
DECEMBER 19, 2023

**AGENDA ITEM 9
ACTION ITEM**

SCHOLARSHARE INVESTMENT BOARD

Resolution to Approve 2024 Asset Allocation Recommendation for ScholarShare 529

Recommendation

ScholarShare Investment Board (SIB or Board) staff recommends the Board adopt Resolution No. 2023-12 approving asset allocation changes to the existing actively-managed and passively-managed enrollment year investment portfolios for ScholarShare 529 (Plan).

Background

Each year, the ScholarShare Investment Board (SIB or Board) and the program manager, TIAA-CREF Tuition Financing, Inc. (TFI), review the asset allocation of the investment portfolios for ScholarShare 529 (Plan) to determine if any changes are necessary to continue to meet its investment objectives.

TFI has provided its “Asset Allocation Recommendation for 2024” (Exhibit A) for the Plan, which was completed with a primary focus on:

- a review of the enrollment year investment portfolios and all static portfolios for the Plan;
- the simulated probability of outpacing tuition inflation in the enrollment year investment portfolios; and
- a fresh look at the investment menu compared with the industry trends.

The asset allocation analysis highlights the review process and rationale for the recommended changes to the Plan’s existing actively-managed and passively-managed enrollment year investment portfolios, as outlined below:

- Elimination of real estate investment trusts (REITs) in the last three (3) stages of the glide path and rotation into core bonds for the Plan’s portfolios listed in the table below:

ScholarShare 529 Active Enrollment Year Investment Portfolios	ScholarShare 529 Passive Enrollment Year Investment Portfolios
2026/2027 Enrollment Portfolio Active	2026/2027 Enrollment Portfolio Passive
2024/2025 Enrollment Portfolio Active	2024/2025 Enrollment Portfolio Passive
Enrollment Year Portfolio Active	Enrollment Year Portfolio Passive

- Elimination of inflation-linked bonds (TIPS) in the first seven (7) stages of the glidepath and split allocation between core bond and high yield bond for the Plan’s portfolios listed in the table below:

ScholarShare 529 Active Enrollment Year Investment Portfolios	ScholarShare 529 Passive Enrollment Year Investment Portfolios
2040/2041 Enrollment Portfolio Active	2040/2041 Enrollment Portfolio Passive
2038/2039 Enrollment Portfolio Active	2038/2039 Enrollment Portfolio Passive
2036/2037 Enrollment Portfolio Active	2036/2037 Enrollment Portfolio Passive
2034/2035 Enrollment Portfolio Active	2034/2035 Enrollment Portfolio Passive
2032/2033 Enrollment Portfolio Active	2032/2033 Enrollment Portfolio Passive
2030/2031 Enrollment Portfolio Active	2030/2031 Enrollment Portfolio Passive
2028/2029 Enrollment Portfolio Active	2028/2029 Enrollment Portfolio Passive

The Board's investment consultant, Meketa Investment Group, Inc. (Meketa), reviewed and analyzed TFI's recommendation and provided a memo (Exhibit B) concurring with the recommended changes. SIB staff have reviewed and concur with the recommended changes to the Plan's actively-managed and passively-managed enrollment year investment portfolios.

The analyses and recommendations provided by TFI and Meketa highlight key observations associated with the recommended changes, including the potential benefits and challenges, asset allocation implications, fee changes, and other final considerations for the Board. In terms of timing, if approved by the Board, these changes are anticipated to take place in spring 2024.

Presenters

Jeremy Thiessen, Senior Director, Institutional Investment Strategist,
TIAA-CREF Tuition Financing, Inc.

Jordan Jones, Investment Analyst, TIAA-CREF Tuition Financing, Inc.

Kay Ceserani, Managing Principal / Consultant, Meketa Investment Group, Inc.

**SCHOLARSHARE INVESTMENT BOARD
RESOLUTION NO. 2023-12**

**RESOLUTION OF THE SCHOLARSHARE INVESTMENT BOARD
RELATING TO THE APPROVAL OF ASSET ALLOCATION CHANGES
TO THE ACTIVELY-MANAGED AND PASSIVELY-MANAGED
ENROLLMENT YEAR INVESTMENT PORTFOLIOS FOR THE
SCHOLARSHARE 529 COLLEGE SAVINGS PLAN**

WHEREAS, the ScholarShare Investment Board (the “SIB” or “Board”) was created under Education Code section 69980 et seq. (the “Golden State ScholarShare Trust Act” or “Act”);

WHEREAS, Section 69981(c)(4) of the Act provides that the Board shall have the powers and authority to cause moneys in the program fund to be held and invested and reinvested;

WHEREAS, Section 69982(f) of the Act provides that the Board shall have the powers and authority to administer the funds of the ScholarShare Trust;

WHEREAS, Section 69984(a)(2)(D) of the Act provides that moneys in the program fund may be invested or reinvested by the Treasurer or may be invested in whole or in part under contract with an investment manager, as determined by the Board;

WHEREAS, the program manager for the ScholarShare 529 College Savings Plan (“ScholarShare 529” or “Plan”), currently TIAA-CREF Tuition Financing, Inc. (“TFI”), recommends asset allocation changes to the existing actively-managed and passive-managed enrollment year investment portfolios for the Plan.

WHEREAS, SIB staff and the Board’s investment consultant, currently Meketa Investment Group, Inc. (“Meketa”), have reviewed TFI’s recommendation and concur with the changes listed below, and as outlined in TFI’s “Asset Allocation Recommendation for 2024” and Meketa’s memo, both dated December 19, 2023.

- Elimination of real estate investment trusts (REITs) in the last three (3) stages of the glide path and rotation into core bonds for the Plan’s portfolios listed below:

ScholarShare 529 Active Enrollment Year Investment Portfolios	ScholarShare 529 Passive Enrollment Year Investment Portfolios
2026/2027 Enrollment Portfolio Active	2026/2027 Enrollment Portfolio Passive
2024/2025 Enrollment Portfolio Active	2024/2025 Enrollment Portfolio Passive
Enrollment Year Portfolio Active	Enrollment Year Portfolio Passive

- Elimination of inflation-linked bonds (TIPS) in the first seven (7) stages of the glidepath and split allocation between core bond and high yield bond for the Plan’s portfolios listed below:

ScholarShare 529 Active Enrollment Year Investment Portfolios	ScholarShare 529 Passive Enrollment Year Investment Portfolios
2040/2041 Enrollment Portfolio Active	2040/2041 Enrollment Portfolio Passive
2038/2039 Enrollment Portfolio Active	2038/2039 Enrollment Portfolio Passive
2036/2037 Enrollment Portfolio Active	2036/2037 Enrollment Portfolio Passive
2034/2035 Enrollment Portfolio Active	2034/2035 Enrollment Portfolio Passive
2032/2033 Enrollment Portfolio Active	2032/2033 Enrollment Portfolio Passive
2030/2031 Enrollment Portfolio Active	2030/2031 Enrollment Portfolio Passive
2028/2029 Enrollment Portfolio Active	2028/2029 Enrollment Portfolio Passive

NOW, THEREFORE, BE IT RESOLVED, that the Board hereby approves the asset allocation changes to the existing actively-managed and passive-managed enrollment year investment portfolios for the Plan and for the change to take place at the time as mutually agreed upon between SIB and TFI.

BE IT FURTHER RESOLVED, that this Resolution becomes effective upon its adoption by the Board.

Attest: _____
Chairperson

Date of Adoption: _____



Asset Allocation Recommendation for 2024

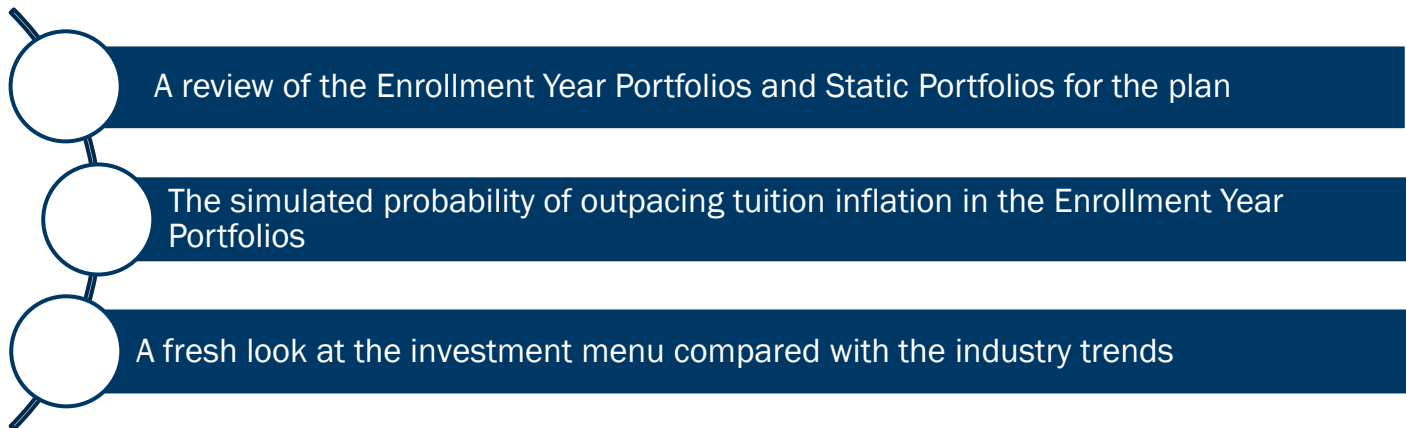
Prepared by TIAA-CREF Tuition
Financing, Inc.

December 19, 2023



Executive Summary

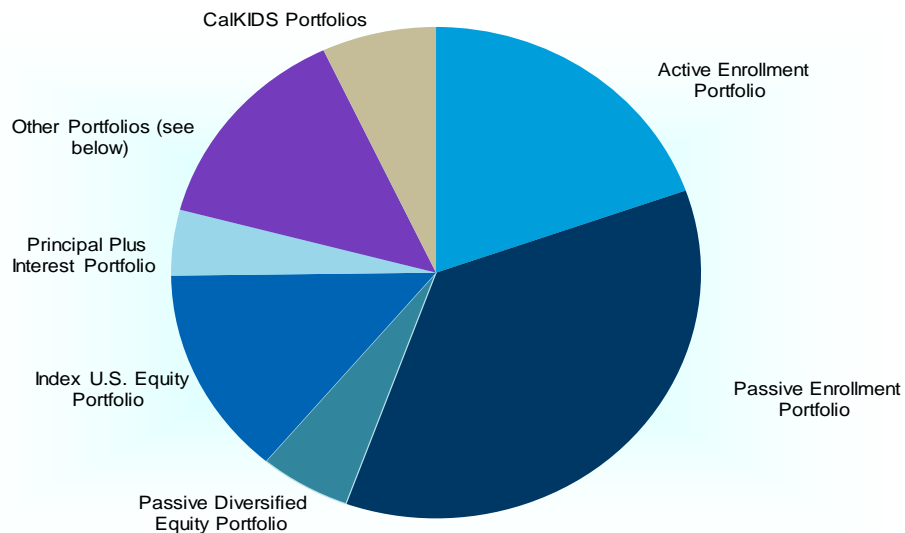
TFI has completed this year's asset allocation study to evaluate the overall investment strategy for ScholarShare with a focus on:



Based on this review, TFI recommends the following changes:

- Elimination of REITs in later stages (2026/2027, 2024/2025, Enrollment Year Portfolio) of glide path and rotation into Core Bonds
- Elimination of Inflation-Linked Bonds in earlier 7 stages of the glide path (2028/2029, 2030/2031, 2032/2033, 2034/2035, 2036/2037, 2038/2039, 2040/2041) and split allocation between Core Bond and High Yield Bond

Asset Overview by Portfolio as of Q3 2023 - Total Assets: \$13.3 Billion



Portfolio	% of Assets	\$ Millions	Portfolio	% of Assets	\$ Millions
Passive Enrollment Portfolio	35.89%	\$4,761	Passive Diversified Equity Portfolio	5.45%	\$723
Active Enrollment Portfolio	19.45%	\$2,580	Principal Plus Interest Portfolio	4.15%	\$550
Index U.S. Equity Portfolio	13.89%	\$1,842	Other Portfolios (see below)	13.79%	\$1,829

Other Portfolios

Active Diversified Equity Portfolio	3.18%	\$422	Index Bond Portfolio	0.73%	\$96
Active Growth Portfolio	2.76%	\$366	Active Conservative Portfolio	0.59%	\$78
Passive Growth Portfolio	2.30%	\$305	Active International Equity Portfolio	0.33%	\$43
Social Choice Equity Portfolio	1.93%	\$256	ESG Enrollment Portfolio	0.11%	\$15
Index International Equity Portfolio	1.11%	\$148	ESG Bond Portfolio	0.02%	\$3.0
Passive Conservative Portfolio	0.68%	\$90	ESG International Equity Portfolio	0.02%	\$2.4

CalKIDS / CSA Portfolios

CalKIDS*	7.38%	\$979	Local CSA Programs	0.03%	\$4.12
----------	-------	-------	--------------------	-------	--------

* CalKIDS AUM invested in ScholarShare are included in the total assets of \$13.3 billion. Does not include CalKIDS AUM held outside of ScholarShare of \$1.08 billion.

Capital Market Assumption Overview

- There were material changes to Capital Market Assumptions from 2023 to 2024
 - Expected Returns increased across all asset classes
 - Fixed Income had largest increases and became more attractive on a risk-adjusted basis
 - Expected Return for Core Fixed Income increased from 2.18% to 4.17% over the past year

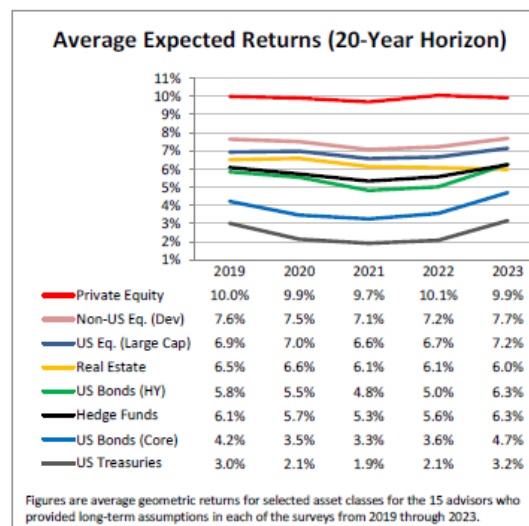
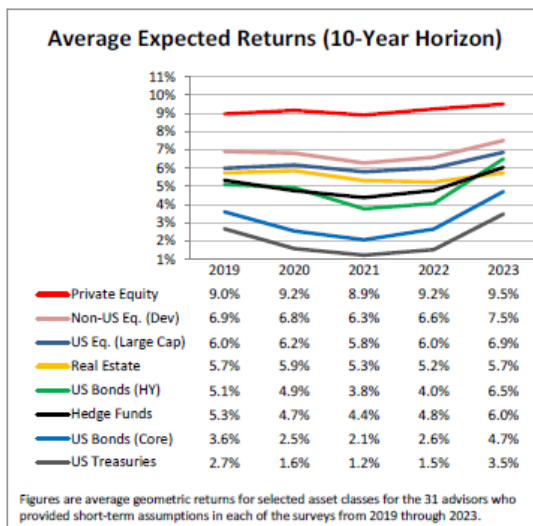
2024-2023 Asset Study Assumptions							
Variables	Benchmarks	2024		2023		Change in Capital Market Assumptions (source: Ibbotson)	
		Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)
U.S. Equity	Russell 3000 Index	7.92%	16.92%	5.97%	16.72%	1.95%	0.20%
Large Cap Growth Equity	Russell 1000 Growth Index	7.20%	18.84%	5.36%	18.26%	1.84%	0.58%
Large Cap Value Equity	Russell 1000 Value Index	7.61%	16.01%	6.45%	15.85%	1.16%	0.16%
Large Cap Equity	S&P 500 Index	7.40%	16.54%	5.82%	16.44%	1.58%	0.10%
Small Cap Equity	Russell 2000 Index	8.92%	22.66%	7.31%	22.51%	1.61%	0.15%
Developed International Equity	MSCI EAFE Index	8.33%	18.51%	6.69%	18.32%	1.64%	0.19%
Emerging Markets Equity	MSCI Emerging Markets Index	9.74%	21.37%	7.76%	21.41%	1.98%	-0.04%
Core Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	4.17%	4.29%	2.18%	5.39%	1.99%	-1.10%
Floating Rate Fixed Income	Credit Suisse Leveraged Loan Index	7.60%	6.37%	3.20%	6.23%	4.40%	0.14%
Emerging Markets Debt	JPM EMBI Global Diversified Index	7.17%	9.42%	5.87%	9.42%	1.30%	0.00%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	6.54%	9.29%	3.16%	9.20%	3.38%	0.09%
TIPS	Bloomberg Inflation-Linked U.S. TIPS Index	4.14%	6.78%	1.80%	6.72%	2.34%	0.06%
Intermediate-Term TIPS	Bloomberg Inflation-Linked 1-10 Year U.S. TIPS Index	4.12%	5.31%	2.09%	5.27%	2.03%	0.04%
Short-Term TIPS	Bloomberg U.S. 0-5 Year TIPS Index	4.00%	3.81%	2.01%	3.54%	1.99%	0.27%
Short-Term Fixed Income	Bloomberg U.S. 1-3 Year Government/Credit Bond Index	3.96%	3.31%	2.15%	3.24%	1.81%	0.07%
Real Estate Securities	FTSE NAREIT All Equity REITs Index	7.14%	18.83%	4.88%	18.49%	2.26%	0.34%
CPI	Consumer Price Index - All Urban Consumers	2.40%	2.46%	2.50%	2.42%	-0.10%	0.04%
3 Month T-Bill	BofAML US Treasury Bill 3 Month Index	3.21%	1.74%	1.16%	1.74%	2.05%	0.00%
TIAA Life Funding Agreement	Funding Agreement	3.21%	2.31%	1.97%	2.16%	1.24%	0.15%
Additional Variables (sources: The College Board and TIAA-CREF Tuition Financing, Inc.)							
	National Private Tuition Inflation	4.72%	3.03%	3.86%	3.10%	0.86%	-0.07%
	National Public Tuition Inflation	5.47%	3.31%	4.49%	3.45%	0.98%	-0.14%

Comparison includes 2024 assumptions minus 2023 assumptions

Source: Ibbotson

Capital Market Assumption Overview

- Horizon Actuarial Services produces an annual Survey of Capital Market Assumptions
- A few notable trends emerged over the past year:
 - Expected returns declined for most asset classes from 2016 through 2022
 - Most notably in fixed income asset classes as the low interest rate environment persisted
 - Increases in interest rates and lower equity valuations in 2022 drove increases in expectations across both equity and fixed income asset classes
 - US Treasuries, US Core Bonds and High Yield Bonds increased the most
 - These were the same asset classes that experienced the greatest decline from 2019 to 2021

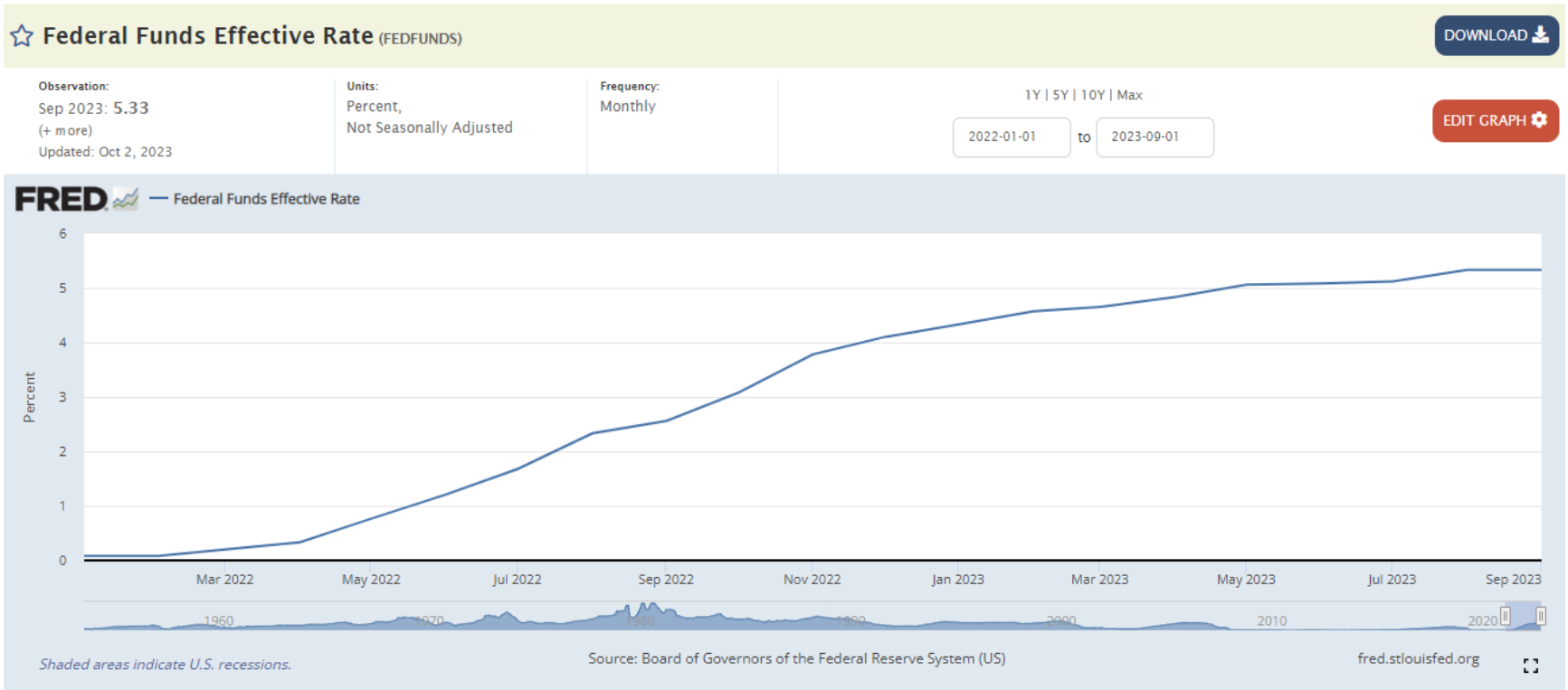


Source: Horizon Actuarial Services

Market Environment

Market Environment

- Interest Rates have increased 500bps since January 2022



Market Environment

- Real Interest Rates are at their highest point since the Great Financial Crisis



Market Environment

- The 2s10s spread has been deeply negative for over 12 months



Market Environment

- The Equity Risk Premium for domestic equities is at its lowest point since 2005



Source: The Daily Shot

Portfolio Implications

Asset Allocation Implications - Passive

- As a result of the material change in the market environment, TFI is recommending the following changes:
 - Elimination of REITs in later stages (2026/2027, 2024/2025, Enrollment Year Portfolio) of glide path and a rotation into Core Bonds
 - Elimination of Inflation-Linked Bonds in earlier 7 stages of the glide path (2028/2029, 2030/2031, 2032/2033, 2034/2035, 2036/2037, 2038/2039, 2040/2041) and split allocation between Core Bond and High Yield Bond

Enrollment Year	TIAA-CREF Equity Index Fund	TIAA-CREF International Equity Index Fund	TIAA-CREF Emerging Markets Equity Index Fund	Vanguard Real Estate Index Fund	TIAA-CREF Bond Index Fund	Vanguard Shrt-Term Infl-Prot Sec Index Fund	Vanguard High-Yield Corporate Fund	TIAA-CREF Life Funding Agreement
Tickers	TIEIX	TCIEX	TEQLX	VGSNX	TBIIX	VTSPX	VWEAX	
2040/2041 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	2.00%	-4.00%	2.00%	0.00%
2038/2039 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	2.00%	-4.00%	2.00%	0.00%
2036/2037 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	2.40%	-4.80%	2.40%	0.00%
2034/2035 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	2.80%	-5.60%	2.80%	0.00%
2032/2033 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	3.20%	-6.40%	3.20%	0.00%
2030/2031 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	4.00%	-8.00%	4.00%	0.00%
2028/2029 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	0.00%	5.20%	-10.40%	5.20%	0.00%
2026/2027 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	-2.50%	2.50%	0.00%	0.00%	0.00%
2024/2025 Enrollment Portfolio Passive	0.00%	0.00%	0.00%	-1.80%	1.80%	0.00%	0.00%	0.00%
Enrollment Year Portfolio Passive	0.00%	0.00%	0.00%	-1.10%	1.10%	0.00%	0.00%	0.00%

Asset Allocation Implications - Active

- As a result of the material change in the market environment, TFI is recommending the following changes:
 - Elimination of REITs in later stages (2026/2027, 2024/2025, Enrollment Year Portfolio) of glide path and a rotation into Core Bonds
 - Elimination of Inflation-Linked Bonds in earlier 7 stages of the glide path (2028/2029, 2030/2031, 2032/2033, 2034/2035, 2036/2037, 2038/2039, 2040/2041) and split allocation between Core Bond and High Yield Bond

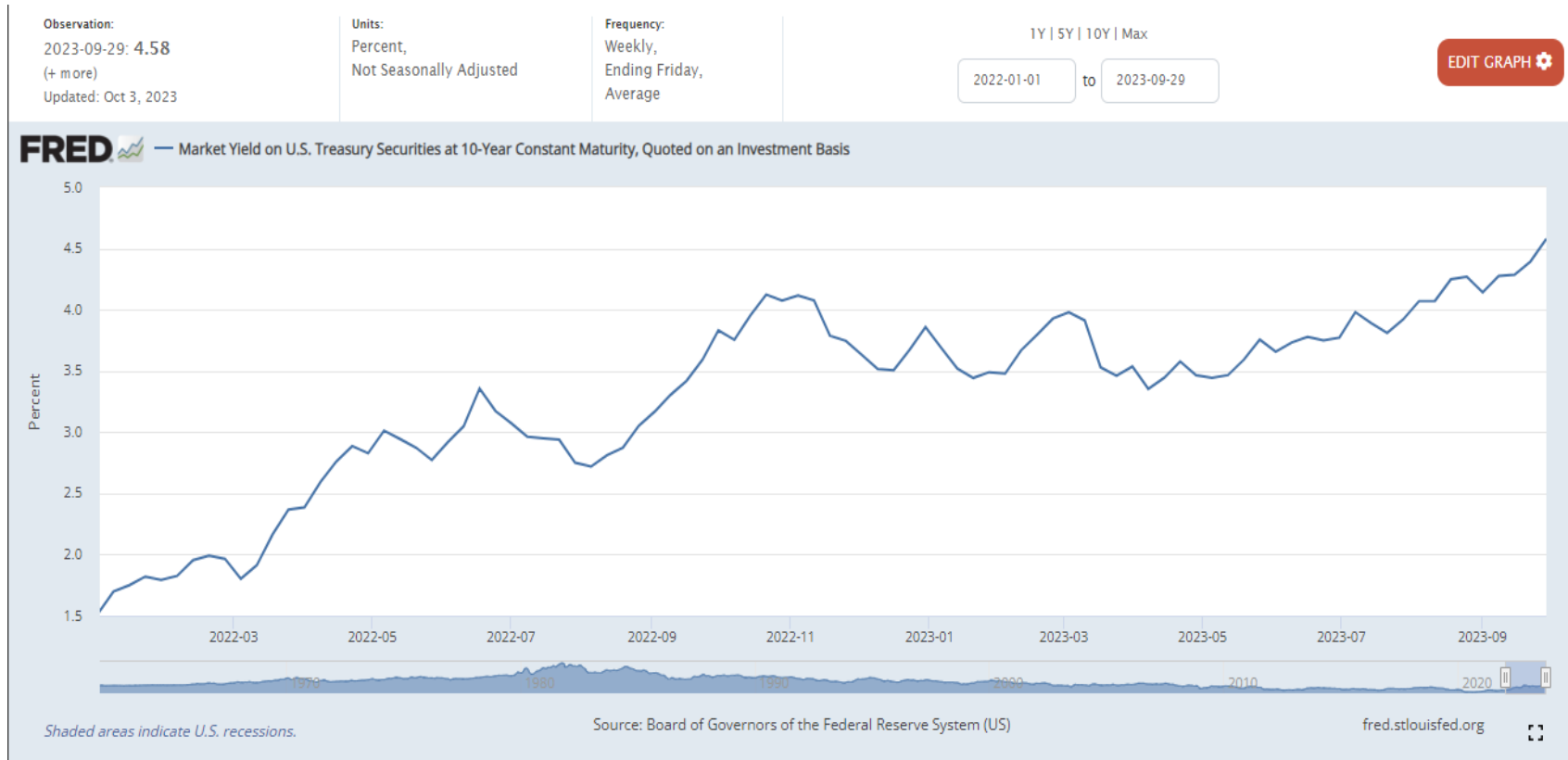
	T. Rowe Price Large Cap Growth Fund	T. Rowe Price Large Cap Value Fund	TIAA-CREF Quant Small-Cap Equity	TIAA-CREF S&P 500 Index Fund	DFA Large Cap Intl Portfolio	DFA Emerging Markets Core Equity I Portfolio	Vanguard Real Estate Index Fund	MetWest Total Return Bond Fund	TIAA-CREF Bond Index Fund	PIMCO Real Return Fund	PIMCO Income Fund	T. Rowe Price Floating Rate Fund	TIAA-CREF Life Funding Agreement
2040/2041 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%	-4.00%	2.00%	0.00%	0.00%
2038/2039 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.00%	-4.00%	2.00%	0.00%	0.00%
2036/2037 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.40%	-4.80%	2.40%	0.00%	0.00%
2034/2035 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.80%	-5.60%	2.80%	0.00%	0.00%
2032/2033 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	3.20%	-6.40%	3.20%	0.00%	0.00%
2030/2031 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.00%	-8.00%	4.00%	0.00%	0.00%
2028/2029 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.20%	-10.40%	5.20%	0.00%	0.00%
2026/2027 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-2.50%	0.00%	0.00%	0.00%	2.50%	0.00%	0.00%
2024/2025 Enrollment Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-1.80%	0.00%	0.00%	0.00%	1.80%	0.00%	0.00%
Enrollment Year Portfolio Active	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-1.10%	0.00%	0.00%	0.00%	1.10%	0.00%	0.00%

Asset Allocation Implications

- We are recommending these changes in response to significant structural shifts seen in the market over a short period:
 - Bonds are now providing materially higher yields compared to the previous market environment
 - Long-Term Capital Market Assumptions for Core Bonds and High Yield Bonds doubled from 2023 to 2024
 - Expected volatility for Core Bonds declined by 20% over 12 months

A) Rotation into Core Bonds in Later Stages of Glide Path

- Government bond yields have more than doubled since January 2022



A) Rotation into Core Bonds in Later Stages of Glide Path

- Corporate bond yields have doubled since January 2022



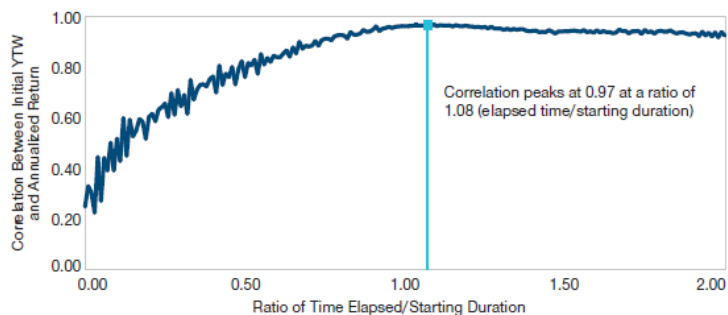
Source: Koyfin

A) Rotation into Core Bonds in Later Stages of Glide Path

- Starting yield on a bond index is a strong predictor of expected return
- Correlation is strong for both the Bloomberg US Aggregate Bond Index (0.97) and US High Yield Index (0.79) if investment is held for a period that is close to the duration of the underlying index

FIGURE 1: Correlation Between Initial YTW and Subsequent Total Returns—U.S. Aggregate

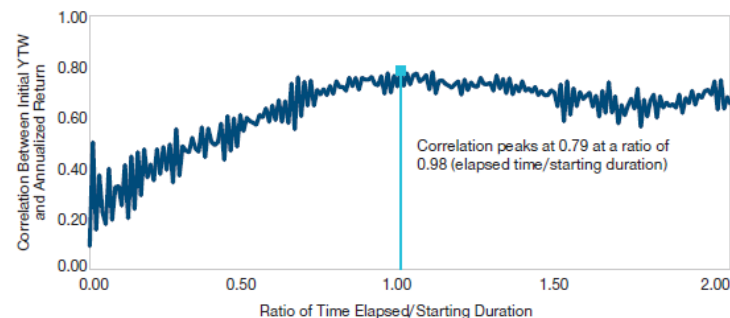
January 1, 1976, Through March 30, 2018



Source for underlying data: Barclays POINT.

FIGURE 4: Correlation Between Initial YTW and Subsequent Total Returns—U.S. High Yield

January 1, 1987, Through March 30, 2018

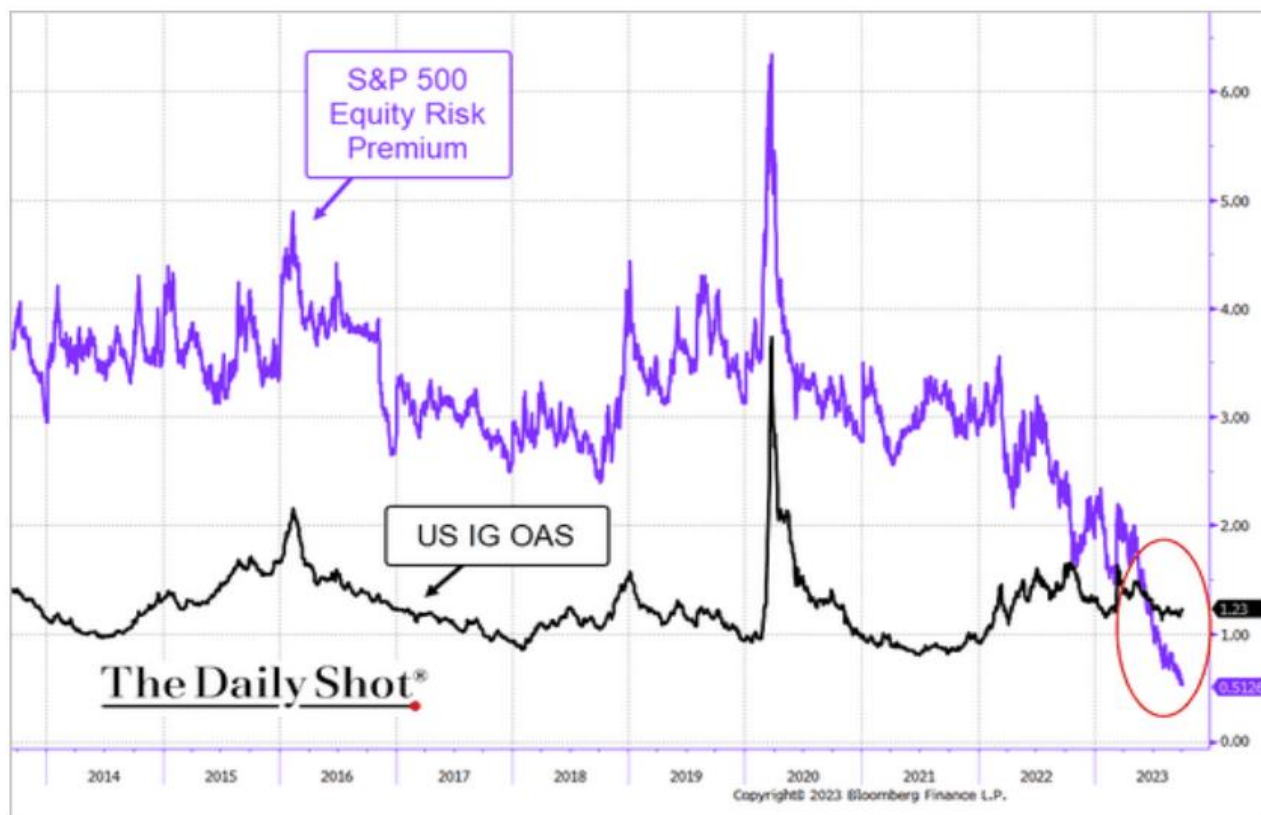


Source for underlying data: Barclays POINT.

Source: T. Rowe Price, Barclays

A) Rotation into Core Bonds in Later Stages of Glide Path

- The Equity Risk Premium for domestic equities (S&P 500) is at its lowest point over the past decade
- The Equity Risk Premium is now below spreads on US Investment Grade Bonds



Source: @TheTerminal, Bloomberg Finance L.P.

Source: The Daily Shot, Bloomberg, The Terminal

A) Rotation into Core Bonds in Later Stages of Glide Path

- Capital Market Assumptions for Core Bonds and High Yield Bonds doubled from 2023 to 2024

		2024 Asset Study Assumptions					
		2024		2023		Difference	
Variables	Benchmarks	Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)
Core Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	4.17%	4.29%	2.18%	5.39%	1.99%	-1.10%
Floating Rate Fixed Income	Credit Suisse Leveraged Loan Index	7.60%	6.37%	3.20%	6.23%	4.40%	0.14%
Emerging Markets Debt	JPM EMBI Global Diversified Index	7.17%	9.42%	5.87%	9.42%	1.30%	0.00%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	6.54%	9.29%	3.16%	9.20%	3.38%	0.09%

Source: Ibbotson

A) Elimination of REITs in Later Stages of Glide Path

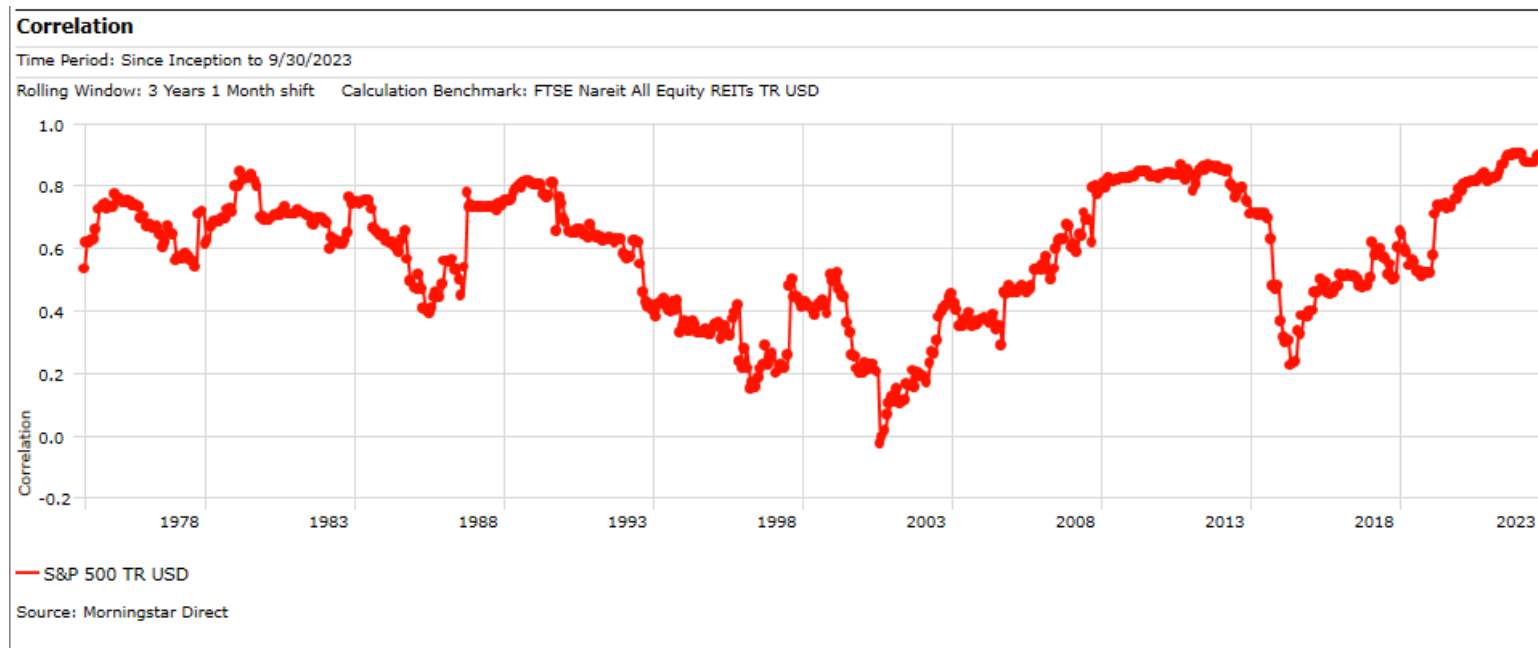
- The increase in Core Bonds will be sourced from a reduction in equities
- We are choosing to reduce REIT exposure:
 - Public REITs do not provide as much diversification benefit as an investment in Direct Real Estate
 - Public REITs have a correlation of 0.15 to Direct Real Estate and 0.66 to Domestic Large Cap Equities

12/31/2022 PSD	Large Cap Stocks	REITs	Global REITs	International REITs	Direct Real Estate
Large Cap Stocks	1.00	0.66	0.64	0.66	0.15
REITs	0.66	1.00	0.47	0.51	0.15
Global REITs	0.64	0.47	1.00	0.58	0.11
International REITs	0.66	0.51	0.58	1.00	0.10
Direct Real Estate	0.15	0.15	0.11	0.10	1.00

Source: Ibbotson

A) Elimination of REITs in Later Stages of Glide Path

- Correlation between Public REITs and S&P 500 has fluctuated over the past four decades but historically becomes elevated during periods of market stress



A) Elimination of REITs in Later Stages of Glide Path

- Later stages of Glide Path should be focused on capital preservation and downside protection
- Bonds now provide attractive risk-adjusted returns while providing better downside protection; REITs do not

Risk							
Time Period: 10/1/2013 to 9/30/2023							
	Return	Std Dev	Worst Quarter	Max Drawdown	Average Drawdown	Number of Observations	
FTSE Nareit All Equity REITs TR USD	6.17	16.77	-23.44	-29.16	-12.05	120.00	
Bloomberg US Agg Bond TR USD	1.13	4.38	-5.93	-17.18	-3.35	120.00	

Source: Morningstar Direct

B) Elimination of Inflation-Linked Bonds in First 7 Stages of Glide Path

- Inflation-Linked Bonds account for relatively small portion of asset allocation in early stages of glide paths
- Core Fixed Income and High Yield Bonds have positive correlations with Inflation-Linked Securities

12/31/2022 PSD	High-Yield Bonds	Bonds
TIPS	0.20	0.64

2024 Asset Study Assumptions

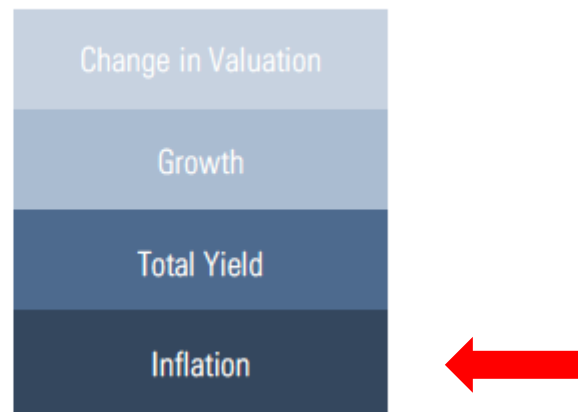
Variables	Benchmarks	2024		2023		Difference	
		Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)	Returns (Long-Term Average)	Volatility (Standard Deviation)
Core Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	4.17%	4.29%	2.18%	5.39%	1.99%	-1.10%
Floating Rate Fixed Income	Credit Suisse Leveraged Loan Index	7.60%	6.37%	3.20%	6.23%	4.40%	0.14%
Emerging Markets Debt	JPM EMBI Global Diversified Index	7.17%	9.42%	5.87%	9.42%	1.30%	0.00%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	6.54%	9.29%	3.16%	9.20%	3.38%	0.09%
TIPS	Bloomberg Inflation-Linked U.S. TIPS Index	4.14%	6.78%	1.80%	6.72%	2.34%	0.06%
Intermediate-Term TIPS	Bloomberg Inflation-Linked 1-10 Year U.S. TIPS Index	4.12%	5.31%	2.09%	5.27%	2.03%	0.04%

Source: Ibbotson

B) Elimination of Inflation-Linked Bonds in First 7 Stages of Glide Path

- Equities account for most of the asset allocation across the first 7 stages of the glide path (ranging from 50-80%)
- Equities, not fixed income, will be responsible for most of the interest rate sensitivity during early stages of the glide path
- Equities do provide a bit of an inflation hedge: inflation is a component of the forecasted equity return in our Capital Market Assumptions

Figure 3: Equity Return Building Blocks



Source: Ibbotson

B) Elimination of Inflation-Linked Bonds in First 7 Stages of Glide Path

TIPS are impacted by both inflation and changes in interest rates

As an inflation-linked, fixed income security, TIPS are:

- Hurt by increasing interest rates (rising rates cause bond prices to fall), and
- Helped by unexpected inflation (increasing inflation makes TIPS more valuable)

Factors affecting TIPS returns

		Interest rates	
		Falling	Rising
Unexpected inflation	High	Best	Uncertain
	Low	Uncertain	Worst

Best TIPS environment

- Falling real rates and rising unexpected inflation—a period of stagflation like the 70s

Most TIPS environments

- Depend on interplay of real rates and inflation expectations—one can offset the other

FOR FINANCIAL PROFESSIONAL USE ONLY. NOT FOR PUBLIC DISTRIBUTION AND NOT FOR USE BY RETAIL INVESTORS.

nuveen

TIAA-CREF Inflation-Linked Bond Fund

Source: Nuveen



FOR INSTITUTIONAL CLIENT USE ONLY, NOT FOR USE WITH OR DISTRIBUTION TO THE PUBLIC

B) Elimination of Inflation-Linked Bonds in First 7 Stages of Glide Path

Shorter duration TIPS portfolio may better match the time horizon of education-oriented portfolios

Protect against inflation during the most critical years

- Many education funding portfolios have a high equity/low fixed income allocation in early years, but move toward a higher fixed income allocation as students get closer to starting college
- A portfolio that invests in only 1-10 year maturity TIPS better matches the typical investment time horizon
- It also normally has a duration of around 5 years
- This helps to hedge against unanticipated inflation increases during the more important payout years, when impact of inflation on returns can be more damaging

Horizon matched inflation protection



Source: Nuveen.

FOR FINANCIAL PROFESSIONAL USE ONLY. NOT FOR PUBLIC DISTRIBUTION AND NOT FOR USE BY RETAIL INVESTORS.

Source: Nuveen

New Recommended Asset Allocation - Passive

Enrollment Year	TIAA-CREF Equity Index Fund	TIAA-CREF International Equity Index Fund	TIAA-CREF Emerging Markets Equity Index Fund	Vanguard Real Estate Index Fund	TIAA-CREF Bond Index Fund	Vanguard Shrt-Term Infl-Prot Sec Index Fund	Vanguard High-Yield Corporate Fund	TIAA-CREF Life Funding Agreement
Tickers	TIEIX	TCIEX	TEQLX	VGSNX	TBIIX	VTSPX	VWEAX	
2040/2041 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	16.00%	0.00%	4.00%	0.00%
2038/2039 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	16.00%	0.00%	4.00%	0.00%
2036/2037 Enrollment Portfolio Passive	47.90%	18.20%	4.60%	5.30%	19.20%	0.00%	4.80%	0.00%
2034/2035 Enrollment Portfolio Passive	45.40%	17.30%	4.30%	5.00%	22.40%	0.00%	5.60%	0.00%
2032/2033 Enrollment Portfolio Passive	42.80%	16.30%	4.10%	4.80%	25.60%	0.00%	6.40%	0.00%
2030/2031 Enrollment Portfolio Passive	37.80%	14.40%	3.60%	4.20%	32.00%	0.00%	8.00%	0.00%
2028/2029 Enrollment Portfolio Passive	30.20%	11.50%	2.90%	3.40%	41.60%	0.00%	10.40%	0.00%
2026/2027 Enrollment Portfolio Passive	22.70%	8.60%	2.20%	0.00%	40.30%	10.80%	5.40%	10.00%
2024/2025 Enrollment Portfolio Passive	15.70%	6.00%	1.50%	0.00%	29.80%	8.00%	4.00%	35.00%
Enrollment Year Portfolio Passive	9.40%	3.60%	0.90%	0.00%	25.60%	7.00%	3.50%	50.00%

Underlying Fund Manager Fees - Passive

Enrollment Year	Fees in bps (Current)	Fees in bps (Proposed)	Difference (in bps)	Difference (in %)
2040/2041 Enrollment Portfolio Passive	6.4	6.6	0.2	0.02%
2038/2039 Enrollment Portfolio Passive	6.4	6.6	0.2	0.02%
2036/2037 Enrollment Portfolio Passive	6.4	6.7	0.3	0.03%
2034/2035 Enrollment Portfolio Passive	6.4	6.7	0.3	0.03%
2032/2033 Enrollment Portfolio Passive	6.5	6.8	0.4	0.04%
2030/2031 Enrollment Portfolio Passive	6.5	7.0	0.5	0.05%
2028/2029 Enrollment Portfolio Passive	6.6	7.2	0.6	0.06%
2026/2027 Enrollment Portfolio Passive	6.0	5.9	-0.1	-0.01%
2024/2025 Enrollment Portfolio Passive	4.4	4.3	-0.1	-0.01%
Enrollment Year Portfolio Passive	3.4	3.3	0.0	0.00%

New Recommended Asset Allocation - Active

	T. Rowe Price Large Cap Growth Fund	T. Rowe Price Large Cap Value Fund	TIAA-CREF Quant Small-Cap Equity	TIAA-CREF S&P 500 Index Fund	DFA Large Cap Intl Portfolio	DFA Emerging Markets Core Equity I Portfolio	Vanguard Real Estate Index Fund	MetWest Total Return Bond Fund	TIAA-CREF Bond Index Fund	PIMCO Real Return Fund	PIMCO Income Fund	T. Rowe Price Floating Rate Fund	TIAA-CREF Life Funding Agreement
2040/2041 Enrollment Portfolio Active	14.80%	14.80%	5.00%	15.80%	19.20%	4.80%	5.60%	7.00%	5.00%	0.00%	6.00%	2.00%	0.00%
2038/2039 Enrollment Portfolio Active	14.80%	14.80%	5.00%	15.80%	19.20%	4.80%	5.60%	7.00%	5.00%	0.00%	6.00%	2.00%	0.00%
2036/2037 Enrollment Portfolio Active	14.00%	14.00%	4.80%	15.20%	18.10%	4.60%	5.30%	8.40%	6.00%	0.00%	7.20%	2.40%	0.00%
2034/2035 Enrollment Portfolio Active	13.30%	13.30%	4.50%	14.20%	17.30%	4.30%	5.10%	9.80%	7.00%	0.00%	8.40%	2.80%	0.00%
2032/2033 Enrollment Portfolio Active	12.50%	12.50%	4.30%	13.60%	16.30%	4.00%	4.80%	11.20%	8.00%	0.00%	9.60%	3.20%	0.00%
2030/2031 Enrollment Portfolio Active	11.10%	11.10%	3.80%	11.80%	14.40%	3.60%	4.20%	14.00%	10.00%	0.00%	12.00%	4.00%	0.00%
2028/2029 Enrollment Portfolio Active	8.80%	8.80%	3.00%	9.60%	11.50%	2.90%	3.40%	18.20%	13.00%	0.00%	15.60%	5.20%	0.00%
2026/2027 Enrollment Portfolio Active	6.60%	6.60%	2.30%	7.20%	8.60%	2.20%	0.00%	18.90%	8.10%	10.80%	13.30%	5.40%	10.00%
2024/2025 Enrollment Portfolio Active	4.60%	4.60%	1.50%	5.00%	6.00%	1.50%	0.00%	14.00%	6.00%	8.00%	9.80%	4.00%	35.00%
Enrollment Year Portfolio Active	2.70%	2.70%	1.00%	3.00%	3.60%	0.90%	0.00%	12.25%	5.25%	7.00%	8.10%	3.50%	50.00%

Underlying Fund Manager Fees - Active

Enrollment Year	Fees in bps (Current)	Fees in bps (Proposed)	Difference (in bps)	Difference (in %)
2040/2041 Enrollment Portfolio Active	34.2	32.9	-1.3	-0.13%
2038/2039 Enrollment Portfolio Active	34.2	32.9	-1.3	-0.13%
2036/2037 Enrollment Portfolio Active	34.7	33.1	-1.6	-0.16%
2034/2035 Enrollment Portfolio Active	35.3	33.5	-1.8	-0.18%
2032/2033 Enrollment Portfolio Active	35.8	33.7	-2.1	-0.21%
2030/2031 Enrollment Portfolio Active	37.0	34.4	-2.6	-0.26%
2028/2029 Enrollment Portfolio Active	38.6	35.2	-3.4	-0.34%
2026/2027 Enrollment Portfolio Active	35.8	37.1	1.3	0.13%
2024/2025 Enrollment Portfolio Active	26.0	26.9	0.9	0.09%
Enrollment Year Portfolio Active	20.6	21.1	0.6	0.06%

Conclusions

Market Environment...

- Capital Market Assumptions have materially changed from 2023 to 2024
- We are recommending asset allocation changes in response to significant structural shifts seen in the market over a short period

Portfolio Implications...

- Elimination of REITs in later stages of glide path and rotation into Core Bonds
- Elimination of Inflation-Linked Bonds in early 7 stages of glide path and split allocation between Core Bond and High Yield Bond

Appendix 1: TFI Asset Allocation Process

The Importance of Diversification

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Highest	19.7 Real Estate	33.6 US Stocks	28.0 Real Estate	2.8 Real Estate	14.8 HY Bond	37.3 EM Stocks	1.6 ST Bond	31.0 US Stocks	20.9 US Stocks	41.3 Real Estate	1.5 MM
	18.2 EM Stocks	22.8 Intl Stocks	12.6 US Stocks	0.7 ST Bond	12.7 US Stocks	25.0 Intl Stocks	1.4 MM	28.7 Real Estate	18.3 EM Stocks	25.7 US Stocks	-0.6 Bank Loan
	17.3 Intl Stocks	6.3 HY Bond	6.0 Bond	0.6 Bond	11.2 EM Stocks	21.1 US Stocks	0.6 Bank Loan	22.0 Intl Stocks	10.1 Global Bond	11.3 Intl Stocks	-3.7 ST Bond
	16.4 US Stocks	5.4 Bank Loan	3.6 TIPS	0.5 US Stocks	10.4 Bank Loan	8.7 Real Estate	0.0 Bond	18.4 EM Stocks	8.4 TIPS	5.7 TIPS	-7.3 TIPS
	14.6 HY Bond	2.9 Real Estate	3.5 HY Bond	0.1 Bank Loan	8.6 Real Estate	7.5 Global Bond	-0.8 Global Bond	15.1 HY Bond	7.8 Intl Stocks	5.3 Bank Loan	-10.6 HY Bond
	9.8 Bank Loan	0.6 ST Bond	1.8 Bank Loan	0.0 MM	4.7 TIPS	7.0 HY Bond	-1.3 TIPS	8.7 Bond	7.5 Bond	4.6 HY Bond	-11.2 Global Bond
	7.0 TIPS	0.0 MM	0.8 ST Bond	-0.8 Intl Stocks	2.7 Bond	4.3 Bank Loan	-2.0 HY Bond	8.7 Bank Loan	6.3 HY Bond	0.0 MM	-13.0 Bond
	4.2 Bond	-2.0 Bond	0.0 MM	-1.4 TIPS	1.6 Global Bond	3.5 Bond	-4.0 Real Estate	6.9 TIPS	3.5 Bank Loan	-0.5 ST Bond	-14.5 Intl Stocks
	1.6 Global Bond	-2.6 EM Stocks	-0.5 Global Bond	-2.8 HY Bond	1.3 ST Bond	3.0 TIPS	-5.2 US Stocks	5.9 Global Bond	3.3 ST Bond	-1.4 Global Bond	-19.2 US Stocks
	1.3 ST Bond	-4.0 Global Bond	-2.2 EM Stocks	-3.6 Global Bond	1.0 Intl Stocks	0.8 ST Bond	-13.8 Intl Stocks	4.0 ST Bond	0.7 MM	-1.5 Bond	-20.9 EM Stocks
Lowest	0.0 MM	-8.6 TIPS	-4.9 Intl Stocks	-14.9 EM Stocks	0.1 MM	0.5 MM	-14.6 EM Stocks	1.8 MM	-5.1 Real Estate	-2.5 EM Stocks	-25.0 Real Estate

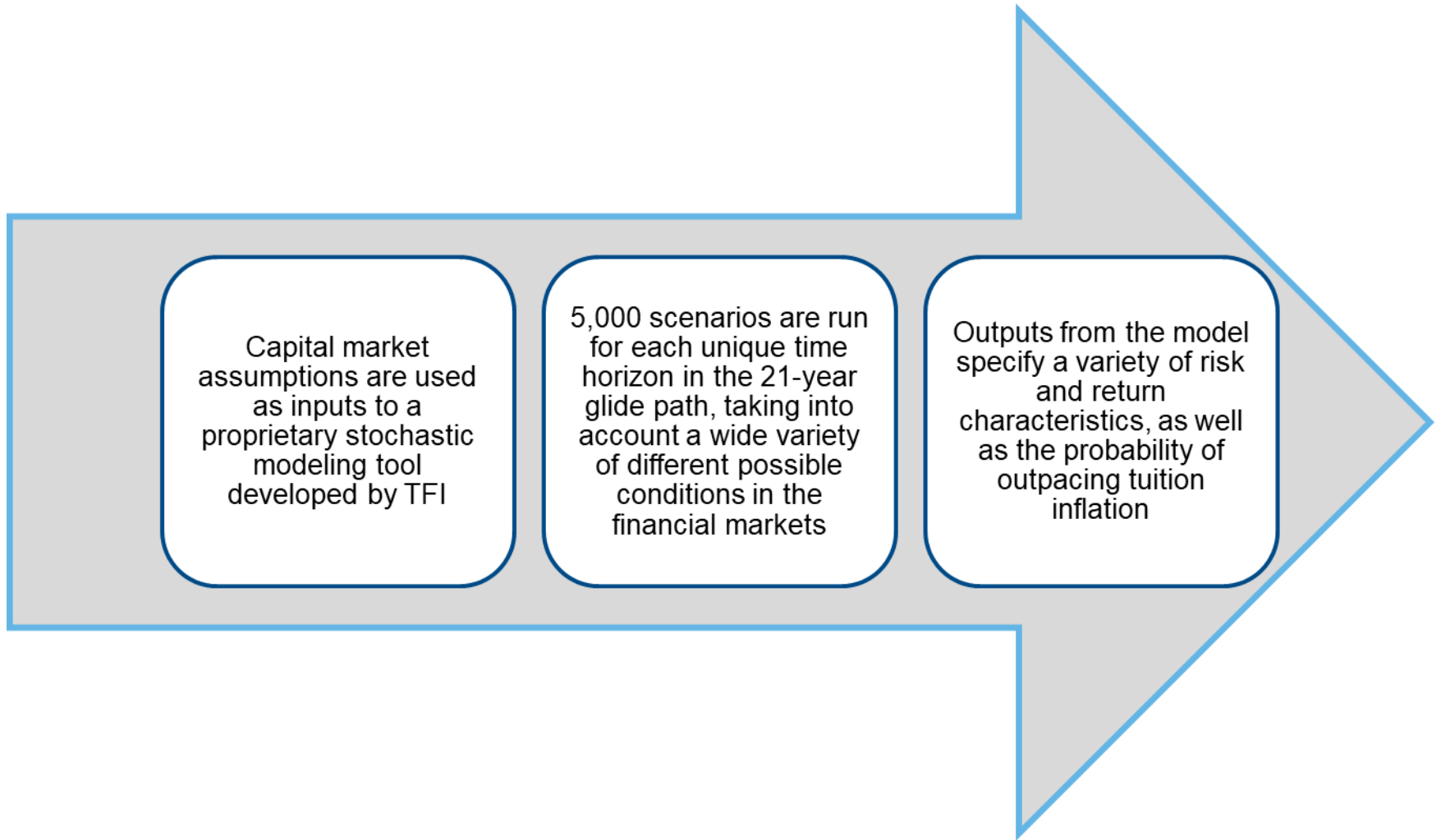
The Importance of Diversification-Notes

Bond	uses the Bloomberg Barclays US Aggregate Bond Index, which measures the performance of the U.S. investment-grade, fixed-rate bond market, including government and credit securities, agency mortgage pass through securities, asset-backed securities and commercial mortgage-backed securities.
TIPS	uses the Bloomberg Barclays US TIPS Index, which measures the performance of fixed-income securities with fixed-rate coupon payments that adjust for inflation as measured by the Consumer Priced Index for All Urban Consumers.
HY Bond	uses the ICE BofAML US HY Cash Pay BB-B Constrained Index, which measures the performance of securities that pay interest in cash and have a credit rating of BB or B.
Real Estate	uses the FTSE NAREIT All Equity REITs Index, which is an unmanaged, market capitalization weighted index of all publicly-traded REITs that invest predominantly in the equity ownership of real estate. The index is designed to reflect the performance of all publicly-traded equity REITs as whole.
Intl Stocks	uses the MSCI EAFE Index, which is a free-float-adjusted market capitalization index designed to measure developed market equity performance, excluding the United States and Canada.
EM Stocks	uses the MSCI Emerging Markets Index, which tracks the performance of the leading stocks in 23 MSCI emerging countries in the following areas: Europe, Asia, Africa, Latin America and the Middle East.
US Stocks	uses Russell 3000 Index, which measures the performance of 3,000 of the largest publicly traded U.S. companies, based on market capitalization, and it measures the performance of about 98% of the total market capitalization of the publicly traded U.S. equity market.
Bank Loan	uses the S&P/LSTA Performing Loan Index, which is a subset of the S&P/LSTA Leveraged Loan Index, and comprises non-investment-grade and non-rated loans. Tracking only performing loans, unlike its parent index, it removes defaulted issues at the price they reach directly following the default.
Global Bond	uses the Citigroup World Government Bond Index, which comprises sovereign debt from over 20 countries, denominated in a variety of currencies.
ST Bond	uses the Bloomberg Barclays US Govt/Credit 1-3 Yr Index, which measures all medium and larger issues of U.S. government, investment-grade corporate, and investment-grade international dollar-denominated bonds that have maturities of between 1 and 3 years and are publicly issued.
MM	uses the iMoneyNet Fund Averages - All Government, which is the average of all major government money market mutual fund yields published weekly for 7- and 30-day simple and compound yields.

Introduction to Monte Carlo Analysis

- The following asset allocation study uses the most recent capital market assumptions to evaluate prospective outcomes for the glide path models
- This year, we modeled the Enrollment Year Investment Portfolios using the appropriate asset allocations for each year along the glide path
- The Enrollment Year Investment Portfolios seek to achieve a reasonable rate of expected return and high probability of outperforming tuition inflation while minimizing the potential shortfalls between expected returns and tuition inflation over the expected investment horizons

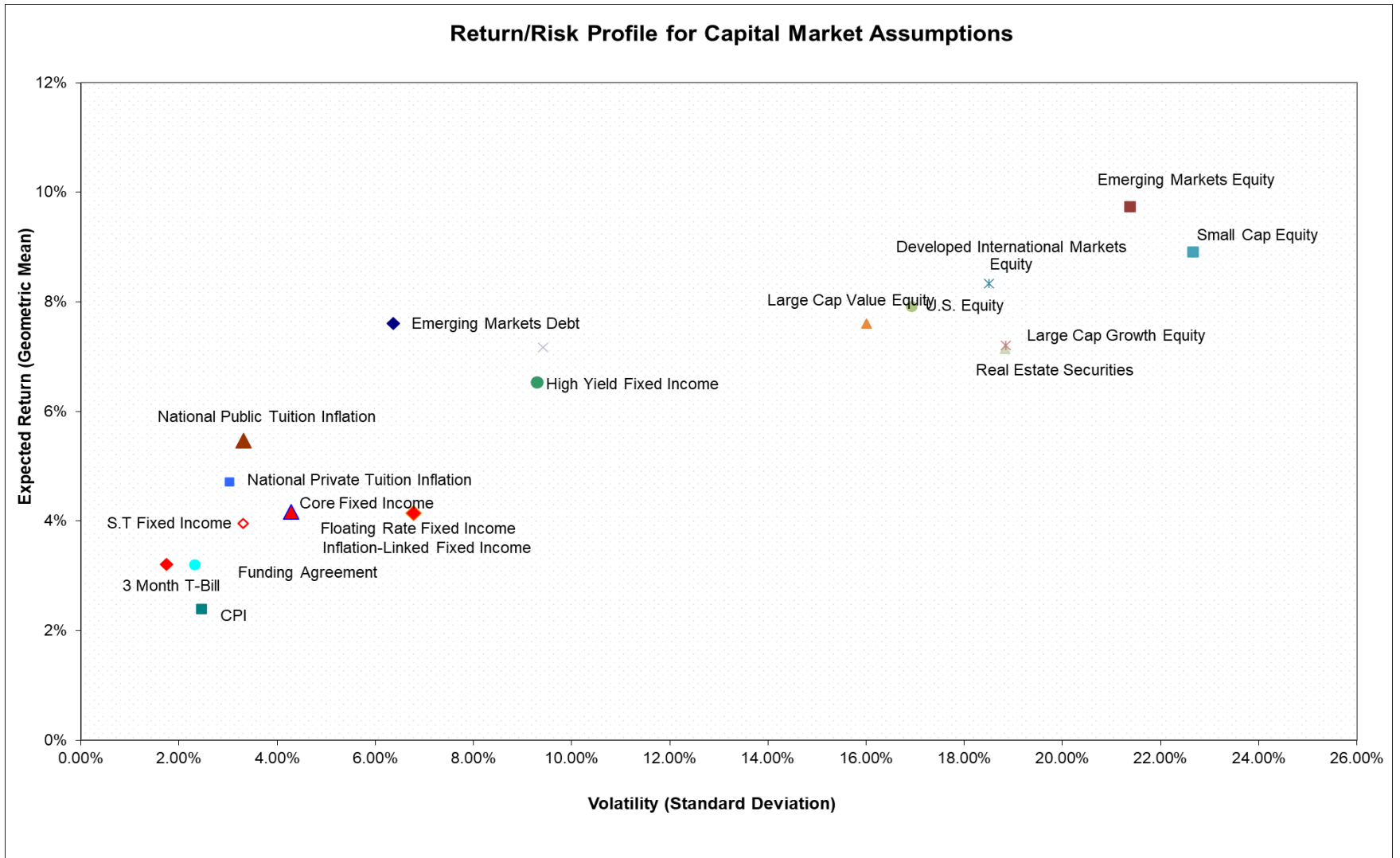
Glide Path Simulation Process



Asset Allocation Assumptions

Variables	Benchmarks	Returns (Long-Term Average)	Volatility (Standard Deviation)
U.S. Equity	Russell 3000 Index	7.92%	16.92%
Large Cap Growth Equity	Russell 1000 Growth Index	7.20%	18.84%
Large Cap Value Equity	Russell 1000 Value Index	7.61%	16.01%
Large Cap Equity	S&P 500 Index	7.40%	16.54%
Small Cap Equity	Russell 2000 Index	8.92%	22.66%
Developed International Equity	MSCI EAFE Index	8.33%	18.51%
Emerging Markets Equity	MSCI Emerging Markets Index	9.74%	21.37%
Core Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	4.17%	4.29%
Floating Rate Fixed Income	S&P/LSTA Performing Loan Index	7.60%	6.37%
Emerging Markets Debt	JPM EMBI Global Diversified Index	7.17%	9.42%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	6.54%	9.29%
TIPS	Bloomberg Inflation-Linked U.S. TIPS Index	4.14%	6.78%
Intermediate-Term TIPS	Bloomberg Inflation-Linked 1-10 Year U.S. TIPS Index	4.12%	5.31%
Short-Term TIPS	Bloomberg U.S. 0-5 Year TIPS Index	4.00%	3.81%
Short-Term Fixed Income	Bloomberg U.S. 1-3 Year Government/Credit Bond Index	3.96%	3.31%
Real Estate Securities	FTSE NAREIT All Equity REITs Index	7.14%	18.83%
CPI	Consumer Price Index - All Urban Consumers	2.40%	2.46%
3 Month T-Bill	BofAML US Treasury Bill 3 Month Index	3.21%	1.74%
TIAA Life Funding Agreement	Funding Agreement	3.21%	2.31%
Additional Variables (sources: The College Board and TIAA-CREF Tuition Financing, Inc.)			
	National Private Tuition Inflation	4.72%	3.03%
	National Public Tuition Inflation	5.47%	3.31%

Asset Allocation Assumptions



Correlations

	TC Life Funding Agreement	JPM EMBI Global Diversified Index	Bloomberg U.S. Aggregate Bond Index	Bloomberg U.S. TIPS Index	Bloomberg U.S. 1-3 Year Gov't / Credit Bond Index	BBofAML US HY BB/B Cash Pay Index	S&P/LSTA Performing Loan Index	Bloomberg U.S. 0-5 Year TIPS Index	FTSE NAREIT All Equity REITs Index	Russell 3000 Index	S&P Index	Russell 1000 Value Index	Russell 1000 Growth Index	Russell 2000 Index	MSCI EAFE Index	MSCI Emerging Markets Index
TC Life Funding Agreement	1.00															
BofAML U.S. 3-Month Treasury Bill / iMoneyNet	-0.07															
JPM EMBI Global Diversified Index	0.48	1.00														
Bloomberg U.S. Aggregate Bond Index	0.64	0.36	1.00													
Bloomberg U.S. TIPS Index	0.36	0.28	0.65	1.00												
Bloomberg U.S. TIPS 1-10 Year Index	0.04	0.75	0.72	0.97												
Bloomberg U.S. 1-3 Year Gov't / Credit Bond Index	0.60	0.33	0.96	0.63	1.00											
BBofAML US HY BB/B Cash Pay Index	0.55	0.35	0.30	0.20	0.32	1.00										
S&P/LSTA Performing Loan Index	-0.20	0.73	0.14	0.53	-0.22	0.95	1.00									
Bloomberg U.S. 0-5 Year TIPS Index	0.17	0.69	0.53	0.84	0.29	0.70	0.63	1.00								
FTSE NAREIT All Equity REITs Index	0.37	0.32	0.09	-0.01	0.08	0.44	0.56	0.41	1.00							
Russell 3000 Index	0.31	0.41	-0.04	-0.14	-0.02	0.50	0.68	0.31	0.66	1.00						
S&P index	-0.21	0.64	0.27	0.40	-0.35	0.75	0.64	0.47	0.77	1.00	1.00					
Russell 1000 Value Index	0.43	0.42	0.02	-0.11	0.01	0.50	0.62	0.36	0.67	0.95	0.94	1.00				
Russell 1000 Growth Index	0.39	0.44	-0.01	-0.10	-0.01	0.43	0.63	0.54	0.59	0.94	0.95	0.85	1.00			
Russell 2000 Index	0.35	0.38	-0.08	-0.14	-0.07	0.46	0.61	0.25	0.71	0.90	0.91	0.89	0.90	1.00		
MSCI EAFE Index	0.30	0.36	-0.10	-0.15	-0.13	0.50	0.68	0.43	0.53	0.79	0.87	0.77	0.79	0.73	1.00	
MSCI Emerging Markets Index	0.17	0.54	-0.15	-0.11	-0.15	0.29	0.78	0.71	0.42	0.64	0.66	0.60	0.64	0.62	0.65	1.00

Tuition Inflation

Tuition data are sourced from the 2022 College Board Trends in Tuition Pricing.

Private 4-year Tuition Inflation:

$$T(t) = 0.0179 + i(t) + 0.0058 * S(t-1) + 0.1819 * B(t) + 0.2393 * R(t-1) - 0.012 * GDP + e1(t)$$

Expected Value = 4.72%

Public Tuition Inflation:

$$T(t) = 0.0375 + i(t) - 0.0132 * S(t-1) + 0.2685 * B(t) + 0.1634 * R(t-1) - 0.6415 * GDP + e2(t)$$

Expected Value =5.47%

where T(t) is the tuition inflation rate in year t,

i(t) is the CPI inflation rate in year t,

S(t) is the real stock total return (Russell 3000 Index) in year t,

B(t) is the real core fixed income total return (Bloomberg Barclays U.S. Aggregate Bond Index) in year t,

R(t) is the 3 Month T-Bill real return in year t,

GDP is the expected real GDP percent change (1.9%) for the next 10 years (source: Federal Reserve Bank of Philadelphia),

e1(t) is the random error term following a logistic distribution (0%, 1.19%) with a zero mean and standard deviation of 2.15%,

e2(t) is the random error term following a logistic distribution (0%, 1.42%) with a zero mean and standard deviation of 2.57%

Regression is based on data from 1977-2022.

For 2021-2022 school year, average tuition and fees were: \$10,940 for all in-state public colleges and \$39,400 for private 4-year colleges; based on most recent data 65% enrolled in public colleges and 35% enrolled in private colleges. The enrollment-weighted average tuition and fees for all colleges were \$20,901 = \$10,940* 65% + \$39,400 * 35%. The forecasted enrollment-weighted average tuition and fees for year 1 are \$21,940 = \$10,940 * (1+5.47%) * 65% + \$39,400. * (1+4.72%) * 35%. Therefore, the public / private enrollment weighted tuition inflation rate for year 1 is: 4.97% = \$21,940 / \$20,901 - 1

Current Passive Enrollment Year Portfolio Simulation Results

Enrollment Year	2023								Investment Horizon (in years)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Domestic Equities	Int'l Equities	Emerging Market Equities	Real Estate Securities	Core Fixed Income	Short-Term Inflation-Linked Bond	High Yield Fund	Funding Agreement		Average Annual Return over Investment Horizon	Standard Deviation of Returns over Investment Horizon	Average Annual Tuition Inflation over Investment Horizon	Probability of Exceeding Tuition Inflation	Probability of Achieving 90 cents per Dollar of Future Tuition	Probability of Non-Negative Return	Annualized Shortfall
2040/2041	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	21	5.81%	2.11%	4.97%	64.96%	73.90%	99.66%	-2.28%
2038/2039	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	19	5.75%	2.09%	4.97%	63.74%	73.30%	99.76%	-2.26%
2036/2037	47.90%	18.20%	4.60%	5.30%	16.80%	4.80%	2.40%	0.00%	17	5.61%	2.13%	4.97%	60.68%	71.98%	99.60%	-2.17%
2034/2035	45.40%	17.30%	4.30%	5.00%	19.60%	5.60%	2.80%	0.00%	15	5.48%	2.06%	4.97%	59.00%	72.12%	99.58%	-2.15%
2032/2033	42.80%	16.30%	4.10%	4.80%	22.40%	6.40%	3.20%	0.00%	13	5.34%	2.07%	4.97%	57.20%	72.10%	99.36%	-2.11%
2030/2031	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%	11	5.19%	1.92%	4.97%	54.82%	73.20%	99.62%	-1.96%
2028/2029	30.20%	11.50%	2.90%	3.40%	36.40%	10.40%	5.20%	0.00%	9	4.96%	1.87%	4.97%	49.36%	72.90%	99.42%	-1.93%
2026/2027	22.70%	8.60%	2.20%	2.50%	37.80%	10.80%	5.40%	10.00%	7	4.73%	1.73%	4.97%	45.16%	77.32%	99.64%	-1.82%
2024/2025	15.70%	6.00%	1.50%	1.80%	28.00%	8.00%	4.00%	35.00%	5	4.52%	1.76%	4.97%	41.08%	81.02%	99.48%	-1.94%
In School	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	3	4.40%	2.01%	4.97%	38.98%	91.36%	98.64%	-2.12%
	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	1	4.48%	3.51%	4.97%	44.74%	99.32%	90.58%	-3.47%

*Annualized Shortfall is the expected annual percentage difference between tuition inflation and returns among all scenarios that fail to exceed tuition inflation.

Recommended Passive Enrollment Year Portfolio Simulation Results

Enrollment Year	2023								Investment Horizon (in years)	(1) Average Annual Return over Investment Horizon	(2) Standard Deviation of Returns over Investment Horizon	(3) Average Annual Tuition Inflation over Investment Horizon	(4) Probability of Exceeding Tuition Inflation	(5) Probability of Achieving 90 cents per Dollar of Future Tuition	(6) Probability of Non-Negative Return	(7) Annualized Shortfall
	Domestic Equities	Int'l Equities	Emerging Market Equities	Real Estate Securities	Core Fixed Income	Short-Term Inflation-Linked Bond	High Yield Fund	Funding Agreement								
2040/2041	50.40%	19.20%	4.80%	5.60%	16.00%	0.00%	4.00%	0.00%	21	5.84%	2.10%	4.97%	65.46%	74.42%	99.66%	-2.28%
2038/2039	50.40%	19.20%	4.80%	5.60%	16.00%	0.00%	4.00%	0.00%	19	5.76%	2.07%	4.97%	64.70%	74.62%	99.54%	-2.23%
2036/2037	47.90%	18.20%	4.60%	5.30%	19.20%	0.00%	4.80%	0.00%	17	5.61%	2.11%	4.97%	62.52%	72.82%	99.44%	-2.26%
2034/2035	45.40%	17.30%	4.30%	5.00%	22.40%	0.00%	5.60%	0.00%	15	5.54%	2.12%	4.97%	59.40%	71.88%	99.48%	-2.15%
2032/2033	42.80%	16.30%	4.10%	4.80%	25.60%	0.00%	6.40%	0.00%	13	5.40%	2.03%	4.97%	57.72%	73.30%	99.56%	-2.05%
2030/2031	37.80%	14.40%	3.60%	4.20%	32.00%	0.00%	8.00%	0.00%	11	5.18%	1.96%	4.97%	54.94%	72.72%	99.60%	-2.00%
2028/2029	30.20%	11.50%	2.90%	3.40%	41.60%	0.00%	10.40%	0.00%	9	4.94%	1.82%	4.97%	48.92%	73.10%	99.56%	-1.91%
2026/2027	22.70%	8.60%	2.20%	0.00%	40.30%	10.80%	5.40%	10.00%	7	4.70%	1.72%	4.97%	43.24%	76.28%	99.84%	-1.82%
2024/2025	15.70%	6.00%	1.50%	0.00%	29.80%	8.00%	4.00%	35.00%	5	4.49%	1.70%	4.97%	38.60%	82.30%	99.70%	-1.87%
In School	9.40%	3.60%	0.90%	0.00%	25.60%	7.00%	3.50%	50.00%	3	4.37%	1.96%	4.97%	38.50%	91.90%	98.96%	-2.11%
	9.40%	3.60%	0.90%	0.00%	25.60%	7.00%	3.50%	50.00%	1	4.39%	3.44%	4.97%	43.14%	99.56%	90.02%	-3.37%

*Annualized Shortfall is the expected annual percentage difference between tuition inflation and returns among all scenarios that fail to exceed tuition inflation.

Current Active Enrollment Year Portfolio Simulation Results

Enrollment Year	Asset Allocations											Investment Horizon (in years)	(1) Average Annual Return over Investment Horizon	(2) Standard Deviation of Returns over Investment Horizon	(3) Average Annual Tuition Inflation over Investment Horizon	(4) Probability of Exceeding Tuition Inflation	(5) Probability of Achieving 90 cents per Dollar of Future Tuition	(6) Probability of Non-Negative Return	(7) Annualized Shortfall
	Large Cap Growth	Large Cap Value	Large Cap Core	Small Cap Equity	Real Estate Securities	Int'l Equities	Emerging Market Equities	Core Fixed Income	Inflation-Linked Bond	Floating Rate	Funding Agreement								
2040/2041	14.80%	14.80%	15.80%	5.00%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%	21	5.68%	2.06%	4.97%	64.00%	72.74%	99.56%	-2.33%
2038/2039	14.80%	14.80%	15.80%	5.00%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%	19	5.60%	2.09%	4.97%	61.14%	71.42%	99.50%	-2.28%
2036/2037	14.00%	14.00%	15.20%	4.80%	5.30%	18.10%	4.60%	16.80%	4.80%	2.40%	0.00%	17	5.54%	2.06%	4.97%	60.40%	72.36%	99.52%	-2.17%
2034/2035	13.30%	13.30%	14.20%	4.50%	5.10%	17.30%	4.30%	19.60%	5.60%	2.80%	0.00%	15	5.46%	2.03%	4.97%	58.94%	72.84%	99.58%	-2.06%
2032/2033	12.50%	12.50%	13.60%	4.30%	4.80%	16.30%	4.00%	22.40%	6.40%	3.20%	0.00%	13	5.33%	2.04%	4.97%	56.52%	72.10%	99.42%	-2.05%
2030/2031	11.10%	11.10%	11.80%	3.80%	4.20%	14.40%	3.60%	28.00%	8.00%	4.00%	0.00%	11	5.20%	1.90%	4.97%	54.76%	73.46%	99.64%	-1.94%
2028/2029	8.80%	8.80%	9.60%	3.00%	3.40%	11.50%	2.90%	36.40%	10.40%	5.20%	0.00%	9	4.95%	1.82%	4.97%	49.26%	74.26%	99.58%	-1.85%
2026/2027	6.60%	6.60%	7.20%	2.30%	2.50%	8.60%	2.20%	37.80%	10.80%	5.40%	10.00%	7	4.80%	1.73%	4.97%	45.26%	77.42%	99.78%	-1.78%
2024/2025	4.60%	4.60%	5.00%	1.50%	1.80%	6.00%	1.50%	28.00%	8.00%	4.00%	35.00%	5	4.58%	1.70%	4.97%	41.02%	82.92%	99.72%	-1.82%
In School	2.70%	2.70%	3.00%	1.00%	1.10%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%	3	4.46%	2.00%	4.97%	38.96%	92.38%	98.86%	-2.05%
	2.70%	2.70%	3.00%	1.00%	1.10%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%	1	4.39%	3.44%	4.97%	43.48%	99.64%	89.98%	-3.39%

*Annualized Shortfall is the expected annual percentage difference between tuition inflation and returns among all scenarios that fail to exceed tuition inflation.

Recommended Active Enrollment Year Portfolio Simulation Results

Enrollment Year	Asset Allocations											Investment Horizon (in years)	(1) Average Annual Return over Investment Horizon	(2) Standard Deviation of Returns over Investment Horizon	(3) Average Annual Tuition Inflation over Investment Horizon	(4) Probability of Exceeding Tuition Inflation	(5) Probability of Achieving 90 cents per Dollar of Future Tuition	(6) Probability of Non-Negative Return	(7) Annualized Shortfall
	Large Cap Growth	Large Cap Value	Large Cap Core	Small Cap Equity	Real Estate Securities	Int'l Equities	Emerging Market Equities	Core Fixed Income	Inflation-Linked Bond	Floating Rate	Funding Agreement								
2040/2041	14.80%	14.80%	15.80%	5.00%	5.60%	19.20%	4.80%	18.00%	0.00%	2.00%	0.00%	21	5.74%	2.04%	4.97%	64.24%	73.02%	99.60%	-2.27%
2038/2039	14.80%	14.80%	15.80%	5.00%	5.60%	19.20%	4.80%	18.00%	0.00%	2.00%	0.00%	19	5.60%	2.09%	4.97%	61.28%	71.76%	99.46%	-2.27%
2036/2037	14.00%	14.00%	15.20%	4.80%	5.30%	18.10%	4.60%	21.60%	0.00%	2.40%	0.00%	17	5.61%	2.05%	4.97%	61.64%	73.00%	99.66%	-2.16%
2034/2035	13.30%	13.30%	14.20%	4.50%	5.10%	17.30%	4.30%	25.20%	0.00%	2.80%	0.00%	15	5.43%	2.06%	4.97%	59.02%	71.96%	99.44%	-2.17%
2032/2033	12.50%	12.50%	13.60%	4.30%	4.80%	16.30%	4.00%	28.80%	0.00%	3.20%	0.00%	13	5.29%	2.00%	4.97%	56.30%	71.22%	99.50%	-2.08%
2030/2031	11.10%	11.10%	11.80%	3.80%	4.20%	14.40%	3.60%	36.00%	0.00%	4.00%	0.00%	11	5.15%	1.90%	4.97%	53.08%	71.78%	99.68%	-1.96%
2028/2029	8.80%	8.80%	9.60%	3.00%	3.40%	11.50%	2.90%	46.80%	0.00%	5.20%	0.00%	9	4.93%	1.77%	4.97%	49.14%	73.86%	99.62%	-1.87%
2026/2027	6.60%	6.60%	7.20%	2.30%	0.00%	8.60%	2.20%	40.30%	10.80%	5.40%	10.00%	7	4.70%	1.66%	4.97%	44.00%	77.26%	99.78%	-1.77%
2024/2025	4.60%	4.60%	5.00%	1.50%	0.00%	6.00%	1.50%	29.80%	8.00%	4.00%	35.00%	5	4.48%	1.65%	4.97%	38.18%	82.92%	99.72%	-1.80%
In School	2.70%	2.70%	3.00%	1.00%	0.00%	3.60%	0.90%	25.60%	7.00%	3.50%	50.00%	3	4.36%	1.87%	4.97%	37.94%	92.88%	99.16%	-2.04%
	2.70%	2.70%	3.00%	1.00%	0.00%	3.60%	0.90%	25.60%	7.00%	3.50%	50.00%	1	4.47%	3.39%	4.97%	43.34%	99.46%	91.04%	-3.29%

*Annualized Shortfall is the expected annual percentage difference between tuition inflation and returns among all scenarios that fail to exceed tuition inflation.

ESG Enrollment Year Portfolio Simulation Results

Enrollment Year	Asset Allocations						Investment Horizon (in years)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Domestic Equities	Int'l Equities	Emerging Market Equities	Core Fixed Income	High Yield Fund	Funding Agreement		Average Annual Return over Investment Horizon	Standard Deviation of Returns over Investment Horizon	Average Annual Tuition Inflation over Investment Horizon	Probability of Exceeding Tuition Inflation	Probability of Achieving 90 cents per Dollar of Future Tuition	Probability of Non-Negative Return	Annualized Shortfall
2040/2041	56.00%	19.20%	4.80%	18.00%	2.00%	0.00%	21	5.81%	2.10%	4.97%	64.98%	73.36%	99.62%	-2.32%
2038/2039	56.00%	19.20%	4.80%	18.00%	2.00%	0.00%	19	5.73%	2.11%	4.97%	64.02%	72.82%	99.66%	-2.28%
2036/2037	53.30%	18.10%	4.60%	21.60%	2.40%	0.00%	17	5.53%	2.06%	4.97%	59.36%	71.00%	99.62%	-2.17%
2034/2035	50.40%	17.30%	4.30%	25.20%	2.80%	0.00%	15	5.44%	2.03%	4.97%	59.08%	70.94%	99.70%	-2.16%
2032/2033	47.70%	16.30%	4.00%	28.80%	3.20%	0.00%	13	5.34%	1.99%	4.97%	56.92%	72.30%	99.62%	-2.05%
2030/2031	42.00%	14.40%	3.60%	36.00%	4.00%	0.00%	11	5.20%	1.90%	4.97%	54.24%	72.78%	99.68%	-1.93%
2028/2029	33.60%	11.50%	2.90%	46.80%	5.20%	0.00%	9	4.99%	1.77%	4.97%	49.94%	75.12%	99.74%	-1.81%
2026/2027	25.20%	8.60%	2.20%	48.60%	5.40%	10.00%	7	4.78%	1.74%	4.97%	46.40%	77.96%	99.56%	-1.81%
2024/2025	17.50%	6.00%	1.50%	36.00%	4.00%	35.00%	5	4.59%	1.72%	4.97%	41.48%	83.28%	99.56%	-1.83%
In School	10.50%	3.60%	0.90%	31.50%	3.50%	50.00%	3	4.39%	1.98%	4.97%	38.04%	92.18%	98.72%	-2.09%
	10.50%	3.60%	0.90%	31.50%	3.50%	50.00%	1	4.38%	3.39%	4.97%	43.60%	99.58%	91.00%	-3.28%

*Annualized Shortfall is the expected annual percentage difference between tuition inflation and returns among all scenarios that fail to exceed tuition inflation.

Definitions

- **(1) Expected Return.** The average of a distribution of possible annualized investment returns over an investment horizon of n years generated by Monte Carlo simulation. The returns are based on the assumption that each year money will be invested according to the asset class allocation assigned to the beneficiary's age.
- **(2) Standard Deviation of Returns.** A statistic used as a measure of the dispersion or variation in the distribution of annualized investment returns over an investment horizon of n years generated by Monte Carlo simulation, equal to the square root of the arithmetic mean of the squares of the deviations from the expected return. A higher standard deviation indicates a higher volatility.
- **(3) Average Annual Tuition Inflation.** The average of a distribution of possible annualized tuition inflation rates over an investment horizon of n years generated by the Monte Carlo simulation.
- **(4) Probability of Exceeding Tuition Inflation.** The likelihood that the annualized investment return exceeds the average tuition inflation rate over an investment horizon of n years, out of all the possible trials simulated by the Monte Carlo simulation.
- **(5) Probability of Achieving 90 Cents per Dollar of Future Tuition.** The likelihood that each dollar of investment today will grow to cover at least 90% of future tuition based on one dollar of today's tuition rising with tuition inflation over an investment horizon of n years.
- **(6) Probability of Non-negative Return.** The likelihood that the investment will achieve at least 0% of annualized return (preserving principal) over an investment horizon of n years.
- **(7) Annualized Shortfall.** The average of a distribution of the differences (shortfalls) between annualized investment returns and annualized tuition inflation rates over an investment horizon of n years among those scenarios that have annualized investment return failing to keep pace with tuition inflation.

Appendix 2: Investment Menu and Underlying Funds

Investment Menu

Passive Enrollment Year Investment Portfolios

Enrollment Year	TIAA-CREF Equity Index Fund	TIAA-CREF International Equity Index Fund	TIAA-CREF Emerging Markets Equity Index Fund	Vanguard Real Estate Index Fund	TIAA-CREF Bond Index Fund	Vanguard Shrt-Term Infl-Prot Sec Index Fund	Vanguard High-Yield Corporate Fund	TIAA-CREF Life Funding Agreement	Nuveen ESG US Aggregate Bond ETF
Tickers	TIEIX	TCIEX	TEQLX	VGSNX	TBIIX	VTSPX	VWEAX		NUBD
2040/2041 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	
2038/2039 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	
2036/2037 Enrollment Portfolio Passive	47.90%	18.20%	4.60%	5.30%	16.80%	4.80%	2.40%	0.00%	
2034/2035 Enrollment Portfolio Passive	45.40%	17.30%	4.30%	5.00%	19.60%	5.60%	2.80%	0.00%	
2032/2033 Enrollment Portfolio Passive	42.80%	16.30%	4.10%	4.80%	22.40%	6.40%	3.20%	0.00%	
2030/2031 Enrollment Portfolio Passive	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%	
2028/2029 Enrollment Portfolio Passive	30.20%	11.50%	2.90%	3.40%	36.40%	10.40%	5.20%	0.00%	
2026/2027 Enrollment Portfolio Passive	22.70%	8.60%	2.20%	2.50%	37.80%	10.80%	5.40%	10.00%	
2024/2025 Enrollment Portfolio Passive	15.70%	6.00%	1.50%	1.80%	28.00%	8.00%	4.00%	35.00%	
Enrollment Year Portfolio Passive	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	

Passive Risk-Based Portfolios

ESG Bond Portfolio									100.00%
Index Bond Portfolio					100.00%				
Index International Equity Portfolio		80.00%	20.00%						
Index U.S. Equity Portfolio	100.00%								
Passive Conservative Portfolio					35.00%	10.00%	5.00%	50.00%	
Passive Diversified Equity Portfolio	63.00%	24.00%	6.00%	7.00%					
Passive Growth Portfolio	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%		

Investment Menu

Active Enrollment Year Investment Portfolios

	T. Rowe Price Large Cap Growth Fund	T. Rowe Price Large Cap Value Fund	TIAA-CREF Quant Small-Cap Equity	TIAA-CREF S&P 500 Index Fund	DFA Large Cap Intl Portfolio	DFA Emerging Markets Core Equity I Portfolio	Vanguard Real Estate Index Fund	MetWest Total Return Bond Fund	TIAA-CREF Bond Index Fund	PIMCO Real Return Fund	PIMCO Income Fund	T. Rowe Price Floating Rate Fund	TIAA-CREF Life Funding Agreement	TIAA-CREF Social Choice Equity Fund	TIAA-CREF Social Choice International Equity Fund
Tickers	TRLGX	TILCX	TISEX	TISPX	DFALX	DFCEX	VGSNX	MWTSX	TBIIX	PRRIX	PIMIX	RPIFX		TISCX	TSONX
2040/2041 Enrollment Portfolio Active	14.80%	14.80%	5.00%	15.80%	19.20%	4.80%	5.60%	7.00%	3.00%	4.00%	4.00%	2.00%	0.00%		
2038/2039 Enrollment Portfolio Active	14.80%	14.80%	5.00%	15.80%	19.20%	4.80%	5.60%	7.00%	3.00%	4.00%	4.00%	2.00%	0.00%		
2036/2037 Enrollment Portfolio Active	14.00%	14.00%	4.80%	15.20%	18.10%	4.60%	5.30%	8.40%	3.60%	4.80%	4.80%	2.40%	0.00%		
2034/2035 Enrollment Portfolio Active	13.30%	13.30%	4.50%	14.20%	17.30%	4.30%	5.10%	9.80%	4.20%	5.60%	5.60%	2.80%	0.00%		
2032/2033 Enrollment Portfolio Active	12.50%	12.50%	4.30%	13.60%	16.30%	4.00%	4.80%	11.20%	4.80%	6.40%	6.40%	3.20%	0.00%		
2030/2031 Enrollment Portfolio Active	11.10%	11.10%	3.80%	11.80%	14.40%	3.60%	4.20%	14.00%	6.00%	8.00%	8.00%	4.00%	0.00%		
2028/2029 Enrollment Portfolio Active	8.80%	8.80%	3.00%	9.60%	11.50%	2.90%	3.40%	18.20%	7.80%	10.40%	10.40%	5.20%	0.00%		
2026/2027 Enrollment Portfolio Active	6.60%	6.60%	2.30%	7.20%	8.60%	2.20%	2.50%	18.90%	8.10%	10.80%	10.80%	5.40%	10.00%		
2024/2025 Enrollment Portfolio Active	4.60%	4.60%	1.50%	5.00%	6.00%	1.50%	1.80%	14.00%	6.00%	8.00%	8.00%	4.00%	35.00%		
Enrollment Year Portfolio Active	2.70%	2.70%	1.00%	3.00%	3.60%	0.90%	1.10%	12.25%	5.25%	7.00%	7.00%	3.50%	50.00%		

Active Risk-Based Portfolios

Active Conservative Portfolio								17.50%	7.50%	10.00%	10.00%	5.00%	50.00%		
Active Diversified Equity Portfolio	18.40%	18.40%	6.30%	19.90%	24.00%	6.00%	7.00%								
Active Growth Portfolio	12.50%	12.50%	4.30%	13.60%	16.30%	4.00%	4.80%	11.20%	4.80%	6.40%	6.40%	3.20%			
Active International Equity Portfolio					80.00%	20.00%									
ESG International Equity Portfolio															100%
Social Choice Equity Portfolio														100%	
Principal Plus Interest Portfolio												100.00%			

Investment Menu

ESG Enrollment Year Investment Portfolios						
	TIAA-CREF Social Choice Equity Fund	TIAA-CREF Social Choice International Equity Fund	Nuveen ESG Emerging Markets Equity ETF	Nuveen ESG US Aggregate Bond ETF	Nuveen ESG High Yield Corporate Bd ETF	TIAA-CREF Life Funding Agreement
Tickers	TISCX	TSONX	NUEM	NUBD	NUHY	
2040/2041 Enrollment Portfolio ESG	56.00%	19.20%	4.80%	18.00%	2.00%	0.00%
2038/2039 Enrollment Portfolio ESG	56.00%	19.20%	4.80%	18.00%	2.00%	0.00%
2036/2037 Enrollment Portfolio ESG	53.30%	18.10%	4.60%	21.60%	2.40%	0.00%
2034/2035 Enrollment Portfolio ESG	50.40%	17.30%	4.30%	25.20%	2.80%	0.00%
2032/2033 Enrollment Portfolio ESG	47.70%	16.30%	4.00%	28.80%	3.20%	0.00%
2030/2031 Enrollment Portfolio ESG	42.00%	14.40%	3.60%	36.00%	4.00%	0.00%
2028/2029 Enrollment Portfolio ESG	33.60%	11.50%	2.90%	46.80%	5.20%	0.00%
2026/2027 Enrollment Portfolio ESG	25.20%	8.60%	2.20%	48.60%	5.40%	10.00%
2024/2025 Enrollment Portfolio ESG	17.50%	6.00%	1.50%	36.00%	4.00%	35.00%
Enrollment Year Portfolio ESG	10.50%	3.60%	0.90%	31.50%	3.50%	50.00%

Underlying Fund by Strategy

U. S. Equities	International and Emerging Markets Equities	Fixed Income	Short-Term and Cash Equivalents	Alternative Assets
Index Funds				
T-C Equity Index	T-C International Equity Index	T-C Bond Index		Vanguard Real Estate Index
T-C S&P 500 Index	T-C Emerging Markets Equity Index	Vanguard Short-Term Inflation-Protected Securities Index		
	Nuveen ESG Emerging Markets Equity ETF	Nuveen ESG U.S. Aggregate Bond ETF Nuveen ESG High Yield Corporate Bond ETF		
Active Funds				
T. Rowe Price Large-Cap Growth	DFA Large-Cap International	MetWest Total Return Bond		T-C Life Funding Agreement
T. Rowe Price Large-Cap Value	DFA Emerging Markets Core Equity 1	PIMCO Real Return		
T-C Quant Small-Cap Equity	T-C Social Choice International Equity	PIMCO Income		
T-C Social Choice Equity		Vanguard High Yield Corporate		
		T. Rowe Price Floating Rate		

Duration in Passive Enrollment Year Investment Options

	TIAA-CREF Bond Index Fund	Vanguard Short-Term Inflation- Protected Securities Index Fund	Vanguard High Yield Corporate Fund	TC Life Funding Agreement	Recommend Weighted Average Duration (Years)	Current Weighted Average Duration (Years)
Portfolio Effective Duration*	6.29	2.56	3.71	0.00		
2040/2041 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2038/2039 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2036/2037 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2034/2035 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2032/2033 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2030/2031 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2028/2029 Enrollment Portfolio Passive	80%	0%	20%	0%	5.8	5.3
2026/2027 Enrollment Portfolio Passive	61%	16%	8%	15%	4.5	4.5
2024/2025 Enrollment Portfolio Passive	39%	10%	5%	46%	2.9	2.8
Enrollment Year Portfolio Passive	30%	8%	4%	58%	2.2	2.2

*Most recent as of September 2023

Duration in Active Enrollment Year Investment Options

	MetWest Total Return Bond Fund	TIAA-CREF Bond Index Fund	PIMCO Real Return Fund	PIMCO Income Fund	T. Rowe Price Floating Rate Fund	TIAA-CREF Life Funding Agreement	Recommend Weighted Average Duration (Years)	Current Weighted Average Duration (Years)
Portfolio Effective Duration*	7.13	6.29	6.23	4.01	0.59	0.00		
2040/2041 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2038/2039 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2036/2037 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2034/2035 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2032/2033 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2030/2031 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2028/2029 Enrollment Portfolio Active	35%	25%	0%	30%	10%	0%	5.3	5.5
2026/2027 Enrollment Portfolio Active	28%	12%	16%	20%	8%	15%	4.7	4.7
2024/2025 Enrollment Portfolio Active	18%	8%	10%	13%	5%	46%	3.0	3.0
Enrollment Year Portfolio Active	14%	6%	8%	9%	4%	58%	2.3	2.3

*Most recent as of September 2023

Duration in ESG Enrollment Year Investment Options

	Nuveen ESG US Aggregate Bond ETF	Nuveen ESG High Yield Corporate Bond ETF	TIAA-CREF Life Funding Agreement	Weighted Average Duration (Years)
Portfolio Effective Duration*	6.23	3.56	0.00	
2040/2041 Enrollment Portfolio ESG	90%	10%	0%	6.0
2038/2039 Enrollment Portfolio ESG	90%	10%	0%	6.0
2036/2037 Enrollment Portfolio ESG	90%	10%	0%	6.0
2034/2035 Enrollment Portfolio ESG	90%	10%	0%	6.0
2032/2033 Enrollment Portfolio ESG	90%	10%	0%	6.0
2030/2031 Enrollment Portfolio ESG	90%	10%	0%	6.0
2028/2029 Enrollment Portfolio ESG	90%	10%	0%	6.0
2026/2027 Enrollment Portfolio ESG	76%	8%	16%	5.0
2024/2025 Enrollment Portfolio ESG	48%	5%	47%	3.2
Enrollment Year Portfolio ESG	37%	4%	59%	2.5

*Most recent as of September 2023.

Appendix 3: Money Market Investment Option

Money Market Investment Option

- Money Markets and cash-like instruments are now providing yield
- Money Market yields closely follow the 3 Month Treasury Bill Yield



Money Market Investment Option

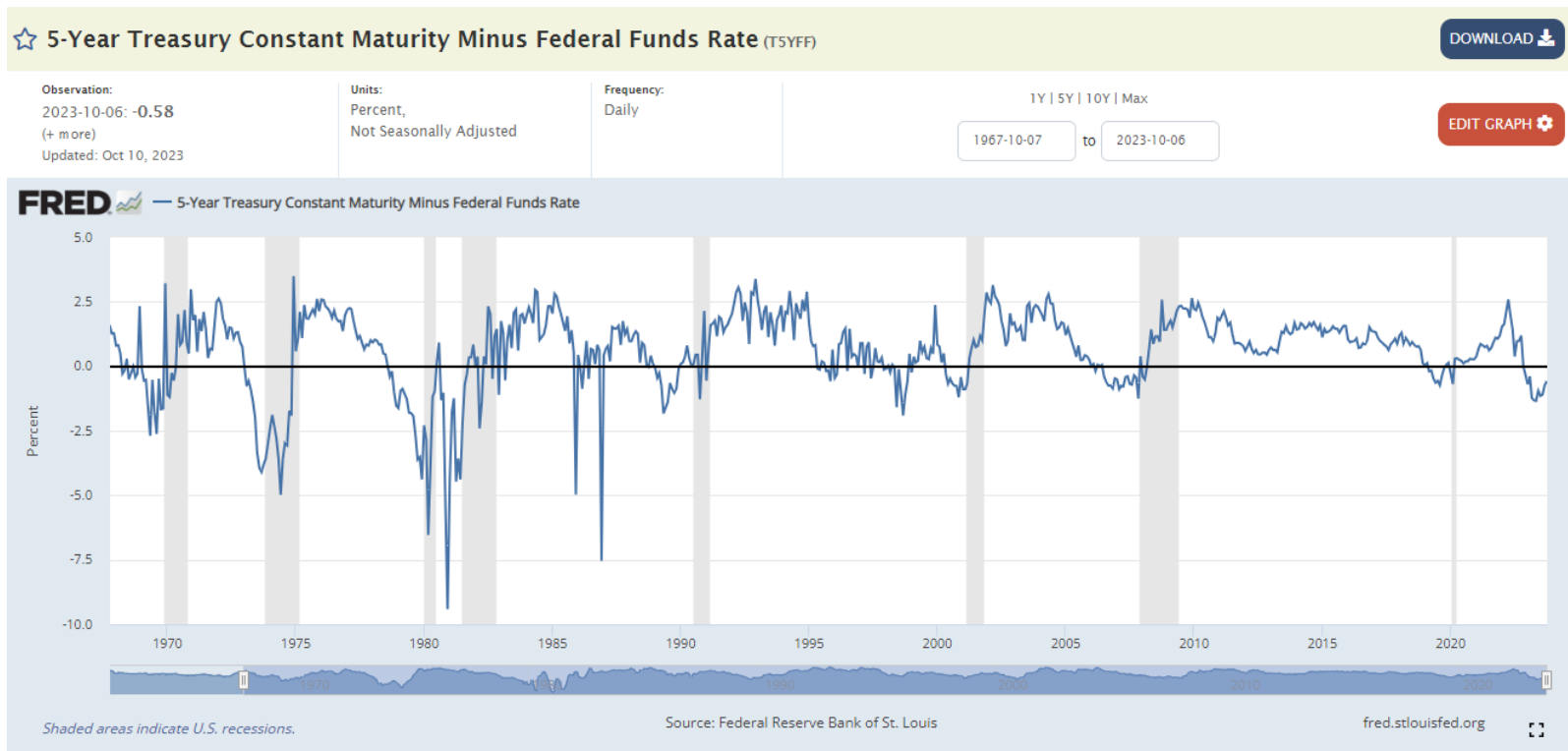
- Yields on 3 Month T-Bills historically decline rapidly during recessions

Date Range	Beginning Yield	Ending Yield	Total Yield Drop
4/74-1/76	8.90	4.73	4.17%
3/80-6/80	14.24	7.88	6.36%
8/81-11/81	15.52	10.37	5.15%
3/82-9/82	13.99	7.88	6.11%
8/84-6/85	11.06	7.05	4.01%
9/90-9/92	7.37	2.75	4.62%
10/00-10/02	6.38	1.44	4.94%
2/07-11/08	5.14	0.04	5.10%
Average Yield Drop			5.06%

Source: Hartford Funds, Factset

Money Market Investment Option

- The Funding Agreement credits investors the 5-year Constant Maturity Treasury yield less 125 bps
- The 5-year Constant Maturity Treasury yield historically becomes higher than the Fed Funds Rate during a recession





TIAA-CREF Tuition Financing, Inc.

MEMORANDUM

TO: ScholarShare Investment Board (SIB)
FROM: Meketa Investment Group (“Meketa”)
DATE: December 19, 2023
RE: 2023 TIAA-CREF Annual Review

Summary & Recommendation

Meketa reviewed TIAA-CREF Tuition Financing, Inc.’s (“TFI”) annual review and recommendation for the ScholarShare 529 (“Plan”) 2024 asset allocation, which highlights their analysis behind the recommended changes to the active and passive enrollment-based glidepaths given the material changes in the market environment over the last year.

TFI’s is recommending:

- The REITs allocation in the last three stages of glidepath be reallocated to core bonds
- The inflation-linked bond (TIPS) allocation in the first seven stages of the glidepath be split between core bond and high yield bonds.

We also note, no changes were recommended for the ESG enrollment-based options as ESG focused funds tend to be at the broader asset class level.

Meketa concurs with TFI’s analysis and finds the asset allocation changes to be potentially beneficial to participants. *Meketa recommends the SIB accept TFI’s recommended changes to the active and passive enrollment-based glidepaths.*

Background

SIB Staff requested that Meketa review TFI’s annual review and recommendation for the 2024 asset allocation for the Plan, which highlights TFI’s analysis behind the proposed changes to the asset allocation for the active and passive enrollment-based glidepaths.

TFI’s recommendations are based on structural shifts in the market where fixed income is more attractive on a risk-adjusted basis. They believe the proposed glidepaths should meet TFI’s expectation for a reasonable rate of expected return while minimizing the potential “shortfalls” between expected returns and tuition inflation over the investment horizons. The first proposal to eliminate REITs in favor of core bonds capitalizes on core bonds providing greater diversification with less risk than REITS while the elimination of TIPS is predicated on the current equity allocation earlier in the glidepath’s function as the primary interest rate sensitivity buffer as well as providing some inflation hedging and that high yields and core bonds provide more appealing risk-adjusted return prospects than TIPS.



In addition to reviewing TFI’s annual review and recommendations, Meketa has analyzed the proposed Glidepath returns vs. current using Meketa’s proprietary asset allocation tool. Below are Meketa’s 2023 Capital Market Expectations, which are the inputs into our model:

Expected Returns and Volatilities			Expected Long-Term Correlations										
Asset Class	Expected Geometric Return	Std Dev	Cash Equivalents	Investment Grade Bonds	TIPS	Bank Loans	US Equity	US Equity Growth	US Equity Value	US Small Cap	Developed Market Equity (non-US)	Emerging Market Equity	REITs
	2023												
Cash Equivalents	2.90%	1.00%	1.00										
Investment Grade Bonds	4.70%	4.00%	0.12	1.00									
TIPS	4.50%	7.00%	0.01	0.76	1.00								
Bank Loans	7.00%	10.00%	-0.34	0.03	0.27	1.00							
US Equity	8.70%	18.00%	-0.24	0.10	0.27	0.63	1.00						
US Equity Growth	8.40%	19.00%	-0.23	0.14	0.31	0.61	0.97	1.00					
US Equity Value	9.10%	18.00%	-0.22	0.05	0.21	0.61	0.97	0.89	1.00				
US Small Cap	9.30%	22.00%	-0.23	0.02	0.18	0.62	0.93	0.88	0.93	1.00			
Developed Market Equity (non-US)	9.80%	19.00%	-0.19	0.16	0.30	0.61	0.89	0.85	0.87	0.80	1.00		
Emerging Market Equity	10.00%	23.00%	-0.17	0.20	0.36	0.62	0.77	0.76	0.74	0.71	0.87	1.00	
REITs	8.00%	25.00%	-0.15	0.29	0.37	0.56	0.76	0.71	0.77	0.74	0.69	0.61	1.00

Glidepath Asset Allocation Review

Meketa has analyzed the expected outcomes for the current and proposed glidepaths for the enrollment-based options. Asset allocation represents the conscious decision to accept and manage risk. Real world risks and objectives faced by investors can be complex and often conflicting as a result they cannot be summarized in a single statistic. Rather, we must use a variety of tools to build a more complete picture. Our analysis takes special consideration for the unique aspects of a 529 plan: short accumulation and depletion periods. We focus on the portfolio’s effectiveness at generating returns relative to the risks incurred while accounting for distinctive risks of 529 plans such as drawdowns/losses in the latter years of the glidepath. Based on our analysis, the proposed enrollment-based portfolios increase the expected return with a commensurate amount of risk. As such, they are efficient (return for risk incurred) and sound (protective against 529s unique risks).



	Active		Passive		ESG
	Current	Proposed	Current	Proposed	Current
5 Percentile Return	11.95%	12.07%	11.81%	12.11%	11.82%
25 Percentile Return	9.19%	9.29%	9.07%	9.29%	9.12%
Expected Return	7.31%	7.39%	7.20%	7.37%	7.27%
75 Percentile Return	5.47%	5.53%	5.36%	5.48%	5.46%
95 Percentile Return	2.87%	2.92%	2.78%	2.83%	2.91%
Expected Standard Deviation	11.49%	11.58%	11.46%	11.74%	11.28%
Probability of Exceeding 5% Tuition Inflation	80.16%	80.81%	79.09%	80.23%	80.21%
Probability of Exceeding 3% Tuition Inflation	94.47%	94.67%	94.07%	94.32%	94.65%
Median Sharpe Ratio	0.38	0.39	0.38	0.38	0.39
Expected Worst Year	-39.09%	-38.97%	-38.82%	-39.12%	-38.51%
Expected Worst Year (Last 8 years)	-27.29%	-29.15%	-27.18%	-30.06%	-26.82%
Expected Worst Year (Last 4 years)	-16.51%	-18.48%	-16.45%	-18.40%	-16.22%

Conclusion

Meketa finds TFI's analysis to be comprehensive and insightful and uses consistent and reasonable inputs in developing their conclusions. Meketa agrees that the proposed glidepaths are sound and should meet TFI's expectation for a reasonable rate of expected return while being cognizant of the risks incurred to achieve those returns. Meketa, therefore, concurs with TFI's analysis and recommendation.

KRC/AK/IH/mp