
DECEMBER 8, 2016

**AGENDA ITEM 3
INFORMATION ITEM**

SCHOLARSHARE INVESTMENT BOARD

Review of 2017 Asset Allocation Recommendation for the ScholarShare College Savings 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 the ScholarShare College Savings Plan (Plan) to determine if any changes are necessary to continue to meet its investment objectives.

For 2017, TFI is recommending no changes to the existing asset allocation strategy for the portfolios in the Plan as outlined in its “2017 Asset Allocation Recommendation” (Exhibit A), which highlights the analysis for their recommendation, including a summary of their analysis of the Plan’s age-based portfolios. The Board’s investment consultant, Pension Consulting Alliance, LLC (PCA), has reviewed and analyzed TFI’s recommendation and has provided a memo (Exhibit B) concurring with TFI’s recommendation.

PCA and SIB staff have reviewed and concur with TFI’s recommendation for no changes in 2017 to the existing asset allocation of the investment portfolios for the Plan.

Presenters

Jeremy Thiessen, Senior Director, TIAA-CREF Tuition Financing, Inc.
Eric White, Principal, Pension Consulting Alliance, LLC



SCHOLARSHARE

CALIFORNIA'S 529 COLLEGE SAVINGS PLAN



2017 Asset Allocation Recommendation

Prepared by Tuition Financing, Inc.
December 2016



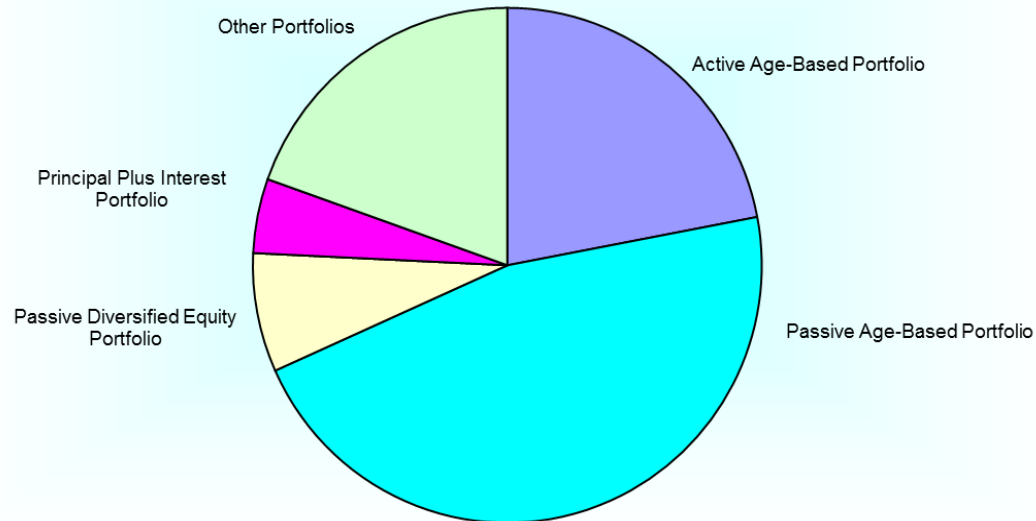
BUILT TO PERFORM.

CREATED TO SERVE.

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- TFI has completed this year's asset allocation study to evaluate the overall reasonableness of the investment strategy for ScholarShare.
- TFI has thoroughly reviewed various risks, sources of return, and overall diversification as follows:
 - In the Age-Based Portfolios, expected returns, volatility, probability of outpacing tuition inflation and short fall risk are all reasonable over expected investment horizon compared to last year's study
 - The new fund added, MetWest Total Return Bond Fund, continues to position well for plausible future market conditions
 - Duration risk for fixed income and short-term investments is within our risk tolerance
 - The equity split between domestic and international is consistent with the efficient frontier
 - The U.S. equity style and capitalization allocations are well balanced
 - Reviewed the two PIMCO Funds and removed them from our "watch list"
- Based on the evaluation of the above criteria, TFI recommends no changes to the current asset allocation strategy.

Assets as of 09/30/16: \$6.930 Billion



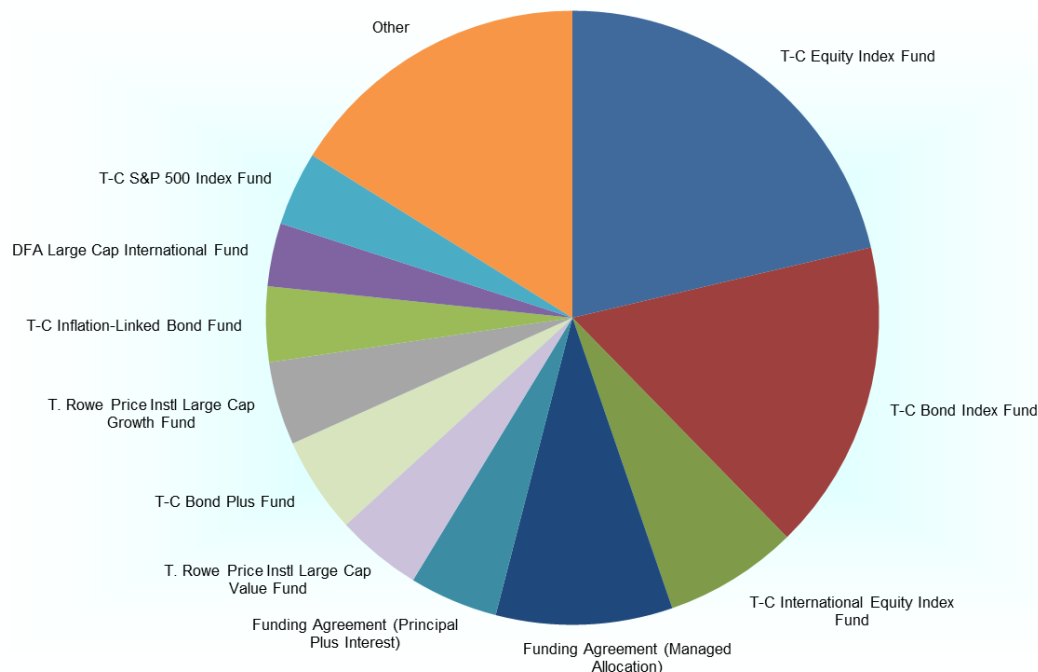
Portfolio	% of Assets	\$ Millions	Portfolio	% of Assets	\$ Millions
Passive Age-Based Portfolio	46.30%	\$ 3,209	Principal Plus Interest Portfolio	4.67%	\$ 324
Active Age-Based Portfolio	21.99%	\$ 1,524	Other Portfolios (see below)	19.57%	\$ 1,356
Passive Diversified Equity Portfolio	7.47%	\$ 518			

Other Portfolios

Index U.S. Large Cap Equity Portfolio	3.91%	\$ 271	Active Moderate Growth Portfolio	0.53%	\$ 37
Index U.S. Equity Portfolio	3.70%	\$ 257	Active Conservative Portfolio	0.46%	\$ 32
Active Diversified Equity Portfolio	2.57%	\$ 178	Passive Conservative Portfolio	0.43%	\$ 30
Social Choice Portfolio	1.95%	\$ 135	Passive Moderate Growth Portfolio	0.43%	\$ 30
Active Growth Portfolio	1.63%	\$ 113	Active International Equity Portfolio	0.25%	\$ 18
Index International Equity Portfolio	1.35%	\$ 93	Active Diversified Fixed Income Portfolio	0.25%	\$ 17
Passive Growth Portfolio	1.26%	\$ 87	Passive Diversified Fixed Income Portfolio	0.17%	\$ 12
Index Bond Portfolio	0.67%	\$ 47			



Assets by Underlying Fund



Fund	% of Assets	\$ Millions	Fund	% of Assets	\$ Millions
T-C Equity Index Fund	21.32%	\$ 1,477	T. Rowe Price Instl Large Cap Value Fund	4.53%	\$ 314
T-C Bond Index Fund	16.35%	\$ 1,133	T. Rowe Price Instl Large Cap Growth Fund	4.39%	\$ 304
Funding Agreement (Managed Allocation)	9.31%	\$ 645	T-C Inflation-Linked Bond Fund	3.96%	\$ 274
T-C International Equity Index Fund	7.06%	\$ 489	T-C S&P 500 Index Fund	3.91%	\$ 271
Metropolitan West Total Return Bond Fund	5.06%	\$ 351	DFA Large Cap International Fund	3.33%	\$ 231
Funding Agreement (Principal Plus Interest)	4.67%	\$ 324	Other	16.12%	\$ 1,117
Other Funds					
T-C Real Estate Securities Fund	3.36%	\$ 233	T-C Emerging Markets Equity Index Fund	1.65%	\$ 114
T-C High Yield Bond Fund	2.24%	\$ 155	T-C Small Cap Equity Fund	1.06%	\$ 73
PIMCO Income Fund	2.12%	\$ 147	T. Rowe Price Instl Floating Rate Fund	0.95%	\$ 66
PIMCO Real Return Fund	2.01%	\$ 140	DFA Emerging Markets Core Equity Portfolio	0.77%	\$ 54
T-C Social Choice Equity Fund	1.95%	\$ 135			



- In the Active Age-Based Portfolio and Active Multi-Fund Portfolios, replaced the TIAA-CREF Bond Plus Fund with the MetWest Total Return Bond Fund

Duration in the Active Age-Based Portfolio



- Each age band has a weighted average duration shorter than that of the Barclays U.S. Aggregate Index (5.47 years), which should serve the portfolios well in a potential rising interest rate environment

Interest Rate Sensitivity of Fixed Income and Short-Term Investments						
Beneficiary's Age	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)
Option-Adjusted Duration (in years, 6/30/16)	4.82	7.97	2.46	0.47	0.00	
0-4	50.00%	20.00%	20.00%	10.00%	0.00%	4.54
5-8	50.00%	20.00%	20.00%	10.00%	0.00%	4.54
9-10	50.00%	20.00%	20.00%	10.00%	0.00%	4.54
11-12	50.00%	20.00%	20.00%	10.00%	0.00%	4.54
13-14	50.00%	20.00%	20.00%	10.00%	0.00%	4.54
15	42.86%	17.14%	17.14%	8.57%	14.29%	3.89
16	36.67%	14.67%	14.67%	7.33%	26.67%	3.33
17	28.13%	11.25%	11.25%	5.63%	43.75%	2.56
18 and over	20.59%	8.24%	8.24%	4.12%	58.82%	1.87

Duration in the Passive Age-Based Portfolio



- Each age band has a weighted average duration shorter than that of the Barclays U.S. Aggregate Index (5.47 years), which should serve the portfolios well in a potential rising interest rate environment
- Effective 1/1/2016, the TC Inflation-Linked Bond Fund changed the Fund's benchmark from Barclays US Treasury US TIPS Index to Barclays US Treasury Inflation Note 1-10 Yr Index, which reduces interest rate risk exposure in the TIPS segment

Interest Rate Sensitivity of Fixed Income and Short-Term Investments					
Beneficiary's Age	TIAA-CREF Bond Index Fund	TIAA-CREF Inflation-Linked Bond Fund	TIAA-CREF High Yield Fund	TC Life Funding Agreement	Weighted Average Duration (Years)
Option-Adjusted Duration (in years, 6/30/16)	5.43	5.69	4.12	0.00	
0-4	70.00%	20.00%	10.00%	0.00%	4.94
5-8	70.00%	20.00%	10.00%	0.00%	4.94
9-10	70.00%	20.00%	10.00%	0.00%	4.94
11-12	70.00%	20.00%	10.00%	0.00%	4.94
13-14	70.00%	20.00%	10.00%	0.00%	4.94
15	60.00%	17.14%	8.57%	14.29%	4.23
16	51.33%	14.67%	7.33%	26.67%	3.62
17	39.38%	11.25%	5.63%	43.75%	2.78
18 and over	28.82%	8.24%	4.12%	58.82%	2.03



Active Age-Based Portfolio



Current Asset Allocations

Underlying Fund Fee	0.56%	0.57%	0.42%	0.51%	0.29%	0.62%	0.44%	0.45%	0.45%	0.56%	0.00%	
Active Age-Based Portfolio Age of Beneficiary	T. Rowe Price Instl Large Cap Growth Fund	T. Rowe Price Instl Large Cap Value Fund	TIAA-CREF Small Cap Equity Fund	TIAA- CREF Real Estate Securities Fund	DFA Large Cap International Portfolio	DFA Emerging Markets Core Equity I Portfolio	MetWest Total Return Bond Fund	PIMCO Real Return Instl Fund	PIMCO Income Instl Fund	T. Rowe Price Instl Floating Rate Fund	T-C Life Funding Agreement	Weighted Average Fund Fee
0 - 4	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	10.00%	4.00%	4.00%	2.00%	0.00%	0.48%
5 - 8	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	15.00%	6.00%	6.00%	3.00%	0.00%	0.48%
9 - 10	17.01%	17.01%	3.78%	4.20%	14.40%	3.60%	20.00%	8.00%	8.00%	4.00%	0.00%	0.48%
11 - 12	14.18%	14.18%	3.14%	3.50%	12.00%	3.00%	25.00%	10.00%	10.00%	5.00%	0.00%	0.47%
13 - 14	11.34%	11.34%	2.52%	2.80%	9.60%	2.40%	30.00%	12.00%	12.00%	6.00%	0.00%	0.47%
15	8.51%	8.51%	1.88%	2.10%	7.20%	1.80%	30.00%	12.00%	12.00%	6.00%	10.00%	0.42%
16	7.09%	7.09%	1.57%	1.75%	6.00%	1.50%	27.50%	11.00%	11.00%	5.50%	20.00%	0.37%
17	5.67%	5.67%	1.26%	1.40%	4.80%	1.20%	22.50%	9.00%	9.00%	4.50%	35.00%	0.30%
18 +	4.25%	4.25%	0.95%	1.05%	3.60%	0.90%	17.50%	7.00%	7.00%	3.50%	50.00%	0.23%

Current Asset Allocations

Underlying Fund Fee	0.05%	0.06%	0.23%	0.51%	0.12%	0.27%	0.36%	0.00%	
Passive Age-Based Portfolio Age of Beneficiary	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	Weighted Average Fund Fee
0 - 4	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%	0.11%
5 - 8	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%	0.12%
9 - 10	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%	0.13%
11 - 12	31.50%	12.00%	3.00%	3.50%	35.00%	10.00%	5.00%	0.00%	0.13%
13 - 14	25.20%	9.60%	2.40%	2.80%	42.00%	12.00%	6.00%	0.00%	0.14%
15	18.90%	7.20%	1.80%	2.10%	42.00%	12.00%	6.00%	10.00%	0.13%
16	15.75%	6.00%	1.50%	1.75%	38.50%	11.00%	5.50%	20.00%	0.12%
17	12.60%	4.80%	1.20%	1.40%	31.50%	9.00%	4.50%	35.00%	0.10%
18 +	9.45%	3.60%	0.90%	1.05%	24.50%	7.00%	3.50%	50.00%	0.08%

Active Multi-Fund Investment Portfolios



Current Asset Allocations

Underlying Fund Fee	0.56%	0.57%	0.42%	0.51%	0.29%	0.62%	0.44%	0.45%	0.45%	0.56%	0.00%	
Active Age-Based Portfolio Age of Beneficiary	T. Rowe Price Instl Large Cap Growth Fund	T. Rowe Price Instl Large Cap Value Fund	TIAA-CREF Small Cap Equity Fund	TIAA- CREF Real Estate Securities Fund	DFA Large Cap International Portfolio	DFA Emerging Markets Core Equity I Portfolio	MetWest Total Return Bond Fund	PIMCO Real Return Instl Fund	PIMCO Income Instl Fund	T. Rowe Price Instl Floating Rate Fund	T-C Life Funding Agreement	Weighted Average Fund Fee
Active Diversified Equity Portfolio	28.35%	28.35%	6.30%	7.00%	24.00%	6.00%						0.49%
Active Growth Portfolio	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	15.00%	6.00%	6.00%	3.00%		0.48%
Active Moderate Growth Portfolio	11.34%	11.34%	2.52%	2.80%	9.60%	2.40%	30.00%	12.00%	12.00%	6.00%		0.47%
Active Diversified Fixed Income Portfolio							50.00%	20.00%	20.00%	10.00%		0.46%
Active Conservative Portfolio							25.00%	10.00%	10.00%	5.00%	50.00%	0.23%
Active International Equity Portfolio					80.00%	20.00%						0.36%

Active Single Fund Investment Portfolios

Investment Portfolios	Percent Allocation	Underlying Mutual Fund	Fund Fee
Social Choice Portfolio	100.00%	TIAA-CREF Social Choice Equity Fund	0.18%
Principal Plus Interest Portfolio	100.00%	TIAA-CREF Life Co. Funding Agreement	0.00%

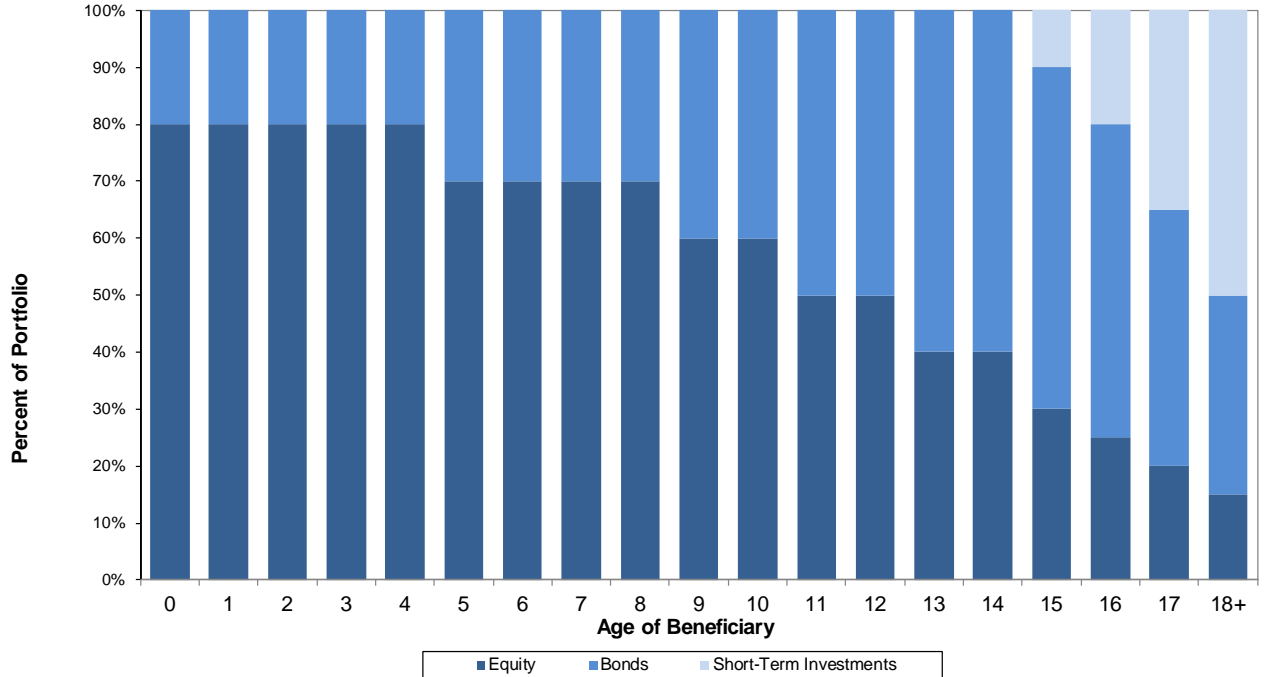
Current Asset Allocations

Underlying Fund Fee	0.05%	0.06%	0.23%	0.51%	0.12%	0.27%	0.36%	0.00%	
Passive Age-Based Portfolio Age of Beneficiary	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	Weighted Average Fund Fee
Passive Diversified Equity Portfolio	63.00%	24.00%	6.00%	7.00%					0.10%
Passive Growth Portfolio	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%		0.12%
Passive Moderate Growth Portfolio	25.20%	9.60%	2.40%	2.80%	42.00%	12.00%	6.00%		0.14%
Passive Diversified Fixed Income Portfolio					70.00%	20.00%	10.00%		0.17%
Passive Conservative Portfolio					35.00%	10.00%	5.00%	50.00%	0.09%
Index International Equity Portfolio		80.00%	20.00%						0.09%

Passive Single Fund Investment Portfolios

Investment Portfolios	Percent Allocation	Underlying Mutual Fund	Fund Fee
Index Bond Portfolio	100.00%	TIAA-CREF Bond Index Fund	0.12%
Index U.S. Large Cap Equity Portfolio	100.00%	TIAA-CREF S&P 500 Index Fund	0.06%
Index U.S. Equity Portfolio	100.00%	TIAA-CREF Equity Index Fund	0.05%

Age-Based Glide Path



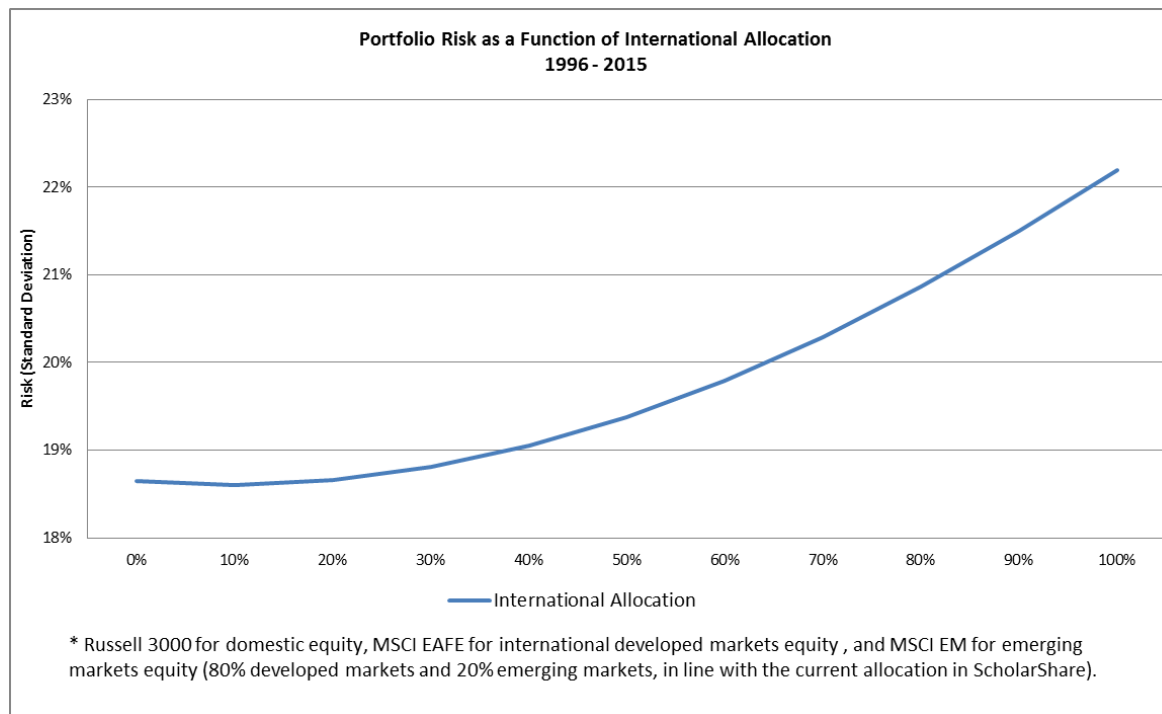
The beginning of the glide path invests in primarily global equities and real estate stocks to take advantage of higher expected returns in these markets for beneficiaries with longer investment horizons.

The middle of the glide path invests in primarily a mix of global equities and real estate stocks and fixed income investments, balancing the more volatile asset classes with less risky bonds for stability.

The end of the glide path invests in a large portion of short-term investments through the TC Life Funding Agreement for increased stability and liquidity just prior to and during college.

- The nine-band structure of the Active and Passive Age-Based Portfolios promote a gradual shift from mostly equities to short-term and cash-equivalents over time

- An international equity allocation of 20%-40% will help achieve the benefits of global diversification without sacrificing returns too much if foreign markets temporarily fall out of favor
- ScholarShare's current international equity allocation of 30% appropriately balances risk and reward, and we feel is well-positioned



- Following Bill Gross' departure from PIMCO, the PIMCO Income Fund and PIMCO Real Return Fund were put on watch status as we became more comfortable with the new management structure and senior leadership of the firm
- The PIMCO Income Fund has continued to deliver excess returns and proven that it can still deliver on its investment objectives
- The PIMCO Real Return Fund, while initially falling behind its benchmark, has also delivered strong returns this year, and maintains a 5 star overall rating with Morningstar as of 9/30/16, proving its superior performance relative to peers
- Performance has been strong enough for both funds that we have removed them from our internal Watch List

- The MetWest Total Return Bond Fund added to the active options continues to receive a 5-star rating from Morningstar. Shorter-than-Index duration, conservative sector positioning and higher-quality credit focus will defensively position the Fund for Fed's next move
- Simulation results from the stochastic Monte Carlo simulation model validates making no changes in the Age-Based Portfolios
- The ScholarShare investment strategy has an appropriate mix of well diversified asset classes that take into account the possibility of many different financial conditions
- The current fixed income strategy in both active and passive options offers lower interest rate risk exposure than the index for U.S. core fixed income
- An equity mix of 70% domestic / 30% international provides a prudent level of risk
- Domestic equity maintains market cap and style neutrality relative to benchmark
- ***Therefore, TFI recommends no changes to the ScholarShare Program at this time***

Appendix

The Importance of Diversification: Annual Returns (%)



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Highest	35.1 Real Estate	39.4 EM Stocks	10.9 Global Bond	78.5 EM Stocks	27.9 Real Estate	13.6 TIPS	19.7 Real Estate	33.6 US Stocks	28.0 Real Estate	2.8 Real Estate
	32.1 EM Stocks	11.6 TIPS	5.2 Bond	52.5 Bank Loan	18.9 EM Stocks	8.3 Real Estate	18.2 EM Stocks	22.8 Intl Stocks	12.6 US Stocks	0.7 ST Bond
	26.3 Intl Stocks	11.2 Intl Stocks	5.0 ST Bond	46.0 HY Bond	16.9 US Stocks	7.8 Bond	17.3 Intl Stocks	6.3 HY Bond	6.0 Bond	0.6 Bond
	15.7 US Stocks	10.9 Global Bond	2.0 MM	31.8 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
	9.2 HY Bond	7.0 Bond	-2.4 TIPS	28.3 US 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
	6.9 Bank Loan	6.8 ST Bond	-23.2 HY Bond	28.0 Real Estate	7.8 Intl Stocks	1.6 ST Bond	9.8 Bank Loan	0.6 ST Bond	1.8 Bank Loan	0.0 MM
	6.1 Global Bond	5.1 US Stocks	-29.3 Bank Loan	11.4 TIPS	6.5 Bond	1.5 Bank Loan	7.0 TIPS	0.0 MM	0.8 ST Bond	-0.8 Intl Stocks
	4.5 MM	4.7 MM	-37.3 US Stocks	5.9 Bond	6.3 TIPS	1.0 US Stocks	4.2 Bond	-2.0 Bond	0.0 MM	-1.4 TIPS
	4.3 Bond	3.2 HY Bond	-37.7 Real Estate	3.8 ST Bond	5.2 Global Bond	0.0 MM	1.6 Global Bond	-2.6 EM Stocks	-0.5 Global Bond	-2.8 HY Bond
	4.3 ST Bond	2.0 Bank Loan	-43.4 Intl Stocks	2.6 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
Lowest	0.4 TIPS	-15.7 Real Estate	-53.3 EM Stocks	0.2 MM	0.0 MM	-18.4 EM Stocks	0.0 MM	-8.6 TIPS	-4.9 Intl Stocks	-14.9 EM Stocks

The Importance of Diversification: Notes



Bond	uses the 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 Barclays US Treasury 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 Bank of American US HY C 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 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 Taxable, which is the average of all major taxable money market mutual fund yields published weekly for 7- and 30-day simple and compound yields.

- The following asset allocation study uses Ibbotson’s most recent capital market assumptions to reaffirm the reasonableness and soundness of the approved glide path for the Active Age-Based Portfolio and Passive Age-Based Portfolio.
- The Age-Based 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.

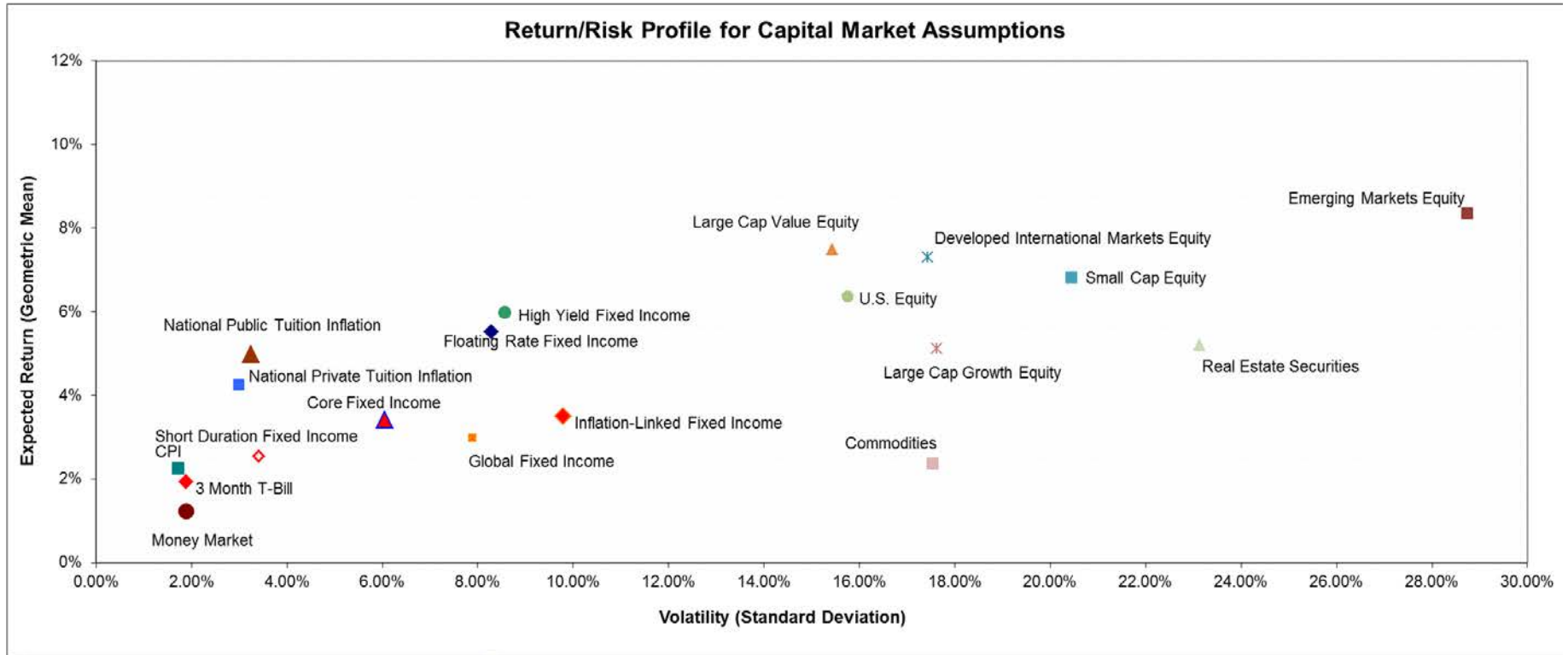
2016 Asset Allocation Assumptions



2016 Asset Allocation Study Assumptions

		Capital Market Assumptions (source: Ibbotson Associates)	
Variables	Benchmarks	Long-Term Returns (Geometric Mean)	Volatility (Standard Deviation)
U.S. Equity	Russell 3000 Index	6.36%	15.75%
Large Cap Growth Equity	Russell 1000 Growth Index	5.11%	17.62%
Large Cap Value Equity	Russell 1000 Value Index	7.49%	15.43%
Small Cap Equity	Russell 2000 Index	6.81%	20.44%
Developed International Markets Equity	MSCI EAFE Index	7.30%	17.43%
Emerging Markets Equity	MSCI Emerging Markets Index	8.35%	28.73%
Core Fixed Income	Barclays U.S. Aggregate Bond Index	3.42%	6.05%
Floating Rate Fixed Income	Credit Suisse Leveraged Loan Index	5.51%	8.28%
Global Fixed Income	Citigroup World Government Bond Index	2.97%	7.89%
High Yield Fixed Income	BofAML US HY BB/B Cash Pay Index	5.98%	8.56%
Inflation-Linked Fixed Income	Barclays U.S. Treasury Inflation-Protected Securities 1-10 Year Index	3.49%	9.79%
Short-Term Inflation-Linked Fixed Income	Barclays U.S. 0-5 Year TIPS Index	2.60%	4.50%
Short Duration Fixed Income	Barclays U.S. 1-3 Year Government/Credit Bond Index	2.55%	3.40%
Commodities	Bloomberg Commodity Index	2.36%	17.53%
Real Estate Securities	FTSE NAREIT All Equity REITs Index	5.20%	23.12%
CPI	Consumer Price Index - All Urban Consumers	2.25%	1.72%
3 Month T-Bill	BofAML US Treasury Bill 3 Mon Index	1.93%	1.89%
Money Market	iMoneyNet Money Fund Report Averages All Taxable	1.23%	1.89%
TC Life Funding Agreement	Funding Agreement	2.80%	3.00%
Additional Variables (sources: The College Board and TIAA-CREF Tuition Financing, Inc.)			
National Private Tuition Inflation		4.25%	2.99%
National Public Tuition Inflation		4.98%	3.25%

2016 Asset Allocation Assumptions



Tuition Inflation Forecasting

Tuition data are sourced from the 2015 College Board Trends in Tuition Pricing.

Private 4-year Tuition Inflation:

$$T(t) = 0.023086 + i(t) + 0.012364 * S(t-1) + 0.167061 * B(t) + 0.227114 * R(t-1) - 0.20096 * GDP + e1(t)$$

Expected Value = 4.25%

Public Tuition Inflation:

$$T(t) = 0.046189 + i(t) - 0.00626 * S(t-1) + 0.24769 * B(t) + 0.105835 * R(t-1) - 0.93794 * GDP + e2(t)$$

Expected Value = 4.98%

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 (2.2%) 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 2.06%,

$e2(t)$ is the random error term following a lognormal distribution (-0.01%, 0.01%) with a zero mean and standard deviation of 2.24%

Regression is based on data from 1977-2015.

For 2015-2016 school year, average tuition and fees were: \$7,350 for all in-state public colleges and \$32,405 for private 4-year colleges; based on most recent data 70% enrolled in public colleges and 30% enrolled in private colleges. The enrollment-weighted average tuition and fees for all colleges were $\$14,866.50 = \$7,350 * 70\% + \$32,405 * 30\%$. The forecasted enrollment-weighted average tuition and fees for year 1 are $\$15,535.98 = \$7,350 * (1+4.98\%) * 70\% + \$32,405 * (1 + 4.25\%) * 30\%$. Therefore, the public / private enrollment weighted tuition inflation rate for year 1 is: $4.50\% = \$15,535.98 / \$14,866.50 - 1$

Correlation Matrix (Expected Relationship Between Pairs of Asset Classes)

	TC Life Funding Agreement	BofAML U.S. 3-Month Treasury Bill / iMoneyNet	Citigroup World Gov't Bond Index	Barclays U.S. Aggregate Bond Index	Barclays U.S. TIPS 1-10 Year Index	Barclays U.S. 1-3 Year Gov't / Credit Bond Index	BofAML US HY BB/B Cash Pay Index	Credit Suisse Leveraged Loan Index	Barclays U.S. 0-5 Year TIPS Index	FTSE NAREIT All Equity REITs Index	Russell 3000 Index	Russell 1000 Value Index	Russell 1000 Growth Index	Russell 2000 Index	Bloomberg Commodity Index	MSCI EAFE Index	MSCI Emerging Markets Index
TC Life Funding Agreement	1.00																
BofAML U.S. 3-Month Treasury Bill / iMoneyNet	0.38	1.00															
Citigroup World Gov't Bond Index	0.40	0.10	1.00														
Barclays U.S. Aggregate Bond Index	0.83	0.23	0.47	1.00													
Barclays U.S. TIPS 1-10 Year Index	0.66	0.09	0.43	0.74	1.00												
Barclays U.S. 1-3 Year Gov't / Credit Bond Index	0.81	0.49	0.40	0.81	0.66	1.00											
BofAML US HY BB/B Cash Pay Index	0.39	0.07	0.34	0.36	0.36	0.40	1.00										
Credit Suisse Leveraged Loan Index	-0.15	-0.15	-0.07	0.03	0.43	-0.08	0.32	1.00									
Barclays U.S. 0-5 Year TIPS Index	0.33	0.33	0.44	0.69	0.85	0.49	0.29	0.44	1.00								
FTSE NAREIT All Equity REITs Index	0.20	0.02	0.19	0.19	0.21	0.14	0.43	0.57	0.18	1.00							
Russell 3000 Index	0.13	0.13	0.18	0.10	-0.15	0.01	0.49	0.24	-0.21	0.50	1.00						
Russell 1000 Value Index	0.18	0.02	0.22	0.10	0.09	0.04	0.50	0.58	-0.11	0.65	0.94	1.00					
Russell 1000 Growth Index	0.03	-0.05	0.11	0.02	0.03	-0.05	0.45	0.58	-0.26	0.52	0.96	0.82	1.00				
Russell 2000 Index	0.13	-0.02	0.11	0.09	0.11	0.02	0.49	0.24	-0.14	0.60	0.88	0.80	0.85	1.00			
Bloomberg Commodity Index	0.23	0.23	0.03	0.00	0.51	-0.14	0.18	0.18	0.16	0.41	0.25	0.26	0.12	0.21	1.00		
MSCI EAFE Index	0.09	-0.01	0.43	0.08	0.11	0.01	0.53	0.63	-0.07	0.57	0.76	0.83	0.78	0.75	0.36	1.00	
MSCI Emerging Markets Index	-0.08	-0.06	0.16	-0.05	0.02	-0.10	0.40	0.70	0.15	0.46	0.73	0.61	0.61	0.63	0.59	0.72	1.00

Simulation Results: Current Active Age-Based Portfolio



Bene's Age	Asset Allocations									
	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	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%
1	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%
2	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%
3	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%
4	22.68%	22.68%	5.04%	5.60%	19.20%	4.80%	14.00%	4.00%	2.00%	0.00%
5	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	21.00%	6.00%	3.00%	0.00%
6	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	21.00%	6.00%	3.00%	0.00%
7	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	21.00%	6.00%	3.00%	0.00%
8	19.85%	19.85%	4.40%	4.90%	16.80%	4.20%	21.00%	6.00%	3.00%	0.00%
9	17.01%	17.01%	3.78%	4.20%	14.40%	3.60%	28.00%	8.00%	4.00%	0.00%
10	17.01%	17.01%	3.78%	4.20%	14.40%	3.60%	28.00%	8.00%	4.00%	0.00%
11	14.18%	14.18%	3.14%	3.50%	12.00%	3.00%	35.00%	10.00%	5.00%	0.00%
12	14.18%	14.18%	3.14%	3.50%	12.00%	3.00%	35.00%	10.00%	5.00%	0.00%
13	11.34%	11.34%	2.52%	2.80%	9.60%	2.40%	42.00%	12.00%	6.00%	0.00%
14	11.34%	11.34%	2.52%	2.80%	9.60%	2.40%	42.00%	12.00%	6.00%	0.00%
15	8.51%	8.51%	1.88%	2.10%	7.20%	1.80%	42.00%	12.00%	6.00%	10.00%
16	7.09%	7.09%	1.57%	1.75%	6.00%	1.50%	38.50%	11.00%	5.50%	20.00%
17	5.67%	5.67%	1.26%	1.40%	4.80%	1.20%	31.50%	9.00%	4.50%	35.00%
18	4.25%	4.25%	0.95%	1.05%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%
19	4.25%	4.25%	0.95%	1.05%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%
20+	4.25%	4.25%	0.95%	1.05%	3.60%	0.90%	24.50%	7.00%	3.50%	50.00%

Investment Horizon (in years)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	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
21	4.52%	2.18%	4.50%	52.94%	62.16%	98.34%	-2.35%
20	4.51%	2.18%	4.50%	53.28%	62.74%	98.36%	-2.30%
19	4.51%	2.18%	4.50%	52.76%	62.50%	98.38%	-2.29%
18	4.51%	2.19%	4.50%	53.26%	64.00%	98.14%	-2.23%
17	4.52%	2.17%	4.50%	52.00%	63.06%	98.08%	-2.21%
16	4.50%	2.21%	4.50%	49.94%	63.04%	97.90%	-2.20%
15	4.52%	2.14%	4.50%	51.34%	64.98%	98.16%	-2.11%
14	4.53%	2.19%	4.50%	49.68%	63.84%	97.70%	-2.13%
13	4.51%	2.13%	4.50%	48.42%	65.08%	97.86%	-2.06%
12	4.51%	2.09%	4.50%	47.12%	64.44%	98.26%	-2.04%
11	4.51%	2.11%	4.50%	46.32%	65.10%	98.10%	-2.05%
10	4.51%	2.15%	4.50%	45.40%	66.30%	97.64%	-2.01%
9	4.52%	2.10%	4.50%	44.44%	68.12%	97.48%	-1.98%
8	4.53%	2.05%	4.50%	42.34%	69.78%	97.54%	-1.93%
7	4.52%	2.13%	4.50%	42.00%	70.90%	97.32%	-1.99%
6	4.52%	2.05%	4.50%	38.04%	74.62%	97.60%	-1.88%
5	4.50%	2.06%	4.50%	37.90%	79.06%	97.26%	-1.92%
4	4.51%	2.16%	4.50%	37.56%	85.74%	96.80%	-1.95%
3	4.50%	2.38%	4.50%	37.32%	91.24%	95.26%	-2.09%
2	4.50%	2.88%	4.50%	39.84%	95.98%	91.40%	-2.43%
1	4.49%	4.10%	4.50%	42.64%	99.60%	83.06%	-3.27%

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

Simulation Results: Current Passive Age-Based Portfolio



Bene's Age	Asset Allocations							
	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%
1	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
2	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
3	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
4	50.40%	19.20%	4.80%	5.60%	14.00%	4.00%	2.00%	0.00%
5	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%
6	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%
7	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%
8	44.10%	16.80%	4.20%	4.90%	21.00%	6.00%	3.00%	0.00%
9	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%
10	37.80%	14.40%	3.60%	4.20%	28.00%	8.00%	4.00%	0.00%
11	31.50%	12.00%	3.00%	3.50%	35.00%	10.00%	5.00%	0.00%
12	31.50%	12.00%	3.00%	3.50%	35.00%	10.00%	5.00%	0.00%
13	25.20%	9.60%	2.40%	2.80%	42.00%	12.00%	6.00%	0.00%
14	25.20%	9.60%	2.40%	2.80%	42.00%	12.00%	6.00%	0.00%
15	18.90%	7.20%	1.80%	2.10%	42.00%	12.00%	6.00%	10.00%
16	15.75%	6.00%	1.50%	1.75%	38.50%	11.00%	5.50%	20.00%
17	12.60%	4.80%	1.20%	1.40%	31.50%	9.00%	4.50%	35.00%
18	9.45%	3.60%	0.90%	1.05%	24.50%	7.00%	3.50%	50.00%
19	9.45%	3.60%	0.90%	1.05%	24.50%	7.00%	3.50%	50.00%
20+	9.45%	3.60%	0.90%	1.05%	24.50%	7.00%	3.50%	50.00%

Investment Horizon (in years)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	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
21	4.56%	2.02%	4.50%	50.76%	61.68%	98.78%	-2.21%
20	4.49%	2.05%	4.50%	50.34%	60.50%	98.62%	-2.28%
19	4.49%	2.04%	4.50%	49.36%	60.90%	98.28%	-2.21%
18	4.40%	2.05%	4.50%	47.66%	59.80%	98.52%	-2.22%
17	4.34%	1.97%	4.50%	46.80%	60.44%	98.46%	-2.15%
16	4.32%	2.01%	4.50%	46.08%	59.84%	98.28%	-2.14%
15	4.30%	2.02%	4.50%	47.04%	61.10%	98.06%	-2.14%
14	4.26%	2.01%	4.50%	45.84%	61.64%	97.92%	-2.08%
13	4.12%	2.03%	4.50%	42.04%	59.98%	98.02%	-2.08%
12	4.20%	2.04%	4.50%	44.06%	62.12%	97.90%	-2.05%
11	4.11%	2.07%	4.50%	42.56%	61.92%	97.52%	-2.07%
10	4.07%	2.05%	4.50%	41.12%	62.94%	97.46%	-2.05%
9	4.05%	2.10%	4.50%	40.50%	64.68%	97.36%	-2.02%
8	3.91%	2.18%	4.50%	38.70%	64.82%	96.46%	-2.09%
7	3.84%	2.21%	4.50%	38.32%	67.00%	95.34%	-2.14%
6	3.73%	2.26%	4.50%	35.82%	69.08%	94.66%	-2.18%
5	3.63%	2.36%	4.50%	34.34%	71.98%	93.84%	-2.24%
4	3.61%	2.52%	4.50%	35.36%	77.88%	92.42%	-2.33%
3	3.48%	2.71%	4.50%	34.02%	84.54%	90.18%	-2.45%
2	3.57%	3.28%	4.50%	36.72%	92.70%	86.40%	-2.79%
1	3.49%	4.59%	4.50%	41.64%	98.16%	78.22%	-3.94%

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



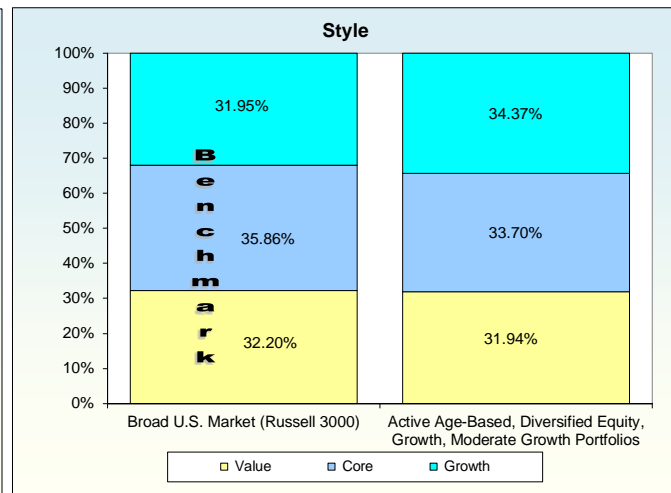
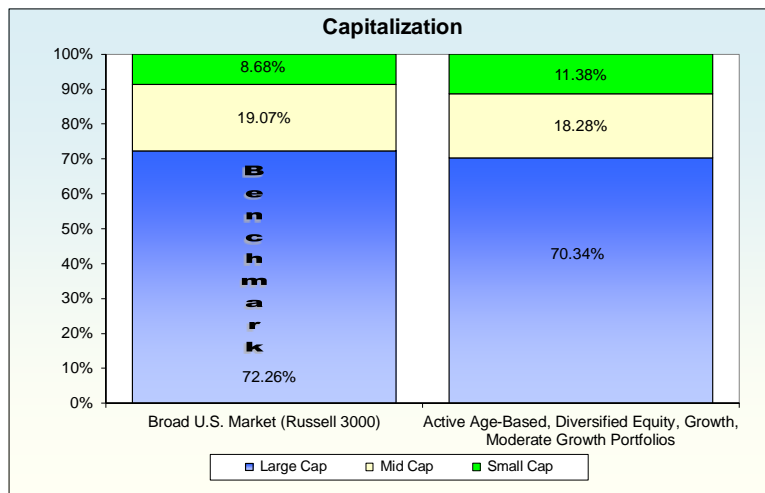
- **(1) Expected Return.** The average of a distribution of possible annualized investment returns over an investment horizon of n years generated by Monte Carlo simulation. The returns are based on the assumption that each year money will be invested according to the asset class allocation assigned to the beneficiary's age as the beneficiary ages the asset allocation will move to a more conservative allocation.
- **(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 Monte Carlo simulation.
- **(4) Probability of Exceeding Tuition Inflation.** The likelihood that the annualized investment return exceeds average tuition inflation rate over an investment horizon of n years, out of all the possible trials simulated by 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.

- TFI reviewed the current domestic equity allocation in the Active Age-Based, Active Diversified Equity, Active Growth, and Active Moderate Growth Portfolios 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 these portfolios 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 Age-Based, Diversified Equity, Growth, Moderate Growth Portfolios	Large Cap	Mid Cap	Small Cap	Total	Value	Core	Growth	Total
Russell 1000 Value Index	45.00%	76.04%	21.23%	2.73%	100.00%	52.93%	37.59%	9.48%	100.00%
Russell 1000 Growth Index	45.00%	80.28%	18.67%	1.06%	100.00%	11.46%	29.78%	58.76%	100.00%
Russell Mid Cap Value Index	0.00%	23.49%	67.75%	8.76%	100.00%	47.80%	34.72%	17.48%	100.00%
Russell Mid Cap Growth Index	0.00%	25.19%	70.79%	4.02%	100.00%	9.70%	27.72%	62.58%	100.00%
Russell 2000 Index	10.00%	0.00%	3.28%	96.72%	100.00%	29.67%	33.84%	36.50%	100.00%
S&P 500 Index	0.00%	86.73%	13.12%	0.15%	100.00%	33.06%	33.91%	33.03%	100.00%
Russell 3000 Index	0.00%	72.52%	18.73%	8.75%	100.00%	31.88%	33.67%	34.45%	100.00%
Total Blended Portfolio	100.00%								
Broad U.S. Market (Russell 3000)		72.26%	19.07%	8.68%	100.00%	32.20%	35.86%	31.95%	100.00%
Active Age-Based, Diversified Equity, Growth, Moderate Growth Portfolios		70.34%	18.28%	11.38%	100.00%	31.94%	33.70%	34.37%	100.00%



Domestic Equity Composition: Style Box Comparison



Benchmarks	Asset Allocation	Morningstar 9 Style Categories									
	Active Age-Based, Diversified Equity, Growth, Moderate Growth Portfolios	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%	40.62%	29.19%	6.23%	10.73%	7.54%	2.96%	1.58%	0.86%	0.30%	100.00%
Russell 1000 Growth Index	45.00%	9.08%	23.58%	47.62%	2.19%	5.75%	10.73%	0.19%	0.45%	0.41%	100.00%
Russell Mid Cap Value Index	0.00%	8.32%	8.12%	7.05%	34.42%	23.85%	9.48%	5.06%	2.76%	0.95%	100.00%
Russell Mid Cap Growth Index	0.00%	0.64%	4.30%	20.25%	8.32%	21.71%	40.76%	0.74%	1.71%	1.58%	100.00%
Russell 2000 Index	10.00%	0.00%	0.00%	0.00%	0.97%	1.28%	1.03%	28.70%	32.56%	35.47%	100.00%
S&P 500 Index	0.00%	27.82%	29.26%	29.64%	5.14%	4.60%	3.39%	0.10%	0.05%	0.00%	100.00%
Russell 3000 Index	0.00%	22.95%	24.46%	25.11%	6.04%	6.25%	6.44%	2.89%	2.96%	2.90%	100.00%
Total Blended Portfolio	100.00%										

Broad Market (Russell 3000)	22.95%	24.46%	25.11%	6.04%	6.25%	6.44%	2.89%	2.96%	2.90%	100.00%
Active Age-Based, Diversified Equity, Growth, Moderate Growth Portfolios	22.37%	23.75%	24.23%	5.91%	6.11%	6.26%	3.67%	3.85%	3.87%	100.00%

Difference in Portfolios vs. Broad Market			
Active Age-Based, Diversified Equity, Growth, Moderate Growth Portfolios	Value	Core	Growth
Large Cap	-0.58%	-0.71%	-0.88%
Mid Cap	-0.13%	-0.14%	-0.18%
Small Cap	0.78%	0.89%	0.97%

Underlying Funds by Asset Class



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		
T-C S&P 500 Index	T-C Emerging Markets Equity Index			
Active Funds				
<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 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.

- ScholarShare offers underlying funds from a number of different asset classes, including both index and active strategies

Underlying Funds Assets



Fund Name	Ticker	Morningstar Rating Overall	Inception Date	Morningstar Institutional Category	Assets as of 9/30/16	% of Assets	YTD Participant Service Fees
DFA Emerging Markets Core Equity I	DFCEX	4	4/5/2005	Diversified Emerging Markets	\$53,689,353	0.77%	
DFA Large Cap International I	DFALX	3	7/17/1991	Foreign Large Core	\$230,862,092	3.33%	
Metropolitan West Total Return Bd I	MWTIX	5	3/31/2000	Short-Term Investment Grade	\$350,842,052	5.06%	\$150,375
PIMCO Income Instl	PIMIX	5	3/30/2007	Multisector Bond	\$147,213,948	2.12%	
PIMCO Real Return Instl	PRRIX	5	1/29/1997	Inflation-Protected Bond	\$139,552,748	2.01%	
T. Rowe Price Instl Floating Rate	RPIFX	4	1/31/2008	Bank Loan	\$65,802,908	0.95%	
T. Rowe Price Instl Large Cap Growth	TRLGX	4	10/31/2001	Large High Growth	\$304,298,202	4.39%	
T. Rowe Price Instl Large Cap Value	TILCX	4	3/31/2000	Large Deep Value	\$313,645,454	4.53%	
TIAA-CREF Bond Index Institutional	TBIIX	3	9/14/2009	Intermediate Investment Grade (4-6)	\$1,132,753,029	16.35%	
TIAA-CREF Emerging Markets Eq Idx Instl	TEQLX	3	8/31/2010	Diversified Emerging Markets	\$114,365,605	1.65%	
TIAA-CREF Equity Index Instl	TIEIX	4	7/1/1999	Large Core	\$1,477,267,881	21.32%	
TIAA-CREF High-Yield Inst	TIHYX	4	3/31/2006	High Yield Bond	\$155,220,107	2.24%	
TIAA-CREF Inflation Link Bd Instl	TIILX	3	10/1/2002	Inflation-Protected Bond	\$274,432,094	3.96%	
TIAA-CREF International Eq Idx Instl	TCIEX	3	10/1/2002	Foreign Large Core	\$488,924,009	7.06%	
TIAA Life Funding Agreement	NA		11/4/2011		\$968,904,251	13.98%	
TIAA-CREF Real Estate Sec Instl	TIREX	4	10/1/2002	Domestic Real Estate	\$232,595,931	3.36%	
TIAA-CREF S&P 500 Index Instl	TISPX	5	10/1/2002	S&P 500 Tracking	\$270,692,672	3.91%	
TIAA-CREF Small-Cap Equity Instl	TISEX	4	10/1/2002	Small Core Growth	\$73,376,303	1.06%	
TIAA-CREF Social Choice Eq Instl	TISCX	3	7/1/1999	Large Core	\$135,250,376	1.95%	

Total

\$6,929,689,018 100.00% \$150,375



Date: November 2, 2016
To: ScholarShare Investment Board (SIB)
From: Pension Consulting Alliance, LLC (PCA)
CC: Eric White, CFA – PCA; Kay Ceserani – PCA
RE: Review of TFI Recommendation for 2017 Asset Allocation

Summary

PCA reviewed TIAA-CREF Tuition Financing, Inc.’s (TFI) annual review and recommendation for the 2017 asset allocation for the ScholarShare College Savings Plan (Plan) which highlighted their analysis behind the recommendation for no changes. Overall, PCA concurs with TFI’s analysis and believes the current glidepath is well optimized. **PCA recommends the SIB accept TFI’s recommendation of no changes to the asset allocation.**

Background

SIB Staff requested that PCA review TFI’s annual review and recommendation for the 2017 asset allocation for the ScholarShare College Savings Plan (Plan) which highlighted their 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.

TFI provided a detailed summary of their analysis for both the actively managed and passively managed age-based portfolios. The analysis showed the expected return and standard deviation of the different portfolios, as well as the likelihood of the portfolios’ returns falling short of the rate of tuition inflation.

Comparison of PCA and TFI’s Long-Term Capital Market Assumptions

Investment Class	PCA Assumptions		TFI Assumptions		Difference	
	Exp. Return	Expected Std. Dev.	Exp. Return	Expected Std. Dev.	Exp. Return	Expected Std. Dev.
Fixed Income	2.90%	4.00%	3.42%	6.05%	0.52%	2.05%
U.S. Equity	6.90%	18.50%	6.36%	15.75%	0.54%	2.75%
International Equity	7.45%	21.00%	7.51%*	19.69%*	0.06%	1.31%

* PCA estimate based on TFI assumptions for Developed and Emerging Markets at 80/20 developed/emerging split

Capital market assumptions underpin all simulation analysis therefore the similarities in capital market assumptions result in similar model outcomes despite the differences in simulation methodology. PCA’s slightly higher return assumption than TFI’s for domestic equities washes out

due to PCA's higher assumed volatility, resulting in quite similar expected outcomes. Our lower return assumptions in fixed income slightly lowers our return assumptions for the intermediate to latter portions of the glidepath, but given the large role of the funding agreement in the latter portion of the glidepath PCA's and TFI's estimates tend to converge as a result of the higher volatility in TFI's assumption for fixed income.

PCA's simulation estimates remain largely the same between 2016 and 2017 given the fact that we made only modest changes in our capital market assumptions between the years, namely an increase of 25 basis points for our fixed income and international equity assumptions. Our US equity assumptions remained constant. TFI's simulated estimates for the return achieved by a newborn participant remained largely the same between 2016 and 2017 (4.52% versus 4.45%).

PCA analyzed what the impact would be of altering the glidepath's equity allocation, namely increasing/decreasing the overall allocation to equities (relative to fixed income) as well as increasing/decreasing the allocation to international equities (relative to US equities). Our findings are in line with what we have found in the past. Namely, that increasing equities improves the expected return of investors on average given the relatively large spread between expected returns for equities versus fixed income. However, due to the significantly higher volatility of equities, outcomes for investors who are on the left side of the distribution (those with below average expected returns) experienced significantly worse expected outcomes. Given this, PCA agrees that the equities allocation should not be increased. On the reverse, reducing equities lowers expected outcomes for the majority of investors and only improves outcomes for those investors on the far left side of the expected return distribution.

Similarly, PCA found that increasing the allocation to international equities slightly increased the expected return given our higher return assumption for international equities relative to US equities. However, given the materially higher volatility assumption of international equities relative to US equities the small gain in expected returns was offset by a larger range of potential outcomes. As such, PCA believes the current ratio of US and international equities to be optimal.

Conclusion

PCA finds TFI's analysis of their glidepaths to be comprehensive and insightful, and uses consistent and reasonable inputs in developing their conclusions. PCA, therefore, concurs with TFI's recommendation for no changes to the glidepath.

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