPLIERS SHALL BE SUBJECT TO ANY DAMAGES OR LIABILITY WITH RESPECT TO THE ADEQUACY, ACCURACY, TIMELINESS OR COMPLETENESS OF THE INDICES OR THE INDEX DATA OR ANY COMPONENT THEREOF, AND THE INDICES AND INDEX DATA AND ALL COMPONENTS THEREOF ARE PROVIDED ON AN "AS IS" BASIS AND YOUR USE IS AT YOUR OWN RISK. ICE DATA, ITS AFFILIATES AND THEIR RESPECTIVE THIRD-PARTY SUPPLIERS DO NOT SPONSOR, ENDORSE, OR RECOMMEND T. ROWE PRICE OR ANY OF ITS PRODUCTS OR SERVICES.

London Stock Exchange Group plc and its group undertakings (collectively, the "LSE Group"). © LSE Group 2023. All rights in the FTSE Russell indexes or data vest in the relevant LSE Group company that owns the index or the data. Neither LSE Group nor its licensors accept any liability for any errors or omissions in the indexes or data and no party may rely on any indexes or data contained in this communication. No further distribution of data from the LSE Group is permitted without the relevant LSE Group company's express written consent. The LSE Group does not promote, sponsor or endorse the content of this communication.

MSCI and its affiliates and third party sources and providers (collectively, "MSCI") makes no express or implied warranties or representations and shall have no liability whatsoever with respect to any MSCI data contained herein. The MSCI data may not be further redistributed or used as a basis for other indices or any securities or financial products. This report is not approved, reviewed, or produced by MSCI. Historical MSCI data and analysis should not be taken as an indication or guarantee of any future performance analysis, forecast or prediction. None of the MSCI data is intended to constitute investment advice or a recommendation to make (or refrain from making) any kind of investment decision and may not be relied on as such.

Information has been obtained from sources believed to be reliable but J.P. Morgan does not warrant its completeness or accuracy. The index is used with permission. The Index may not be copied, used, or distributed without J.P. Morgan's prior written approval. Copyright © 2023, J.P. Morgan Chase & Co. All rights reserved.

The S&P Indices are a product of S&P Dow Jones Indices LLC, a division of S&P Global, or its affiliates ("SPDJI") and [Third Party Licensor], and has been licensed for use by T. Rowe Price. Standard & Poor's® and S&P® are registered trademarks of Standard & Poor's Financial Services LLC, a division of S&P Global ("S&P"); Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"); The T. Rowe Price Capital Market Assumptions are not sponsored, endorsed, sold or promoted by SPDJI, Dow Jones, S&P, their respective affiliates, and none of such parties make any representation regarding the advisability of investing in such product(s) nor do they have any liability for any errors, omissions, or interruptions of the S&P Indices.

S&P Copyright © 2023, S&P Global Market Intelligence (and its affiliates, as applicable). Reproduction of any information, data or material, including ratings ("Content") in any form is prohibited except with the prior written permission of the relevant party. Such party, its affiliates and suppliers ("Content Providers") do not guarantee the accuracy, adequacy, completeness, timeliness or availability of any Content and are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such Content. In no event shall Content Providers be liable for any damages, costs, expenses, legal fees, or losses (including lost income or lost profit and opportunity costs) in connection with any use of the Content. A reference to a particular investment or security, a rating or any observation concerning an investment that is part of the Content is not a recommendation to buy, sell or hold such investment or security, does not address the sustainability of an investment or security and should not be relied on as investment advice. Credit ratings are statements of opinions and are not statements of fact.

CFA® and Chartered Financial Analyst® are registered trademarks owned by CFA Institute.

Important Information

This material is being furnished for general informational and/or marketing purposes only. The material does not constitute or undertake to give advice of any nature, including fiduciary investment advice, nor is it intended to serve as the primary basis for an investment decision. Prospective investors are recommended to seek independent legal, financial and tax advice before making any investment decision. T. Rowe Price group of companies including T. Rowe Price Associates, Inc. and/or its affiliates receive revenue from T. Rowe Price investment products and services. **Past performance is not a reliable indicator of future performance.** The value of an investment and any income from it can go down as well as up. Investors may get back less than the amount invested.

The material does not constitute a distribution, an offer, an invitation, a personal or general recommendation or solicitation to sell or buy any securities in any jurisdiction or to conduct any particular investment activity. The material has not been reviewed by any regulatory authority in any jurisdiction.

Information and opinions presented have been obtained or derived from sources believed to be reliable and current; however, we cannot guarantee the sources' accuracy or completeness. There is no guarantee that any forecasts made will come to pass. The views contained herein are as of the date written and are subject to change without notice; these views may differ from those of other T. Rowe Price group companies and/or associates. Under no circumstances should the material, in whole or in part, be copied or redistributed without consent from T. Rowe Price.

The material is not intended for use by persons in jurisdictions which prohibit or restrict the distribution of the material and in certain countries the material is provided upon specific request. It is not intended for distribution to retail investors in any jurisdiction.

This material was prepared for use in the United States for U.S.-based plan sponsors, consultants, and advisors, and the material reflects the current retirement environment in the U.S. It is also available to Canadian-based plan sponsors, consultants and advisors for reference. There are many differences between the two nations' retirement plan offerings and structures. Therefore, this material is offered to accredited investors in Canada for educational purposes only and does not constitute a solicitation or offer of any product or service.

Canada—Issued in Canada by T. Rowe Price (Canada), Inc. T. Rowe Price (Canada), Inc.'s investment management services are only available to Accredited Investors as defined under National Instrument 45-106. T. Rowe Price (Canada), Inc. enters into written delegation agreements with affiliates to provide investment management services.

USA—Issued in the USA by T. Rowe Price Associates, Inc., 100 East Pratt Street, Baltimore, MD, 21202, which is regulated by the U.S. Securities and Exchange Commission. For Institutional Investors only.

ID0006272 (09/2023)
202309-3099399