

Trends in retirement plan contributions and asset allocations by TIAA participants: 2012 to 2018

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Abstract

This paper examines how workers allocated their contributions and assets in their employer-sponsored retirement savings plans within the TIAA system over the 2012 to 2018 period. Consistent with previous research, we find that Lifecycle funds, an auto-diversified target-date fund with an age-based glide path, are used by an increasing share of participants. Younger participants, who are more likely to have defaulted into the Lifecycle fund, tend to use it as a single comprehensive fund-of-funds investment. Older participants who invest in a Lifecycle fund tend to use it as part of a broader portfolio strategy. As with previous studies, we find older workers, participants with longer TIAA system tenure, and higher asset participants are more likely to customize their investment portfolio across multiple asset classes and investment products. Overall, we find the current investment menu provides a strong set of options capable of meeting the needs of a diverse workforce.

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1. Introduction

Defined-contribution (DC) plan participants bear responsibility for managing the investment risk in their employer-sponsored retirement savings plans, deciding which investments best suit their needs when allocating contributions and asset accumulations.¹ But research indicates that many workers have difficulty making these decisions due to behavioral biases or a lack of financial literacy.² Following the seminal work of Madrian and Shea (2001) and Benartzi and Thaler (2004) that highlighted the efficacy of default choices, many employers have added these features to their plans in an effort to help employees make better retirement savings decisions. The use of default provisions escalated with the passage of the Pension Protection Act (PPA) of 2006, which codified auto-enrollment into a plan, default contribution levels, auto-escalation of contributions, and the use of target date funds (TDFs) as Qualified Default Investment Alternatives (QDIAs).³ As first documented by Richardson and Bissette (2014), this latter change had a significant effect on investment behavior, effectively dividing participants between younger, shorter tenured workers who tended to use the default TDFs exclusively, and older, longer tenured participants who continued to customize their portfolio. Moreover, recent research by McDonald, Richardson and Rietz (2019) provide evidence that participants are more likely to stick with a default TDF compared to a default money-market fund, which was the most common default investment fund prior to the PPA.

This paper examines recent trends in how participants in the Teachers Insurance and Annuity Association of

America (TIAA) system allocated their contributions and assets to their primary⁴ employer-sponsored retirement plan savings account over the 2012 to 2018 period.⁵ It adds to previous studies documenting TIAA participant allocation decisions, starting with Ameriks, King and Warshawsky (1997), and updates by Ameriks (2000), Rugh (2004), and Richardson and Bissette (2014). Taken as a group, this series of occasional papers provide a long cross-sectional time series, dating back to 1986 and ending in 2018, of how TIAA participants changed their investment allocations in response to the evolution of the investment menu.

Our analysis provides insights into participants' investment product preferences and the management of their retirement savings risk profile. Participants can be defined as falling into one of three categories: (1) TDF only, (2) customized portfolio with TDF component, or (3) customized portfolio with no TDF component. We document how the TDF only investor group continues to grow relative to the custom portfolio groups. TIAA-CREF Lifecycle funds, a type of TDF, are auto-diversified and auto-balanced baskets of equity and fixed income mutual funds where the portfolio weights vary based on the participant's age. As with most TDFs, they incorporate an age-based 'glide-path' that reduces equity exposure and increases fixed income exposure as a participant ages. Consistent with previous research, we find a continuation of the trend towards increased use of Lifecycle funds, both in terms of the percentage of participants using these funds and intensity of their use as a single comprehensive fund-of-funds investment.⁶ This latter effect is especially true for workers who started participating in a plan after 2006.

¹ In 2016, the Employee Benefits Security Administration (2018) found that compared to defined benefit (DB) plans, DC plans represent the vast majority (85%) of active private sector plan participants.

² See Benartzi and Thaler (2007, 2013) for an overview of research of behavioral biases. For research on financial literacy and retirement planning readiness see Lusardi and Mitchell (2007, 2011, 2017), and Hastings et al. (2013), among others.

³ See VanDerhei and Lucas (2010) for evidence on the impact of the PPA on participation and contributions.

⁴ Many TIAA participants have access to more than one employer-retirement plan. Our analysis includes contributions from participants in a primary plan that is a Retirement Annuity (RA), Group Retirement Annuity (GRA), or Retirement Choice (RC) plan.

⁵ Earlier papers in this occasional series used the convention of referring to participant contributions as 'premiums' because of the exclusive use of deferred annuity products on the investment menu. Given the growth and utilization of mutual fund offerings (especially TDFs) we use the term "contribution" for both mutual funds and annuity contracts.

⁶ See Richardson and Bissette (2014) for past TIAA participant experience and VanDerhei, Holden, Alonso, and Bass (2018) for 401(k) evidence.

Within our cross-sectional analysis, we find that participants who are older, longer tenured, and wealthier are increasingly likely to customize their retirement portfolio using a mixture of investment products and increasingly less likely to use Lifecycle funds, either as a single investment or as part of a broader portfolio strategy, both for contribution allocations and asset allocation. For custom portfolio participants allocating contributions and assets to equity or fixed income asset classes, we document participants shifting allocations into non-Lifecycle mutual funds and out of variable annuities. Finally, despite an overall decline in participation in the real estate class, average allocations into real estate have continued to increase since the Great Recession.

1.1 TIAA asset classes and investment accounts

Participants in the TIAA system choose from a diversified menu of deferred annuity and mutual fund investments available when constructing their retirement portfolio. Table 1 provides information on investment choices and assets classes available to participants, as of December 31, 2018, along with the dates of inception. Participants can invest in a guaranteed asset class using the TIAA Traditional and TIAA Stable Value annuities. TIAA Traditional began in 1918 as the original (and for years the only) investment with the TIAA system. The TIAA Traditional annuity provides a guarantee of principal, a guaranteed interest rate, and the potential for declared interest in excess of the guaranteed rate.⁷ In 2010, TIAA began offering another guaranteed product, TIAA Stable Value, which also offers a guarantee of principal, a guaranteed interest rate, and the potential for interest rates above the guaranteed amount.⁸

⁷ Interest credited to TIAA Traditional Annuity accumulations includes a guaranteed interest rate, plus additional amounts declared on a year-by-year basis by the TIAA Board of Trustees. When declared, the additional amounts remain in effect through the “declaration year,” as a 12-month period, which begins each March 1 for accumulating annuities, and are not guaranteed for future years. Any guarantees under annuities issued by TIAA are subject to TIAA’s claims-paying ability. TIAA Traditional is a guaranteed insurance contract and not an investment for Federal Securities Law purposes. For RA and GRA participants, the current guaranteed annual interest rate is 3% for all contributions. For RC participants, the guaranteed rate is set each calendar year (between 1-3%), applies to all contributions during that calendar year, and is guaranteed for at least ten years.

⁸ A guaranteed interest rate of 1-3% is applied to all contributions depending on the specific annuity contract and applies to the entire amount of existing accumulations and contributions. The guaranteed rate is set every six months. Additional amounts, when declared, remain in for a six-month period, set on January 1 and July 1 of each year. TIAA Stable Value is a guaranteed insurance contract and not an investment for Federal Securities Law purposes.

Table 1. Asset classes, inception dates, and total assets under management for TIAA, as of December 31, 2018

Asset Class and Investment Account	Date of Inception	Assets (\$ mil)	% of Total
Guaranteed			
TIAA Traditional	April 23, 1918	\$305,941	43.6%
TIAA Stable Value	September 1, 2010	\$1,245	
Equity			
CREF Stock	July 1, 1952	\$103,836	35.2%
CREF Global Equities	May 1, 1992	\$18,214	
CREF Growth	April 29, 1994	\$23,227	
CREF Equity Index	April 29, 1994	\$16,832	
TIAA-CREF Equity Mutual Funds (24)	July 1, 1999	\$85,788	
Fixed Income			
CREF Money Market	April 1, 1988	\$9,898	8.9%
CREF Bond Market	March 1, 1990	\$13,221	
CREF Inflation-Linked Bond	May 1, 1997	\$6,343	
TIAA-CREF Fixed Income Mutual Funds (14)	July 1, 1999	\$32,945	
Real Estate			
TIAA Real Estate	October 2, 1995	\$25,843	3.9%
TIAA-CREF Real Estate Securities Mutual Fund	October 1, 2002	\$1,761	
Balanced/Multi-Asset			
CREF Social Choice	March 1, 1990	\$12,858	8.4%
TIAA-CREF Lifecycle Funds (24)	October 15, 2004	\$45,017	
TIAA-CREF Lifestyle Funds (5)	December 9, 2011	\$340	
TIAA-CREF Managed Allocation Mutual Fund	March 31, 2006	\$792	

Source: Tabulation of TIAA Financial Annual Reports and Statements and administrative records.

Notes: For mutual funds the retail class is excluded (with the exception of the Managed Allocation Fund, all classes are included above). The totals and the data sources in this table are different from the following information in this paper which summarizes data for active premium-paying TIAA participants in primary plans only.

The TIAA system began expanding in 1952 with the creation of the College Retirement Equities Fund (CREF) Stock Account, the first commercially available variable annuity that allowed for the direct investment of equity in a participant's DC pension plan. TIAA Traditional and CREF Stock were the only two investments available until the introduction of the CREF Money Market fund in 1988. In the 1990s, the TIAA system expanded the CREF menu to Bond Market (1990), Social Choice (1990), Global Equities (1992), Growth (1994), Equity Index (1994), and Inflation-Linked Bond (1999). A new variable annuity,

TIAA Real Estate, was launched in 1995 to provide participants the opportunity for direct investment in real estate. The TIAA system began introducing equity and fixed income mutual funds to the investment menu in 1999, added a Real Estate mutual fund in 2002, and first offered Lifecycle funds in late 2004. A Managed Allocation mutual fund was introduced in 2006 and a family of Lifestyle funds (balanced fund-of-funds with varying equity and fixed income exposure) was launched in 2011.

Table 1 shows that in 2018 approximately 65% of assets are in non-equity asset classes and 35% are in the equity class. The proportion of assets in equities has slightly increased compared to Richardson and Bisette (2014), but is lower than documented in Rugh (2004). There has been substantial growth in the balanced/multi-asset category, largely due to the increased use of Lifecycle funds, with this category growing from 4.1% of assets in 2011⁹ to 8.4% in 2018. The remainder of this paper provides a detailed analysis of trends in participants' contribution allocations (section 2) and asset allocations (section 3) along various dimensions. Section 4 concludes with a brief discussion.

2. Trends in contribution allocations

We examine contribution allocation decisions for workers actively contributing to TIAA system primary retirement savings plan in any year between 2012 and 2018. We document that a growing proportion of participants do not customize their contribution allocations but instead opt for the auto-diversified Lifecycle investment option, which is typically the plan default investment option. Analyzing participant contribution allocations to investments across six asset classes, we find substantial differences in asset allocation by age cohort, gender, and retirement savings wealth.

2.1 Asset class participation

Table 2 provides summary participation rates across the six asset categories. We separate participation rates into four categories: zero allocations to that class (0%), less than half (0.01 to 50%), more than half of their contributions (50.1 to 99.9%), and all contributions to an asset class (100%). Similar to the trend noted in Richardson and Bisette (2014), the percentage of participants allocating contributions to Lifecycle funds continues to grow significantly, growing by 20 percentage points over the seven-year period of study. By 2018, over half of participants were contributing to Lifecycle funds, with about 88% of those participants contributing to this asset class using it as their only investment choice. There are several factors that may contribute to this trend, including ease of use and “stickiness” of a well-

designed default investment. With respect to the former, Lifecycle funds offer immediate diversification, automatic annual adjustments to the equity and fixed income weights (the age-based glide path), and automatic rebalancing, all of which may be attractive to participants who do not want to spend time worrying about the right mix of investments. McDonald, Richardson, and Rietz (2019) find continued use of Lifecycle funds is more persistent (sticky) compared to Money Market fund defaults. Ease of use and an asset mix that aligns with standard investment heuristics may contribute to the growth in the use of this asset class.

By comparison, all other asset classes experienced declines in participation rates due to the Lifecycle Fund asset class effect. The Fixed Income and Equity classes had the largest drops in participation, falling 16.8 and 14.2 percentage points, respectively, which are nearly one-third declines in participation rates. The Guaranteed participation rate declined by 10 percentage points. However, the participation rate for 100% contribution allocations to this asset class has remained steady around 5% since 2012. The Real Estate and Multi-Asset classes had the smallest declines at around three percentage points. We note that in 2018 only about one-in-thirteen participants allocated any contributions to the Multi-Asset class.

The relatively larger participation declines in the Equity and Fixed Income may be attributable to these asset classes being close substitutes to the Lifecycle Fund class. Indeed, the underlying basket of mutual funds in a Lifecycle fund is primarily comprised of Equity and Fixed Income mutual funds. The other asset classes, and Guaranteed and Real Estate in particular, are distinct investments compared to Lifecycle funds and thereby more complementary to customized portfolio construction.

⁹ Richardson and Bisette (2014)

Table 2. Contribution allocation participation rates for TIAA Accounts, by asset class, 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Guaranteed							
100%	5.3%	5.1%	4.7%	4.4%	4.5%	4.9%	5.1%
50.1-99%	8.3	7.7	7.0	4.8	4.4	4.5	4.7
0.1-50%	28.0	26.6	24.7	25.0	24.7	23.2	21.8
0%	58.4	60.7	63.6	65.8	66.4	67.4	68.4
Equity							
100%	7.1	7.0	7.0	6.7	6.2	5.8	5.6
50.1-99%	27.0	26.1	25.0	24.5	24.5	23.1	21.3
0.1-50%	20.8	19.7	18.2	14.7	14.7	14.2	13.9
0%	45.1	47.2	49.8	54.7	54.7	56.9	59.3
Fixed Income							
100%	8.7	8.3	7.8	7.4	6.0	4.1	3.5
50.1-99%	2.8	2.5	2.2	2.0	2.5	1.6	1.3
0.1-50%	28.1	26.4	24.2	22.3	21.4	20.2	18.0
0%	60.5	62.8	65.9	68.3	70.1	74.2	77.2
Real Estate							
100%	0.3	0.4	0.5	0.7	0.8	0.9	1.0
50.1-99%	0.5	0.5	0.6	0.5	0.7	0.8	0.9
0.1-50%	29.4	28.5	27.5	27.2	27.2	26.8	26.0
0%	69.8	70.6	71.5	71.6	71.2	71.5	72.1
Multi-Asset							
100%	0.8	0.8	0.8	0.8	0.7	0.8	0.9
50.1-99%	0.8	0.7	0.7	0.8	0.8	0.7	0.7
0.1-50%	8.7	8.7	8.6	8.0	7.1	6.4	5.5
0%	89.7	89.8	89.9	90.4	91.4	92.1	93.0
Lifecycle							
100%	25.3	28.1	31.7	35.0	37.4	41.4	44.2
50.1-99%	1.7	1.9	2.1	2.1	2.4	2.6	2.3
0.1-50%	2.8	3.0	3.3	3.2	3.8	3.8	3.7
0%	70.3	67.1	62.9	59.7	56.4	52.3	49.8

Source: Author tabulations of administrative records.

Notes: Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

2.2 Participation by age

Table 3 examines asset class participation for five different age cohorts using year-end data for the years 2012 and 2018. The statistics highlight that the impact of Lifecycle Fund Asset class participation is not consistent across age cohorts. For both years, younger cohorts were increasingly more likely to use Lifecycle funds and were also more likely to use them as a single fund-of-funds investment. But both of these effects are diminishing over time. In 2012, the youngest cohort was over five times more likely to use a Lifecycle fund compared to the oldest cohort but only about three times more likely in 2018. With respect to contribution allocations, in 2012 (2018), 91% (95%) of participants under the age of 35 who contributed to a Lifecycle fund used it as the only asset class. By comparison, about 75% (79%) of those over age 65 who contributed to a

Lifecycle fund used it as a single comprehensive fund-of-funds investment in 2012 (2018). Overall, each age cohort increased contribution allocation participation in the Lifecycle asset class and were more likely to use this as the only asset class allocation.

Most other asset classes experienced declines in all age-cohort participation rates due to the dual effects of increased participation in the Lifecycle asset class and increased likelihood of using Lifecycle funds as an overall single fund-of-funds investment strategy. Participation rates fell between 2012 and 2018 for all age cohorts for the Guaranteed, Equity, and Fixed Income asset classes. Participation rates in the Multi-Asset fell for younger cohorts but was unchanged for the oldest age cohort. Participation rates for Real Estate fell for two youngest age cohorts but rose for the three older cohorts.

Table 3. Contribution allocation participation rates by asset class and age cohort, December 2012 and December 2018

	2012					2018				
	Under 35	35-44	45-54	55-64	65+	Under 35	35-44	45-54	55-64	65+
Guaranteed										
100%	2.4%	2.6%	4.5%	8.4%	12.7%	2.1%	3.1%	4.3%	7.2%	11.7%
50.1-99%	2.5	4.3	7.8	13.5	17.1	1.0	2.3	4.3	7.7	10.1
0.1-50%	17.9	29.9	32.6	30.1	24.1	8.3	16.4	26.3	29.7	28.8
0%	77.2	63.2	55.0	48.0	46.1	88.6	78.3	65.2	55.4	49.4
Equity										
100%	2.9	5.8	8.7	8.5	10.5	2.8	4.2	6.5	7.1	8.1
50.1-99%	17.5	30.9	32.2	26.9	20.9	9.4	18.6	26.7	26.1	24.1
0.1-50%	10.1	15.9	21.5	28.8	31.5	4.0	8.7	14.3	21.1	24.7
0%	69.6	47.4	37.6	35.8	37.1	83.8	68.5	52.6	45.7	43.1
Fixed Income										
100%	11.7	8.6	7.6	7.5	9.2	4.1	3.4	3.2	3.1	4.2
50.1-99%	1.8	2.2	2.6	3.6	4.6	0.5	0.8	1.2	1.8	2.6
0.1-50%	20.3	28.9	30.9	30.7	26.1	6.9	14.2	20.8	24.5	24.2
0%	66.2	60.4	58.9	58.2	60.1	88.5	81.5	74.9	70.6	69.0
Real Estate										
100%	0.2	0.3	0.3	0.4	0.7	0.6	1.0	1.1	1.2	1.6
50.1-99%	0.2	0.4	0.5	0.6	0.8	0.8	0.9	1.0	0.9	0.9
0.1-50%	20.7	33.7	32.7	29.9	24.8	11.0	22.2	31.0	33.3	31.6
0%	78.9	65.6	66.5	69.2	73.7	87.6	75.8	67.0	64.7	65.9
Multi-Asset										
100%	0.4	0.8	1.0	1.0	0.9	0.6	0.7	0.9	1.1	1.1
50.1-99%	0.3	0.7	1.0	1.0	0.7	0.1	0.4	0.8	1.0	1.0
0.1-50%	4.1	8.2	10.8	10.5	8.2	1.1	3.4	6.8	8.5	7.9
0%	95.2	90.3	87.2	87.6	90.3	98.3	95.5	91.4	89.5	90.0
Lifecycle										
100%	51.7	31.3	19.4	12.7	7.6	73.9	56.6	38.4	27.3	18.3
50.1-99%	2.1	2.1	1.6	1.3	0.9	1.9	2.7	2.6	2.4	1.7
0.1-50%	2.9	3.4	3.0	2.4	1.6	2.1	3.7	4.4	4.3	3.3
0%	43.3	63.3	76.0	83.6	89.9	22.1	37.0	54.7	66.0	76.8

Source: Author tabulations of administrative records.

Notes: Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

2.3 Participation by gender

Table 4 provides evidence on participation rates by gender at year-end in 2012 and 2018. There is no reason, all else equal, to expect men and women to have significant contribution allocation differences. However, due to gender differences in longevity, labor force participation, and lifetime earnings there may be differences in contribution allocations between men and women. In both years, we find women were less likely to allocate any contributions to equity, but were

equally likely to allocate some contributions to other asset classes, and follows earlier research by Sunden and Surette (1998) on gender differences in retirement savings allocations. Women were more likely to allocate some contributions to the Lifecycle asset class and were substantially more likely to allocate all contributions to the Lifecycle class in both years, but the differences were significantly larger in 2018.

Table 4. Contribution allocation participation rates by asset class and gender, December 2012 and December 2018

	2012		2018	
	Women	Men	Women	Men
Guaranteed				
100%	5.5%	5.2%	5.1%	5.2%
50.1-99%	8.5	8.3	5.0	4.8
0.1-50%	29.0	28.6	22.1	24.1
0%	57.1	57.9	67.8	65.9
Equity				
100%	6.2	9.0	4.9	7.3
50.1-99%	26.9	29.8	20.9	24.6
0.1-50%	21.5	21.0	14.3	15.1
0%	45.5	40.3	59.9	53.1
Fixed Income				
100%	8.9	7.3	3.6	3.1
50.1-99%	2.9	2.8	1.3	1.4
0.1-50%	29.0	28.6	18.5	19.6
0%	59.2	61.4	76.6	75.9
Real Estate				
100%	0.2	0.5	0.9	1.3
50.1-99%	0.4	0.6	0.8	1.1
0.1-50%	30.5	30.2	26.4	28.7
0%	68.9	68.8	71.8	68.9
Multi-Asset				
100%	0.9	0.8	0.9	0.9
50.1-99%	0.8	0.8	0.7	0.7
0.1-50%	9.1	9.0	5.7	6.2
0%	89.2	89.5	92.8	92.2
Lifecycle				
100%	25.1	22.1	44.8	37.8
50.1-99%	1.7	1.7	2.3	2.5
0.1-50%	2.6	3.1	3.4	4.3
0%	70.6	73.2	49.5	55.4

Source: Author tabulations of administrative records.

Notes: Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

2.4 Participation by asset accumulation quintile

Table 5 shows asset class participation by asset accumulation quintile for year-end 2012 and 2018. Asset accumulation is defined as a participant's total primary plan TIAA system assets measured at the end of a calendar year. The trends in Table 5 are highly correlated with those in Table 3 because, in general, age and asset accumulation are highly correlated. In both years, we find participation in the Guaranteed, Equity, and Multi-Assets classes steadily increases as asset accumulation rises. Those in the highest asset quintile were about two times more likely to allocate contributions to the Guaranteed class and were over three times more likely to participate in the Equity class, compared to those in the lowest asset quintile. In 2012, participation in the Fixed Income class was roughly the same across quintiles, but by

2018, those in the lower quintiles were significantly less likely to contribute anything to this class compared to those in the highest asset quintile. Participation in the Real Estate asset class was more likely for contributors in the third and fourth asset quintiles in 2012, but by 2018, those in higher quintiles were increasingly more likely to participate in this class compared to those in the lowest quintile.

Participation in the Lifecycle asset class monotonically decreases as asset accumulation increases. Participants in all asset quintiles were significantly more likely to contribute some assets to the Lifecycle class in 2018, compared to 2012. And those in lower asset quintiles were steadily more likely to use the Lifecycle class for all their contributions in both years.

Table 5. Contribution allocation participation rates by asset class and asset accumulation quintile, December 2012 and December 2018

	2012					2018				
	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Guaranteed										
100%	3.6%	4.3%	4.8%	6.0%	8.1%	4.3%	4.1%	4.7%	5.5%	7.0%
50.1-99%	2.6	5.2	7.7	10.0	16.6	1.8	2.3	4.4	7.0	8.3
0.1-50%	12.4	24.5	35.5	38.2	32.9	9.2	11.7	19.0	32.3	39.8
0%	81.4	66.1	52.0	45.8	42.4	84.8	81.9	71.8	55.3	44.8
Equity										
100%	3.1	4.5	6.5	9.6	12.1	3.3	4.1	4.8	6.1	9.8
50.1-99%	10.4	21.6	33.8	38.5	33.7	8.3	12.3	18.7	31.0	38.4
0.1-50%	9.1	16.3	22.2	26.1	32.3	4.8	7.7	13.0	20.2	25.1
0%	77.4	57.6	37.5	25.8	21.9	83.6	76.0	63.6	42.7	26.7
Fixed Income										
100%	18.7	9.3	5.8	4.2	3.3	6.8	4.2	2.8	1.8	1.3
50.1-99%	2.2	2.8	2.7	3.0	3.3	0.7	1.0	1.4	1.6	1.8
0.1-50%	14.6	26.7	34.7	35.3	31.9	7.4	10.9	17.0	26.3	30.3
0%	64.5	61.2	56.9	57.5	61.6	85.2	83.8	78.8	70.4	66.6
Real Estate										
100%	0.4	0.3	0.3	0.3	0.5	1.2	1.0	1.0	1.0	1.1
50.1-99%	0.3	0.4	0.6	0.5	0.6	1.3	0.8	0.9	0.8	0.8
0.1-50%	13.5	27.0	40.0	39.6	30.2	10.7	15.9	25.2	39.6	41.5
0%	85.8	72.2	59.2	59.6	68.7	86.9	82.3	73.0	58.7	56.6
Multi-Asset										
100%	0.5	0.7	0.9	1.1	0.8	0.8	0.7	0.7	0.9	1.0
50.1-99%	0.3	0.5	0.8	1.2	1.1	0.2	0.3	0.5	1.0	1.4
0.1-50%	3.2	5.6	8.9	13.6	13.2	1.0	2.2	4.5	8.5	11.9
0%	96.0	93.2	89.5	84.1	84.9	98.0	96.9	94.3	89.6	85.6
Lifecycle										
100%	50.7	38.3	20.8	8.8	4.2	67.3	62.5	49.4	27.7	10.9
50.1-99%	1.5	2.2	1.9	1.6	1.2	1.5	2.3	3.0	2.9	2.2
0.1-50%	2.3	3.1	3.1	3.0	2.6	1.6	3.0	4.1	5.1	5.0
0%	45.5	56.4	74.1	86.5	92.0	29.7	32.1	43.5	64.4	81.9

Source: Author tabulations of administrative records.

Notes: Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding.

Statistics shown are as of December 31 of each year unless otherwise noted

2.5 Average contribution allocations

Table 6 and Figure 1 provides data on trends in the average TIAA participant's contribution allocation over the 2012 to 2018 period. The average contribution allocation provides insight into how an average participant allocates a dollar of contributions. Figure 1 shows that the average participant has been steadily increasing the fraction of each dollar allocated to the Lifecycle asset class. This increase, amounting to 20 cents per dollar in 2018 over the 2012 allocation, was primarily achieved by reducing allocations to the Equity (8 cents), Fixed Income (9 cents), and Guaranteed (3 cents) asset classes. The relatively large effects on the Equity and Fixed Income classes in particular highlights the previously documented trend away from customized portfolios and towards auto-diversified Lifecycle allocations.

Table 6 provides additional information on trends in the average participant's contribution allocations by investment product type. Given the size of the investment menu, we pool various products by asset class. Following the setup in Table 1, we group together CREF Equity funds (CREF Stock, CREF Growth, CREF Global Equities, and CREF Equity Index) and CREF Fixed Income funds (CREF Bond Market, CREF Money Market,

and CREF Inflation-Linked Bond). Likewise, we group together the 24 TIAA-CREF Equity mutual funds and the 14 TIAA-CREF Fixed Income Mutual Funds and the 24 TIAA-CREF Lifecycle mutual funds. The CREF Social Choice is a Multi-Asset balanced fund, as are the five TIAA-CREF Lifestyle and the Managed Allocation funds. We report each Guaranteed and Real Estate investment product separately.

The trends show that the underlying average investment product allocations to various asset classes has changed, sometimes significantly. For example, the average allocation to CREF Equity funds has fallen by about 11 cents, but the allocation to Equity mutual funds has increased by around 2.3 cents per dollar. A similar effect applies to a shift in average allocations within the Fixed Income between CREF and mutual fund products. With respect to the Guaranteed class, the 4.7 cent decrease in the average allocation to TIAA Traditional was offset by the 1.7 cent increase in the average contribution to Stable Value. The overall trend has been a steady increase in average allocations to Lifecycle funds, Equity and Fixed Income mutual funds, and the TIAA Real Estate account.

Figure 1. Average contribution allocations by asset class, 2012 to 2018

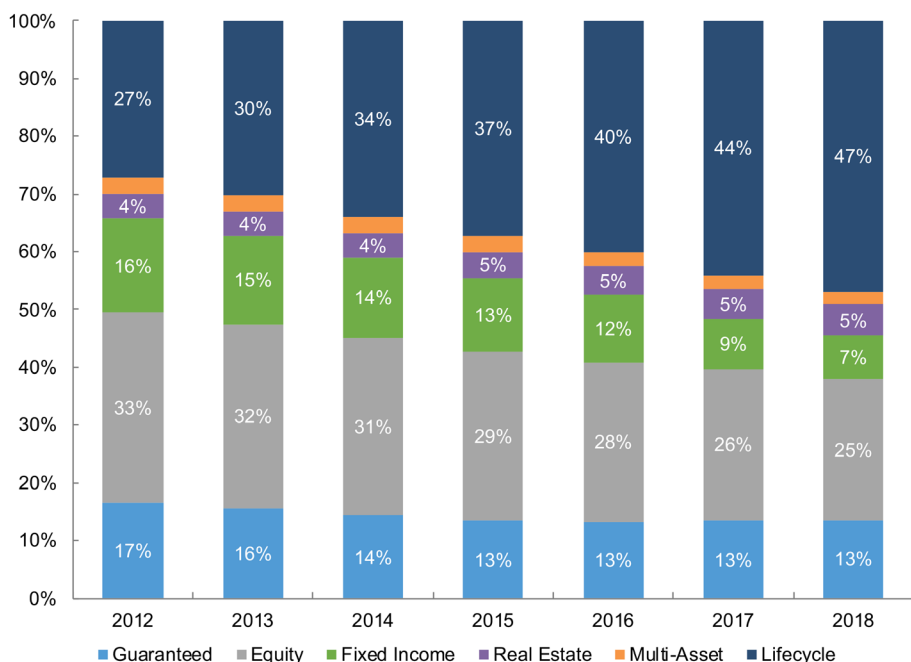


Table 6. Average contribution allocations by asset class and investment account, 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	16.5%	15.6%	14.3%	13.4%	13.3%	13.4%	13.4%
Equity	33.0	31.9	30.7	29.2	27.6	26.2	24.6
Fixed Income	16.2	15.2	13.9	12.8	11.6	8.6	7.4
Real Estate	4.2	4.3	4.2	4.5	5.0	5.2	5.4
Multi-Asset	3.0	2.9	2.8	2.7	2.4	2.4	2.2
Lifecycle	27.1	30.2	34.0	37.3	40.1	44.1	46.9
Investment Account							
Guaranteed							
TIAA Traditional	16.1	15.1	13.8	12.8	12.4	11.9	11.4
TIAA Stable Value	0.3	0.4	0.5	0.5	0.9	1.5	2.0
Equity							
CREF	27.9	26.1	24.3	22.4	20.6	18.7	17.2
Mutual Funds	5.1	5.8	6.4	6.7	7.0	7.5	7.4
Fixed Income							
CREF	15.7	14.8	13.2	12.3	10.8	7.7	6.3
Mutual Funds	0.5	0.5	0.6	0.6	0.8	1.0	1.1
Real Estate							
TIAA Real Estate	4.0	4.1	4.1	4.3	4.7	4.9	5.2
Mutual Funds	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Multi-Asset							
CREF Social Choice	2.9	2.8	2.8	2.6	2.4	2.3	2.1
Mutual Funds	0.1	0.0	0.1	0.1	0.1	0.1	0.1
Lifecycle							
Mutual Funds	27.1	30.2	34.0	37.3	40.1	44.1	46.9

Source: Author tabulations of administrative records.

Notes: CREF Equity Funds include any premiums allocated to either CREF Stock, CREF Equity Index, CREF Growth, and CREF Global Equities. CREF Fixed Income Funds includes any premiums allocated to either CREF Money Market, CREF Bond Market, and CREF Inflation-Linked Bond. Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

2.6 Conditional average contribution allocations

Table 7 provides data on trends in the conditional average contributions allocation by asset class and investment account over the 2012 to 2018 period. The conditional average contribution allocation is defined as the average share of a dollar allocated to an investment conditional on a participant allocating at least one cent to the investment. This method controls for participants who have zero percent allocated to an investment, either by choice or because their plan does not include the investment option. For example, the 2018 average contribution allocated to the Guaranteed class is 13 cents per dollar. Controlling for participants with at least one cent contributed to this class, Table 7 shows the 2018 conditional average contribution was nearly 43 cents per dollar. As noted in Richardson and Bisette (2014), the conditional averages provide more refined insights into participant allocation choices on the intensive margin compared to the unconditional averages in Table 6. As such, the sum of the conditional averages do not equal one dollar.

With respect to asset classes, the general trend conforms to the Richardson and Bisette (2014) finding

that conditional average contribution allocations have been relatively stable over time. Participants investing in the Lifecycle asset class tend to use it as a single comprehensive fund-of-funds investment, averaging over 90 cents per dollar contributed in each year. The Equity class has been consistently around 60 cents per dollar, in spite of a historical long bull market for equities. By contrast, the Fixed Income class experienced a steady decline in conditional average contributions (about 8.3 cents per dollar) that correlates with the long-term decline in bond yields. Correspondingly, the conditional average allocations to the Guaranteed and Real Estate classes saw increases of about 3 cents and 5 cents per dollar, respectively.

The trends in conditional allocations by investment product type follows a similar pattern. TIAA Stable Value and the Real Estate account both saw substantial growth in conditional allocations. Conditional allocations to Fixed Income products, both for CREF and mutual funds, declined over the study period. Within the Real Estate class, all the growth can be attributed to TIAA Real Estate, with conditional allocations monotonically increasing each year for an increase of about 40% since 2012.

Table 7. Conditional average contribution allocations by asset class and investment account, 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	39.7%	39.6%	39.4%	39.2%	39.6%	41.1%	42.6%
Equity	60.0	60.4	61.2	61.3	60.9	60.9	60.4
Fixed Income	41.0	40.9	40.6	40.5	38.7	33.5	32.7
Real Estate	13.8	14.5	14.9	15.9	17.2	18.2	19.3
Multi-Asset	28.9	28.2	28.0	28.4	28.3	30.3	32.0
Lifecycle	91.2	91.6	91.7	92.7	92.0	92.5	93.3
Investment Account							
Guaranteed							
TIAA Traditional	39.4	39.2	38.9	38.5	38.7	39.1	39.7
TIAA Stable Value	46.0	53.7	49.5	45.7	43.1	51.5	54.6
Equity							
CREF	54.5	53.7	53.2	52.4	51.3	50.2	50.0
Mutual Funds	44.2	44.4	44.9	44.4	43.8	44.8	44.1
Fixed Income							
CREF	40.6	40.7	40.3	40.4	38.4	32.7	31.7
Mutual Funds	25.0	20.9	23.1	19.9	20.0	21.2	22.1
Real Estate							
TIAA Real Estate	13.6	14.2	14.6	15.6	16.9	17.8	18.9
Mutual Funds	7.6	7.3	7.0	7.3	7.6	7.3	7.3
Multi-Asset							
CREF Social Choice	28.6	28.1	27.8	27.6	27.9	29.8	31.0
Mutual Funds	48.8	40.8	53.0	68.1	53.3	49.7	63.9
Lifecycle							
Mutual Funds	91.2	91.6	91.7	92.7	92.0	92.5	93.3

Source: Author tabulations of administrative records.

Notes: Percent of participants contributing to primary plan with an RA, GRA, or RC contract. Percentages do not sum to 100 since these are conditional averages. Statistics shown are as of December 31 of each year unless otherwise noted.

3. Trends in asset allocation

While participants' contribution allocations provide a good measure of their risk preferences, participants' asset allocations provide the best measure of actual risk exposure. At any point in time, participants' asset allocations are sensitive to a variety of factors, including their contribution allocation, daily (spot) asset prices, and the longer-term effect of compounded returns. Samuelson and Zeckhauser (1988) provided early evidence on inertia around a participant's contribution allocation, concluding that many people make an initial allocation decision and never change it thereafter. In later work, Biliias, Georggarakos, and Haliasso (2010) found inertia persists through market upswings and downswings. And research by Brunnermeier and Nagel (2008) documents that inertia persists through changes in liquid household wealth levels. When participants do make changes, Ameriks and Zeldes (2004) find that participants are more likely to change contribution allocations than to rebalance their assets. Inertia in rebalancing or asset allocation decisions can lead to portfolio drift for participants' risk exposure and result in substantial spreads between contribution and asset allocations.

Within the TIAA system, there are important differences in how participants can change contribution versus asset allocations.¹⁰ Participants can typically change contribution allocations at any time, subject to their plan restrictions. And participants can generally reallocate assets between CREF and mutual fund investments at any time, subject to their plan restrictions. The TIAA Real Estate Account generally limits transfers out of the account to once a quarter and may restrict transfers into the account for certain participants. TIAA Traditional accumulations held within a primary plan have the greatest restrictions on liquidity. Participants can generally transfer assets into TIAA Traditional at any time,

but participants transferring assets out must typically do so in 10 level annual payments (for RA or GRA) and 84 monthly payments (for RC). Participants can typically transfer assets into TIAA Stable Value at any time and can generally transfer assets out of Stable Value, subject to plan rules.¹¹ Overall, asset accumulations may differ substantially from contribution allocations due to a variety of underlying participant characteristics, plan features, and market factors.

3.1 Asset class and investment product ownership

Table 8 shows the proportion of contributing participants with accumulations in various asset classes and investment products for the years 2012 to 2018. Consistent with prior papers, and similar to the data in Table 2, there are steady declines in ownership rates for all asset classes except for the Lifecycle class. Further, this shift in asset class ownership is partly due to changes in contribution allocations or asset reallocations because a higher proportion of participants own each class of assets than actively contributes to that class in each year. For example, participants are about 13 percentage points more likely to hold TIAA Traditional than contribute to it in any year. While this could be partly attributed to the illiquidity of TIAA Traditional, similar trends hold for other asset classes—with comparably large differences in participation differences in the Fixed Income and Equity classes. These effects could be partly due to a mixture of demographics and inertia. Brown, Poterba, and Richardson (2020) document that individuals in the TIAA system are retiring at older ages. If many of these participants joined when the investment menu was smaller and changed contribution or asset allocations as the investment menu expanded, then we would expect to see differences between contribution participation rates and asset class ownership.

Consistent with steady increase in contribution participation patterns, ownership in Lifecycle funds has

¹⁰ See Ameriks (2000) for a detailed description of these differences by institutional contract type.

¹¹ In general, transfers out of Stable Value are subject to a "90-day wash rule." When a plan offers "competing funds" (i.e., the TIAA Real Estate Account, short-term bond funds, money market funds, self-directed brokerage account), transfers from Stable Value must first be made to a non-competing option (i.e., stock fund or intermediate bond fund), where it must remain for 90 days before being transferred to the competing fund. To minimize frequent trading, following a transfer out of Stable Value, transfers may not be made into Stable Value for 30 days.

steadily risen each year, reaching the 50% ownership mark in 2018. For the Equity and Fixed Income classes, the decrease in CREF participation was partly offset by an increase in Mutual Fund participation for those types

of investments. Similarly, the decline in TIAA Traditional participation was partly offset by an increase in TIAA Stable Value participation within the Guaranteed class.

Table 8. Percent of participants with assets in TIAA accounts, by asset class and investment account, 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	54.7%	52.2%	49.6%	47.6%	46.9%	45.6%	44.6%
Equity	62.5	60.4	57.9	55.5	53.4	51.1	49.1
Fixed Income	50.2	47.5	45.0	43.1	41.6	38.3	36.2
Real Estate	37.5	36.8	36.2	36.0	36.2	35.4	34.9
Multi-Asset	13.9	13.8	13.7	12.7	11.8	10.8	9.9
Lifecycle	29.9	33.8	38.0	41.2	44.4	48.3	50.4
Investment Account							
Guaranteed							
TIAA Traditional	54.3	51.8	49.2	47.0	45.8	44.0	42.6
TIAA Stable Value	0.7	0.9	1.1	1.4	2.4	3.3	4.0
Equity							
CREF	59.4	56.9	54.0	51.3	48.8	45.7	43.9
Mutual Funds	13.3	15.0	16.2	17.6	18.6	19.3	19.1
Fixed Income							
CREF	49.5	46.7	44.1	42.0	40.0	36.3	34.1
Mutual Income	2.5	2.7	3.2	3.5	4.8	5.5	5.8
Real Estate							
TIAA Real Estate	37.1	36.4	35.8	35.4	35.6	34.9	34.3
Mutual Funds	2.1	2.3	2.6	3.2	3.5	3.5	3.3
Multi-Asset							
CREF Social Choice	13.8	13.8	13.7	12.6	11.7	10.8	9.9
Mutual Funds	0.1	0.1	0.1	0.1	0.1	0.1	0.0
Lifecycle							
Mutual Funds	29.9	33.8	38.0	41.2	44.4	48.3	50.4

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

3.2 Asset class and investment account ownership by year-of-entry

Table 9 shows the percentage ownership of asset classes and investment accounts by active participants' year-of-entry into the TIAA system as of December 2018. For participants joining prior to 2000, over three quarters held assets in the Guaranteed and Equity asset classes, about half have accumulations in the Fixed Income and Real Estate classes, and only about one in five of these participants holding assets in the Multi-Asset and Lifecycle classes. For each successive entry cohort, ownership falls dramatically with the exception of the Lifecycle class. For the 2018 cohort, only about one in ten have ownership in each of the Guaranteed, Equity, and Fixed Income classes, with participation in the Multi-Asset class falling to one in one hundred. By contrast, four in five participants in this cohort own Lifecycle class assets.

Trends in cohort ownership of investment products follows a similar path, with roughly three in four pre-2000 cohort participants owning TIAA Traditional and CREF Equity funds and around half of this group holding

TIAA Real Estate and CREF Fixed Income. Subsequent cohorts are generally less likely to own investment products outside of Lifecycle funds. For entry cohorts after 2005, in particular, there is a large, steady increase of Lifecycle funds ownership rates, extending the finding by Richardson and Bissette (2014). This increase in Lifecycle fund ownership coincides with TIAA's launch of this product in late 2004, the passage of the Pension Protection Act in 2006, and the widespread take-up of these types of target-date funds as the default investment option within retirement savings plans.

The overall trend in cohort asset ownership may be also partly due to behavioral factors, in particular investment menu effects, inertia, and endorsement effects. The cohort ownership trends are correlated with the menu of investment products that were available to each cohort. If these cohorts exhibit inertia with respect to initial allocations, then we would expect these trends in ownership. And the widespread adoption of target-date funds as a plan default could influence ownership through a plan endorsement effect.

Table 9. Percent of participants with assets in TIAA accounts as of December 31, 2018, by year of entry cohorts

	1985-1999	2000-2004	2005-2011	2012	2013	2014	2015	2016	2017	2018
Asset Class										
Guaranteed	76.6%	73.9%	42.8%	21.5%	17.5%	14.5%	13.2%	17.4%	14.5%	10.9%
Equity	81.1	78.5	49.3	27.1	25.4	22.9	20.2	20.6	15.0	11.9
Fixed Income	49.5	63.6	38.7	19.7	17.8	15.5	14.7	16.4	11.3	8.8
Real Estate	53.1	51.8	44.0	25.8	22.6	20.3	19.0	18.1	11.5	10.2
Multi-Asset	21.9	15.2	8.4	4.5	3.8	3.0	2.3	1.8	1.5	1.2
Lifecycle	21.3	27.7	53.8	69.4	71.3	74.6	74.7	71.2	76.4	80.0
Investment Account										
Guaranteed										
TIAA Traditional	75.9	72.9	41.0	18.2	15.5	12.9	11.2	13.3	9.8	7.6
TIAA Stable Value	5.0	4.0	3.6	4.2	2.7	2.1	2.4	4.6	5.1	3.7
Equity										
CREF	76.3	73.9	42.8	21.2	18.8	16.5	14.5	15.0	11.1	9.1
Mutual Funds	29.4	24.4	20.2	15.0	15.3	13.9	12.1	10.2	6.9	4.9
Fixed Income										
CREF	50.4	49.8	41.9	23.7	20.5	18.2	17.3	15.9	9.8	8.7
Mutual Funds	9.8	6.8	5.5	4.3	4.1	3.7	2.9	3.5	2.5	2.1
Real Estate										
TIAA Real Estate	48.9	63.0	38.0	19.2	17.3	15.1	14.3	16.1	11.1	8.6
Mutual Funds	6.5	4.8	3.1	1.8	1.6	1.3	1.4	1.1	0.6	0.4
Multi-Asset										
CREF Social Choice	21.8	15.2	8.3	4.5	3.8	3.0	2.3	1.8	1.5	1.1
Mutual Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Lifecycle										
Mutual Funds	21.3	27.7	53.8	69.4	71.3	74.6	74.7	71.2	76.4	80.0

Source: Author tabulations of administrative records.

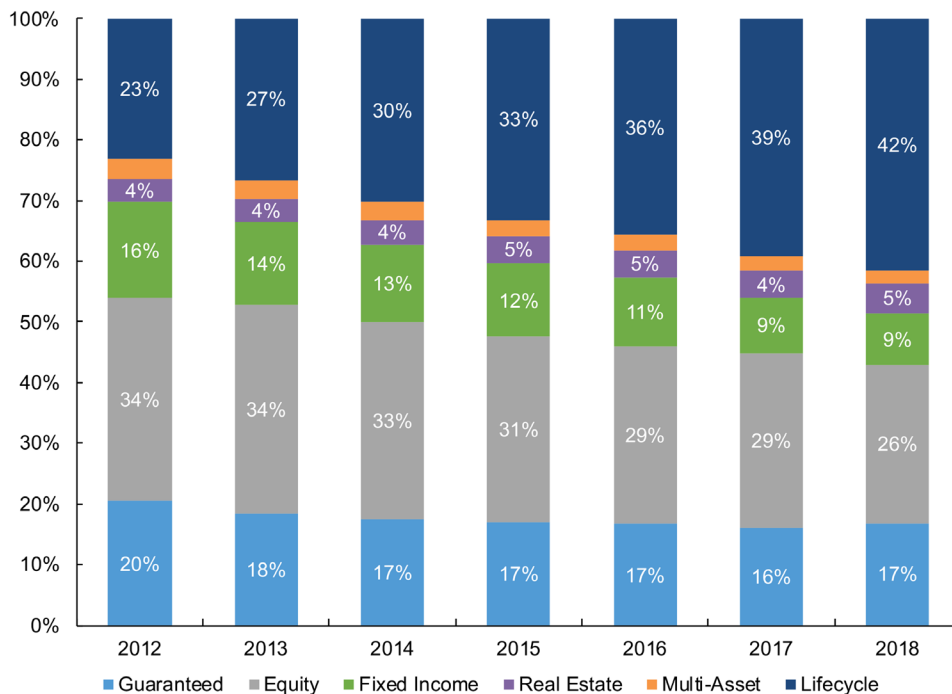
Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

3.3 Average asset allocations

Figure 2 shows participants' average asset allocation by asset class and Table 10 provides additional information on average investment account allocations. Similar to average contribution allocations, the data provide insights into how an average participant splits a dollar of assets among investment options. The share allocated to the Lifecycle class has steadily increased by over 18 cents per dollar over the study period. The share of assets allocated to Lifecycle funds has increased at a

historic rate since the Pension Protection Act of 2006, which codified target date funds as a qualified default investment alternative (QDIA), rising from about two cents per dollar in 2006¹² to about 42 cents per dollar in 2018, a 19-fold increase in average allocations over a 13-year period. Over the study period, the increased share of allocations to Lifecycle funds is primarily attributable to a decline in average allocations to the Equity (7.5 cents), Fixed Income (7.1 cents), and Guaranteed (3.6 cents) asset classes.

Figure 2. Average asset allocations, 2012 to 2018



¹² Richardson and Bisette (2014).

Table 10 provides information on assets allocations across investment products. Similar to the contribution trends, there are shifts in allocations within asset classes. With respect to the Equity and Fixed Income classes, the decline in the share of assets held in CREF Equity (9.4 cents) and Fixed Income (7.5 cents) funds were partially offset by increases in Mutual Fund

Equity (1.9 cents) and Fixed Income (0.5 cents) funds. Within the Guaranteed class, the decline in the average participant's allocation to TIAA Traditional (4.9 cents) was offset by an increase in the allocation to TIAA Stable Value (1.3 cents). With the exception of Real Estate investment options, all investment products lost average allocation share to Lifecycle funds.

Table 10. Average asset allocations by asset class and investment account, 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	20.5%	18.4%	17.3%	17.0%	16.7%	16.0%	16.8%
Equity	33.5	34.4	32.7	30.5	29.2	28.8	26.0
Fixed Income	15.7	13.7	12.7	12.2	11.3	9.1	8.6
Real Estate	4.0	3.8	4.1	4.5	4.6	4.5	4.9
Multi-Asset	3.1	3.0	2.9	2.6	2.4	2.3	2.1
Lifecycle	23.3	26.7	30.3	33.2	35.7	39.3	41.5
Investment Account							
Guaranteed							
TIAA Traditional	20.2	18.1	17.0	16.6	16.0	15.0	15.4
TIAA Stable Value	0.2	0.3	0.3	0.4	0.7	1.0	1.5
Equity							
CREF	29.1	29.0	26.9	24.5	22.7	21.9	19.8
Mutual Funds	4.4	5.4	5.7	6.0	6.5	6.8	6.3
Fixed Income							
CREF	15.3	13.3	12.3	11.7	10.7	8.4	7.8
Mutual Funds	0.4	0.3	0.4	0.4	0.6	0.7	0.8
Real Estate							
TIAA Real Estate	3.9	3.7	4.0	4.3	4.4	4.3	4.7
Mutual Funds	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Multi-Asset							
CREF Social Choice	3.1	3.0	2.9	2.6	2.4	2.3	2.1
Mutual Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lifecycle							
Mutual Funds	23.3	26.7	30.3	33.2	35.7	39.3	41.5

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

3.4 Average asset allocations by age, December 2012 and December 2018

Table 11 examines average asset allocations, by age cohort, for December 2012 and December 2018. In both periods, older cohorts, on average, held a greater proportion of their assets in the Guaranteed class and had relatively smaller holdings in the Lifecycle class. While the share of asset dollar allocated to Lifecycle funds rose for all age cohorts, the data indicate the changes in average asset allocations documented in Table 10 are most highly concentrated in the two youngest cohorts. Correspondingly, the share of the average asset dollar allocated to various asset classes was most stable for two oldest age cohorts.

A previous study by Richardson and Bisette (2014) showed a small percentage of participants allocating *all* of their assets to a particular asset class but that a growing proportion of younger workers were beginning to allocate all assets to Lifecycle funds. Table 11 shows that proportion has continued to grow, and by 2018 nearly 70% of the youngest age cohort had 100% of their assets in Lifecycle funds. But a growing proportion of the older cohorts also allocated all their assets in Lifecycle funds, with nearly one in five participants aged 55 and older using this asset class exclusively in 2018. A shortcoming of the age-cohort analysis is that participants age into different cohorts buckets over time. In the appendix, we control for this effect using panel data and provide analysis on average allocations by age.

Table 11. Average asset class allocations by age cohort, December 2012 and December 2018

Asset Class	2012					2018				
	Under 35	35-44	45-54	55-64	65 +	Under 35	35-44	45-54	55-64	65 +
Asset Class										
Guaranteed	8.1%	13.4%	20.5%	30.3%	36.6%	4.5%	9.2%	15.7%	25.9%	35.9%
Equity	19.9	34.6	39.1	36.1	34.3	11.8	22.4	32.4	31.9	30.0
Fixed Income	17.1	15.3	15.0	15.4	16.6	6.5	7.8	8.8	9.6	10.9
Real Estate	2.8	4.6	4.4	3.9	3.7	2.8	4.7	5.7	5.7	5.6
Multi-Asset	1.3	2.9	3.9	3.7	2.8	0.7	1.4	2.5	3.0	2.7
Lifecycle	51.0	29.2	17.1	10.6	6.0	73.8	54.5	34.8	23.8	14.9
Percent allocating 100% to an asset class										
Guaranteed	2.2	2.2	3.6	6.1	8.6	1.9	2.3	3.0	5.0	5.0
Equity	2.3	3.8	4.9	3.9	4.3	2.7	2.9	3.7	3.4	3.4
Fixed Income	10.8	6.7	5.3	4.7	5.0	4.0	3.0	2.4	2.1	2.1
Real Estate	0.1	0.2	0.2	0.2	0.2	0.5	0.6	0.4	0.4	0.4
Multi-Asset	0.3	0.6	0.6	0.6	0.5	0.4	0.4	0.5	0.5	0.5
Lifecycle	45.7	23.1	13.1	8.0	4.4	69.2	45.7	27.0	18.0	18.0
Investment Account										
Guaranteed										
TIAA Traditional	7.9	13.2	20.2	30.0	36.3	3.0	7.8	14.3	24.4	34.3
TIAA Stable Value	0.2	0.2	0.2	0.2	0.2	1.5	1.4	1.4	1.6	1.6
Equity										
CREF	15.6	29.2	34.5	32.2	31.2	7.2	15.6	25.2	25.4	24.6
Mutual Funds	4.3	5.4	4.5	3.9	3.2	4.6	6.9	7.1	6.5	5.4
Fixed Income										
CREF	16.8	15.0	14.7	14.9	16.1	6.0	7.1	8.0	8.6	9.7
Mutual Funds	0.3	0.3	0.3	0.4	0.5	0.5	0.7	0.8	1.1	1.2
Real Estate										
TIAA Real Estate	2.7	4.5	4.3	3.8	3.7	2.7	4.5	5.5	5.5	5.4
Mutual Funds	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Multi-Asset										
CREF Social Choice	1.3	2.9	3.9	3.7	2.8	0.7	1.4	2.5	3.0	2.7
Mutual Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lifecycle										
Mutual Funds	51.0	29.2	17.1	10.6	6.0	73.8	54.5	34.8	23.8	14.9

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

3.5 Average asset allocations by gender

Table 12 shows average assets allocations for men and women at years-end 2012 and 2018. In the earlier period, women had fewer assets in the equity class and more in the fixed income and lifecycle classes, with no other meaningful differences in allocations. By the end

of 2018, men still allocated more assets to the equity class but the fixed income difference is substantially diminished. Women also were allocating more assets to Lifecycle funds and less to the Real Estate class compared to men.

Table 12. Average asset class allocations by gender, December 2012 and December 2018

Asset Class	2012		2018	
	Women	Men	Women	Men
Asset Class				
Guaranteed	20.9%	20.8%	17.1%	18.3%
Equity	32.8	37.2	25.3	30.2
Fixed Income	16.0	14.3	8.8	8.3
Real Estate	3.9	4.3	4.7	5.7
Multi-Asset	3.3	3.0	2.2	2.2
Lifecycle	23.1	20.2	41.9	35.3
Percent allocating 100% to an asset class				
Guaranteed	4.2	3.8	3.7	3.7
Equity	3.6	4.6	2.9	3.9
Fixed Income	6.7	5.0	2.8	2.2
Real Estate	0.1	0.2	0.4	0.6
Multi-Asset	0.6	0.5	0.5	0.4
Lifecycle	18.9	16.2	35.2	28.8
Investment Account				
Guaranteed				
TIAA Traditional	20.6	20.6	15.5	17.0
TIAA Stable Value	0.2	0.1	1.6	1.2
Equity				
CREF	28.7	32.0	19.3	22.8
Mutual Funds	4.1	5.3	5.9	7.5
Fixed Income				
CREF	15.7	13.9	8.0	7.4
Mutual Funds	0.4	0.4	0.8	0.9
Real Estate				
TIAA Real Estate	3.8	4.2	4.5	5.5
Mutual Funds	0.1	0.2	0.2	0.2
Multi-Asset				
CREF Social Choice	3.3	3.0	2.2	2.2
Mutual Funds	0.0	0.0	0.0	0.0
Lifecycle				
Mutual Funds	23.1	20.2	41.9	35.3

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

3.6 Average asset allocations by accumulation quintile, December 2012 and December 2018

Table 13 shows average asset allocations by asset accumulation quintile for years-end 2012 and 2018. In both periods, participants in progressively higher asset quintiles allocated more to the Guaranteed and Equity classes and less to the Fixed Income and Lifecycle classes. Participants allocating relatively fewer assets to

Lifecycle funds is consistent with Spatt's (2018) insights that "employee-investors" choose a more customized portfolio once their wealth reaches a critical level. While previous tables had documented the decrease in average contribution and asset allocations to the Guaranteed and Equity classes and increases to the Lifecycle class, Table 13 indicates the large percentage changes are concentrated in the second and third asset quintiles.

Table 13. Average asset allocation by accumulation quintile, December 2012 and December 2018

Asset Class	2012					2018				
	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	5th Quintile
Guaranteed	8.5%	14.5%	19.9%	24.9%	34.6%	7.8%	9.1%	14.5%	22.2%	30.6%
Equity	13.5	25.3	38.2	45.7	45.0	10.6	16.0	23.3	36.0	44.2
Fixed Income	23.7	17.0	14.2	12.8	10.7	9.8	8.7	8.3	8.2	8.0
Real Estate	2.2	3.7	5.4	5.1	3.5	3.8	3.8	4.8	6.4	5.9
Multi-Asset	1.3	2.1	3.2	4.7	4.0	0.9	1.1	1.7	2.9	3.7
Lifecycle	50.7	37.5	19.1	6.7	2.2	67.0	61.4	47.3	24.3	7.6
Percent allocating 100% to an asset class										
Guaranteed	3.9	3.9	3.7	4.2	4.7	4.4	3.3	3.2	3.5	3.9
Equity	3.1	3.4	4.0	5.3	3.7	3.4	3.3	2.9	2.8	3.4
Fixed Income	18.3	7.7	3.6	1.9	0.6	7.1	3.6	1.9	0.8	0.3
Real Estate	0.4	0.2	0.1	0.1	0.0	1.2	0.6	0.4	0.2	0.1
Multi-Asset	0.5	0.6	0.6	0.7	0.4	0.6	0.4	0.4	0.5	0.4
Lifecycle	47.6	31.0	13.3	3.1	0.6	64.5	54.4	37.6	15.3	2.9
Investment Account										
Guaranteed										
TIAA Traditional	7.8	14.2	19.8	24.8	34.5	4.6	7.3	13.4	21.5	30.1
TIAA Stable Value	0.6	0.1	0.1	0.1	0.0	3.3	1.8	1.2	0.7	0.5
Equity										
CREF	10.5	20.9	33.1	40.7	40.5	7.0	10.3	16.6	28.4	36.6
Mutual Funds	3.0	4.4	5.1	4.9	4.5	3.6	5.7	6.8	7.7	7.6
Fixed Income										
CREF	23.1	16.6	13.9	12.5	10.3	9.0	7.9	7.5	7.4	7.0
Mutual Funds	0.6	0.3	0.3	0.3	0.4	0.8	0.7	0.8	0.8	1.0
Real Estate										
TIAA Real Estate	2.2	3.6	5.3	5.0	3.4	3.7	3.6	4.6	6.1	5.6
Mutual Funds	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3
Multi-Asset										
CREF Social Choice	1.3	2.1	3.2	4.7	4.0	0.9	1.1	1.7	2.9	3.7
Mutual Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lifecycle										
Mutual Funds	50.7	37.5	19.1	6.7	2.2	67.0	61.4	47.3	24.3	7.6

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

4. Discussion


This paper documents several changes in trends in participants' contribution and asset allocations and overall risk profiles. We find that since 2012, participants continue to increase the use (and the intensity of use) of Lifecycle mutual funds, with these funds receiving nearly half of all contributions in 2018, for both contribution and asset allocations. Overall, we document decreases in participation and allocation of contributions and assets into the Guaranteed, Equity, and Fixed Income classes. However, these trends are most significant for younger, lower wealth participants who are more likely to join a plan with a Lifecycle fund default. However, more data is needed to understand the persistence of participants' use of a Lifecycle fund over a working career and we plan to study the stickiness of default solutions in future research.

Our analysis extends earlier papers (Ameriks, et al., 1997; Ameriks, 2000; Rugh, 2004; and Richardson

and Bissette, 2014), adding to the historical cross-sectional time-series analysis of TIAA participants' behavior. Ameriks (2000) found an increasing use of equity during the 1990s boom. This was followed by a shift in allocations into Fixed Income and Guaranteed classes following the tech bubble documented by Rugh (2004). Richardson and Bissette (2014) analyze the shift in preference for Lifecycle funds before and after these funds became the dominant qualified default investment for many plans and through the Great Recession. This paper documents the continued increase in take-up and use of Lifecycle funds during the long bull market for U.S. equities prior to COVID-19 following the end of the Great Recession. The combined result of this paper with Richardson and Bissette (2014) documents the increasing popularity of Lifecycle funds – an auto-diversified single comprehensive fund-of-funds investment that provides an age-weighted approach to portfolio diversification – in simplifying the investment choices of retirement plan participants.

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Appendix

A.1 Panel data: average contribution and asset allocation for continuous contributors

This paper documents contribution and asset allocation trends for the total population of actively contributing TIAA participants. Table 9 shows that utilization of different asset classes and investment accounts varies substantially by year-of-entry. However, it is unclear if the total population trends are only due to new participant cohorts (those joining the TIAA system after 2012), or also extend to participants who joined the TIAA system in 2012 or earlier and contributed throughout the study period. To examine this question, we construct a panel dataset to analyze the allocation decisions of “continuous contributors,” defined as participants who

were actively contributing to a primary retirement plan in each year from 2012 through 2018.

Table A1 shows the average contribution allocations by continuous contributors, by asset class and investment product, for each year over the 2012 to 2018 period. In aggregate, average contribution allocations are relatively ‘sticky’—there are minimal changes relative to the general changes documented in Table 6. This result supports earlier research by Ameriks and Zeldes (2004), who found participants made few changes to their contribution allocations over time. The differences documented in Table A1 are consistent with the overall population trends of steadily increasing average allocations to Lifecycle funds, albeit on a smaller scale.

Table A1. Average contribution allocations from ‘continuous contributors’: 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	17.9%	17.8%	17.6%	17.4%	17.8%	18.4%	19.0%
Equity	37.7	37.6	37.8	37.5	36.8	36.2	35.1
Fixed Income	13.2	12.3	11.3	10.7	9.9	8.5	8.0
Real Estate	4.8	5.0	5.2	5.7	6.2	6.7	7.1
Multi-Asset	3.4	3.5	3.6	3.5	3.4	3.3	3.2
Lifecycle	22.9	23.7	24.6	25.2	25.9	26.9	27.6
Percent allocating 100% to an asset class							
Guaranteed	5.1	5.2	5.2	5.1	5.4	5.8	6.1
Equity	7.3	7.4	7.6	7.5	7.3	7.1	7.2
Fixed Income	5.4	4.9	4.4	4.1	3.2	2.5	2.4
Real Estate	0.3	0.4	0.5	0.6	0.8	0.9	1.1
Multi-Asset	0.9	0.9	0.9	0.9	0.9	0.9	1.0
Lifecycle	20.8	21.4	22.2	22.7	23.1	23.9	24.5
Investment Account							
Guaranteed							
TIAA Traditional	17.5	17.3	17.0	16.8	17.0	17.2	17.6
TIAA Stable Value	0.3	0.5	0.5	0.5	0.8	1.2	1.4
Equity							
CREF	32.1	31.4	30.8	29.9	28.6	27.0	25.8
Mutual Funds	5.6	6.3	7.0	7.6	8.2	9.2	9.3
Fixed Income							
CREF	12.8	11.9	10.8	10.1	9.1	7.5	6.8
Mutual Funds	0.4	0.5	0.5	0.6	0.8	1.0	1.2
Real Estate							
TIAA Real Estate	4.6	4.9	5.0	5.4	5.9	6.4	6.8
Mutual Funds	0.1	0.2	0.2	0.2	0.3	0.3	0.3
Multi-Asset							
CREF Social Choice	3.4	3.4	3.5	3.5	3.3	3.2	3.1
Mutual Funds	0.0	0.0	0.0	0.1	0.1	0.1	0.1
Lifecycle							
Mutual Funds	22.9	23.7	24.6	25.2	25.9	26.9	27.6

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

Table A2 displays average asset allocations for continuous contributors, by asset class and investment product, for each year over the 2012 to 2018 period. The statistics indicate that asset allocations are relatively stable compared to the Table 10 total population results. There were small increases to the Guaranteed and Real

Estate asset classes, and a significant decrease in the Fixed Income class. This may signal a shift to higher yielding and guaranteed income due to steadily decline bond yields over the study period. All other asset class allocations were stable.

Table A2. Average asset allocations from ‘continuous contributors’: 2012 to 2018

	2012	2013	2014	2015	2016	2017	2018
Asset Class							
Guaranteed	21.4%	20.3%	20.3%	21.1%	21.6%	21.5%	24.0%
Equity	37.7	40.1	39.7	38.6	38.1	39.0	36.1
Fixed Income	13.2	11.4	10.9	10.6	10.2	9.1	9.5
Real Estate	4.4	4.3	4.8	5.4	5.6	5.4	6.1
Multi-Asset	3.5	3.5	3.6	3.4	3.3	3.1	3.0
Lifecycle	19.8	20.4	20.7	21.0	21.2	21.9	21.3
Percent allocating 100% to an asset class							
Guaranteed	3.5	3.4	3.3	3.3	3.4	3.4	3.9
Equity	3.8	3.8	3.7	3.5	3.3	3.2	3.2
Fixed Income	3.9	3.4	3.0	2.7	2.0	1.5	1.6
Real Estate	0.1	0.2	0.2	0.2	0.2	0.2	0.3
Multi-Asset	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lifecycle	15.8	15.4	15.1	14.8	14.5	14.5	13.9
Investment Account							
Guaranteed							
TIAA Traditional	21.2	20.0	20.0	20.8	21.2	21.0	23.3
TIAA Stable Value	0.2	0.2	0.2	0.3	0.4	0.5	0.7
Equity							
CREF	32.8	34.3	33.5	32.0	30.8	31.0	28.9
Mutual Funds	4.8	5.8	6.2	6.6	7.3	7.9	7.2
Fixed Income							
CREF	12.8	11.1	10.6	10.2	9.6	8.4	8.7
Mutual Funds	0.3	0.3	0.3	0.4	0.6	0.7	0.9
Real Estate							
TIAA Real Estate	4.3	4.2	4.6	5.1	5.3	5.2	5.9
Mutual Funds	0.1	0.1	0.2	0.2	0.2	0.2	0.2
Multi-Asset							
CREF Social Choice	3.5	3.5	3.6	3.4	3.3	3.1	3.0
Mutual Funds	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lifecycle							
Mutual Funds	19.8	20.4	20.7	21.0	21.2	21.9	21.3

Source: Author tabulations of administrative records.

Notes: Participants contributing to primary plan with an RA, GRA, or RC contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

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