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**DECEMBER 10, 2020**

**AGENDA ITEM 8  
INFORMATION ITEM**

**SCHOLARSHARE INVESTMENT BOARD**

*Review of 2021 Asset Allocation Recommendation for ScholarShare 529*

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***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.

For 2021, TFI has provided its “2021 Asset Allocation Recommendation” (Exhibit A), which highlights the analysis completed for their recommendation for no additional changes for 2021. Their analysis primarily focused on:

- a review of all the enhancements that occurred in 2020;
- the simulated probability of outpacing tuition inflation in the Enrollment Year Investment Portfolios; and
- a fresh look at the investment menu and account owner options.

The Board’s investment consultant, Meketa Investment Group, Inc. (Meketa), has reviewed and analyzed TFI’s recommendation and has provided a memo (Exhibit B) concurring with TFI’s recommendation for no changes for 2021. Meketa and SIB staff have reviewed and concur with TFI’s recommendation for no additional changes in 2021 for the Plan.

***Presenters***

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

Glenn Friedman, Director, Asset Allocation and Investments, TIAA-CREF Tuition Financing, Inc.  
Eric White, Principal, Meketa Investment Group, Inc.



## **Asset Allocation Recommendation for 2021**

Prepared by TIAA-CREF Tuition Financing, Inc.  
December 10, 2020

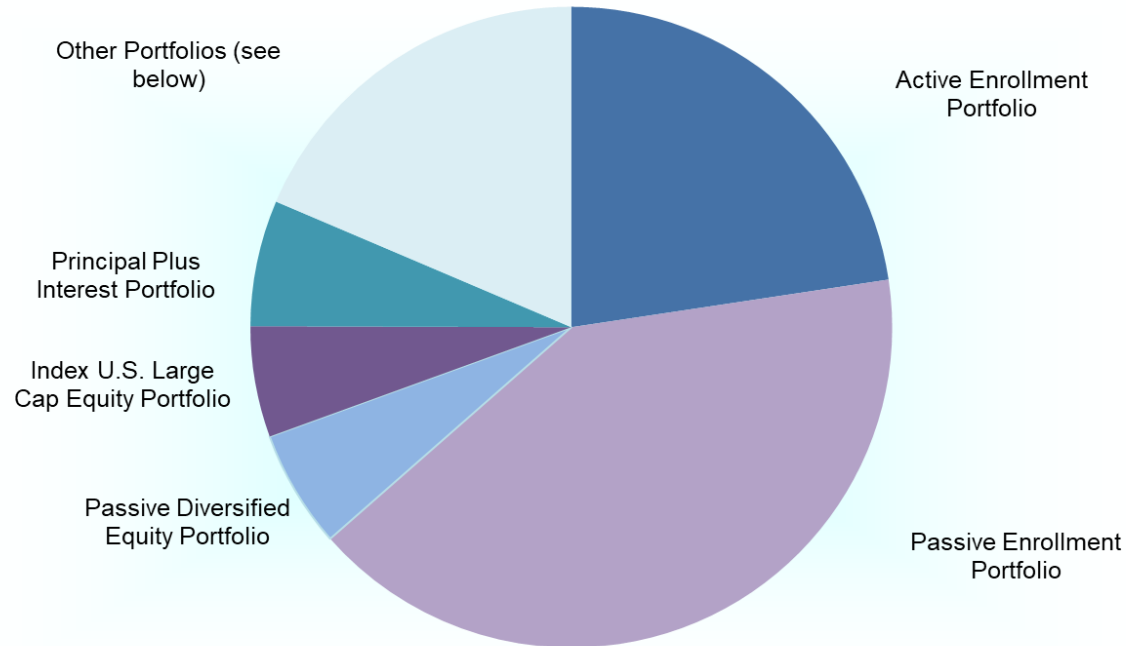


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- TFI has completed this year's asset allocation study to evaluate the overall investment strategy for ScholarShare 529
- This year's asset allocation study primarily focused on:
  - A review of all the enhancements that occurred earlier this year
  - The simulated probability of outpacing tuition inflation in the Enrollment Year Portfolios
  - A fresh look at the investment menu and account owner options
- Based on this review, TFI recommends no additional changes for 2021.



# Assets by Investment Option as of 09/30/20: \$10.4 B



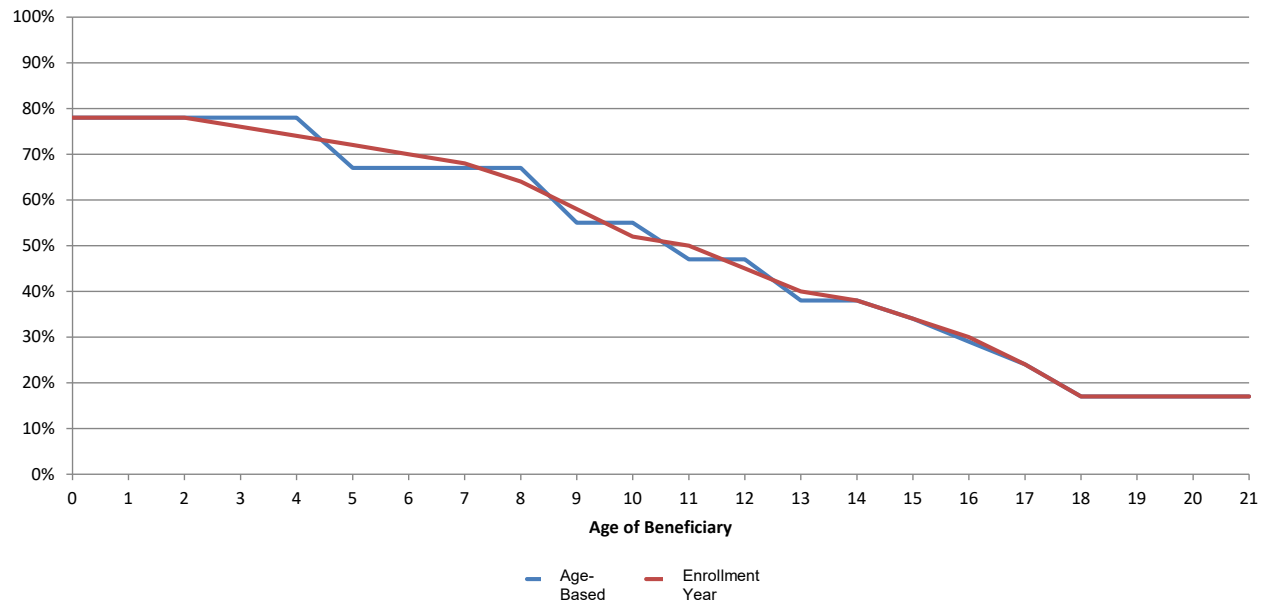
Portfolio	% of Assets	\$ Millions	Portfolio	% of Assets	\$ Millions
Passive Enrollment Portfolio	40.90%	\$ 4,255	Index U.S. Large Cap Equity Portfolio	5.93%	\$ 617
Active Enrollment Portfolio	22.62%	\$ 2,353	Passive Diversified Equity Portfolio	5.59%	\$ 582
Principal Plus Interest Portfolio	6.36%	\$ 661	Other Portfolios (see below)	18.59%	\$ 1,934

### Other Portfolios

Index U.S. Equity Portfolio	5.08%	\$ 529	Passive Moderate Growth Portfolio	0.71%	\$ 74
Active Diversified Equity Portfolio	2.64%	\$ 274	Passive Conservative Portfolio	0.67%	\$ 70
Active Growth Portfolio	1.90%	\$ 198	Active Moderate Growth Portfolio	0.66%	\$ 68
Social Choice Portfolio	1.87%	\$ 194	Active Conservative Portfolio	0.44%	\$ 45
Passive Growth Portfolio	1.47%	\$ 153	Passive Diversified Fixed Income Portfolio	0.36%	\$ 37
Index International Equity Portfolio	1.14%	\$ 118	Active Diversified Fixed Income Portfolio	0.35%	\$ 36
Index Bond Portfolio	1.05%	\$ 109	Active International Equity Portfolio	0.27%	\$ 28

# Change Implemented on 1/24/2020

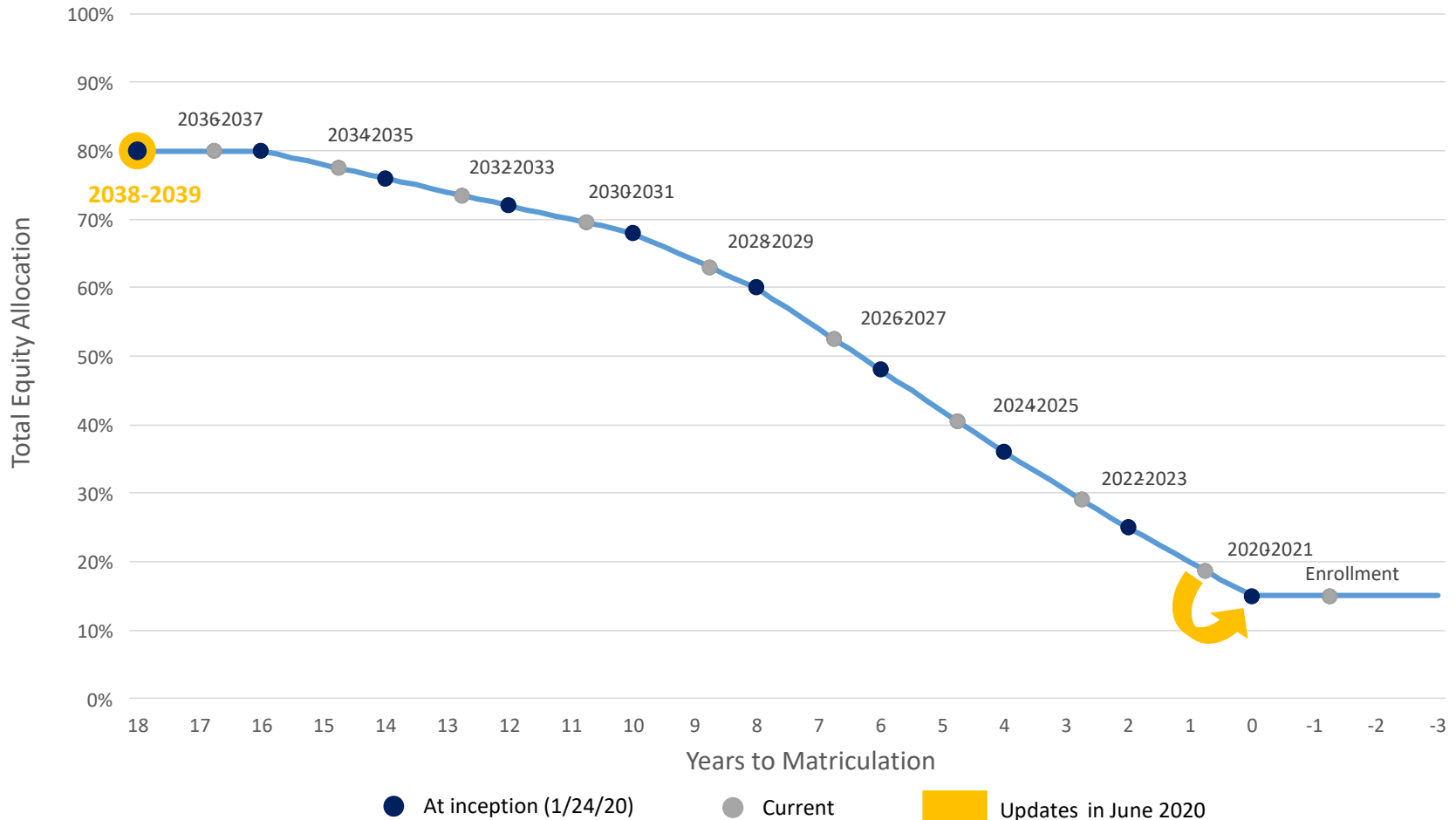
- Transitioned from an age-based glide path to an enrollment date model



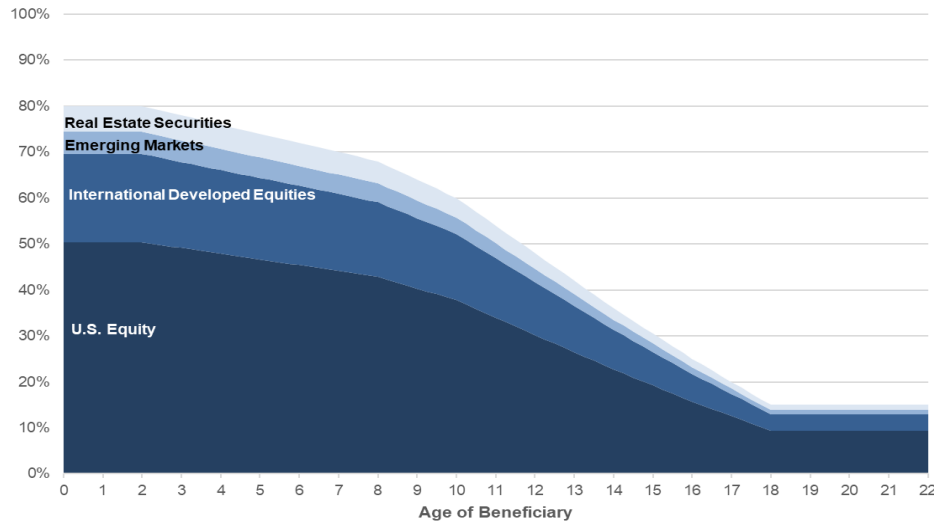
- Both the Active and Passive tracks are now rebalanced gradually on a quarterly basis and maintain the same level of risk across the glide path
- No more band rolls; asset allocations occur at the underlying fund level
- *The program management fee was also reduced from 0.03% to 0.01% in January*

# Enrollment Year Glide Path Maintenance

- Before the start of the new academic year, a new portfolio will be created for the youngest beneficiaries (2038-2039), and the 2020-2021 cohort will merge into the Enrollment Portfolio.



# Glide Path by Asset Class

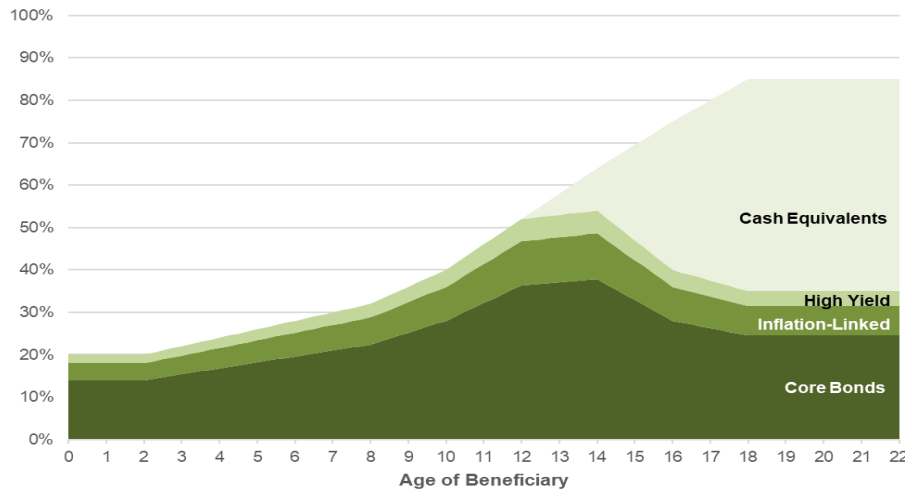


## Equity

- Total equity allocation is split between U.S. (70%) and International (30%) exposure
- No sector biases
- Similar compositions to broad, cap-weighted domestic and international equity markets

## Fixed Income

- Total fixed-income exposure starts at 20% and ends at 35% fixed income/50% cash equivs
- Core and satellite approach
- Inflation-linked bonds provide a hedge against inflation risk and enhance diversification
- Cash (Funding Agreement) provides a hedge against interest rate risk, reduces volatility, and provides principal protection



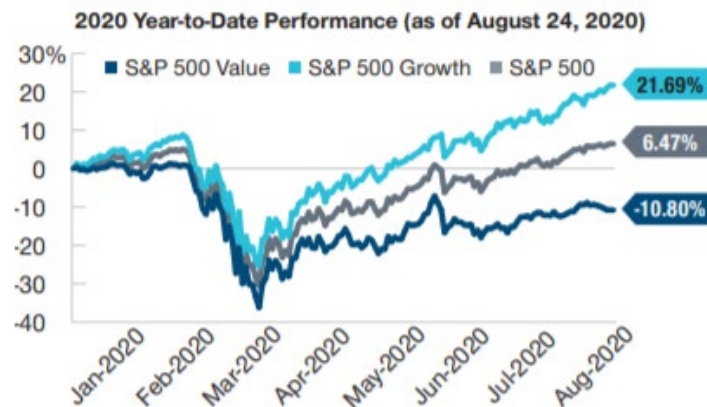
The above chart represents the strategic asset allocation progression of one of a series of multi-asset class portfolios. Asset allocations represent the exposures sought along the glide path and are not actual mutual fund exposures. Allocations are presented for information only and may not represent the actual allocation at the time of investment.





## Equity

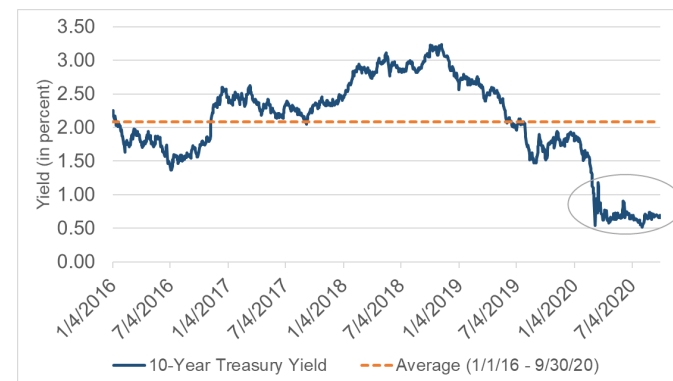
After reaching all-time highs earlier in the year, U.S. equity markets experienced the quickest bear market on record as a result of the Covid-19 pandemic, and then a sharp bull market recovery based on stimuli and optimistic expectations. The market remains bifurcated as many technology and communication companies benefited from lockdown policies, while traditional value sectors like Financials and Energy have been hampered by interest rate pressures and supply/demand imbalances. Certain trends may reverse as cyclicals tend to lead coming out of recessionary environments.



Index performance is for illustrative purposes only and is not indicative of any specific investment. Investors cannot invest directly in an index. Sources: Standard & Poor's and U.S. Census Bureau/Haver Analytics. T. Rowe Price analysis using data from FactSet Research Systems Inc. All rights reserved.

## Rates

The Federal Reserve Board swiftly eased monetary conditions in March by reinstating a zero interest rate regime. It also initiated quantitative easing and other measures to promote liquidity, and pledged to remain supportive to aid the recovery. Treasury yield levels across the curve are reminiscent of the then-record-lows in the aftermath of the Great Recession and are likely to be a prospective challenge for bond investors.



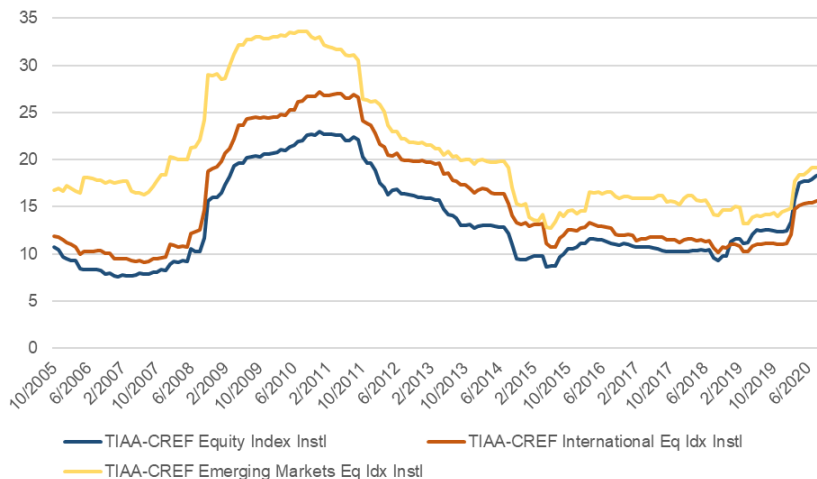
Source: www.treasury.gov.

## Going Forward

Elevated uncertainty remains as the world vigilantly waits for a trusted vaccine. The economic and financial recovery remain tied to the current health crisis and time will tell how quickly this will end. In these trying times, we remain committed to the same tenets of long-term portfolio construction: **diversification, patience, and prudent asset allocation.**

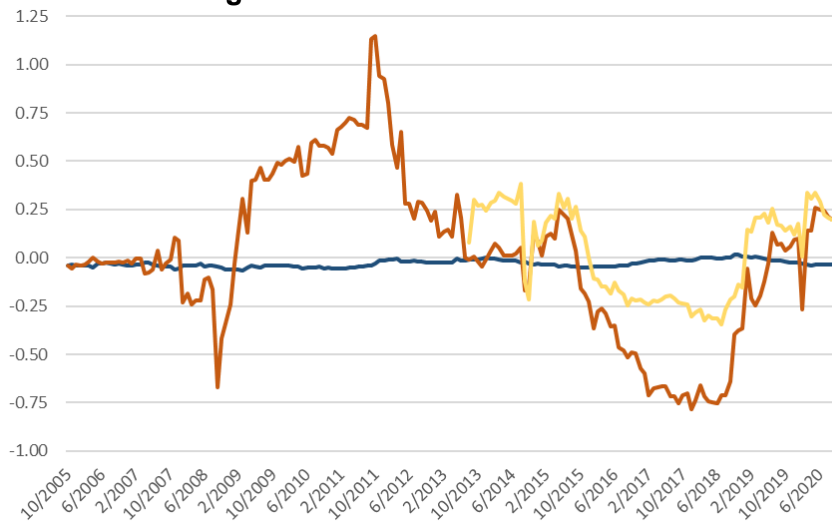
# Putting This Year's Volatility in Context

## Rolling 3-Year Standard Deviations



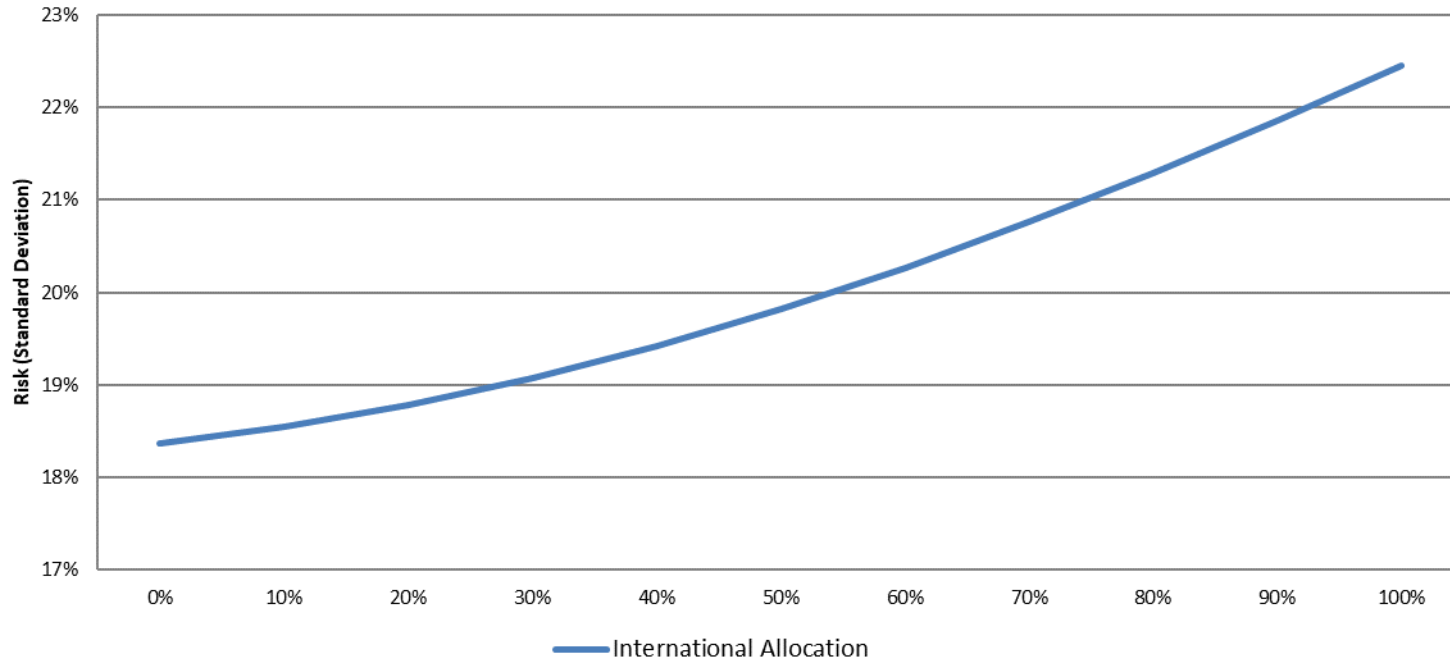
The TIAA-CREF Emerging Markets Equity Index Fund was inceptioned in 2010. Before then, the fund's benchmark was used.

## Rolling 3-Year Excess Standard Deviations



- The plan's primary equity index funds saw their three-year standard deviation tick up with this year's heightened volatility.
- However, all three are still well below the levels seen during the Global Financial Crisis.
- Recent convergence indicates that volatility has affected these three markets by similar magnitudes.
  - Could be a sign of increased globalization or cross-border pricing efficiency.
- Excess standard deviations relative to each fund's respective benchmark can be either positive or negative.
- The two international equity index funds experience higher excess volatility due to exogenous factors like fair value pricing.
- Over the long run, each fund still maintains a volatility profile similar to that of its index.

Portfolio Risk as a Function of International Allocation  
2000 - 2019



\* Russell 3000 for domestic equity, MSCI EAFE for international developed markets equity, and MSCI EM for emerging markets equity (80% developed markets and 20% emerging markets, in line with the current allocation in ScholarShare 529).

- An international allocation of 20%-40% is meaningful enough to reap the benefits of global diversification, but not too much to hurt performance if foreign markets temporarily fall out of favor
- An allocation greater than 50% suggests that any potential incremental return is outweighed by taking on a disproportionate large amount of risk

# Duration in the Active Enrollment Year Portfolio

## Interest Rate Sensitivity of Fixed Income and Short-Term Investments

	MetWest Total Return Bond Fund	PIMCO Real Return Instl Fund	PIMCO Income Instl Fund	T. Rowe Price Instl Floating Rate Fund	TC Life Funding Agreement	Weighted Average Duration (Years)
<b>Portfolio Effective Duration*</b>	5.54	8.29	1.86	0.39	0.00	
<b>2036/2037 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2034/2035 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2032/2033 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2030/2031 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2028/2029 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2026/2027 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2024/2025 Enrollment Portfolio Active</b>	50%	20%	20%	10%	0%	4.8
<b>2022/2023 Enrollment Portfolio Active</b>	42%	17%	17%	8%	16%	4.1
<b>2020/2021 Enrollment Portfolio Active</b>	27%	11%	11%	5%	47%	2.6
<b>Enrollment Year Portfolio Active</b>	21%	8%	8%	4%	59%	2.0

\*As of 8/31/2020.

- Each portfolio is short duration relative to the Bloomberg Barclays U.S. Aggregate Index (6.09 years), which is a prudent strategy for a low yield environment

# Duration in the Passive Enrollment Year Portfolio

## Interest Rate Sensitivity of Fixed Income and Short-Term Investments

	TIAA-CREF Bond Index Fund	TIAA-CREF Inflation-Linked Bond Fund	TIAA-CREF High Yield Fund	TC Life Funding Agreement	Weighted Average Duration (Years)
<b>Portfolio Effective Duration*</b>	6.06	4.91	3.77	0.00	
<b>2036/2037 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2034/2035 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2032/2033 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2030/2031 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2028/2029 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2026/2027 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2024/2025 Enrollment Portfolio Passive</b>	70%	20%	10%	0%	5.6
<b>2022/2023 Enrollment Portfolio Passive</b>	59%	17%	8%	16%	4.7
<b>2020/2021 Enrollment Portfolio Passive</b>	37%	11%	5%	47%	3.0
<b>Enrollment Year Portfolio Passive</b>	29%	8%	4%	59%	2.3

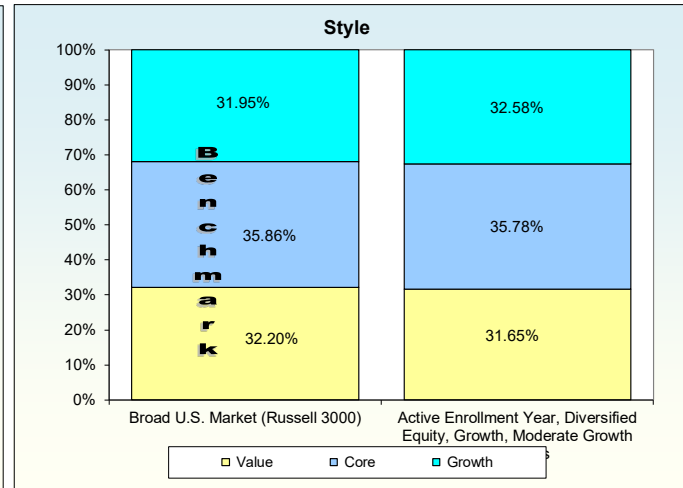
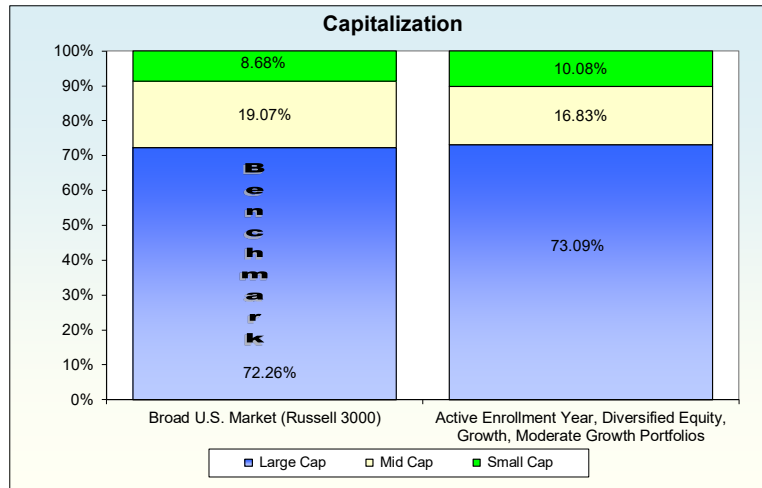
\*As of 8/31/2020.

- Similar to the Active glide path, each portfolio is short duration relative to the Bloomberg Barclays U.S. Aggregate Index (6.09 years)

- TFI reviewed the current domestic equity allocation compared to each of the Morningstar 9 Style categories in relation to the broad domestic equity index (Russell 3000 Index).
- TFI's philosophy in developing a domestic equity strategy is to maintain a neutral and balanced position in both style (growth vs. value) and capitalization (large cap, mid cap, and small cap) to the Russell 3000 Index.
- The style and capitalization weightings for the domestic equity component of the Active Enrollment Year Portfolio and Active Multi-Fund Portfolios with U.S. equity exposure are in line with those of the Russell 3000 Index.

# Domestic Equity Composition: Market Cap and Style

Benchmarks	Asset Allocation	Capitalization Analysis				Style Analysis			
	Active Enrollment Year, Diversified Equity, Growth, Moderate Growth Portfolios	Large Cap	Mid Cap	Small Cap	Total	Value	Core	Growth	Total
Russell 1000 Value Index	45.00%	75.29%	22.36%	2.35%	100.00%	50.06%	36.32%	13.63%	100.00%
Russell 1000 Growth Index	45.00%	87.14%	12.35%	0.51%	100.00%	14.90%	35.25%	49.85%	100.00%
Russell Mid Cap Value Index	0.00%	21.03%	71.25%	7.72%	100.00%	40.78%	40.15%	19.08%	100.00%
Russell Mid Cap Growth Index	0.00%	30.69%	66.54%	2.77%	100.00%	9.47%	34.67%	55.86%	100.00%
Russell 2000 Index	10.00%	0.00%	12.12%	87.88%	100.00%	24.17%	35.75%	40.08%	100.00%
S&P 500 Index	0.00%	87.33%	12.51%	0.17%	100.00%	34.64%	34.85%	30.52%	100.00%
Russell 3000 Index	0.00%	76.53%	17.30%	6.17%	100.00%	32.24%	33.99%	33.77%	100.00%
<b>Total Blended Portfolio</b>	<b>100.00%</b>								
<b>Broad U.S. Market (Russell 3000)</b>		<b>72.26%</b>	<b>19.07%</b>	<b>8.68%</b>	<b>100.00%</b>	<b>32.20%</b>	<b>35.86%</b>	<b>31.95%</b>	<b>100.00%</b>
<b>Active Enrollment Year, Diversified Equity, Growth, Moderate Growth Portfolios</b>		<b>73.09%</b>	<b>16.83%</b>	<b>10.08%</b>	<b>100.00%</b>	<b>31.65%</b>	<b>35.78%</b>	<b>32.58%</b>	<b>100.00%</b>



# Domestic Equity Composition: Style Box Comparison

Benchmarks	Asset Allocation Active Enrollment Year, Diversified Equity, Growth, Moderate Growth Portfolios	Morningstar 9 Style Categories									
		Large Value	Large Core	Large Growth	Mid Value	Mid Core	Mid Growth	Small Value	Small Core	Small Growth	Total
Russell 1000 Value Index	45.00%	39.48%	27.29%	8.52%	9.28%	8.32%	4.77%	1.30%	0.70%	0.34%	100.00%
Russell 1000 Growth Index	45.00%	13.60%	31.40%	42.14%	1.22%	3.68%	7.44%	0.08%	0.17%	0.26%	100.00%
Russell Mid Cap Value Index	0.00%	8.22%	10.51%	2.30%	28.28%	27.32%	15.65%	4.28%	2.31%	1.13%	100.00%
Russell Mid Cap Growth Index	0.00%	2.45%	13.93%	14.32%	6.57%	19.85%	40.12%	0.45%	0.89%	1.42%	100.00%
Russell 2000 Index	10.00%	0.00%	0.00%	0.00%	0.70%	3.11%	8.31%	23.47%	32.64%	31.78%	100.00%
S&P 500 Index	0.00%	28.98%	30.52%	27.84%	5.50%	4.33%	2.68%	0.17%	0.00%	0.00%	100.00%
Russell 3000 Index	0.00%	24.44%	26.10%	26.00%	5.75%	5.72%	5.83%	2.04%	2.17%	1.95%	100.00%
<b>Total Blended Portfolio</b>	<b>100.00%</b>										

Broad Market (Russell 3000)	24.44%	26.10%	26.00%	5.75%	5.72%	5.83%	2.04%	2.17%	1.95%	100.00%
Active Enrollment Year, Diversified Equity, Growth, Moderate Growth Portfolios	23.88%	26.41%	22.80%	4.79%	5.71%	6.32%	2.97%	3.66%	3.45%	100.00%

Difference in Portfolios vs. Broad Market			
Active Enrollment Year, Diversified Equity, Growth, Moderate Growth Portfolios	Value	Core	Growth
Large Cap	-0.56%	0.31%	-3.20%
Mid Cap	-0.96%	-0.01%	0.50%
Small Cap	0.93%	1.49%	1.50%



# Recent Fee Changes for Underlying Funds

Underlying Fund	Date of Fee Change	Previous	Current	Change
DFA Emerging Markets Core Equity I Portfolio	2/28/2020	0.52%	0.48%	<b>-0.04%</b>
T. Rowe Price Instl Large Cap Value Fund	5/1/2020	0.57%	0.56%	<b>-0.01%</b>
TIAA-CREF Real Estate Securities Fund	8/1/2020	0.51%	0.50%	<b>-0.01%</b>
DFA Large Cap International Portfolio	2/28/2020	0.23%	0.22%	<b>-0.01%</b>
T. Rowe Price Instl Floating Rate Fund	10/1/2020	0.57%	0.58%	<b>0.01%</b>
MetWest Total Return Bond Fund	7/29/2020	0.37%	0.38%	<b>0.01%</b>

- Expense ratios for some underlying funds have seen small changes over the past year
- As a whole, fees continue to gradually come down, following the general industry trend for fund pricing

## Enrollment Year Portfolios...

- have been performing as expected and will be going through biannual updates this spring

## Market Volatility...

- brought on by the pandemic had varying affects on the markets, but we remain committed to the same proven tenets of strategic asset allocation and portfolio construction, which will serve investors over the long run

## Portfolio Allocations...

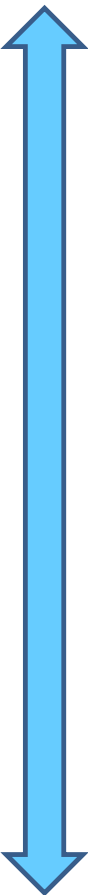
- to international equity and exposure to interest rate sensitivity remain reasonable

## Prospective Investment Outcomes...

- may be more moderate than past results due to current valuations and low return expectations for the major asset classes, but results from the Monte Carlo analysis help quantify future outcomes and support current asset allocations

# Appendix 1: TFI Asset Allocation Process

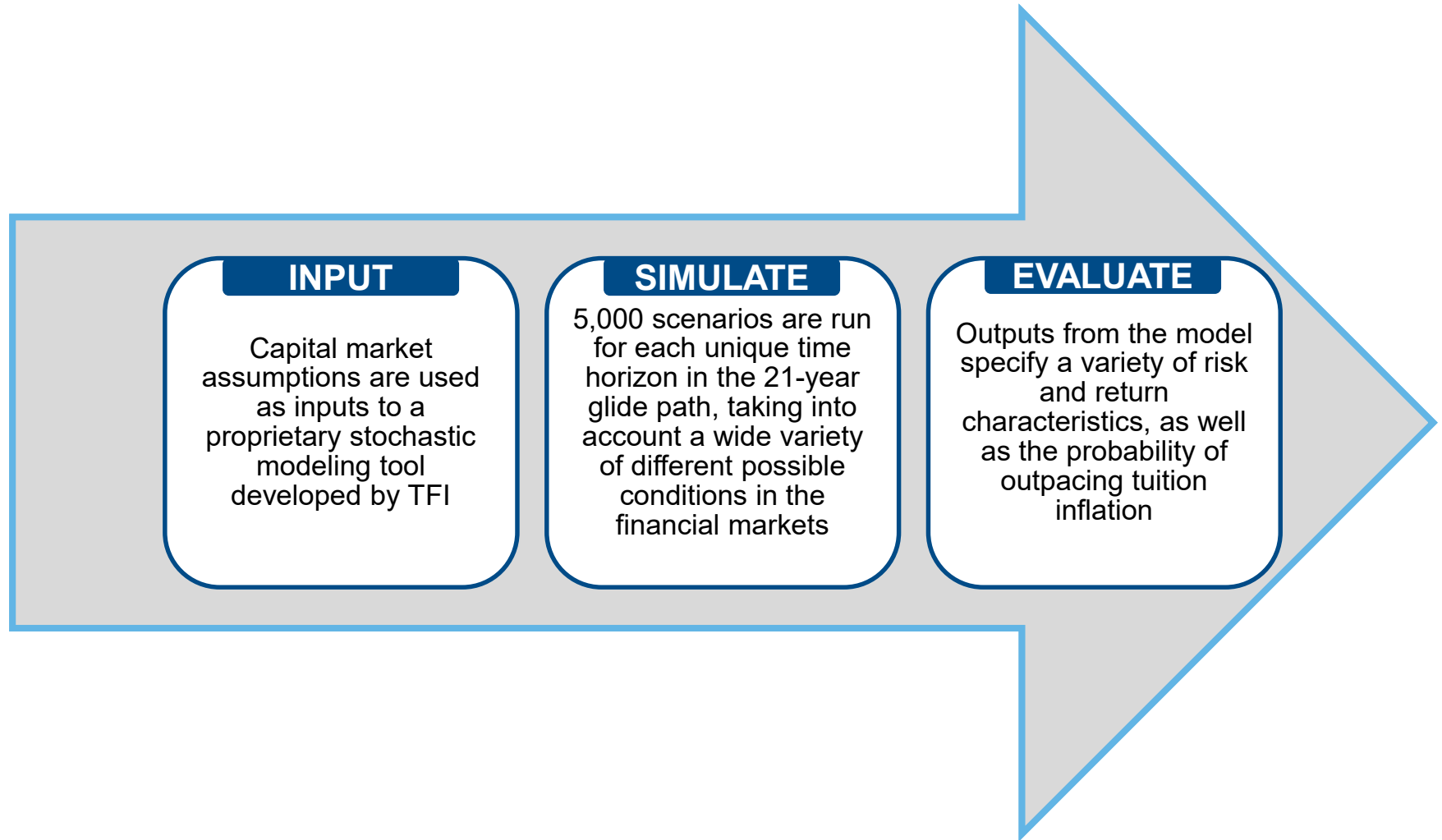
# The Importance of Diversification

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Highest 	27.9 Real Estate	13.6 TIPS	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
	18.9 EM Stocks	8.3 Real Estate	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
	16.9 US Stocks	7.8 Bond	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
	14.3 HY Bond	6.4 Global 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
	10.4 Bank Loan	5.4 HY Bond	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	1.6 ST 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
	6.5 Bond	1.5 Bank Loan	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 TIPS	1.0 US Stocks	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
	5.2 Global Bond	0.0 MM	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
	2.8 ST Bond	-12.1 Intl 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
Lowest	0.0 MM	-18.4 EM Stocks	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

# 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.

- 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

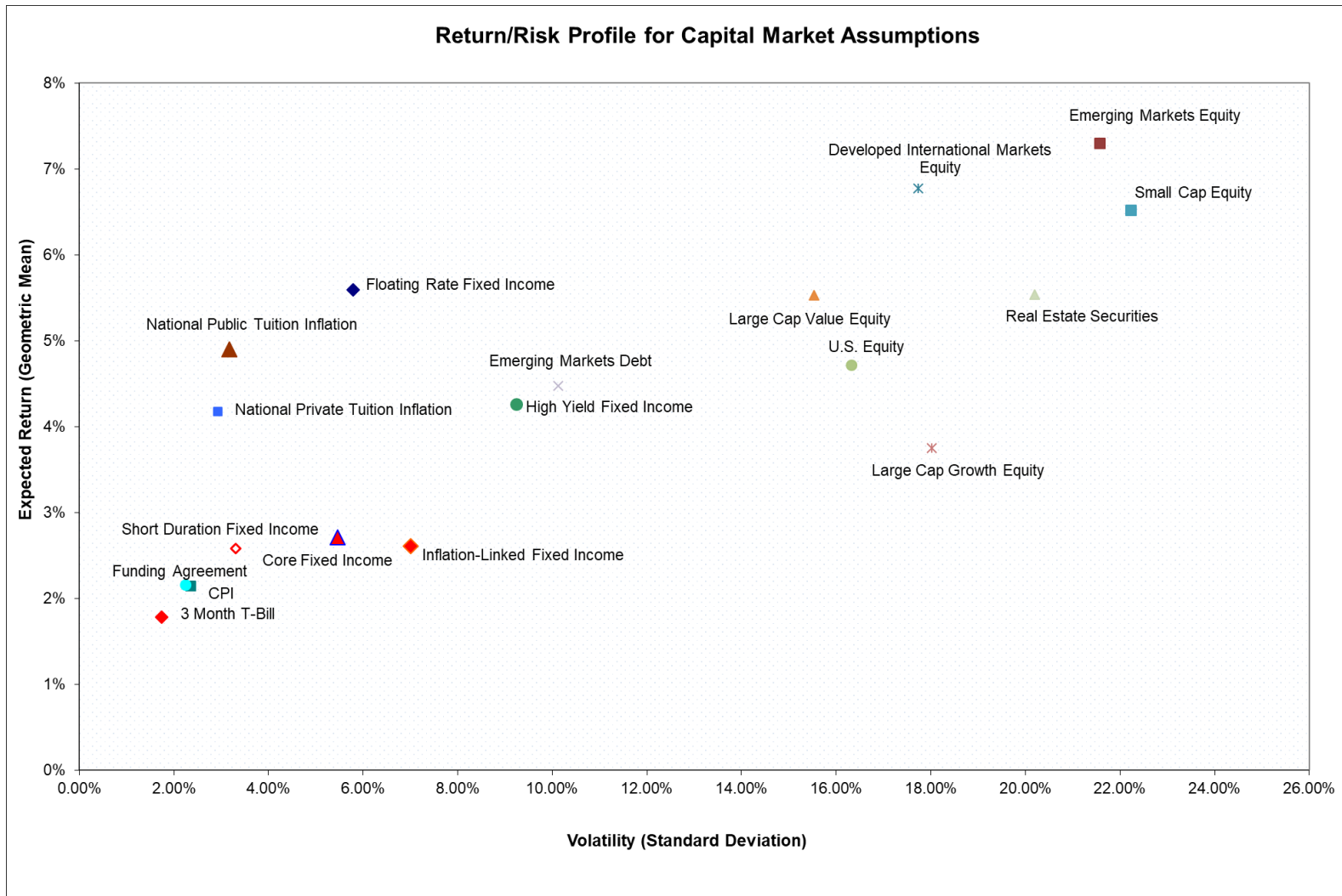


# Asset Allocation Assumptions

Variables	Benchmarks	Capital Market Assumptions (source: Ibbotson)	
		Returns (Long-Term Average)	Volatility (Standard Deviation)
U.S. Equity	Russell 3000 Index	4.72%	16.32%
Large Cap Growth Equity	Russell 1000 Growth Index	3.75%	18.02%
Large Cap Value Equity	Russell 1000 Value Index	5.53%	15.53%
Small Cap Equity	Russell 2000 Index	6.52%	22.22%
Developed International Equity	MSCI EAFE Index	6.77%	17.74%
Emerging Markets Equity	MSCI Emerging Markets Index	7.30%	21.57%
Core Fixed Income	Bloomberg Barclays U.S. Aggregate Bond Index	2.71%	5.46%
Floating Rate Fixed Income	Credit Suisse Leveraged Loan Index	5.59%	5.79%
Emerging Markets Debt	JPM EMBI Global Diversified Index	4.47%	10.13%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	4.26%	9.24%
TIPS	Bloomberg Barclays Inflation-Linked U.S. TIPS Index	2.61%	7.01%
Intermediate-Term TIPS	Bloomberg Barclays Inflation-Linked 1-10 Year U.S. TIPS Index	2.78%	5.43%
Short-Term Fixed Income	Bloomberg Barclays U.S. 1-3 Year Government/Credit Bond Index	2.58%	3.31%
Real Estate Securities	FTSE NAREIT All Equity REITs Index	5.54%	20.19%
CPI	Consumer Price Index - All Urban Consumers	2.14%	2.35%
3 Month T-Bill	BofAML US Treasury Bill 3 Month Index	1.78%	1.74%
TIAA Life Funding Agreement	Funding Agreement	2.16%	2.24%
<b>Additional Variables (sources: The College Board and TIAA-CREF Tuition Financing, Inc.)</b>			
	National Private Tuition Inflation	4.17%	2.93%
	National Public Tuition Inflation	4.89%	3.17%



# Asset Allocation Assumptions



Correlation Matrix (Expected Relationship Between Pairs of Asset Classes)

	TC Life Funding Agreement	BofAML U.S. 3-Month Treasury Bill / iMoneyNet	JPM EMBI Global Diversified Index	BBarclays U.S. Aggregate Bond Index	BBarclays U.S. Universal Index	BBarclays U.S. TIPS Year Index	BBarclays U.S. TIPS 1-10 Year Index	BBarclays U.S. 1-3 Year Gov't / Credit Bond Index	BBofAML US HY BB/B Cash Pay Index	Credit Suisse Leveraged Loan Index	FTSE NAREIT All Equity REITs Index	Russell 3000 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	0.04	1.00															
JPM EMBI Global Diversified Index	0.40	0.03	1.00														
BBarclays U.S. Aggregate Bond Index	0.69	0.19	0.34	1.00													
BBarclays U.S. Universal Index	0.66	0.07	0.74	0.90	1.00												
BBarclays U.S. TIPS Year Index	0.41	0.04	0.36	0.87	0.66	1.00											
BBarclays U.S. TIPS 1-10 Year Index	0.12	0.12	0.74	0.84	0.84	0.97	1.00										
BBarclays U.S. 1-3 Year Gov't / Credit Bond Index	0.76	0.35	0.30	0.27	0.94	0.59	0.27	1.00									
BBofAML US HY BB/B Cash Pay Index	0.38	0.05	0.44	0.57	0.39	0.32	0.63	0.38	1.00								
Credit Suisse Leveraged Loan Index	-0.16	-0.21	0.81	0.10	0.05	0.44	0.56	-0.33	0.96	1.00							
FTSE NAREIT All Equity REITs Index	0.28	0.03	0.42	0.49	0.24	0.23	0.35	0.23	0.51	0.62	1.00						
Russell 3000 Index	0.33	0.02	0.54	0.33	0.18	0.17	0.28	0.17	0.55	0.70	0.50	1.00					
Russell 1000 Value Index	0.32	0.04	0.53	0.30	0.16	0.16	0.22	0.16	0.53	0.63	0.58	0.93	1.00				
Russell 1000 Growth Index	0.31	-0.01	0.50	0.35	0.14	0.14	0.33	0.12	0.48	0.73	0.44	0.91	0.82	1.00			
Russell 2000 Index	0.28	-0.01	0.48	0.28	0.05	0.11	0.24	0.06	0.49	0.63	0.59	0.79	0.79	0.77	1.00		
MSCI EAFE Index	0.20	0.00	0.65	0.32	0.13	0.18	0.37	0.13	0.48	0.69	0.49	0.65	0.65	0.62	0.62	1.00	
MSCI Emerging Markets Index	0.06	-0.04	0.58	0.50	-0.02	0.09	0.62	-0.02	0.42	0.79	0.43	0.66	0.66	0.64	0.64	0.70	1.00

Tuition data are sourced from the 2019 College Board Trends in Tuition Pricing.

**Private 4-year Tuition Inflation:**

$$T(t) = 0.0244 + i(t) + 0.0137 * S(t-1) + 0.1622 * B(t) + 0.2750 * R(t-1) - 0.1990 * GDP + e1(t)$$

Expected Value = 4.17%

**Public Tuition Inflation:**

$$T(t) = 0.0475 + i(t) - 0.0034 * S(t-1) + 0.2312 * B(t) + 0.2317 * R(t-1) - 0.9249 * GDP + e2(t)$$

Expected Value = 4.89%

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 (Barclays Capital 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 (2.20%) for the next 10 years (source: Federal Reserve Bank of Philadelphia),

e1(t) is the random error term following a logistic distribution (0%, 0.01%) with a zero mean and standard deviation of 2.10%,

e2(t) is the random error term following a lognormal distribution (-0.01%, 0.01%) with a zero mean and standard deviation of 2.23%

Regression is based on data from 1977-2019.

For 2019-2020 school year, average tuition and fees were: \$10,440 for all in-state public colleges and \$36,880 for private 4-year colleges; based on most recent data 66% enrolled in public colleges and 34% enrolled in private colleges. The enrollment-weighted average tuition and fees for all colleges were \$19,430 = \$10,440 \* 66% + \$36,880 \* 34%. The forecasted enrollment-weighted average tuition and fees for year 1 are \$20,290 = \$10,440 \* (1+4.89%) \* 66% + \$38,418 \* (1 + 4.17%) \* 34%. Therefore, the public / private enrollment weighted tuition inflation rate for year 1 is: 4.43% = \$20,290 / \$19,430 - 1

# Enrollment Year Portfolio Simulation Results

## Results of Monte Carlo Simulation

### Passive Enrollment Portfolio

Bene's Age	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
	Domestic Equities	Int'l Equities	Emerging Market Equities	Real Estate Securities	Core Fixed Income	Inflation-Linked Bond	High Yield Fund	Funding Agreement								
0	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	21	3.72%	2.06%	4.43%	36.22%	46.10%	96.60%	-2.53%
1	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	20	3.76%	2.10%	4.43%	36.58%	47.92%	96.02%	-2.49%
2	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	19	3.71%	2.10%	4.43%	35.84%	47.02%	96.14%	-2.46%
3	49.15%	18.70%	4.70%	5.45%	15.40%	4.40%	2.20%	0.00%	18	3.68%	2.08%	4.43%	34.06%	45.50%	96.00%	-2.45%
4	47.90%	18.20%	4.60%	5.30%	16.80%	4.80%	2.40%	0.00%	17	3.65%	2.12%	4.43%	34.80%	47.46%	95.84%	-2.43%
5	46.65%	17.75%	4.45%	5.15%	18.20%	5.20%	2.60%	0.00%	16	3.61%	2.15%	4.43%	34.86%	47.00%	95.32%	-2.49%
6	45.40%	17.30%	4.30%	5.00%	19.60%	5.60%	2.80%	0.00%	15	3.60%	2.10%	4.43%	33.44%	47.18%	95.68%	-2.39%
7	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%	14	3.54%	2.14%	4.43%	32.30%	47.92%	95.04%	-2.39%
8	42.80%	16.30%	4.10%	4.80%	22.40%	6.40%	3.20%	0.00%	13	3.54%	2.16%	4.43%	33.84%	49.06%	95.02%	-2.39%
9	40.30%	15.35%	3.85%	4.50%	25.20%	7.20%	3.60%	0.00%	12	3.48%	2.10%	4.43%	31.34%	49.14%	95.20%	-2.34%
10	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%	11	3.43%	2.07%	4.43%	30.24%	49.88%	94.86%	-2.32%
11	34.00%	12.95%	3.25%	3.80%	32.20%	9.20%	4.60%	0.00%	10	3.32%	2.04%	4.43%	27.94%	49.24%	94.58%	-2.31%
12	30.20%	11.50%	2.90%	3.40%	36.40%	10.40%	5.20%	0.00%	9	3.31%	2.00%	4.43%	27.34%	52.20%	94.80%	-2.27%
13	26.45%	10.05%	2.55%	2.95%	37.10%	10.60%	5.30%	5.00%	8	3.23%	1.95%	4.43%	24.70%	53.70%	94.98%	-2.22%
14	22.70%	8.60%	2.20%	2.50%	37.80%	10.80%	5.40%	10.00%	7	3.23%	1.98%	4.43%	24.34%	57.70%	94.74%	-2.17%
15	19.20%	7.30%	1.85%	2.15%	32.90%	9.40%	4.70%	22.50%	6	3.12%	1.94%	4.43%	24.08%	60.54%	94.54%	-2.23%
16	15.70%	6.00%	1.50%	1.80%	28.00%	8.00%	4.00%	35.00%	5	3.13%	1.97%	4.43%	23.52%	67.20%	94.88%	-2.22%
17	12.55%	4.80%	1.20%	1.45%	26.25%	7.50%	3.75%	42.50%	4	3.11%	2.03%	4.43%	24.88%	76.32%	93.88%	-2.26%
18	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	3	3.05%	2.25%	4.43%	25.72%	85.56%	91.82%	-2.41%
19	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	2	3.09%	2.77%	4.43%	30.28%	93.40%	86.72%	-2.78%
20+	9.40%	3.60%	0.90%	1.10%	24.50%	7.00%	3.50%	50.00%	1	3.05%	3.91%	4.43%	35.40%	99.00%	78.22%	-3.70%

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

# Enrollment Year Portfolio Simulation Results

## Results of Monte Carlo Simulation

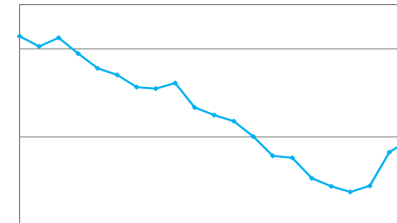
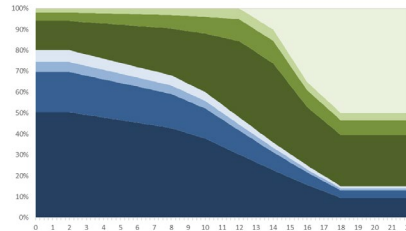
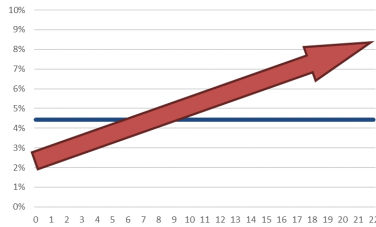
### Active Enrollment Portfolio

Bene's Age	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	Small Cap Equity	Real Estate Securities	Int'l Equities	Emerging Market Equities	Core Fixed Income	Inflation-Linked Bond	Floating Rate	Funding Agreement								
0	22.70%	22.70%	5.00%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%	21	3.80%	2.03%	4.43%	36.74%	46.88%	96.54%	-2.46%
1	22.70%	22.70%	5.00%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%	20	3.83%	2.07%	4.43%	38.04%	49.62%	96.60%	-2.46%
2	22.70%	22.70%	5.00%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%	19	3.79%	2.09%	4.43%	36.84%	48.28%	96.46%	-2.42%
3	22.15%	22.15%	4.90%	5.45%	18.65%	4.70%	15.40%	4.40%	2.20%	0.00%	18	3.76%	2.06%	4.43%	35.64%	47.98%	96.44%	-2.40%
4	21.60%	21.60%	4.80%	5.30%	18.10%	4.60%	16.80%	4.80%	2.40%	0.00%	17	3.72%	2.09%	4.43%	36.52%	48.76%	95.96%	-2.41%
5	21.00%	21.00%	4.65%	5.20%	17.70%	4.45%	18.20%	5.20%	2.60%	0.00%	16	3.69%	2.12%	4.43%	35.36%	48.60%	95.50%	-2.41%
6	20.40%	20.40%	4.50%	5.10%	17.30%	4.30%	19.60%	5.60%	2.80%	0.00%	15	3.67%	2.06%	4.43%	34.96%	48.58%	96.20%	-2.36%
7	19.85%	19.85%	4.40%	4.95%	16.80%	4.15%	21.00%	6.00%	3.00%	0.00%	14	3.64%	2.11%	4.43%	33.70%	49.42%	95.70%	-2.33%
8	19.30%	19.30%	4.30%	4.80%	16.30%	4.00%	22.40%	6.40%	3.20%	0.00%	13	3.61%	2.12%	4.43%	34.46%	50.44%	95.48%	-2.33%
9	18.15%	18.15%	4.05%	4.50%	15.35%	3.80%	25.20%	7.20%	3.60%	0.00%	12	3.56%	2.07%	4.43%	33.02%	50.54%	95.58%	-2.30%
10	17.00%	17.00%	3.80%	4.20%	14.40%	3.60%	28.00%	8.00%	4.00%	0.00%	11	3.52%	2.03%	4.43%	31.30%	51.30%	95.56%	-2.25%
11	15.30%	15.30%	3.40%	3.80%	12.95%	3.25%	32.20%	9.20%	4.60%	0.00%	10	3.40%	2.00%	4.43%	29.10%	51.02%	95.26%	-2.26%
12	13.60%	13.60%	3.00%	3.40%	11.50%	2.90%	36.40%	10.40%	5.20%	0.00%	9	3.38%	1.95%	4.43%	28.82%	53.56%	95.80%	-2.22%
13	11.90%	11.90%	2.65%	2.95%	10.05%	2.55%	37.10%	10.60%	5.30%	5.00%	8	3.30%	1.90%	4.43%	25.84%	55.34%	95.82%	-2.16%
14	10.20%	10.20%	2.30%	2.50%	8.60%	2.20%	37.80%	10.80%	5.40%	10.00%	7	3.30%	1.93%	4.43%	25.60%	59.46%	95.48%	-2.12%
15	8.65%	8.65%	1.90%	2.15%	7.30%	1.85%	32.90%	9.40%	4.70%	22.50%	6	3.18%	1.89%	4.43%	24.68%	62.34%	95.22%	-2.17%
16	7.10%	7.10%	1.50%	1.80%	6.00%	1.50%	28.00%	8.00%	4.00%	35.00%	5	3.18%	1.93%	4.43%	24.46%	68.74%	95.04%	-2.17%
17	5.65%	5.65%	1.25%	1.45%	4.80%	1.20%	26.25%	7.50%	3.75%	42.50%	4	3.17%	1.99%	4.43%	25.34%	77.70%	94.52%	-2.20%
18	4.20%	4.20%	1.00%	1.10%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%	3	3.10%	2.20%	4.43%	26.02%	86.34%	92.68%	-2.36%
19	4.20%	4.20%	1.00%	1.10%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%	2	3.14%	2.70%	4.43%	30.56%	94.08%	88.22%	-2.71%
20+	4.20%	4.20%	1.00%	1.10%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%	1	3.08%	3.82%	4.43%	36.14%	98.98%	79.74%	-3.66%

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

- **(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.

# Glide Path Simulation Summary



## Outpacing tuition inflation is associated with

- Long time horizons for investing
- High capital market assumptions for capital appreciation
- Gradually de-risking the portfolio over time to preserve assets when needed

## Asset class diversification

- Forms the building blocks for a goals-based portfolio
- Is a measured way to integrate many investment characteristics
- Can improve an investor's long-term risk/reward profile

## Tuition Inflation

- Probabilities follow the "inverse J" pattern
- Continues to be in the range of 4-5%, which exceeds the long-term capital market assumption for several asset classes, creating challenges

## Appendix 2: Other Supporting Material



# Active Investment Portfolios

## Active Enrollment Year Portfolio

Enrollment Year	T. Rowe Price Instl Large Cap Growth Fund	T. Rowe Price Instl Large Cap Value Fund	T. Rowe Price Instl Floating Rate Fund	TIAA-CREF Quant Small-Cap Equity Instl	TIAA-CREF Real Estate Securities Fund	DFA Large Cap Intl Portfolio	DFA Emerging Markets Core Equity I Portfolio	MetWest Total Return Bond Fund	PIMCO Real Return Instl Fund	PIMCO Income Instl Fund	T-C Life Funding Agreement
Tickers	TRLGX	TILCX	RPIFX	TISEX	TIREX	DFALX	DFCEX	MWTSX	PRRIX	PIMIX	
2036/2037 Enrollment Portfolio Active	22.70%	22.70%	2.00%	5.00%	5.60%	19.20%	4.80%	10.00%	4.00%	4.00%	0.00%
2034/2035 Enrollment Portfolio Active	22.70%	22.70%	2.00%	5.00%	5.60%	19.20%	4.80%	10.00%	4.00%	4.00%	0.00%
2032/2033 Enrollment Portfolio Active	21.60%	21.60%	2.40%	4.80%	5.30%	18.10%	4.60%	12.00%	4.80%	4.80%	0.00%
2030/2031 Enrollment Portfolio Active	20.40%	20.40%	2.80%	4.50%	5.10%	17.30%	4.30%	14.00%	5.60%	5.60%	0.00%
2028/2029 Enrollment Portfolio Active	19.30%	19.30%	3.20%	4.30%	4.80%	16.30%	4.00%	16.00%	6.40%	6.40%	0.00%
2026/2027 Enrollment Portfolio Active	17.00%	17.00%	4.00%	3.80%	4.20%	14.40%	3.60%	20.00%	8.00%	8.00%	0.00%
2024/2025 Enrollment Portfolio Active	13.60%	13.60%	5.20%	3.00%	3.40%	11.50%	2.90%	26.00%	10.40%	10.40%	0.00%
2022/2023 Enrollment Portfolio Active	10.20%	10.20%	5.40%	2.30%	2.50%	8.60%	2.20%	27.00%	10.80%	10.80%	10.00%
2020/2021 Enrollment Portfolio Active	7.10%	7.10%	4.00%	1.50%	1.80%	6.00%	1.50%	20.00%	8.00%	8.00%	35.00%
Enrollment Year Portfolio Active	4.20%	4.20%	3.50%	1.00%	1.10%	3.60%	0.90%	17.50%	7.00%	7.00%	50.00%

## Active Multi-Fund Investment Portfolios

Active Diversified Equity Portfolio	28.35%	28.35%		6.30%	7.00%	24.00%	6.00%				
Active Growth Portfolio	19.85%	19.85%	3.00%	4.40%	4.90%	16.80%	4.20%	15.00%	6.00%	6.00%	
Active Moderate Growth Portfolio	11.34%	11.34%	6.00%	2.52%	2.80%	9.60%	2.40%	30.00%	12.00%	12.00%	
Active Diversified Fixed Income Portfolio			10.00%					50.00%	20.00%	20.00%	
Active Conservative Portfolio			5.00%					25.00%	10.00%	10.00%	50.00%
Active International Equity Portfolio						80.00%	20.00%				

## Active Single Fund Investment Portfolios

	TIAA-CREF Social Choice Equity Fund	T-C Life Funding Agreement
Tickers	TISCX	
Social Choice Portfolio	100.00%	
Principal Plus Interest Portfolio		100.00%

Glide Path asset allocations are as reflected in the Plan Description.

# Passive Investment Portfolios

Passive Enrollment Year Portfolio								
Enrollment Year	TIAA-CREF Equity Index Fund	TIAA-CREF International Equity Index Fund	TIAA-CREF Emerging Markets Equity Index Fund	TIAA-CREF Real Estate Securities Fund	TIAA-CREF Bond Index Fund	TIAA-CREF Inflation-Linked Bond Fund	TIAA-CREF High Yield Fund	T-C Life Funding Agreement
Tickers	TIEIX	TCIEX	TEQLX	TIREX	TBIIX	TIILX	TIHYX	
2036/2037 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
2034/2035 Enrollment Portfolio Passive	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
2032/2033 Enrollment Portfolio Passive	47.90%	18.20%	4.60%	5.30%	16.80%	4.80%	2.40%	0.00%
2030/2031 Enrollment Portfolio Passive	45.40%	17.30%	4.30%	5.00%	19.60%	5.60%	2.80%	0.00%
2028/2029 Enrollment Portfolio Passive	42.80%	16.30%	4.10%	4.80%	22.40%	6.40%	3.20%	0.00%
2026/2027 Enrollment Portfolio Passive	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%
2024/2025 Enrollment Portfolio Passive	30.20%	11.50%	2.90%	3.40%	36.40%	10.40%	5.20%	0.00%
2022/2023 Enrollment Portfolio Passive	22.70%	8.60%	2.20%	2.50%	37.80%	10.80%	5.40%	10.00%
2020/2021 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 Multi-Fund Investment Portfolios								
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%	
Passive Moderate Growth Portfolio	25.20%	9.60%	2.40%	2.80%	42.00%	12.00%	6.00%	
Passive Diversified Fixed Income Portfolio					70.00%	20.00%	10.00%	
Passive Conservative Portfolio					35.00%	10.00%	5.00%	50.00%
Index International Equity Portfolio		80.00%	20.00%					

Passive Single Fund Investment Portfolios			
	TIAA-CREF Bond Index Fund	TIAA-CREF S&P 500 Index Fund	TIAA-CREF Equity Index Fund
Tickers	TBIIX	TISPX	TIEIX
Index Bond Portfolio	100.00%		
Index U.S. Large Cap Equity Portfolio		100.00%	
Index U.S. Equity Portfolio			100.00%

Glide Path asset allocations are as reflected in the Plan Description.

# Underlying Funds by Strategy

U. S. Equities	International and Emerging Markets Equities	Fixed Income	Short-Term and Cash Equivalents	Alternative Assets
<b>Index Funds</b>				
T-C Equity Index	T-C International Equity Index	T-C Bond Index		
T-C S&P 500 Index	T-C Emerging Markets Equity Index			
<b>Active Funds</b>				
<i>T. Rowe Price Large-Cap Growth</i>	<i>DFA Large-Cap Int'l</i>	<i>MetWest Total Return Bond</i>	T-C Life Funding Agreement	T-C Real Estate Securities
<i>T. Rowe Price Large-Cap Value</i>	<i>DFA Emerging Markets Core Equity 1</i>	<i>PIMCO Real Return</i>		
T-C Quant Small-Cap Equity		<i>PIMCO Income</i>		
T-C Social Choice Equity		<i>T. Rowe Price Floating Rate</i>		
		T-C Inflation-Linked Bond		
		T-C High Yield		

Colored italics are non-proprietary funds.

# Underlying Funds by Market Value as of 09/30/20

Underlying Funds	Market Value (\$)	% of Assets
T-C Life Funding Agreement	2,160,600,000	20.77%
T-C Equity Index Fund	1,967,400,000	18.91%
T-C Bond Index Fund	1,379,800,000	13.27%
T-C International Equity Index Fund	636,400,000	6.12%
T-C S&P 500 Index Fund	616,800,000	5.93%
Metropolitan West Total Return Bond Fund	564,000,000	5.42%
T. Rowe Price Instl Large Cap Growth Fund	412,000,000	3.96%
T. Rowe Price Instl Large Cap Value Fund	401,900,000	3.86%
T-C Inflation-Linked Bond Fund	363,700,000	3.50%
DFA Large Cap International Fund	361,500,000	3.48%
T-C Real Estate Securities Fund	258,200,000	2.48%
PIMCO Real Return Fund	226,600,000	2.18%
PIMCO Income Fund	225,400,000	2.17%
T-C Social Choice Equity Fund	194,100,000	1.87%
T-C High Yield Bond Fund	181,500,000	1.74%
T-C Emerging Markets Equity Index Fund	160,300,000	1.54%
T. Rowe Price Instl Floating Rate Fund	112,200,000	1.08%
DFA Emerging Markets Core Equity Portfolio	90,600,000	0.87%
T-C Quant Small Cap Equity Fund	88,500,000	0.85%
<b>Total</b>	<b>10,401,500,000</b>	<b>100.00%</b>

# Fixed Income Credit Quality by Portfolio: Active Enrollment Year

Enrollment Year	AAA (Including U.S. Treasury/ Agency)	AA	A	BBB	BB	B	Below B	Not Rated	Investment Grade	High Yield
2036 2037	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2034 2035	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2032 3033	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2030 2031	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2028 2029	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2026 2027	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2024 2025	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2022 2023	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
2020 2021	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%
Enrollment	49.9%	2.4%	5.2%	12.0%	4.6%	7.2%	4.6%	14.3%	69.4%	16.3%

As of 6/30/20. Percentages are reflected as a percent of total fixed income: MetWest Total Return Bond Fund, PIMCO Real Return Fund, PIMCO Income Fund, and T. Rowe Price Institutional Floating Rate Fund. May not sum to 100% due to rounding.



- The blended portfolios are highly diversified across the quality spectrum
- Allocations across the rating tiers are static throughout the glide path as underlying funds remain in constant proportions
- The high yield portion of each portfolio is slightly higher in the Active glide path than the Passive glide path, reflecting differences in fund selection and active management decisions



TIAA-CREF Tuition Financing, Inc.

BUILT TO PERFORM.

CREATED TO SERVE.

## MEMORANDUM

**TO:** ScholarShare Investment Board (SIB)  
**FROM:** Meketa Investment Group (“Meketa”)  
**DATE:** December 10, 2020  
**RE:** 2020 Annual Review

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### Summary

Meketa reviewed TIAA-CREF Tuition Financing, Inc.’s (TFI) annual review and recommendation for the 2020 asset allocation for the ScholarShare 529 (Plan), which highlights their analysis behind the recommendation for no changes. Overall, Meketa concurs with TFI’s analysis and believes the current glidepath is well optimized. *Meketa recommends the SIB accept TFI’s recommendation of no changes to the asset allocation.*

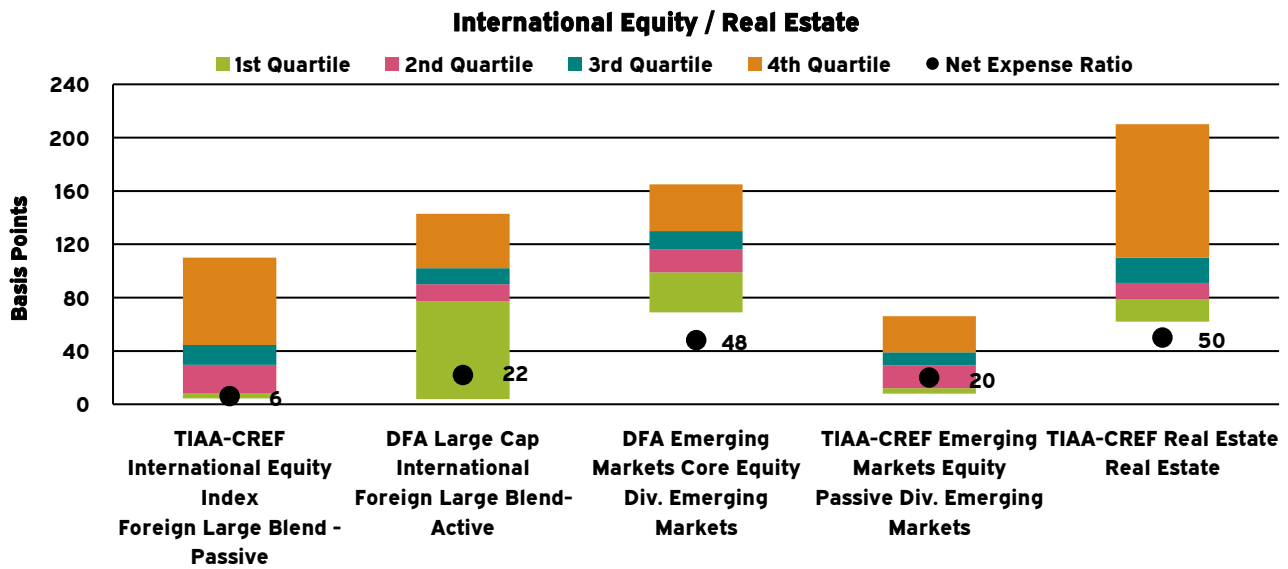
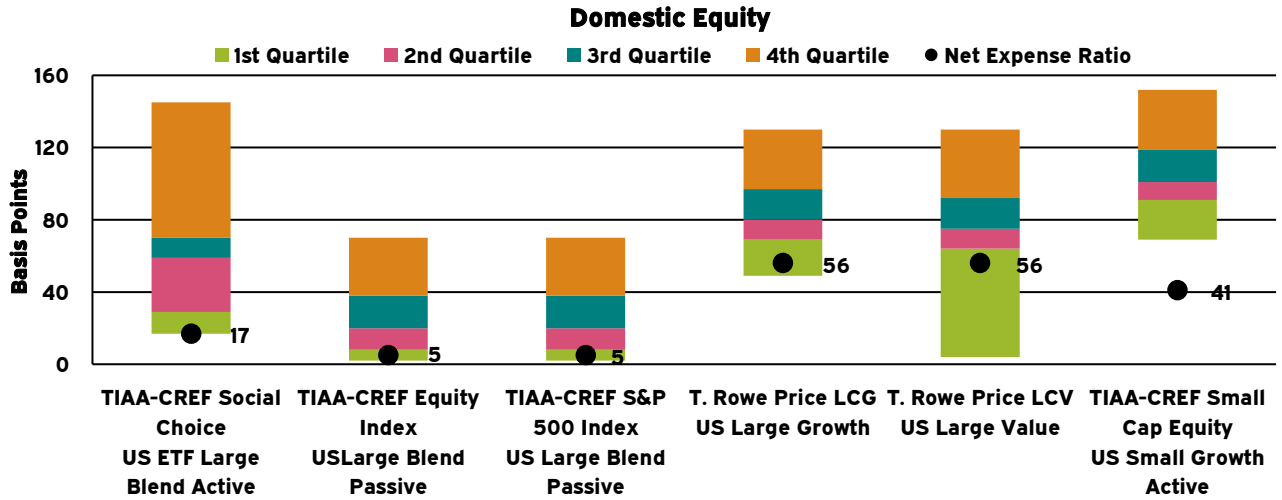
### Background

SIB Staff requested that Meketa review TFI’s annual review and recommendation for the 2021 asset allocation for the ScholarShare 529 (Plan), which highlights TFI’s analysis behind the recommendation for no changes. TFI believes their current glidepaths are sound and that they 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.

Meketa is in concurrence with TIAA’s observation that, “returns may be more moderate than past results due to current valuations and low return expectations for the major asset classes but results from the Monte Carlo analysis help quantify future outcomes and support current asset allocations”. Meketa also anticipates muted returns going forward, as a result of high current valuation levels for US equities and ultra-low fixed income yields. Meketa’s analysis supports that the Plan’s asset allocation is still well optimized despite the lower expected returns. There currently do not appear to be any reasonable asset allocation changes that would increase the expected returns of the Plan without correspondingly increasing the risk exposure of the Plan. As such, we are in concurrence that no changes to the asset allocation should be made at this time.

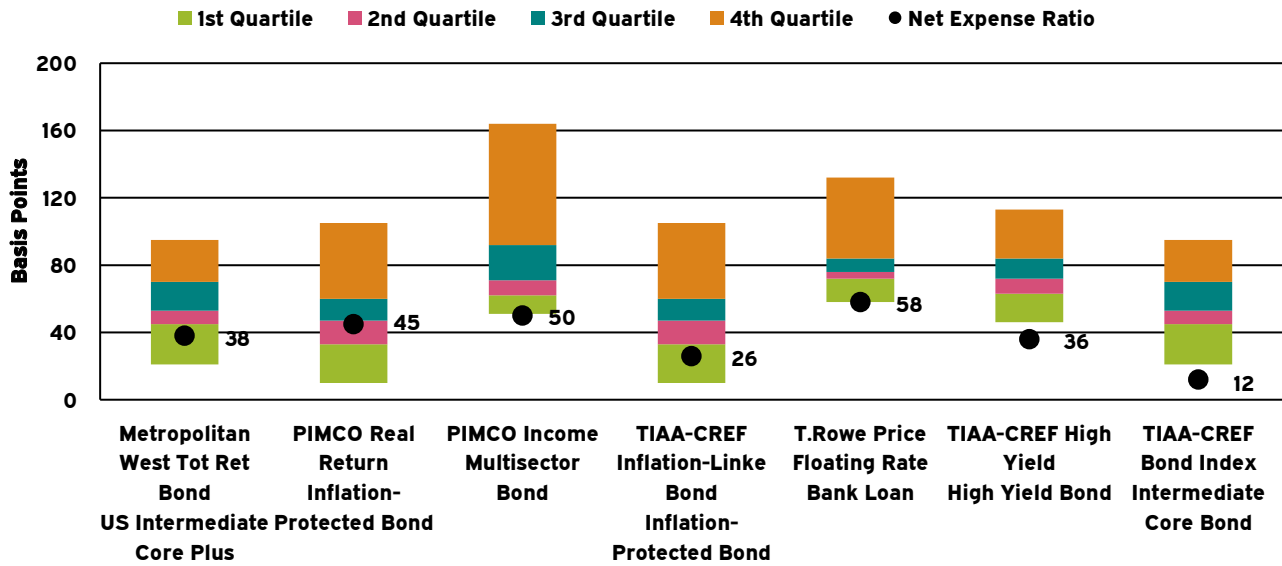
### Underlying Fund Fee Review

Meketa analyzed the fund fees of the underlying investment options within the Plan. Meketa compared each underlying fund’s expense ratio to its Morningstar category and created custom passive and active peer groups for a more relevant comparison. Meketa found that each underlying fund in the Plan has fees that are below median and that the majority of funds have fees that fall within or below the first quartile.





### Fixed Income



### Conclusion

Meketa finds TFI’s analysis of their glidepaths to be comprehensive and insightful and uses consistent and reasonable inputs in developing their conclusions. Meketa agrees that the current glidepaths are sound and should meet TFI’s expectation for a reasonable rate of expected return. In addition, we believe the underlying fund fees are highly competitive relative to peers. Meketa, therefore, concurs with TFI’s analysis and recommendation.