9/12/2023

Strategies for Investment of SFA Assets under PBGC's Final Rule

MODERATOR:

Jonathan Siegel, Loomis, Sayles & Co.

SPEAKERS:

Sue Crotty, Segal Marco Advisors

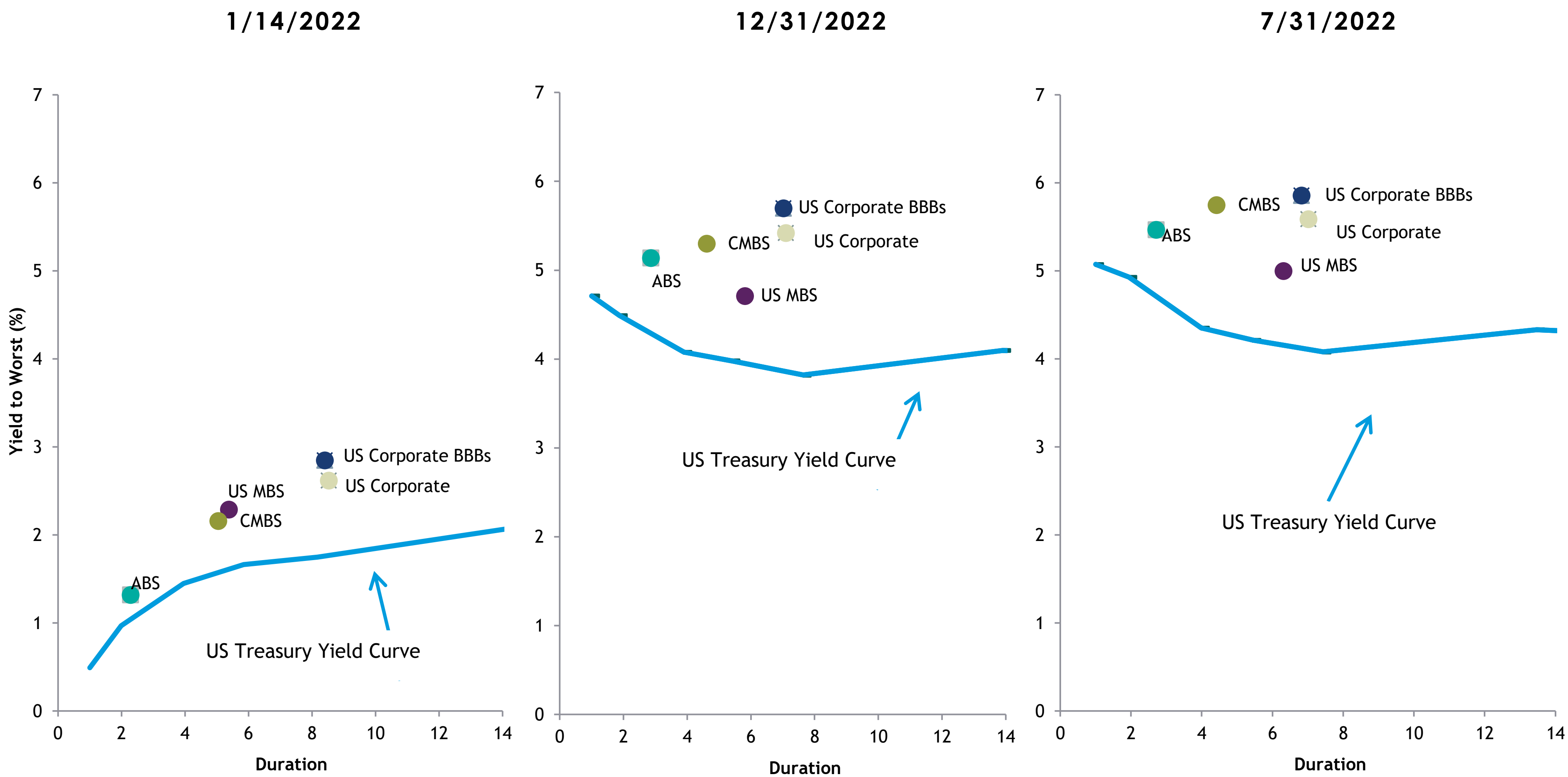
Joshua Barbash, BlackRock

Shivin Kwatra, BNYMellon/Insight Investments

Danielle Singer, Invesco

Michael Buchenholz, JP Morgan

sector yields vs like duration treasurys



Sources: JPMorgan, Bloomberg.
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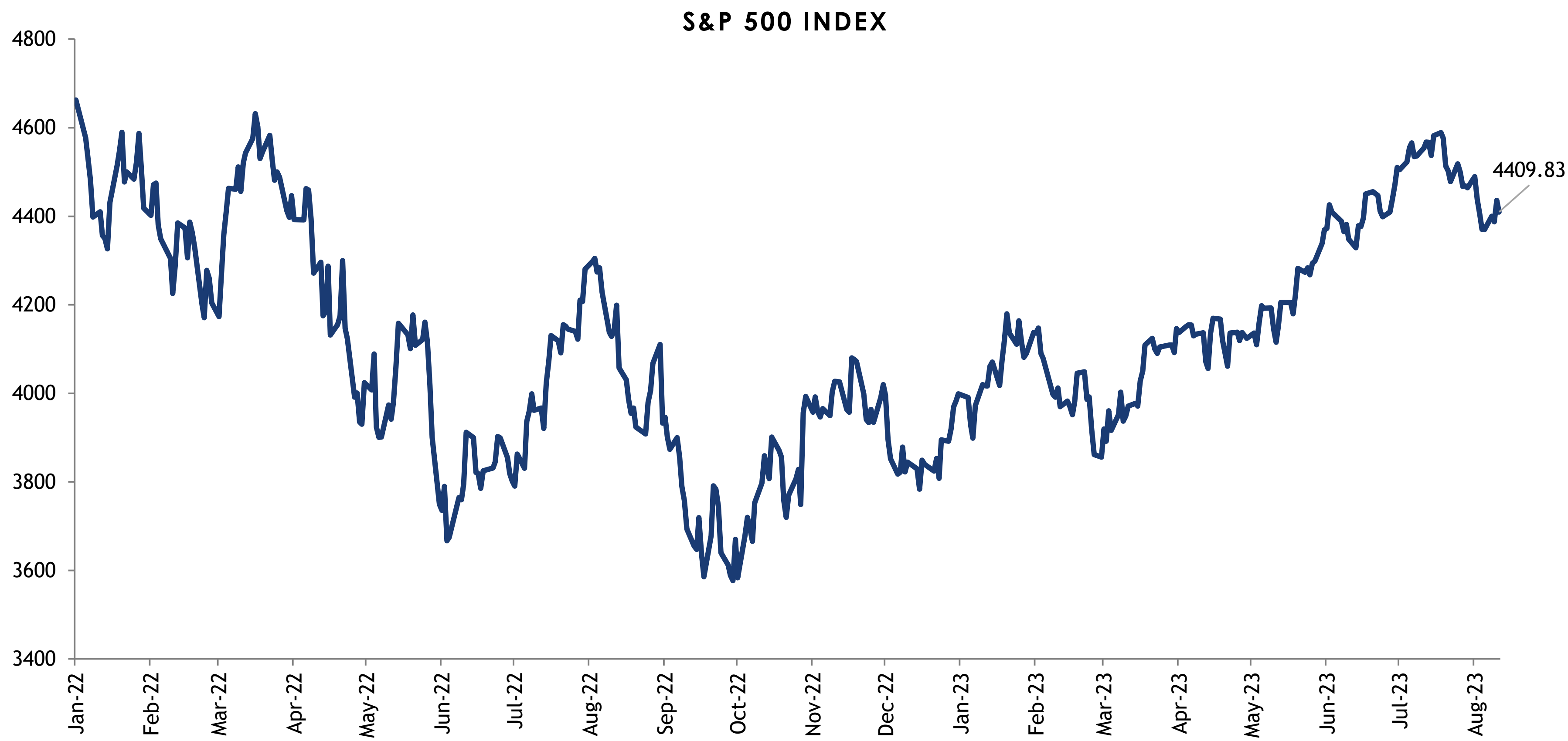
Indices are unmanaged and do not incur fees. It is not possible to invest directly in an index.
Past performance is no guarantee of future results.

S&P500 returns

1/14/2022 - 8/24/2023



Source: Bloomberg, as of 8/24/2023.

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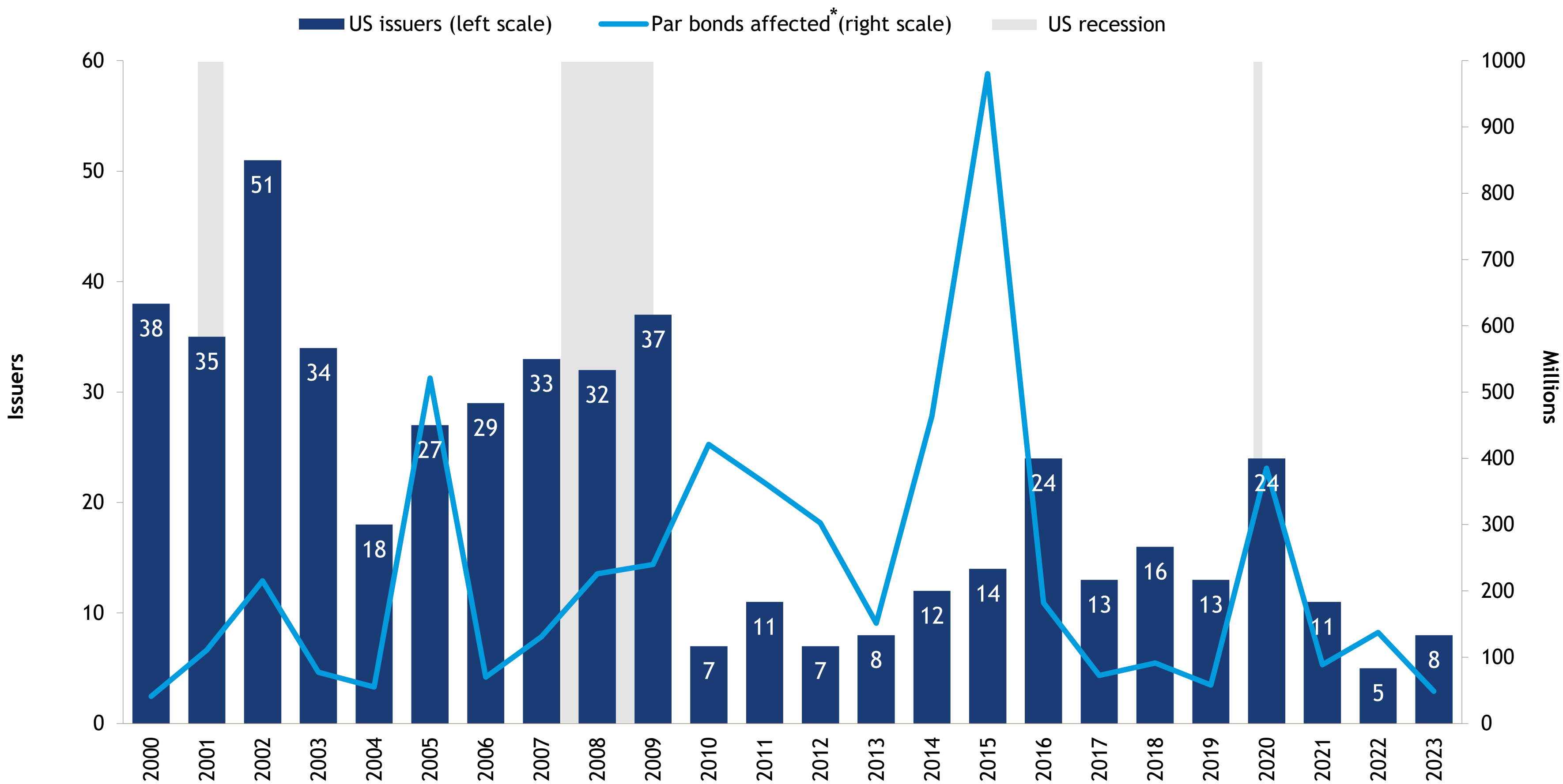
US fallen angels

AS OF 6/30/2023



Source: S&P as of 6/30/2023.
**Number of issuers in a given year whose rating has fallen from investment grade to speculative grade.*

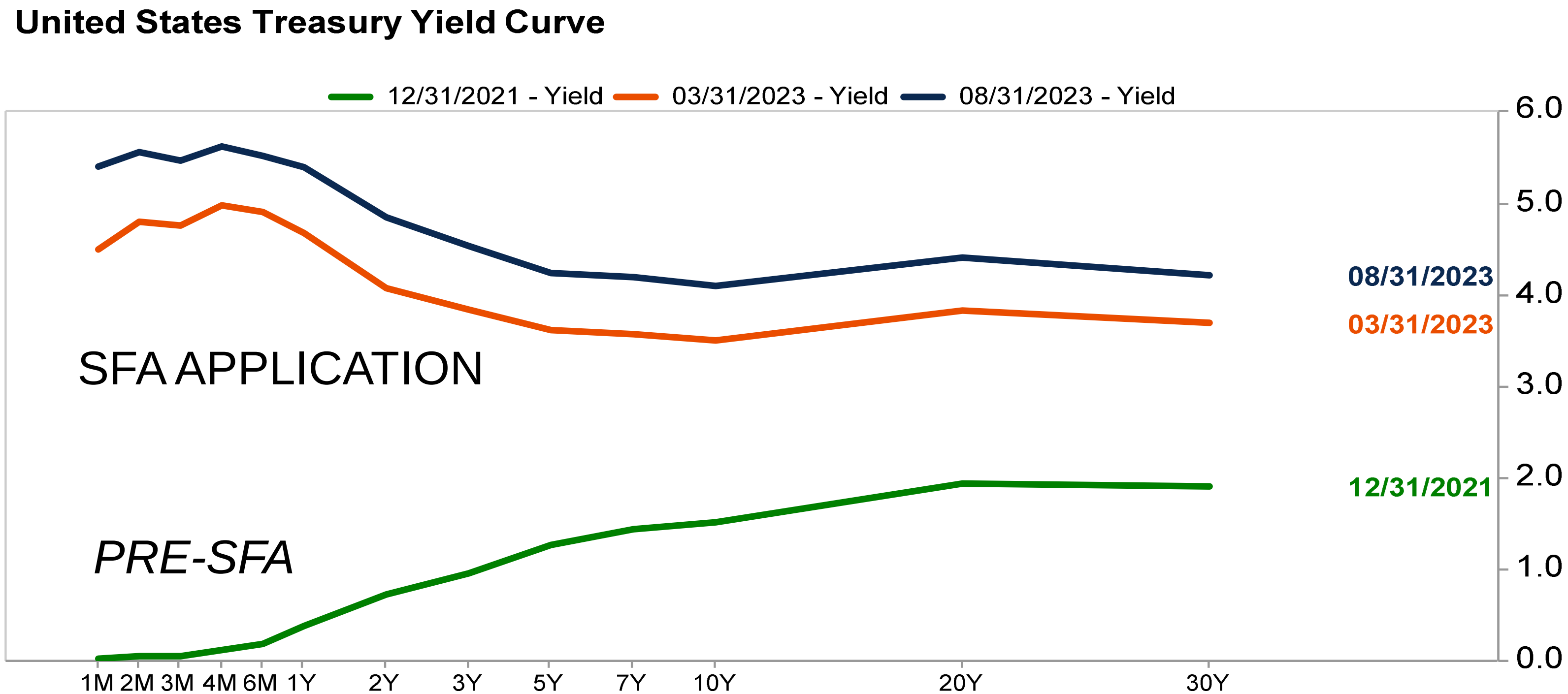
US investment grade144a issuance

AS OF 8/18/2023

	144a ISSUANCE – US INVESTMENT GRADE				
YEAR	NON-144a ISSUANCE (# of bonds)	144a ISSUANCE (# of bonds)	GRAND TOTAL (# of bonds)	NON-144a AS % OF TOTAL ISSUANCE	144a AS % OF TOTAL ISSUANCE
2014	766	257	1023	74.85%	25.15%
2015	914	257	1171	78.02%	21.98%
2016	948	233	1181	80.26%	19.74%
2017	941	313	1254	75.03%	24.97%
2018	853	274	1127	75.69%	24.31%
2019	794	305	1099	72.27%	27.73%
2020	1309	449	1758	74.47%	25.53%
2021	991	389	1381	71.80%	28.20%
2022	867	347	1214	71.40%	28.60%
2023 YTD	701	167	868	80.72%	19.28%

Source: JPMorgan, as of 8/18/2023.

U.S. Treasury Yield Curve



Yield to Maturity

	1Y	2Y	5Y	10Y	30Y
12/31/2021	0.38	0.73	1.27	1.51	1.90
3/31/2023	4.67	4.07	3.61	3.50	3.69
8/31/2023	5.39	4.84	4.23	4.09	4.21

Source: FactSet

Segal Marco Advisors

Josh Barbash

September 12, 2023

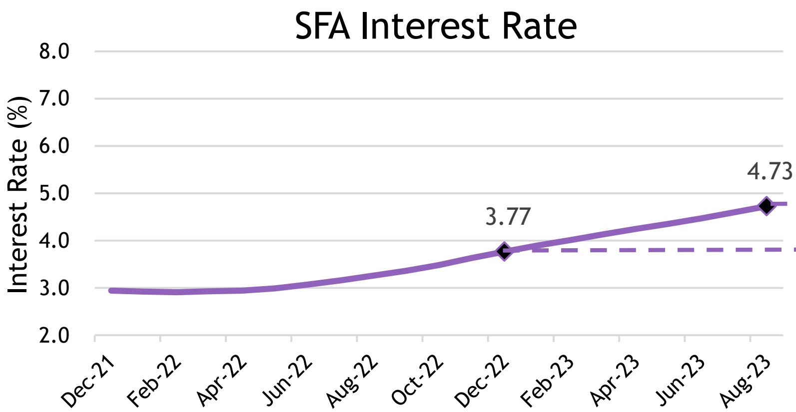
BlackRock

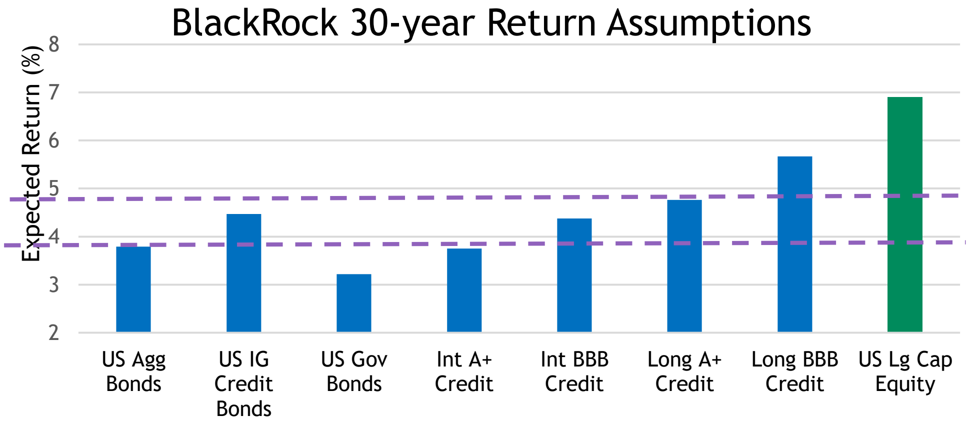
BlackRock Slides for NCCMP Conference

SFA Rates vs BlackRock Capital Market Assumptions

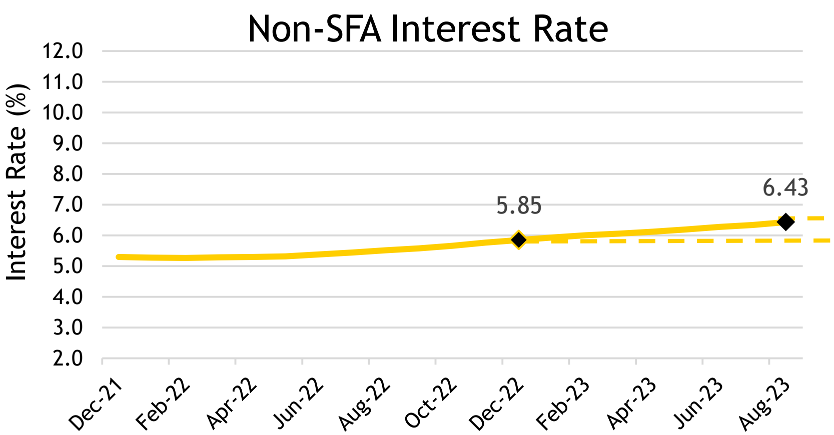
"Lock-In" applications may have used rates from beginning of 2023 while expected return assumptions have increased in conjunction with continued rising rates

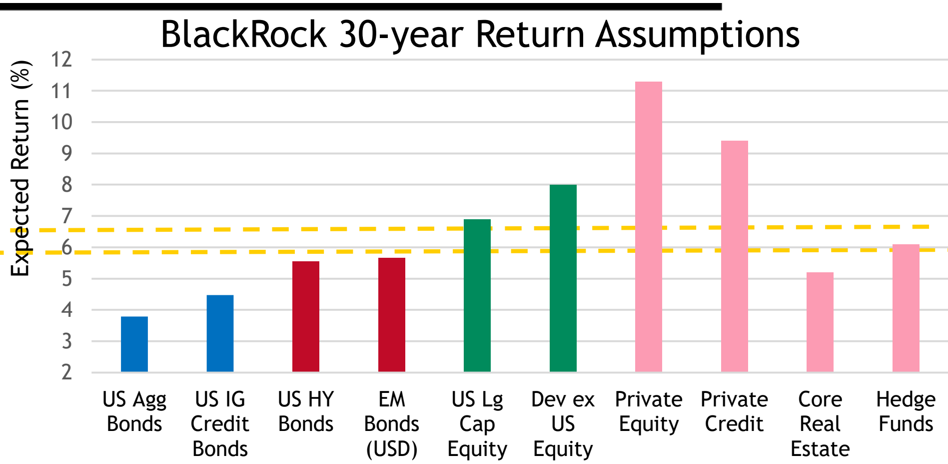
SFA Interest Rate vs SFA Eligible Assets





Non-SFA Interest Rate vs Various Asset Classes





This information is not intended as a recommendation to invest in any particular asset class or strategy – or even estimate – of future performance.

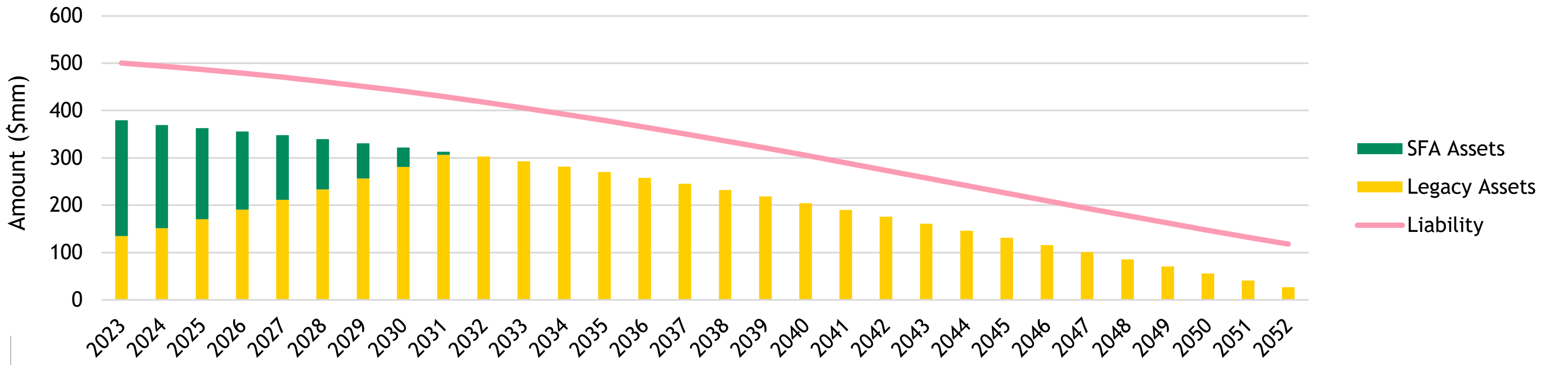
Source: BlackRock Investment Institute, August 2023. Data as of 30 June 2023. SFA and Non-SFA interest rates based on segment rates published by the IRS.

Notes: Return assumptions are total nominal returns. US dollar return expectations for all asset classes are shown in unhedged terms, These capital market assumptions may generate better or worse market (beta) returns net of fees.

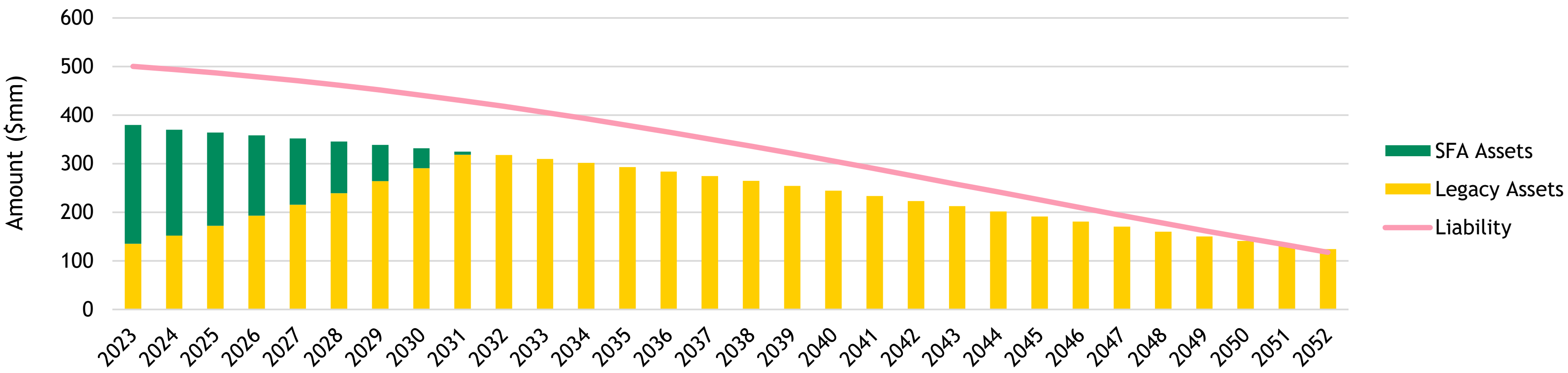
Trajectory of SFA and Legacy Assets vs Total Liability

Given higher returns relative to SFA interest rates, plan sponsors may seek to invest to fund benefits beyond 2051

Projection of Assets vs Liability Assuming Legacy Return of 5.85% and SFA Return of 4.50%



Projection of Assets vs Liability Assuming Legacy Return of 6.50% and SFA Return of 4.50%



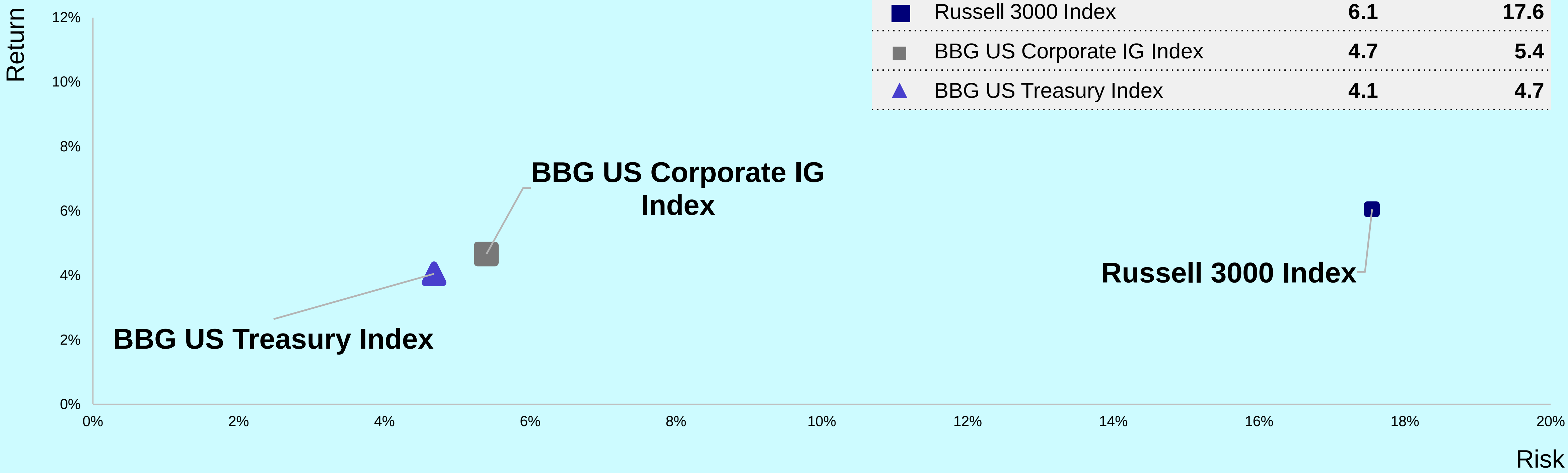
Source: BlackRock for illustrative purposes only. Liabilities valued using generic sample client with 12 year duration and ~$500mm liability measured using ML 6A corporate discount curve as of 12/31/2022. Initial asset value assumes $135mm initial Legacy asset value and SFA funding of $245mm based on 3.77% and 5.85% SFA and non-SFA interest rates respectively. In both charts, the Legacy and SFA returns are hypothetical net of fee long-term returns and the 6.50% Legacy return is the net of fee return on legacy assets needed for total plan to achieve 100% funded relative to liability as of 12/31/2051.

First question

Adding equities to an SFA portfolio
Risk and return estimates

10-year return and risk assumptions (USD)

	Return(%)	Risk (%)
Russell 3000 Index	**6.1**	**17.6**
BBG US Corporate IG Index	**4.7**	**5.4**
BBG US Treasury Index	**4.1**	**4.7**



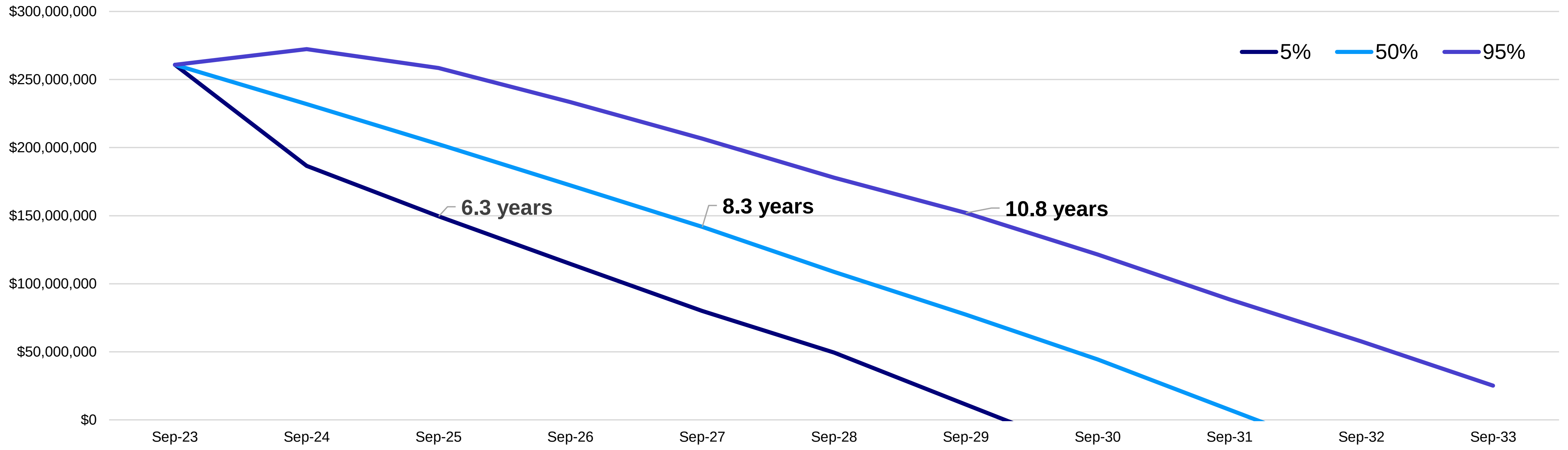
Source: Invesco as of June 30, 2023. Past performance is not a guarantee of future results. There can be no assurance that any estimated returns or projections can be realized, that forward-looking statements will materialize or that actual returns or results will not be materially lower than those presented. Data is unhedged USD. An investment cannot be made into an index. Please note these are geometric returns. Refer to Capital market assumptions (CMAs) slide for additional CMA information.

Considering surplus and shortfall risk
Analyzing potential outcomes for different asset allocations

Total return portfolio

Traditional total return approaches may provide higher return potential, but as market volatility and sequence risk plays a role, the dispersion of potential outcomes means a trade off in certainty and potential longevity of SFA assets

Potential outcomes for 85% FI, 15% EQ total return portfolio

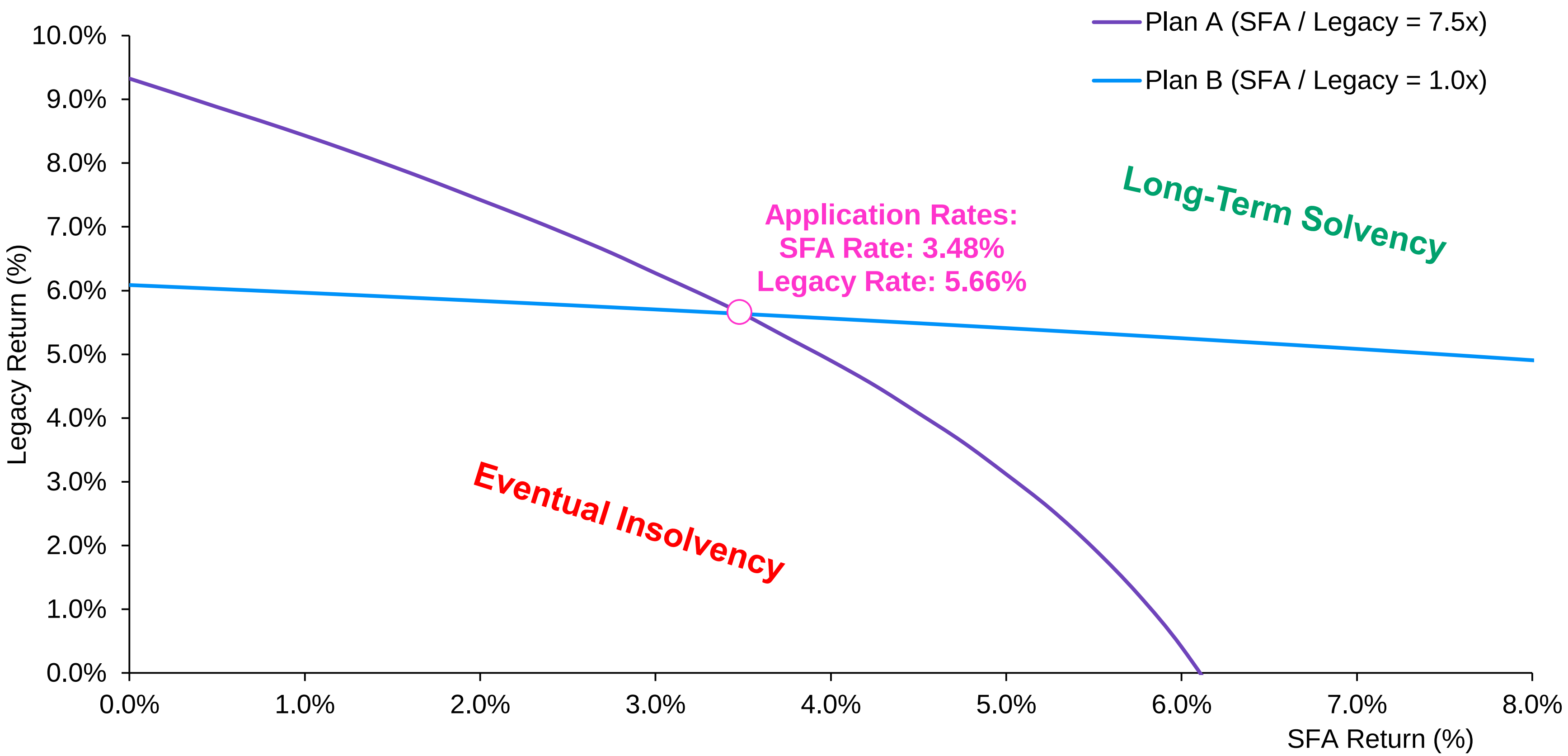


For illustrative purposes only. Source: Invesco Solutions. Hypothetical asset projections account for cash flows. Modeling ranges are calculated using Moody's economic scenario generator which accounts for annual path dependency of the volatility of returns. 5th percentile indicates that there are only 5% of outcomes that are worse than the projection. Years represent the life of the assets until depletion. See disclosures at end for additional information.

Question 1

Return Needs For Both SFA and Legacy Asset Pools Are Unique

SFA & Legacy Asset Return Needed to Reach Year Thirty



- Return combinations below the blue line will lead to Plan insolvency prior to Year 30. Combinations above the blue line will sustain the Plan beyond Year 30.

Source: J.P. Morgan Asset Management, PBGC SFA Application Website, Data as of June 30th, 2023

Josh Barbash

September 12, 2023

BlackRock

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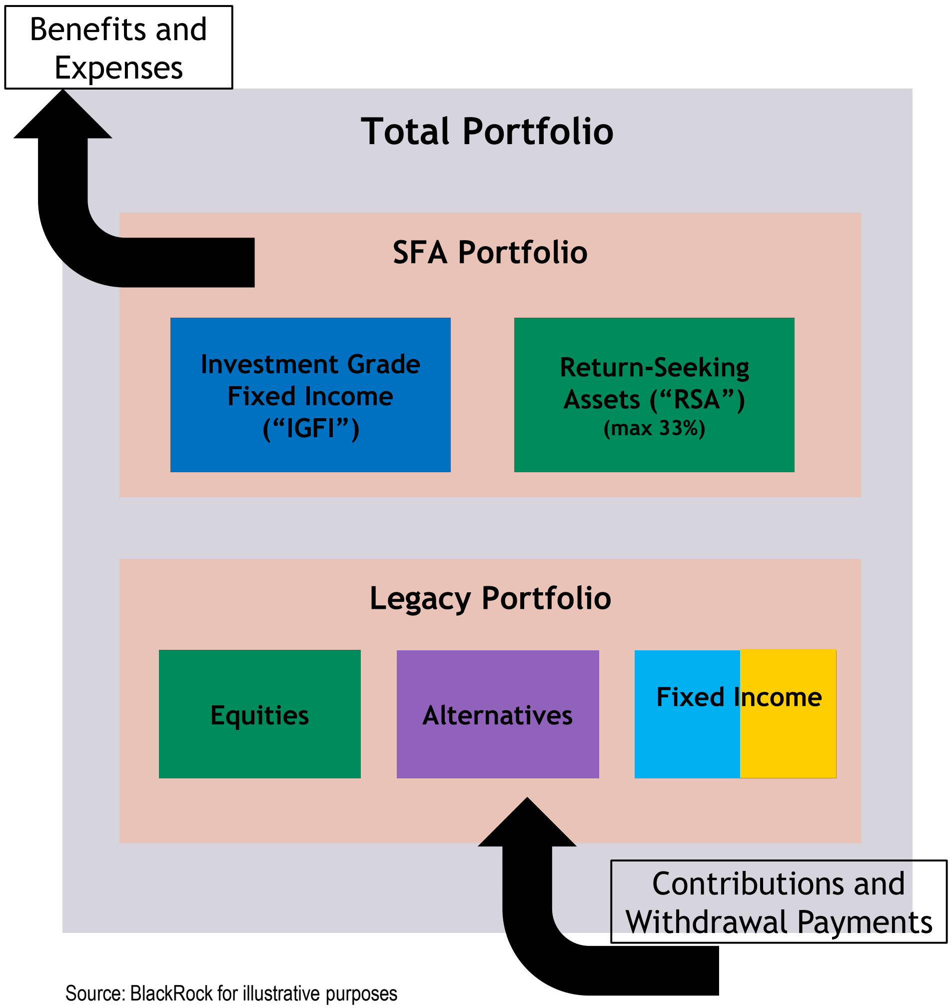
Managing SFA and Legacy Assets in a Total Portfolio Framework

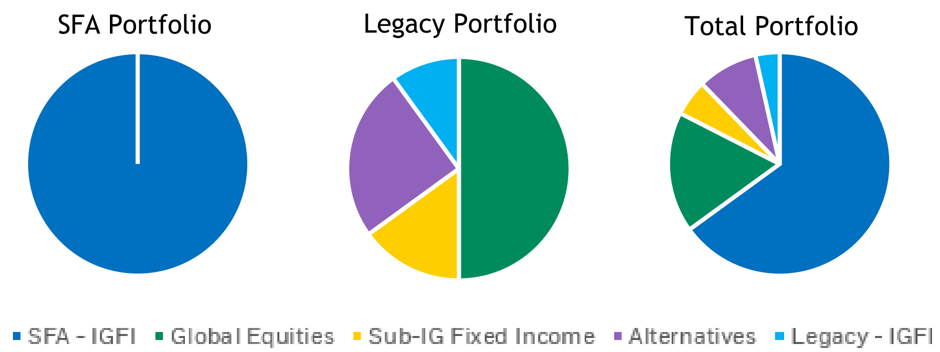
SFA and Legacy Assets Must Remain Distinct



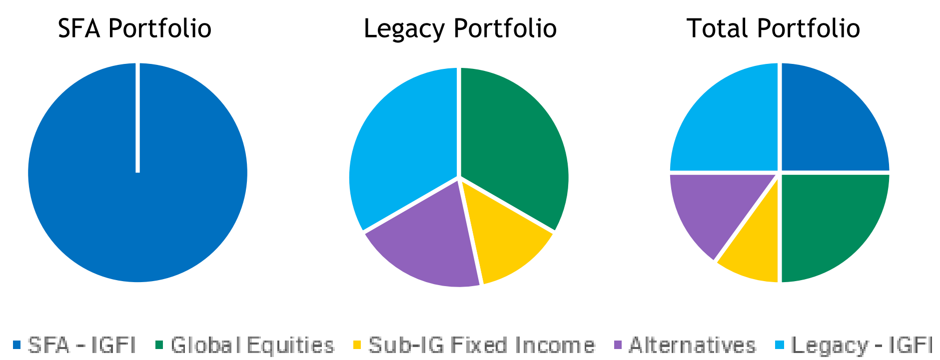
Source: BlackRock for illustrative purposes

Illustrative Total Portfolio Evolution

Day-One Portfolio
(SFA = 65% of Assets, Legacy = 35% of Assets)



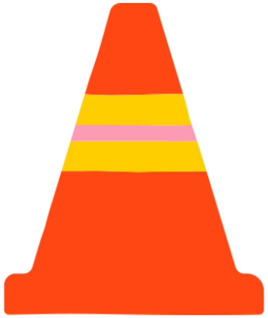
Year-5 Portfolio
(SFA = 25% of Assets, Legacy = 75% of Assets)



Steps to Ensure your Total SAA Makes Sense at All Times

Total SAA is the primary determinant of Solvency Ratio outcomes

Annual review of SAA, including common holdings between non-SFA and SFA, is warranted



Establish protocols to monitor and adjust for <u>both</u> 33% limit on RSA assets in SFA, and total SAA vs policy

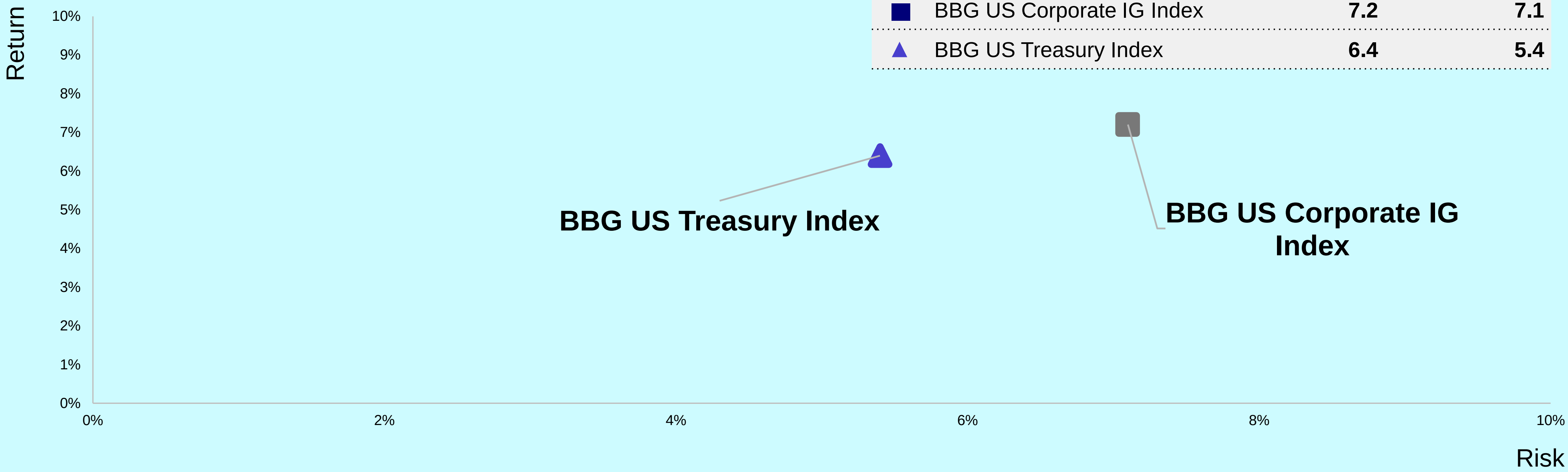
Source: BlackRock. Subject to change.

Second question

Is corporate risk worth it?
Risk and return (December 1978 – July 2023)

Historical return and risk (USD)

	Return(%)	Risk (%)
■ BBG US Corporate IG Index	**7.2**	**7.1**
▲ BBG US Treasury Index	**6.4**	**5.4**



Source: Invesco as of June 30, 2023. Past performance is not a guarantee of future results. There can be no assurance that any estimated returns or projections can be realized, that forward-looking statements will materialize or that actual returns or results will not be materially lower than those presented. Data is unhedged USD. An investment cannot be made into an index. Please note these are geometric returns.

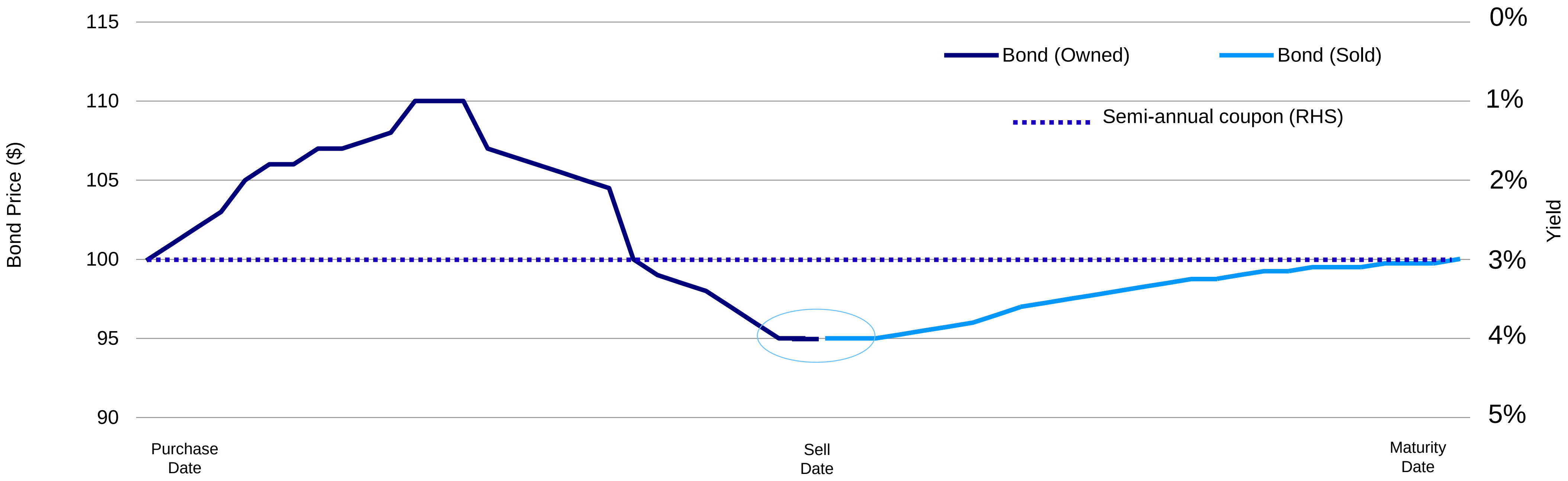
Taking advantage of fixed income

Incorporating a buy & maintain strategy can increase certainty

Market volatility can impact the success of a portfolio

Forced selling at unknown prices can create uncertainty around ability to meet liabilities

Impact of market movements on the price of a bond



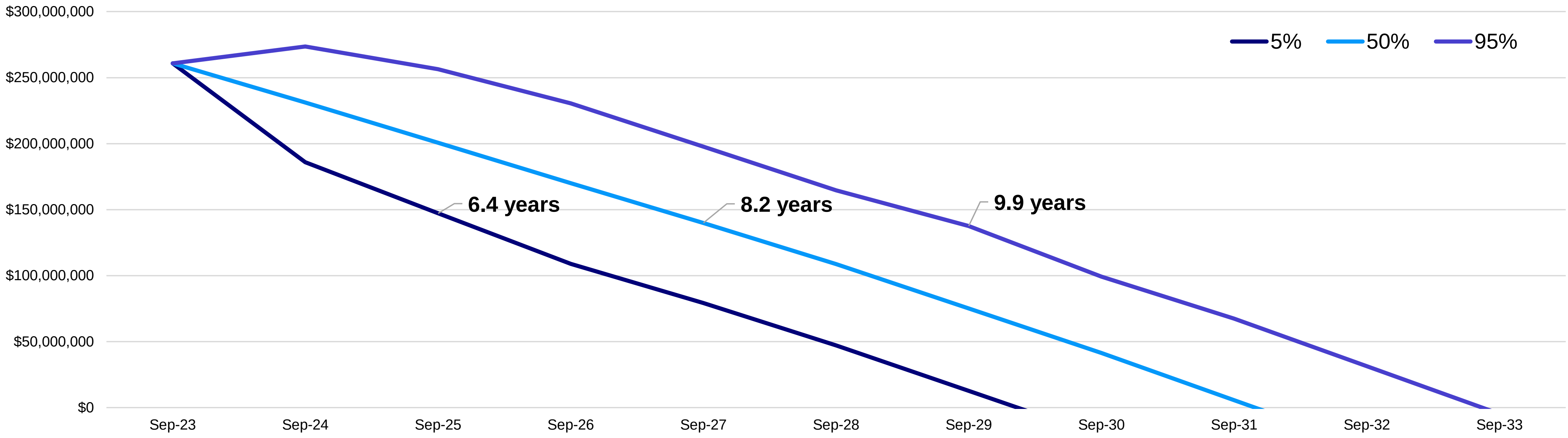
For illustrative purposes only. No investment decisions should be taken on the basis of these charts.

Considering surplus and shortfall risk
Analyzing potential outcomes for different asset allocations

Total return portfolio

Traditional total return approaches may provide higher return potential, but as market volatility and sequence risk plays a role, the dispersion of potential outcomes means a trade off in certainty and potential longevity of SFA assets

Potential outcomes for 100% FI total return portfolio



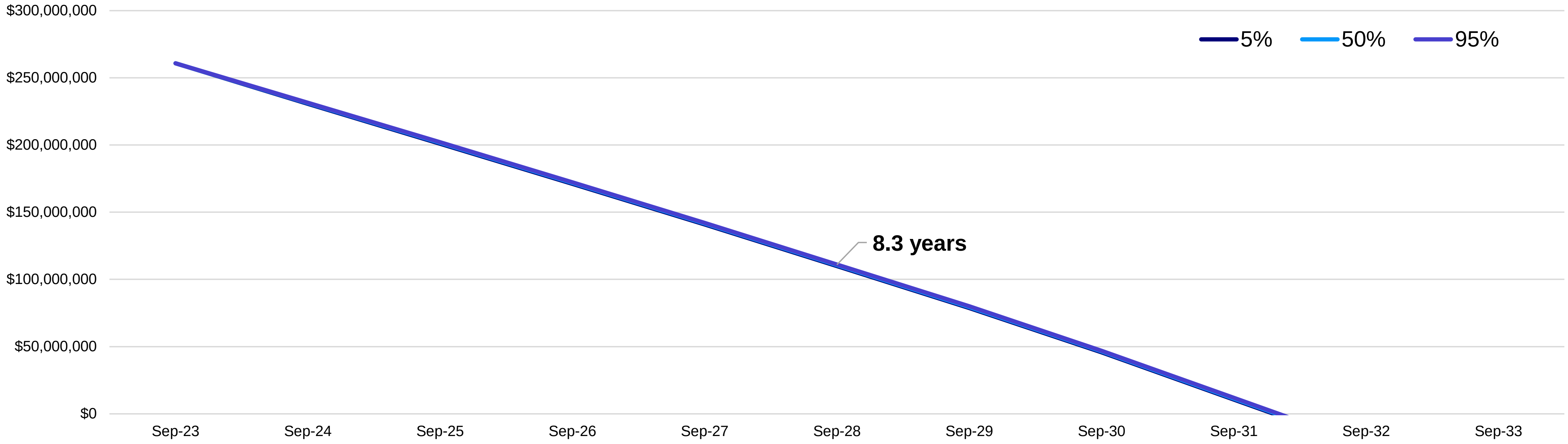
For illustrative purposes only. Source: Invesco Solutions. Hypothetical asset projections account for cash flows. Modeling ranges are calculated using Moody's economic scenario generator which accounts for annual path dependency of the volatility of returns. 5th percentile indicates that there are only 5% of outcomes that are worse than the projection. Years represent the life of the assets until depletion. See disclosures at end for additional information.

Considering surplus and shortfall risk
Analyzing potential outcomes for different asset allocations

Buy & maintain portfolio

Increased certainty due to low turnover, known income and cashflow benchmarking which may provide better outcomes

Potential outcomes for buy & maintain portfolio by percentile



For illustrative purposes only. Source: Invesco Solutions. Hypothetical asset projections account for cash flows. Modeling ranges are calculated using Moody's economic scenario generator which accounts for annual path dependency of the volatility of returns. 5th percentile indicates that there are only 5% of outcomes that are worse than the projection. Years represent the life of the assets until depletion. See disclosures at end for additional information.

Question 2

Implementation Should Be Tailored To Unique Constraints & Objectives

SFA Mandate Features & Considerations

Feature	Options	Considerations
Number of Managers	Single vs. Multiple Manager	• Consolidation into a single manager can reduce effective fees and create a single point of contact and coordination • Multi-manager structure offers risk diversification at the cost of increased complexity
Manager Structure	Parallel vs. Stacked and Full Outsourcing	• Running identical mandates in parallel makes manager performance comparisons easier • Stacking managers across different parts of the yield curve creates a separation of duties, but can unnecessarily increase turnover as the portfolio matures
Cashflow Matching	Number of Years	• Mitigates impact of selling into a liquidity crunch or volatile market to fund benefits • Three to Five years is a good rule of thumb for most plans while those who are risk averse can match longer
Active versus Passive	Buy & Maintain versus Alpha Generation Focus	• Active management creates potential for alpha but comes with higher fees and tracking error • Plans with short expected SFA lifetimes may want to avoid an active component altogether
Investment Grade Opportunity Set	Treasuries, Credit, Securitized	• Treasuries are the lowest risk / lowest return SFA asset • Credit boosts returns but introduces downgrade and default risk. A robust credit research capability is essential • Securitized boost yields while diversifying credit. Agency-backed bonds are default remote but introduce uncertainty around cashflow timing. Manager should have deep securitized sourcing and analytical capabilities
RSA Budgeting	RSA Allowance and Budgeting Across Managers	• RSAs can enhance diversification (e.g. 144a bonds) and boost returns (e.g. public equity) • The closer the RSA allocation is to the 33% limit, the more difficult compliance and monitoring will be, particularly in a multi-managers structure
Account Type	Separate Account, Commingled Funds or Combination	• Funds provide diversification but limited customization for smaller asset pools and are most likely vehicle for RSA allocations to equity • Funds must comply with the July 19th FAQ publication defining “predominately” • Separate account allows maximum flexibility and customization

Source: J.P. Morgan Asset Management

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Disclosures

Assumptions

Moody's Economic Scenario Generator

- All analysis as of May 31, 2023, unless otherwise stated
- Returns based on Invesco's 10-year Capital Market Assumptions
- Scenario modelling based on 1,000 simulations using economic scenario paths provided by Moody's, adjusted for May 31, 2023 market conditions
- Projections allow for plan expenses and assume annual rebalancing to a constant asset allocation
- Portfolio projections benchmarked to BBG US Aggregate Index with a starting yield of 5.4%.

Source: Invesco as of April 30, 2023. There is no guarantee that the simulated returns will be achieved in the future. Performance shown is simulated. The simulation presented here was created to consider possible results of a strategy not previously managed by Invesco for any client. Simulated performance is hypothetical. It does not reflect trading in actual accounts and is provided for informational purposes only to illustrate these strategies during specific periods. There is no guarantee the simulated results will be realized in the future. Invesco cannot assure the simulated performance results shown for these strategies would be similar to the firm's experience had it actually been managing portfolios using these strategies. In addition, the results actual investors might have achieved would vary because of differences in the timing and amounts of their investments. Returns shown for this simulation would be lower when reduced by the advisory fees and any other expenses incurred in the management of an investment advisory account. Simulated performance results have certain limitations. Such results do not represent the impact of material economic and market factors might have on an investment advisor's decision-making process if the advisor were actually managing client money. Simulated performance also differs from actual performance because it is achieved through retroactive application of a model investment methodology and may be designed with the benefit of hindsight.

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Capital market assumptions (CMAs)

Invesco Solutions develops CMAs that provide long-term estimates for the behavior of major asset classes globally. The team is dedicated to designing outcome-oriented, multi-asset portfolios that meet the specific goals of investors. The assumptions, which are based on 5- and 10-year investment time horizons, are intended to help guide our strategic asset class allocations and should not serve as the basis or primary source for any investment decision. For each selected asset class, we develop assumptions for estimated return, estimated standard deviation of return (volatility), and estimated correlation with other asset classes. Estimates and targets reflecting our various assumptions concerning anticipated results are inherently subject to significant economic, competitive, and other uncertainties and contingencies and have been included solely for informational and illustrative purposes. Forecasts of financial market trends that are based on current market conditions constitute our judgement and are subject to change without notice. This information is not intended as a recommendation to invest in a specific asset class or strategy, or as a promise or guarantee of future performance. These Invesco proprietary asset class assumptions are passive, and do not consider the impact of active management. As the themes discussed herein may be unsuitable for investors depending on their specific investment objectives and financial situation, and given the complex risk-reward trade-offs involved, we encourage you to consider your own judgment and quantitative optimization approaches in setting strategic allocations to asset classes and strategies. Asset allocation and diversification do not guarantee a profit or eliminate the risk of loss. This material is not intended to provide, and should not be relied on, for tax advice. References to future returns are not promises or estimates of actual returns a client portfolio may achieve. Assumptions and estimates are provided for illustrative purposes only. They should not be relied upon as recommendations to buy or sell securities. Forecasts of financial market trends that are based on current market conditions constitute our judgment and are subject to change without notice. Estimated returns can be conditional on economic scenarios. If a particular scenario comes to pass, actual returns could be significantly higher or lower than these estimates. Indexes are unmanaged and used for illustrative purposes only. They are not intended to be indicative of the performance of any strategy. Broad-based securities indices are unmanaged and are not subject to fees and expenses typically associated with managed accounts or investment funds. It is not possible to invest directly in an index. All estimates in this document are in US dollar terms unless noted otherwise. For additional details regarding the methodology used to develop these estimates, please contact Invesco.

Invesco Vision

Designed by Invesco Investment Solutions (IIS), Invesco Vision is a decision support system that combines analytical and diagnostic capabilities to foster better portfolio management decision-making. Invesco Vision incorporates capital market assumptions (CMAs) developed by IIS, proprietary risk forecasts, and robust optimization techniques to help guide our portfolio construction and rebalancing processes. Advanced risk management approaches have been incorporated into the system such as de-smoothing of alternative risk factors, multi-asset factor decompositions, in addition to stress test analyses (both historical and hypothetical) to understand the drivers of volatility within our portfolios. By helping investors and researchers better understand portfolio risks and trade-offs, it helps to identify potential solutions best aligned with their specific preferences and objectives.

The Invesco Vision tool can be used in practice to develop solutions across a range of challenges encountered in the marketplace. The analysis output and insights shown here from Invesco Vision does not take into account any individual investor's investment objectives, financial situation or particular needs. The insights are not intended as recommendations to invest in a specific asset class or strategy, or as a promise of future performance. For additional information on our methodology, please refer to the comprehensive white paper, Invesco Vision: Portfolio Management Decision Support System.