The Next Generation of Retirement Plan Success Metrics

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Learning objectives

- Review industry trends and the importance of lifetime income.
- Explore emerging metrics for assessing the success of a retirement plan.
- Discover tools your institution can put in place to apply new metrics and may help to enhance participants' retirement outcomes.
- Hear about how your institution can achieve a high fiduciary standard.

Agenda

- Evolutionary retirement saving trends
- Why lifetime income is important
- The risks retirees face
- Innovative solutions and the use of annuities
- Retirement readiness and new metrics

EVOLUTIONARY TRENDS IN RETIREMENT INVESTING

Evolution of retirement plans

1980s **1990s** **2000s**

Types:

Defined Benefit (DB) Plans

Defined Contribution (DC) Plans

Investments:

Mutual funds → Asset allocation funds → Target date funds → Custom target date funds → Custom TDF w/ lifetime income

Customer need
Rebalance funds in portfolio across asset classes

Customer need
Adjust asset class allocation to be more conservative over time

Customer need
Optimize asset management expertise within various asset classes

Customer need
Provide the ability to generate lifetime income in retirement

Regulatory:

The Revenue Act of 1978 included a provision that became Internal Revenue Code (IRC) Sec. 401(k).

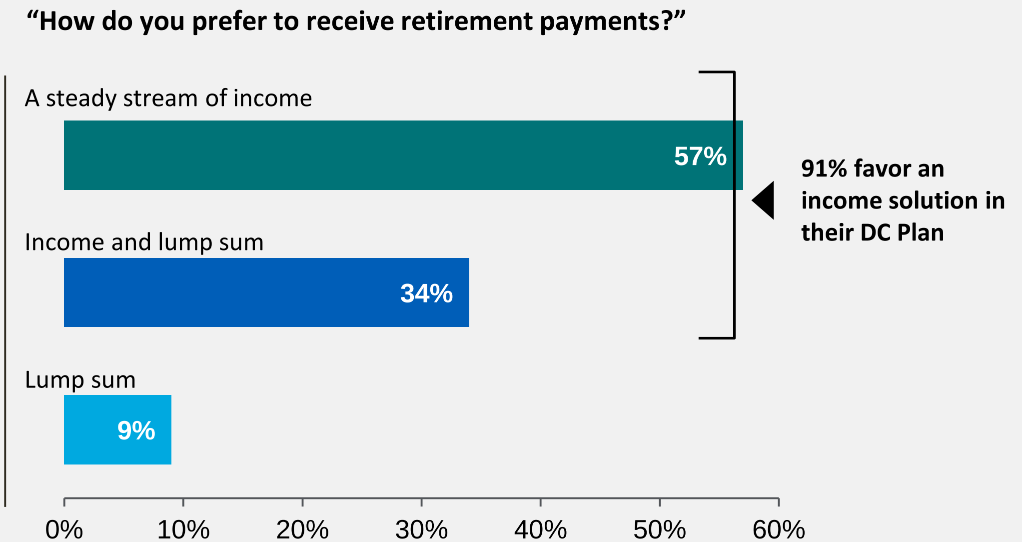
The Tax Reform Act of 1986 (TRA '86)
Imposed new rules including a ceiling on elective deferrals and nondiscrimination testing.

The Pension Protection Act of 2006 established safe harbor investments.

The DOL and Treasury issued guidance designed to expand the use of income annuities in 401(k) plans.

The demand for retirement income

BlackRock survey: Participants looking for income solutions



- 91% of participants are interested in an income solution
- 70% of plan sponsors consider adding one a top priority
- Yet only 7% of defined contribution plans offer one

10% of sponsors have an in-plan annuity product, and only 2% of those without an annuity product are very likely to add one in the coming year.[1]

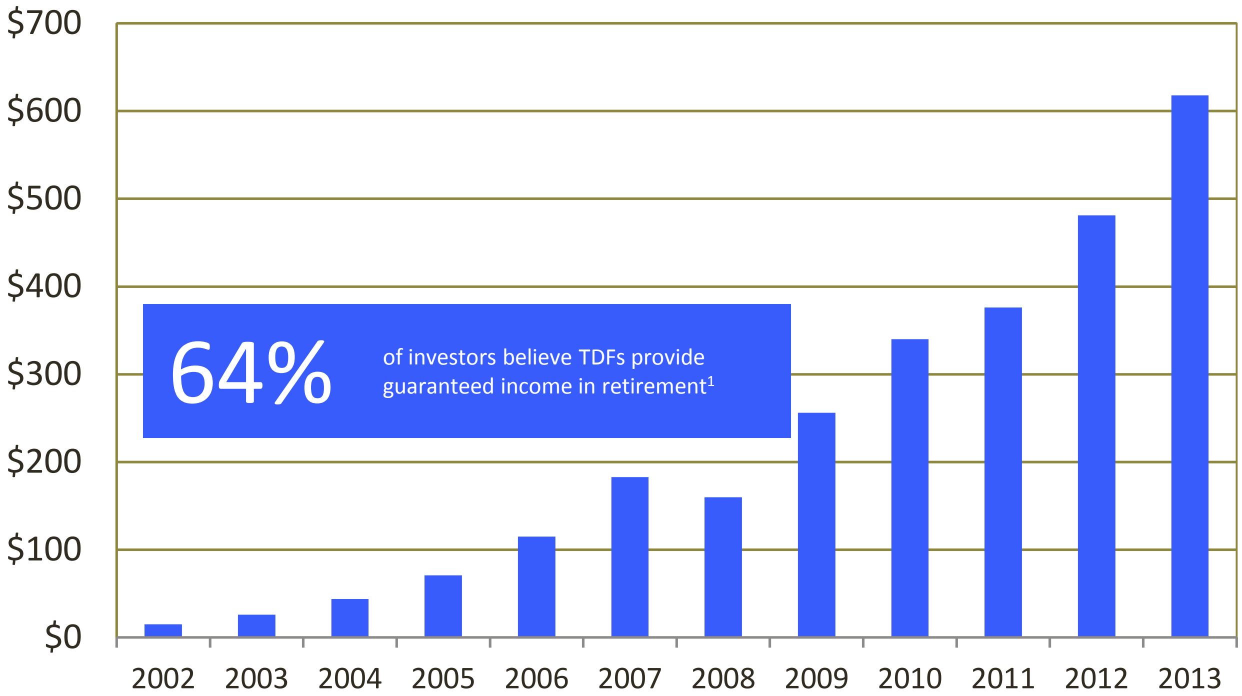
[1] Aon Hewitt, 2013 Hot Topics in Retirement.

Source: BlackRock Participant Survey. March 2010.

Source: BlackRock participant survey and plan sponsor survey (2009, 2010). Hewitt Associates LLC 2010.

Increasing flows to target date funds

Target date fund assets in billions 2002-2013[1]



72%

of participants surveyed said they would be somewhat or very interested in contributing to an investment option in their 401(k), 403(b) or 457 plan that focuses mainly on generating guaranteed monthly income in retirement (instead of accumulating a specific amount).[2]

[1] Investor Testing of Target Date Fund (TDF) Comprehension and Communication, Independent Report for SEC, 2012. Source: Investment Company Institute. 2014. *2013 Investment Company Fact Book: A Review of Trends and Activity in the Investment Company Industry*. Washington, DC: Investment Company Institute. Available at **www.ici.org/pdf/2013_factbook.pdf**.

[2] Retirement Research Inc., Brightwork Partners study, 2011.

THE RISKS RETIREES FACE

Retirees face numerous risks.

Longevity

By 2050, the number of Americans who are 85 or older could triple to almost 20 million.
Source: *Administration on Aging.*

Market

1980-2000: S&P Index up 1100%
2000-2010: S&P Index up 15%

Inflation

1980	1990	2000	2010
$1	$1.59	$2.09	$2.65

Interest rate

A 3% increase in yield will result in a 17.52% decline in price.
Seven-Year Treasury Constant Maturity Yield

Withdrawal

25% of participants expect to be able to withdraw more than 10% of their retirement savings annually.
Source: *Lifetime Income in Defined Contribution Plans: A Fiduciary Approach, 2012. Drinker Biddle LLP.*

Cognitive

"The prevalence of Alzheimer's disease doubles every five years beyond age 65."
Source: *Progress Report on Alzheimer's Disease, 1999*. National Institutes of Health: Bethesda, MD.

Longevity risk

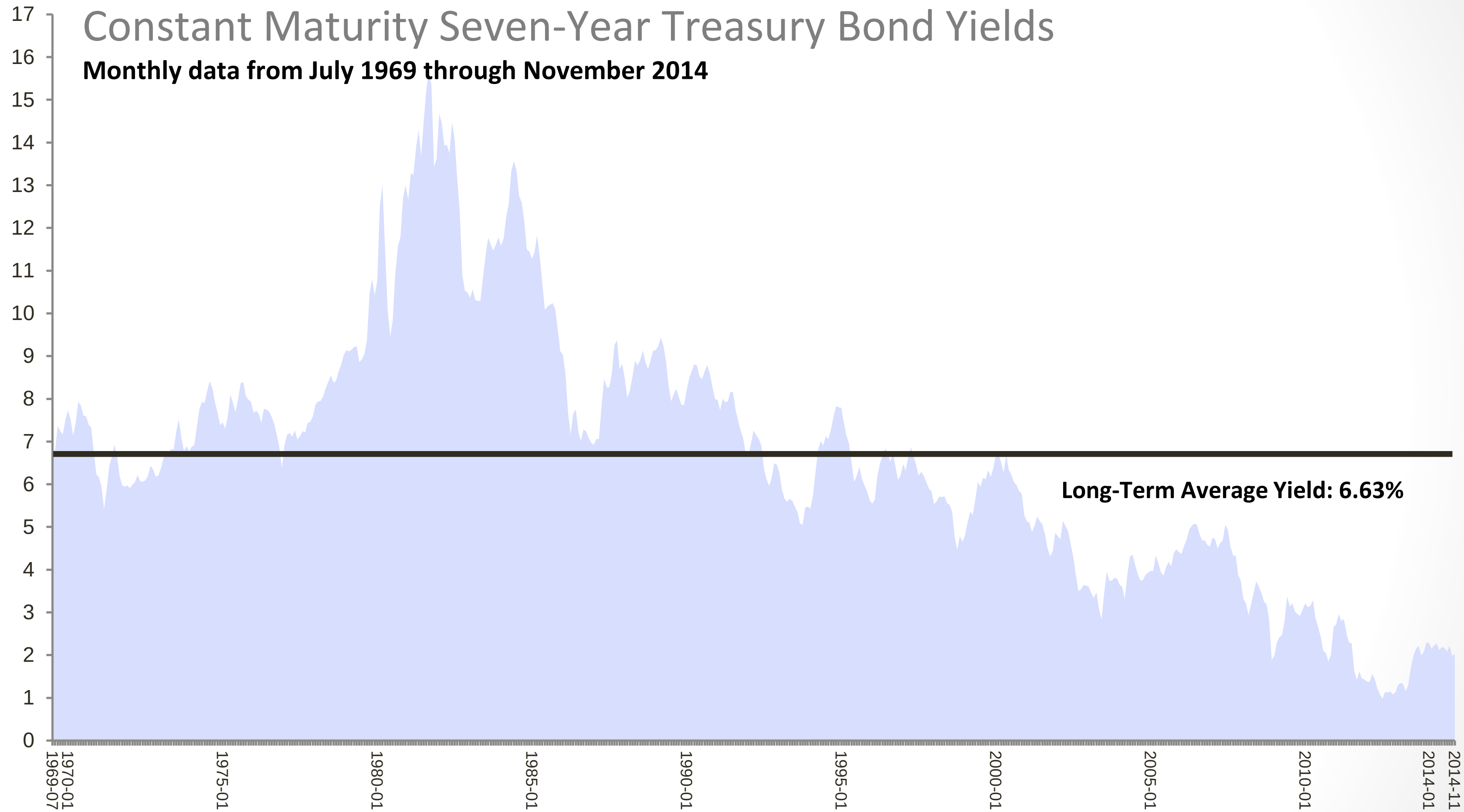
- People are living longer:
  - If a participant and his spouse are both 65, there is a 50% chance that one will live to age 92 and a 25% chance that one will live to age 97.*
  - Half of today's 65-year-old men are expected to live to 85 and half of 65-year-old women are expected to live to 88.*
  - By 2050, the number of Americans who are 85 or older could triple to almost 20 million.**

> "To illustrate the unique financial complexities facing retirees, consider 10 high school friends who decide to retire at age 65. Now, guess when the first of those 10 friends will die. As it turns out, the first death is likely to occur only four years into retirement, at age 69. Next, try guessing when the last person will die. The answer is 34 years into retirement, at age 99!"

Shlomo Benartzi,
UCLA Professor, April 2010

* Source: "Building Your Future," Insured Retirement Institute, 2011.
** Source: Administration on Aging.

Interest rate risk



Data Source: Board of Governors of the Federal Reserve System.
Past performance is no guarantee of future results.

Withdrawal rate risk

Withdrawal rate issue:
Reality check needed

90%
The probability of a 4% withdrawal rate lasting 30 years

33%
Have no idea how much they can safely withdraw

25%
Expect to be able to withdraw more than 10% of their retirement savings annually

Source: *Lifetime Income in Defined Contribution Plans: A Fiduciary Approach,* Fred Reish, Bruce Ashton and Joseph Faucher; 2012 Drinker Biddle & Reath LLP.

INNOVATIVE SOLUTIONS AND THE USE OF ANNUITIES

Annuity Overview

What is an annuity?

- An annuity is an investment option designed to use an individual's contributions to accumulate assets and then pay out an income stream at some point in time.

Why would you add an annuity to a defined contribution plan?

- Unlike defined benefit plans, defined contribution plans do not offer investment options that guarantee an income stream for employees at retirement.
- Guaranteed income (annuity) options may be able to provide employees by providing income during retirement.
- The distribution (spending) phase of retirement money is just as important, if not more so, as the accumulation phase.

All guarantees are subject to the issuing insurance company's claims-paying ability.

Potential **benefits** of annuities

- Potential guaranteed income for the rest of a participant’s life
- Protection against market declines
- Can lead to increased readiness in retirement
- Many products offer spousal/partner coverage
- Many of these products offer portfolio rebalancing on a regular basis
- Potentially lower fees through group purchasing power

All guarantees are subject to the issuing insurance company's claims-paying ability.

Potential **concerns** of annuities

- Fiduciary concerns for plan sponsors on several levels
  - The possibility that the insurer will fail
  - Participant education versus investment advice
- Portability
- Additional due diligence
- Benchmarking
- Expenses and transparency
- Benefit adequacy
- Suitability

Rethinking current practices, potential future solutions

Annuities

Accumulation	De-Accumulation
Complex – Portfolio Structuring, Monitoring, Rebalancing	Relatively Simple – Decision Process to Determine Retirement Needs

Mutual Funds

Accumulation	De-Accumulation
More Complex – Portfolio Structuring, Monitoring, Rebalancing	Very Complex – Payout Structuring and Investment Decisions combine with Declining Health, Diminished Capacity

Target Date Funds

Accumulation	De-Accumulation
Simple – "One Decision" Process	Very Complex – Payout Structuring and Investment Decisions combine with Declining Health, Diminished Capacity

"Annuitized" Target Date

Accumulation	De-Accumulation
Simple – "One Decision" Process	Relatively Simple – Decision Process to Determine Retirement Needs

How lifetime income options provide greater income compared to traditional mutual funds

	Traditional MF Target Date Structure	INCOME ACCOUNT (Fixed and Variable Annuities)	+	GROWTH ACCOUNT (Diversified Annuity)
Initial monthly contribution *(assumed 2% annual increase)*	$583	**$405**		**$178**
Accumulations at age 65	$1,000,000	**$653,297**		**$365,748**

These sample portfolios are for illustrative purposes only and past performance is no guarantee of future results.

See appendix schedules 1, 2 and 3 for detailed calculation information.

Model Portfolios are investment concepts that can be implemented through the TIAA-CREF Custom Portfolio Model Service.

TIAA-CREF is the recordkeeper for the Model Service and does not build the models or recommend underlying investment options comprising the models. This is the responsibility of the Plan Sponsor, who may likely work with a third-party fiduciary (such as an investment consultant or asset manager) to design the models, including allocations and glide paths for the models used within the program and to allocate the plan's participants to the Models created for that plan. The plan sponsor, and its consultant or investment adviser responsible for managing the portfolio may choose to utilize a methodology different from the concepts portrayed in this material.

How lifetime income options provide greater income compared to traditional mutual funds

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Initial monthly contribution *(assumed 2% annual increase)*	$583	**$405**	**$178**
Accumulations at age 65	$1,000,000	**$653,297**	**$365,748**
Initial annual payouts in retirement	4% drawdown $40,000	Variable and Fixed Annuities: $40,000/year	Payout Options / Wealth Builder

The Income Account matches the retirement income of the Mutual Fund and the Appreciation Account provides additional wealth to fund other expenses

1. 4% drawdown: $14,630
   37% more in "flexible income"
2. Fixed Annuity: $21,553
   54% more in "guaranteed* income"

$365,748 grows to $2,468,803 if invested for 24 years at 8.28%

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RETIREMENT READINESS AND NEW METRICS

Evolution of what's meaningful

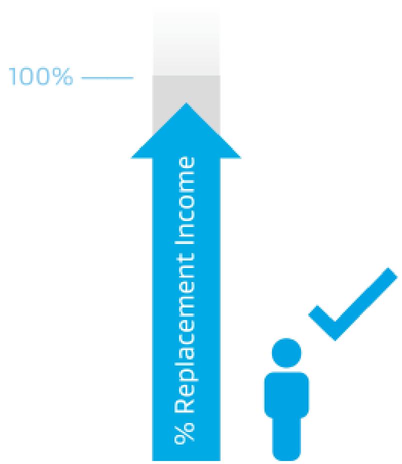
Income vs Wealth Focus

Many factors that are important for accumulating wealth are not the same meaningful factors that are important when preparing for a successful retirement.

Wealth Focus	Income Focus
Risk tolerance	Contributions
Performance	Income need
Account balance	Longevity

“Retirement Readiness” at a glance

Plan and participant retirement readiness ratios are linked.



The higher the plan’s average retirement income replacement ratio, the greater the overall preparedness of plan participants for retirement.

Using the TIAA-CREF advice engine, each plan participant’s retirement readiness was calculated to determine how “ready” individuals are for replacing income in retirement.

- On track to replace more than 80% of after-tax income in retirement
- On track to replace 50%-79% of after-tax income in retirement
- On track to replace less than 50% of after-tax income in retirement

For more details, please refer to the “Report Methodology and Assumptions” slide at the end of this presentation.

Executive summary

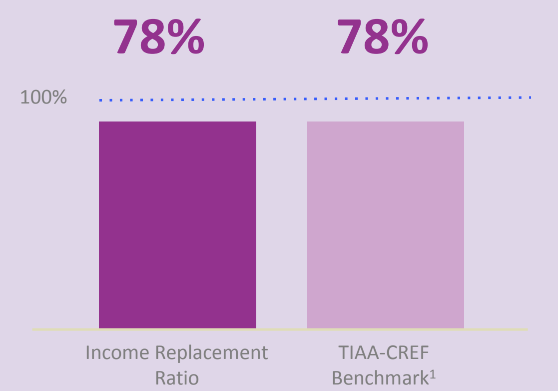
Sample data for illustrative purposes only.

PATH TO RETIREMENT

13%
SAVINGS RATE
Employer **8%** + Employee 5**%** = Savings Rate

65%
Of employees who may want to consider an asset allocation change[2]

$148,799
AVERAGE BALANCE



226,187 # OF PARTICIPANTS

THROUGH RETIREMENT

513
OF ANNUITANTS

77
AVERAGE AGE OF RETIREE

$13,400,000
TOTAL ANNUAL PAYOUT

$26,111
AVERAGE ANNUAL PAYOUT

Current Situation

- Your average income replacement ratio is slightly above the benchmark.
- Relevant year over year data

Contributing Factors

- Social Security is playing a key role in this number.
- Stock market performance
- Plan design changes

Opportunities

- Male participants in the dollar stretcher segment represent most of the people in the “red zone.”

Recommendations

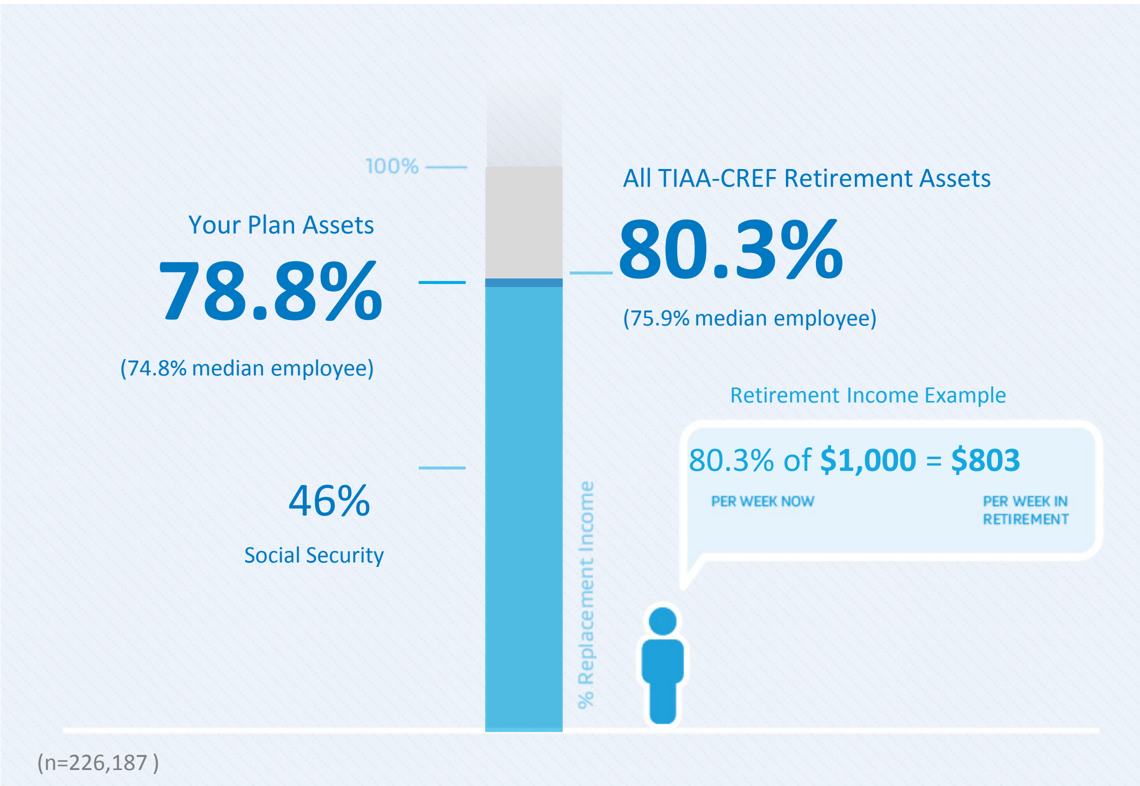
- Implement a targeted campaign via CE&A to increase savings rate of “red zone” participants.
- Consider specific plan changes.
- Offer advice to all participants.

[1] The TIAA-CREF benchmark reflects [xxx institutions in the (market type) with plan assets between $xxx and $xxx.
[2] See Retirement Readiness by Risk Factor for more information.

Plan outcome summary

Sample data for illustrative purposes only.

Average Income Replacement Across Your Employees (as of December 31, 2012)



This report uses the actual salary and/or compensation data the institution provided to TIAA-CREF.

Current Plan Assets

$79,319
Average annual salary (pretax)

$44,265
Average annual after-tax retirement income your participants are on track to receive from your TIAA-CREF plan(s)

$148,799
Average plan balance

13%
Average contribution rate (employee and employer)

47
Average age

10.2 years
Average tenure

Plan Assets + Employee Assets in All TIAA-CREF Retirement Plans (past and current employers)

$45,368
Average annual after-tax retirement income your participants are on track to receive from all their TIAA-CREF plans (including other employers)

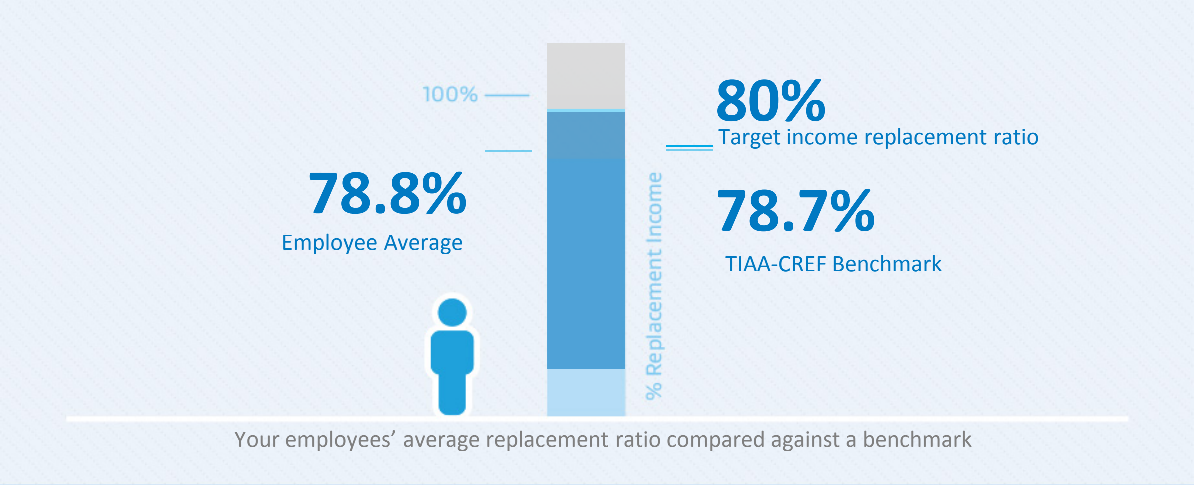
$168,260
Average all TIAA-CREF assets balance

20.1%
Employees with balances in other TIAA-CREF administered retirement plans

Compare to your benchmark

Sample data for illustrative purposes only.

Average Income Replacement Across Your Employees Compared to the TIAA-CREF Benchmark and Average Income Replacement Ratio



80% is a generally accepted target income replacement ratio.

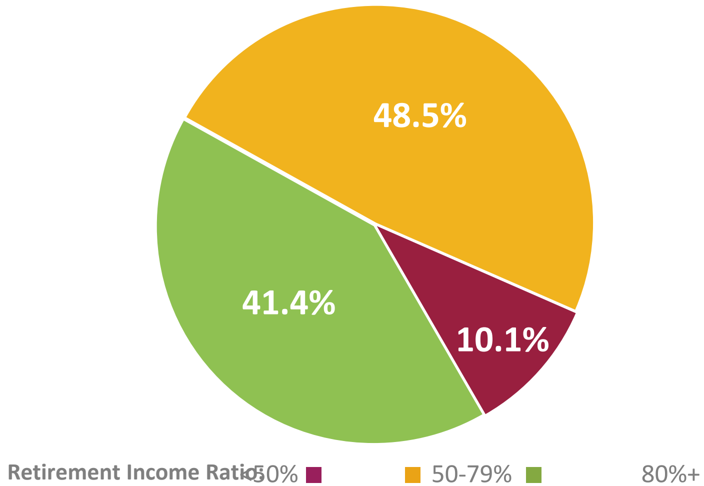
The TIAA-CREF benchmark reflects 238 institutions in the higher education market with plan assets between $100M and $500M.

	Your Plan Assets	TIAA-CREF Benchmark	Effect on income replacement ratio
Average annual salary (pretax)	$79,319	$69,023	The lower the average annual salary, the higher the ratio, because the participant must replace less income in retirement. Also, lower salary means Social Security has a greater impact in providing a retirement income floor.
Average annual retirement income (after-tax)	$44,265	$42,916	The higher the retirement income, the higher the income replacement ratio, assuming salaries are equal.
Average asset balance	$148,799	$105,826	The higher the average balance, the higher the potential income in retirement.
Average contribution rate	13%	13%	The higher the average contribution rate, the higher the potential income in retirement.
Average age	47	47	The lower the average age of plan participants, the more time employees have to save, leading to higher potential income in retirement.

Employee readiness at a glance

Sample data for illustrative purposes only.

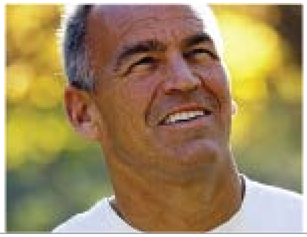
Employee Detail by Zone



	Green Zone	Yellow Zone	Red Zone
Avg. Age	44.47	48.66	52.69
Avg. Tenure	11.65	9.17	8.92
Avg. Salary	$59,421	$77,195	$171,134
Avg. Balance	$196,820	$130,634	$231,861
Avg. Savings Rate	16.27%	10.37%	8.73%
Avg. SS/Income Goal	51%	45%	26%

Retirement readiness by lifestage segment

Sample data for illustrative purposes only.

	Dollar Stretchers	Life Builders	Accumulators	Transitioners	Established
					
# of employees	34,000	65,437	70,779	41,235	14,622
Avg. total assets	$18,804	$39,958	$147,050	$342,717	$701,948
Avg. salary	**$42,971**	**$59,296**	**$95,887**	**$102,457**	**$107,716**
Avg. income replacement ratio	75%	84%	79%	70%	84%
Avg. saving rate	7%	11%	14%	17%	18%
Avg. tenure	6	7	10	17	21

FIDUCIARY RESPONSIBILITIES DURING EVALUATION PROCESS

Evaluation and Selection

Selecting an income guaranteed solution is a Fiduciary decision.

DOL Safe Harbor for Annuity Selection

A Fiduciary must:

- Engage in an objective, thorough, and analytical search for an annuity provider;
- Consider information sufficient to assess the provider's ability to make all future annuity payments;
- Consider the cost of the annuity (including any fees and commissions) in relation to the benefits and administrative services to be provided under the contract;
- Conclude that, at the time of selection, the annuity provider is financially able to make all future payments; and
- If necessary, consult with an appropriate expert.

Once more, in English!

Selecting an income guaranteed solution is a Fiduciary decision.

- Engage in a prudent process
- Gather important information
- Insurance rating agency ratings
  - Institutional experience
  - Level of capital, reserves, surplus
  - Structure of contract
  - Potential for State guarantees
- Make an informed decision "at the time," then monitor
- Get help!

Understanding Costs

You should understand fees relative to similar products in the marketplace.

Common Costs	Common Variables
Provider “guarantee”	Variable or fixed-rate dynamics
Investment management	Adjustments or “phasing”
Mortality and expense	Portability

Summary

- New solutions continue to evolve in retirement savings.
  - Lifetime income is becoming increasingly important and in-demand.
  - Retirees face many challenges and risks on their path to retiring with confidence.
- Innovative solutions are available to help drive better outcomes for employees.
- New proposed DOL regulations around QDIAs and selecting an annuity provider can be a catalyst for broader marketplace acceptance of lifetime income solutions.
- Fiduciaries should consider the breadth of product options before deciding on a lifetime income/annuity solution.

Plan Outcome Assessment: Report methodology and assumptions

Calculation of the Retirement Income Replacement Ratio

- TIAA-CREF measures retirement income replacement ratios by calculating the projected stream of distributions from participants' assets and estimated Social Security benefits in current dollars as a percentage of employees' current salaries.
- Using the participant's salary, current contribution rates and asset allocation, TIAA-CREF leverages the advice engine from Ibbotson Associates, Inc., an independent expert retained by TIAA-CREF, to perform a sophisticated, Monte Carlo analysis (500 total simulations) to project the retirement income replacement ratio. The results indicate the participant's 70% probability of achieving the retirement goal.
- The plan-level retirement income replacement ratio is determined by calculating the average retirement income replacement ratio of all participants in the plan analysis. All actively contributing participants are included in the analysis, unless the participant has annual compensation of less than $25,000, has contributed less than $300 in the previous 12-month period, has a current balance less than $100, or is less than 18 or greater than 81 years of age.
- **IMPORTANT**: The Plan Outcome Assessment projections, and other information generated regarding the likelihood of various investment outcomes, are hypothetical, do not reflect actual investment results, and are not a guarantee of future results. The projections are dependent in part on subjective and proprietary assumptions, including the rate of inflation and the rate of return for different asset classes, and these rates are difficult to accurately predict. The projections also rely on financial and economic historical assumptions that may not reoccur in the future, volatility measures and other facts.

Participant-Related Assumptions (Salary, Contribution, Retirement Age and Advice)

- Participant compensation is based on data submitted by the employer. The participant's gross annual income is used for various calculations, including retirement income replacement ratio, estimated Social Security benefits, and estimated federal and state taxes.
- Participant contributions are aggregated for a 12-month period for participants with a balance at the beginning of the period. For participants without a beginning balance, the contribution amount from the last month of the 12-month period is annualized. IRS contribution limits are applied and adjusted for participants eligible for catch-up provisions. Ibbotson Associates, Inc. shifts any contribution amount above the annual limit of $50,000 to after-tax contributions for modeling purposes.
- All retirement plan contributions are considered to be dedicated solely for retirement. Assets will not be liquidated for use prior to retirement, and all contributions will end at the Target Retirement Age (TRA).
- The TRA value is defaulted to 67 for most plan participants. Participants aged 66 or higher have a TRA that is set two years from the current age. Life expectancy values are estimated by Ibbotson Associates, Inc. and are based on participant age and gender.
- The participant's balance is aggregated for all selected plans. Amounts are designed as pretax and Roth contributions, as appropriate.
- The participant's asset allocation, for the purposes of this analysis, is categorized into simplified asset classes (i.e., stable value, equities, real estate, fixed income, multi-asset and money market).
- The advice provided by Ibbotson Associates, Inc. consists of model portfolios composed of target allocations for the asset classes. Based on the target retirement goals, Ibbotson will recommend a specific tolerance level designed to adjust over time based on Ibbotson's proprietary methodology which customizes a risk level trajectory for the participant.
- The hypothetical advice target for the model is an 80% replacement ratio. An 80% target rate is considered an optimal replacement rate when considering all participant retirement contributions, employer contributions and Social Security.

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Appendix – Schedule 1

INPUTS	
Age	35
Salary:	$46,630
Contribution %:	15%
Salary Inflation:	2%
memo: monthly	$583
memo: annual	$6,995

HYPOTHETICAL TARGET DATE

Weightings

RETURNS AND FEES

		Large-Cap Value Fund (J)	Enhanced Large-Cap Value Index Fund (K)	Large-Cap Growth Fund (L)	Enhanced Large-Cap Growth Index Fund (M)	Growth & Income Fund (N)	Small-Cap Equity Fund (O)	Mid-Cap Value Fund (P)	Mid-Cap Growth Fund (Q)	International Equity Fund (R)	Enhanced International Equity Index Fund (S)	Emerging Markets Equity Fund (T)	Global Natural Resources Fund (U)	International Opportunities Fund (V)	Bond Fund (W)	High-Yield Fund (X)	Bond Plus Fund (Y)	Short-Term Bond Fund (Z)	Money Market Fund (AA)	Inflation-Linked Bond Fund (AB)	End Balance
Historic Return:	Total Avg.	9.94%	9.33%	8.26%	8.16%	9.86%	8.84%	11.69%	9.41%	6.47%	5.36%	4.45%	5.02%	5.75%	5.70%	6.93%	5.56%	4.38%	3.06%	5.74%	
Fund Fee (bps)	L/C Fee:	0.45	0.37	0.46	0.37	0.45	0.55	0.45	0.47	0.51	0.47	0.95	0.74	0.70	0.32	0.37	0.33	0.28	0.13	0.27	
Fee Adjustment *** (bps)	0.54	0.09	0.17	0.08	0.17	0.09	-0.01	0.09	0.07	0.03	0.07	-0.41	-0.20	-0.16	0.22	0.17	0.21	0.26	0.41	0.27	
Embedded Rev. Share		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Rev. Share Changes		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Simulation Return		9.85%	9.16%	8.18%	7.99%	9.77%	8.85%	11.60%	9.34%	6.44%	5.29%	4.86%	5.22%	5.91%	5.48%	6.76%	5.35%	4.12%	2.65%	5.47%	0.000
		0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	

ACCUMULATIONS

Age	Year	Fund	Beginning Balance + ContribS.	Large-Cap Value Fund (J)	Enhanced Large-Cap Value Index Fund (K)	Large-Cap Growth Fund (L)	Enhanced Large-Cap Growth Index Fund (M)	Growth & Income Fund (N)	Small-Cap Equity Fund (O)	Mid-Cap Value Fund (P)	Mid-Cap Growth Fund (Q)	International Equity Fund (R)	Enhanced International Equity Index Fund (S)	Emerging Markets Equity Fund (T)	Global Natural Resources Fund (U)	International Opportunities Fund (V)	Bond Fund (W)	High-Yield Fund (X)	Bond Plus Fund (Y)	Short-Term Bond Fund (Z)	Money Market Fund (AA)	Inflation-Linked Bond Fund (AB)	End Balance
35	2014	2045	$6,995	11.5%	11.5%	11.8%	11.8%	9.8%	5.0%	0.6%	0.6%	7.2%	6.9%	4.9%	1.5%	6.8%	0.0%	6.0%	4.0%	0.0%	0.0%	0.0%	$7,540
40	2019	2040	$53,434	11.5%	11.5%	11.8%	11.8%	9.8%	5.0%	0.6%	0.6%	7.2%	6.9%	4.9%	1.5%	6.8%	0.0%	6.0%	4.0%	0.0%	0.0%	0.0%	$57,598
45	2024	2035	$125,517	10.7%	10.7%	11.0%	11.0%	9.2%	4.7%	0.5%	0.6%	6.7%	6.4%	4.6%	1.4%	6.4%	4.2%	5.9%	6.0%	0.0%	0.0%	0.0%	$135,101
50	2029	2030	$233,900	9.6%	9.7%	10.0%	10.0%	8.4%	4.2%	0.4%	0.5%	6.0%	5.8%	4.2%	1.3%	5.8%	9.1%	5.9%	9.1%	0.0%	0.0%	0.0%	$251,284
55	2034	2025	$392,544	8.7%	8.7%	8.9%	9.0%	7.5%	3.8%	0.4%	0.4%	5.4%	5.2%	3.8%	1.1%	5.2%	13.1%	5.1%	10.6%	1.5%	0.0%	1.6%	$420,814
60	2039	2020	$619,314	7.7%	7.7%	7.9%	7.9%	6.6%	3.4%	0.3%	0.3%	4.8%	4.5%	3.4%	1.0%	4.6%	17.8%	4.2%	10.8%	3.5%	0.0%	3.6%	$662,436
65	2044	2015	$936,937	6.7%	6.7%	6.9%	6.9%	5.8%	2.9%	0.2%	0.3%	4.2%	3.9%	3.1%	0.9%	4.0%	21.9%	3.9%	10.8%	5.9%	0.0%	5.2%	$1,000,000
70																							
75																							
80																							
85																							
90																							

RETIREMENT CALCULATIONS

	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	End Balance
Accumulations to 65	$66,600	$67,100	$68,900	$69,000	$58,000	$28,700	$2,100	$2,600	$41,500	$39,100	$30,500	$8,700	$40,300	$218,800	$39,200	$108,400	$58,800	$100	$51,600	$1,000,000
A) 4% DRAWDOWN:	$2,664	$2,684	$2,756	$2,760	$2,320	$1,148	$84	$104	$1,660	$1,564	$1,220	$348	$1,612	$8,752	$1,568	$4,336	$2,352	$4	$2,064	$40,000
	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	
B) FULLY ANNUITIZED - 20-Yr Min. Payout	$4,150	$4,181	$4,293	$4,300	$3,614	$1,788	$131	$162	$2,586	$2,436	$1,901	$542	$2,511	$12,894	$2,310	$6,388	$3,465	$6	$3,215	$60,874
	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	new $ rate	new $	new $ rate	new $ rate	variable	variable	
	$4,150	$4,181	$4,293	$4,300	$3,614	$1,788	$131	$162	$2,586	$2,436	$1,901	$542	$2,511	$15,852	$2,310	$6,388	$3,465	$6	$3,215	$63,832
	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	variable	blended $	new $	new $ rate	new $ rate	variable	variable	

Notes: A Used the performance and characteristics of Vanguard R1000V Index Fund
Notes: B Returns of Russell 3000 1/94 through 4/94
Notes: C Returns of Russell 3000 Growth 1/94 through 4/94
Notes: D Returns of Wilshire EM 1/94 through 12/98, MSCI EM thereafter.
Notes: E Returns of Wilshire US REIT 1/94 through 10/95
Notes: F Returns of Barclays Agg 1/94 through 2/97, Barclays US TIPS 3/97 through 5/97
Notes: G Returns Citi WGBI non-USD 1/94 through 12/11
Notes: H Returns are RA Annuity minus 75 bps per year.
Notes: I - Used Barclays Aggregate Bond Index Full Return Series
Notes: J Russell 1000 Value from 1/94 through 10/02
Notes: K Russell 1000 Value from 1/94 through 11/07

Notes: L Russell 1000 Growth from 1/94 through 3/06
Notes: M Russell 1000 Growth from 1/94 through 11/07
Notes: N S&P 500 from 1/94 through 7/99
Notes: O Russell 2000 from 1/94 through 10/02
Notes: P Russell MCV from 1/94 through 10/02
Notes: Q Russell MCG from 1/94 through 10/02
Notes: R MSCI EAFE from 1/94 through 7/99
Notes: S MSCI EAFE from 1/94 through 11/07
Notes: T Wilshire EM from 1/94 through 12/98, MSCI EM from 1/99 through 8/10
Notes: U S&P 500 from 1/94 through 7/08, MSCI Commodity Index from 8/08 through 11/11
Notes: V MSCI EAFE from 1/94 through 12/98, MSCI ACWI ex USA from 1/99 through 4/13

Notes: W Barclays Aggregate Bond Index from 1/94 through 7/99
Notes: X Barclays Aggregate Bond Index from 1/94 through 12/96, BOAML HY C pay BB-B Constrained from 1/97 through 3/06
Notes: Y Barclays Aggregate Bond Index from 1/94 through 3/06
Notes: Z Barclays 1-3 Yr Govt/Credit from 1/94 through 3/06
Notes: AA Barclays 1-3 Mo T-Bills from 1/94 through 7/99
Notes: AB Barclays Aggregate Bond Index from 1/94 through 2/97, Barclays TIPS from 3/97 through 10/02

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For all illustrations, analysis begins at age 35 and ends at age 65. Market Indexes and returns used in this and other examples are from Morningstar except TIAA Traditional Annuity, from TIAA-CREF and represent the annualized historic return of each strategy or index for 20 years ended 12-31-2013. Components and returns used are: Russell 3000: 9.32%, Barclays Aggregate Bond Index: 5.74%, TIAA Traditional Annuity 5.98%, MSCI EAFE Index: 5.68%, Citigroup World Govt. Bond Index: 5.46%. In each example, the hypothetical weights are applied to strategies and rebalanced annually. Fees vary by example. For mutual fund-based examples, a flat fee is applied to each strategy and this fee declines slightly over time.

For annuity-based examples, the current fees for CREF Stock, TIAA Traditional, CREF Global, and DFA World ex US Fixed Income fund are applied against the respective returns of the Russell 3000, TIAA Traditional, MSCI EAFE, and Citigroup World Government Bond Index. All models assume a beginning participant salary of $45.929.20 annually with a 2% annual escalation.

Appendix – Schedule 2

HYPOTHETICAL FULLY-ANNUITIZED TARGET DATE FUND

INPUTS	
Age	35
Salary:	$32,391
Contribution %:	15%
Salary Inflation:	2%
memo: monthly	$405
memo: annual	$4,859

	Beginning Balance + Contribs.	Weightings													End Balance
		CREF Equity Index	CREF Stock	CREF Global Equities	CREF Growth	Russell 1000 Value TR USD	MSCI EM NR USD	CREF Social Choice	TIAA RSRA-TIAA Real Estate Account	TIAA-CREF Bond Index (BUFFER)	RCP Annuity (RA minus 75 bps/yr)	CREF Inflation-Linked Bond	CREF Money Market	DFA World ex US Government Fxd Inc I	
		B			F	A	D		E	I	H	F		G	
RETURNS AND FEES															
Historic Return:		8.96%	8.28%	6.77%	7.62%	9.52%	4.89%	7.91%	5.83%	5.51%	5.19%	5.59%	2.97%	5.52%	
Fund Fee (bps)		0.39	0.46	0.47	0.42	0.17	0.35	0.41	0.89	0.22	0.56	0.41	0.40	0.30	
Fee Adjustment *** (bps)		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Embedded Rev. Share		0.24	0.24	0.24	0.24	0.00	0.00	0.24	0.24	0.00	0.15	0.24	0.24	0.00	0.195
Rev. Share Changes		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000
Simulation Return		8.96%	8.28%	6.77%	7.62%	9.52%	4.89%	7.91%	5.83%	5.51%	5.19%	5.59%	2.97%	5.52%	0.195

ACCUMULATIONS

Age	Year	Fund	Beginning Balance + Contribs.	CREF Equity Index	CREF Stock	CREF Global Equities	CREF Growth	Russell 1000 Value TR USD	MSCI EM NR USD	CREF Social Choice	TIAA RSRA-TIAA Real Estate Account	TIAA-CREF Bond Index (BUFFER)	RCP Annuity	CREF Inflation-Linked Bond	CREF Money Market	DFA World ex US Government Fxd Inc I	End Balance
35	2014	2045	$4,859	26.8%	24.0%	32.0%	0.0%	0.0%	7.0%	0.0%	0.0%	2.0%	6.5%	0.0%	0.8%	1.0%	$5,219
40	2019	2040	$36,774	26.8%	24.0%	32.0%	0.0%	0.0%	7.0%	0.0%	0.0%	2.0%	6.5%	0.0%	0.8%	1.0%	$39,502
45	2024	2035	$85,522	25.0%	22.0%	29.5%	0.0%	0.0%	7.0%	0.0%	0.0%	4.0%	10.5%	0.0%	1.0%	1.0%	$91,723
50	2029	2030	$157,602	23.0%	20.0%	27.0%	0.0%	0.0%	6.0%	0.0%	0.0%	5.0%	17.0%	0.0%	1.0%	1.0%	$168,762
55	2034	2025	$261,760	20.5%	18.0%	24.0%	0.0%	0.0%	5.5%	0.0%	0.0%	6.0%	22.0%	1.0%	1.5%	1.5%	$279,761
60	2039	2020	$408,879	17.5%	18.0%	19.5%	0.0%	0.0%	5.5%	0.0%	0.0%	7.0%	26.0%	3.0%	2.0%	1.5%	$436,246
65	2044	2015	$613,540	15.5%	14.0%	18.5%	0.0%	0.0%	4.5%	0.0%	0.0%	7.0%	31.0%	5.0%	2.5%	2.0%	$653,297
70																	
75																	
80																	
85																	
90																	

RETIREMENT CALCULATIONS

		CREF Equity Index	CREF Stock	CREF Global Equities	CREF Growth	Russell 1000 Value TR USD	MSCI EM NR USD	CREF Social Choice	TIAA RSRA-TIAA Real Estate Account	TIAA-CREF Bond Index (BUFFER)	RCP Annuity	CREF Inflation-Linked Bond	CREF Money Market	DFA World ex US Government Fxd Inc I	End Balance
Accumulations to 65		$101,261	$91,462	$120,860	$0	$0	$29,398	$0	$0	$45,731	$202,522	$32,665	$16,332	$13,066	$653,297
		15.5%	14.0%	18.5%			4.5%			7.0%	31.0%	5.0%	2.5%	2.0%	
A) 4% DRAWDOWN:		$4,050	$3,658	$4,834	$0	$0	$1,176	$0	$0	$2,704	$11,974	$1,307	$653	$523	$30,879
		4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	4% Draw	new $ rate	new $ rate	4% Draw	4% Draw	4% Draw	
B) FULLY ANNUITIZED - 20-Yr Min. Payout	New Money Rate	$6,331	$5,718	$7,556	$0	$0	$1,838	$0	$0	$2,704	$11,974	$2,042	$1,021	$817	$40,000
		variable	variable	variable	variable	variable	variable	variable	variable	new $ rate	new $ rate	variable	variable	variable	
	Historic Rate with Vintages	$6,331	$5,718	$7,556	$0	$0	$1,838	$0	$0	$2,704	$14,721	$2,042	$1,021	$817	$42,747
		variable	variable	variable	variable	variable	variable	variable	variable	new $ rate	blended $ rate	variable	variable	variable	

Notes: A Used the performance and characteristics of Vanguard R1000V Index Fund
Notes: B Returns of Russell 3000 1/94 through 4/94
Notes: C Returns of Russell 3000 Growth 1/94 through 4/94
Notes: D Returns of Wilshire EM 1/94 through 12/98, MSCI EM thereafter.
Notes: E Returns of Wilshire US REIT 1/94 through 10/95
Notes: F Returns of Barclays Agg 1/94 through 2/97, Barclays US TIPS 3/97 through 5/97
Notes: G Returns Citi WGBI non-USD 1/94 through 12/11
Notes: H Returns are RA Annuity minus 75 bps per year.
Notes: I - Used Barclays Aggregate Bond Index Full Return Series
Notes: J Russell 1000 Value from 1/94 through 10/02
Notes: K Russell 1000 Value from 1/94 through 11/07
Notes: L Russell 1000 Growth from 1/94 through 3/06
Notes: M Russell 1000 Growth from 1/94 through 11/07
Notes: N S&P 500 from 1/94 through 7/99
Notes: O Russell 2000 from 1/94 through 10/02
Notes: P Russell MCV from 1/94 through 10/02
Notes: Q Russell MCG from 1/94 through 10/02
Notes: R MSCI EAFE from 1/94 through 7/99
Notes: S MSCI EAFE from 1/94 through 11/07
Notes: T Wilshire EM from 1/94 through 12/98, MSCI EM from 1/99 through 8/10
Notes: U S&P 500 from 1/94 through 7/08, MSCI Commodity Index from 8/08 through 11/11
Notes: V MSCI EAFE from 1/94 through 12/98, MSCI ACWI ex USA from 1/99 through 4/13
Notes: W Barclays Aggregate Bond Index from 1/94 through 7/99
Notes: X Barclays Aggregate Bond Index from 1/94 through 12/96, BOAML HY C pay BB-B Constrained fro
Notes: Y Barclays Aggregate Bond Index from 1/94 through 3/06
Notes: Z Barclays 1-3 Yr Govt/Credit from 1/94 through 3/06
Notes: AA Barclays 1-3 Mo T-Bills from 1/94 through 7/99
Notes: AB Barclays Aggregate Bond Index from 1/94 through 2/97, Barclays TIPS from 3/97 through 10/02

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Appendix – Schedule 3

Age	Age	35	Beginning Balance + Contributions	HYPOTHETICAL SINGLE INVESTMENT Annualized Returns - 20 Years Ended 12-31-2013	CREF Stock	End Balance
	Salary:	$14,240				
	Contribution %:	15%				
	Salary Inflation:	2%				
	memo: monthly	$178			0.00%	
				Simulation Return:	8.28%	
				Ending Balance at Age 65:		$365,748
35	2014	2045	$2,136	Simulation Return:	8.28%	$2,313
36	2015	2045	$4,491	Simulation Return:	8.28%	$4,863
37	2016	2045	$7,086	Simulation Return:	8.28%	$7,673
38	2017	2045	$9,939	Simulation Return:	8.28%	$10,762
39	2018	2045	$13,074	Simulation Return:	8.28%	$14,157
40	2019	2040	$16,515	Simulation Return:	8.28%	$17,883
41	2020	2040	$20,288	Simulation Return:	8.28%	$21,969
42	2021	2040	$24,422	Simulation Return:	8.28%	$26,445
43	2022	2040	$28,947	Simulation Return:	8.28%	$31,345
44	2023	2040	$33,897	Simulation Return:	8.28%	$36,704
45	2024	2035	$39,308	Simulation Return:	8.28%	$42,563
46	2025	2035	$45,219	Simulation Return:	8.28%	$48,964
47	2026	2035	$51,673	Simulation Return:	8.28%	$55,952
48	2027	2035	$58,715	Simulation Return:	8.28%	$63,578
49	2028	2035	$66,396	Simulation Return:	8.28%	$71,895
50	2029	2030	$74,770	Simulation Return:	8.28%	$80,962
51	2030	2030	$83,894	Simulation Return:	8.28%	$90,842
52	2031	2030	$93,832	Simulation Return:	8.28%	$101,603
53	2032	2030	$104,654	Simulation Return:	8.28%	$113,321
54	2033	2030	$116,432	Simulation Return:	8.28%	$126,075
55	2034	2025	$129,249	Simulation Return:	8.28%	$139,952
56	2035	2025	$143,190	Simulation Return:	8.28%	$155,048
57	2036	2025	$158,350	Simulation Return:	8.28%	$171,464
58	2037	2025	$174,832	Simulation Return:	8.28%	$189,311
59	2038	2025	$192,747	Simulation Return:	8.28%	$208,709
60	2039	2020	$212,213	Simulation Return:	8.28%	$229,788
61	2040	2020	$233,362	Simulation Return:	8.28%	$252,688
62	2041	2020	$256,334	Simulation Return:	8.28%	$277,562
63	2042	2020	$281,281	Simulation Return:	8.28%	$304,575
64	2043	2020	$308,368	Simulation Return:	8.28%	$333,906
65	2044	2015	$337,775	Simulation Return:	8.28%	$365,748

Graphic Entries

End Balance	$365,748
	0.04
4% Draw	$14,630

End Balance	$365,748
New Money Rate	6.47%
20-Year Certain Factor	0.911
New $ Fixed Annuity	$21,553

Principal	$365,748
Investment Term	24
Rate of Return	8.28%
Ending Balance:	$2,468,800

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