

RESEARCH DIALOGUE

Issue no. 112

MARCH 2014

TRENDS IN PREMIUM AND ASSET ALLOCATIONS BY TIAA-CREF PARTICIPANTS: 2005-2011

David P. Richardson, Ph.D.
Senior Economist
TIAA-CREF Institute

Benjamin Bisette
Quantitative Analyst
TIAA-CREF Institute

ABSTRACT

This paper analyzes how workers participating in a retirement plan through the TIAA-CREF system managed their investment portfolio risk by examining their premium and asset allocation decisions over the period 2005 to 2011. The results indicate that, on average, participants were well diversified across asset classes. Older participants, those with long tenure in the system, and those with relatively large asset accumulations, tended to customize their portfolios by diversifying across various asset classes, including guaranteed, equity, fixed income, real estate, and balanced funds. Younger participants, those with shorter tenure, and those with relatively low asset accumulations, tended to heavily rely on the balanced fund class for automatic diversification. Within the balanced class, the latter participants made extensive use of lifecycle funds, a type of target date fund that utilizes age-based automatic glide paths for diversifying the underlying mix of equity and fixed-income fund investments.

We thank Chung Wong and Tai Kam for help in constructing the data. Thanks to Jeff Brown, Olivia Mitchell, and Jim Poterba for helpful comments and suggestions. The views expressed are those of the author and do not necessarily represent the views of TIAA-CREF or the TIAA-CREF Institute. Any errors are my own.



Financial Services

Any opinions expressed herein are those of the authors, and do not necessarily represent the views of TIAA-CREF, the TIAA-CREF Institute or any other organization with which the authors are affiliated.

INTRODUCTION

Over the past 30 years, defined contribution (DC) plans have emerged as the primary employment-based retirement program for millions of U.S. workers.¹ DC plans provide covered workers with substantial latitude in determining whether to participate, how much salary to contribute, how to invest assets, and how to take distributions from the plan. As participation in DC plans has grown, more households bear increased responsibility for managing the various risks to their retirement savings. A growing body of research finds that many DC plan participants have difficulty making decisions that maximize their chances of achieving retirement security. For example, workers may make poor retirement plan decisions because they are prone to certain behavioral biases or have low financial literacy.² Public policy makers recently began enacting changes to the DC plan system with the goal of reducing the risk of participants making systematic mistakes. Major changes enacted as part of the Pension Protection Act of 2006 included new rules for qualified plan default provisions that are designed to increase worker participation, achieve a minimum rate of retirement contributions, and provide automatic investment diversification.

This paper provides insights into how workers participating in a retirement plan through the TIAA-CREF system manage their investment risk by examining their premium (contribution) and asset allocation decisions over the period 2005 to 2011.³ The results indicate that, on average, participants were well diversified across asset classes. Older participants, those with long tenure in the system, and those with relatively large asset accumulations, tended to customize their portfolios by diversifying across various asset classes, including guaranteed, equity, fixed income, real estate, and balanced funds. Younger participants, those with shorter tenure, and those with relatively low asset accumulations, tended to heavily rely on the balanced fund class for automatic diversification. Within the balanced class, the latter participants made extensive use of lifecycle funds, a type of target date fund that utilizes age-based automatic glide paths for diversifying the underlying mix of equity and fixed-income fund investments. Consistent with recent analysis of 401(k) participants by VanDerhei et al. (2012), we show that the strong take-up in participation rates and allocations to lifecycle funds is unprecedented over the period that TIAA-CREF has offered mutual funds.

TIAA-CREF asset classes and investment accounts

Individuals participating in the TIAA-CREF system choose from a menu of investments when building their retirement portfolio. Table 1 provides information on the asset classes and investment choices available to participants as of December 31, 2011; it also documents the rapid growth in the investment choice set over the past 20 years. Participants can invest in one guaranteed asset, the TIAA traditional annuity. This asset class was the genesis of the TIAA system in 1918 and provides a guarantee of principal, a guaranteed interest rate, and additional declared dividends in excess of the guaranteed rate.⁴ In 1952, CREF became the first organization to offer a variable annuity when it introduced the CREF stock account. This account allowed participants to directly purchase (and bear the associated investment risks of) an equity asset class within their retirement plans. In 1988, CREF began offering a fixed-income asset class with the introduction of the CREF Money Market account. A fourth asset class – balanced – was added in 1990 with the introduction of the CREF social choice fund.⁵ The introduction of the TIAA real estate fund in 1995 added a fifth asset class – real estate. As shown in Table 1, a number of additional equity, fixed-income, real estate, and balanced asset class fund options were added to the investment menu over the 1990s and 2000s. Notable among these were the introduction

1 Department of Labor (2013) data indicate that, for private sector workers, defined contribution (DC) plan participation first surpassed defined benefit (DB) plan participation in 1992. There were more than twice as many total DC participants as DB participants and more than four times as many active DC participants in 2011.

2 Benartzi and Thaler (2007) provide a good overview on how behavior biases may effect retirement. Lusardi and Mitchell (Forthcoming) discuss the importance of financial literacy to improving decision making.

3 Prior studies analyze TIAA-CREF participant choices back to 1986. See Ameriks, King, and Warshawsky (1997), Ameriks (2000) and Rugh (2004). This paper follows the historic convention of defining all contributions to a participant's account as 'premiums', regardless of whether the contributions are allocated to an annuity contract or a mutual fund.

4 A guaranteed interest rate of 3% is applied to all premiums remitted since 1979. When declared, additional amounts remain in effect for a 12-month period beginning March 1st of each year.

5 Previous studies did not consider this a distinct asset class.

of the CREF inflation-linked bond fund (1997), retirement class mutual funds (2002), and the target-date series of lifecycle mutual funds in 2004. In total, TIAA-CREF offered 77 investment options across five different asset classes in 2011; assets were divided about 34% to 66% into the equity and non-equity asset classes, respectively. This aggregate portfolio allocation follows a trend, first noted by Rugh (2004), that total assets have been growing faster than the equity asset class as the investment menu expands.

TIAA-CREF participants make two decisions with respect to investment allocations. First, they must choose how to allocate each dollar of premiums contributed into their accounts. The investment allocation of premiums, which is an allocation of system flows, can generally be changed at any time but it is effective as of the next regular premium contribution. Second, participants can choose how to allocate their stock of existing retirement assets. Because different asset classes earn different rates of return over time, asset allocations will not generally be the same as the allocation of premiums for any person. Participants can reallocate the stock of assets in two ways: they can set up an automatic rebalancing that occurs once a year on the participant’s birthday, or they can manually reallocate assets a limited number of times per year. The remainder of this paper provides a detailed analysis of trends in premium and asset allocation decisions of premium-paying (active employee) participants over the period 2005-2011.

TABLE 1: ASSET CLASSES, INCEPTION DATES, AND TOTAL ASSETS UNDER MANAGEMENT FOR TIAA-CREF PENSION ACCOUNTS AND RETIREMENT CLASS MUTUAL FUNDS, AS OF DECEMBER 31, 2011

ASSET CLASS AND INVESTMENT ACCOUNT	DATE OF INCEPTION	ASSETS (\$ MIL.)	% OF TOTAL
Guaranteed			
TIAA Traditional	April 23, 1918	\$237,092	49.5%
Equity			
CREF Stock	July 1, 1952	\$96,883	} 33.7%
CREF Global Equities	March 1, 1990	\$13,158	
CREF Growth	April 29, 1994	\$13,264	
CREF Equity Index	April 29, 1994	\$10,691	
TIAA-CREF Equity Mutual Funds (27)	October 1, 2002	\$27,347	
Fixed Income			
CREF Money Market	April 1, 1988	\$12,396	} 9.7%
CREF Bond Market	March 1, 1990	\$13,364	
CREF Inflation-Linked Bond	May 1, 1997	\$9,946	
TIAA-CREF Retirement Class Fixed Income Mutual Funds (10)	March 31, 2006	\$10,748	
Real Estate			
TIAA Real Estate	October 2, 1995	\$13,327	} 3.0%
TIAA-CREF Real Estate Securities Mutual Funds (2)	October 1, 2002	\$1,033	
Balanced/Multi-Asset			
CREF Social Choice	March 1, 1990	\$10,335	} 4.1%
Lifecycle funds (22)	October 15, 2004	\$8,742	
Lifestyle Funds (5)	December 9, 2011	\$50	
TIAA-CREF Managed Allocation Mutual Fund	March 31, 2006	\$547	

Source: TIAA-CREF SEC Financial Reporting and Corporate Actuarial

Note: The data sources for this table includes all pension, retirement class, and institutional class mutual fund assets and the totals are different from the following information which summarizes data for premium-paying TIAA-CREF participants in primary plans only.

TRENDS IN PREMIUM ALLOCATIONS

First, we examine the premium allocation decisions of participants covered by a primary employer retirement plan over 2005 to 2011 period.⁶ Our analysis covers participation and allocation rates for the five asset classes and the investment options within these asset classes. Understanding premium flows can provide insights into participant risk profiles because all participants must set allocation weights for contributions. Historically, this was an active choice made by all participants, but the growing adoption of plan default investment options have made the initial allocation a passive choice for an increasing percentage of participants.

Asset class participation rates

Table 2 summarizes premium allocation and participation trends across the five asset classes. For each asset, we report those with no allocations (0%) to an asset class, less than half of an allocation (0.1 to 50%), the majority of an allocation (50.1 to 99.9%), and all of the allocation (100%). Earlier papers by Ameriks (2000) and Rugh (2004) documented a consistent decline in the percent of participants contributing 100% of premiums to guaranteed income over the 1986 (23.5%) to 2004 (6.8%) period. Table 2 indicates this trend continued through the end of 2008 (4.9%) before increasing sharply in 2009 (5.9%) and 2010 (6.2%). A similar trend is evident in the equity class, with the proportion of participants allocating all of their premiums to this class falling almost four percentage points over the past seven years. Over this same period, the percent of participants allocating all their premiums to the fixed-income or real estate classes remained fairly steady. In contrast, the proportion of participants allocating all their premiums to the balanced class rose sharply, from about 1% to around 20%. Because this asset class offers instant diversification, the data suggest that participants continued to diversify their contributions across a variety of investment choices.

A second trend highlighted in Figure 1 was the strong uptake in balanced class participation, beginning with the introduction of lifecycle funds. As noted in Table 1, participants have had access to a balanced fund option since 1990. Beginning with the introduction of lifecycle funds in late 2004, however, participation rates in the balanced asset class more than doubled, from about 15% to about 34% of participants. This increase in participation coincided with a decrease in premium participation in the guaranteed, equity, and real estate classes. There are a number of possible reasons for these coincident trends, including participant responses to the 2008 financial crisis, the increased use of lifecycle funds as the plan default investment, or the increased popularity of age-based lifecycle investments as an automatically balanced “fund-of-funds.” If the financial crisis was a significant effect, then we would expect to see a large change in the years 2008 and 2009. Given the smoothness of the year-to-year changes, the latter two reasons are more likely.

Asset class participation by age

Table 3 shows the distribution of premium allocations, by age group and asset class, at year-end for 2006 and 2011. The 2006 data are consistent with previous research by Rugh (2004) and indicate that progressively older TIAA-CREF age groups tended to take relatively less volatility in their retirement portfolios by allocating a higher percentage of premiums to the guaranteed and fixed-income classes. Relative to 2006, average premium allocations for year-end 2011 were substantially different for all age groups. Premium allocations to the guaranteed income and equity classes fell for all age cohorts. The strongest declines in participation in these asset classes came from the younger cohorts, who also reduced their participation in the fixed-income and real estate asset classes. By contrast, older participants increased their participation in the fixed-income class and maintained steady participation rates in the real estate class.

Notable across all cohorts was the substantial rise in participants allocating premiums to the balanced class by year-end 2011. Yet balanced fund participation varied by age cohort. For the youngest cohort, about 52% allocated some premiums to the balanced funds and almost 43% allocated all of their premiums to this asset class. By comparison, the participation rate in the balanced class declined steadily for each successively older cohort. In addition, a progressively higher proportion of each older cohort used the balanced class as a component of an overall portfolio strategy rather than as a “fund-of-funds.”

⁶ This analysis includes premiums from participants covered by a primary plan that is a Retirement Annuity (RA), Group Retirement Annuity (GRA), or Retirement Saving Annuity (RSA) plan.

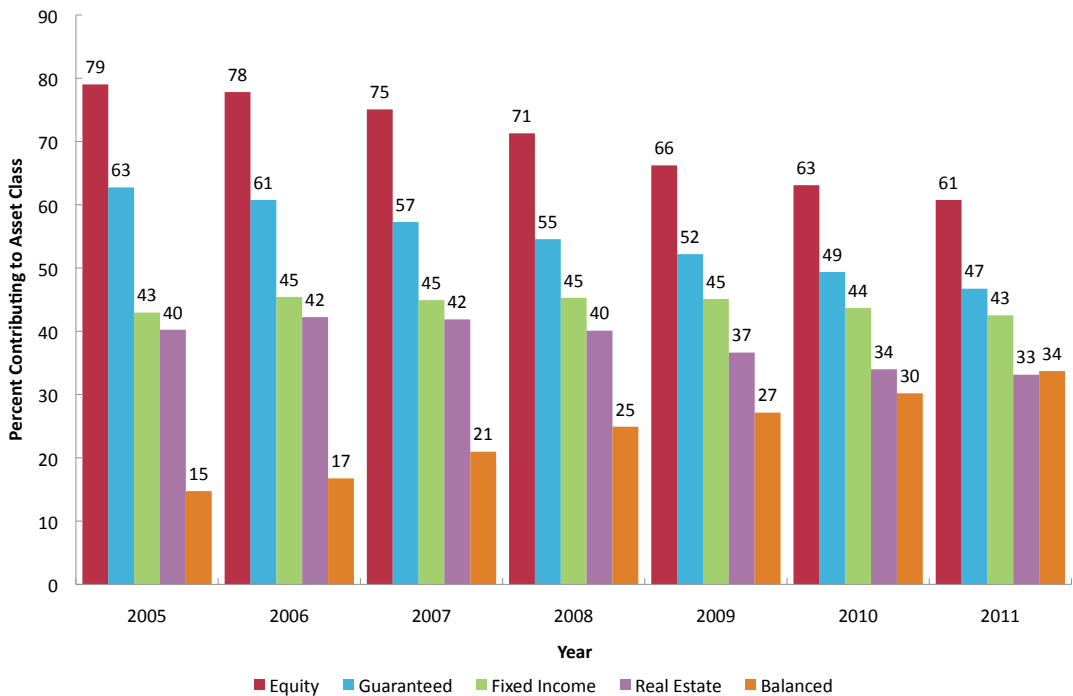
TABLE 2: PREMIUM ALLOCATION PARTICIPATION RATES FOR TIAA-CREF ACCOUNTS, BY ASSET CLASS, 2005 TO 2011

	2005	2006	2007	2008	2009	2010	2011
Guaranteed							
100%	6.2%	5.6%	5.0%	4.9%	5.9%	6.2%	5.7%
50.1 - 99%	7.9	9.7	11.3	11.1	11.4	10.2	9.5
0.1 - 50%	48.6	45.5	40.9	38.5	34.9	32.9	31.5
0%	37.3	39.2	42.7	45.4	47.8	50.6	53.3
Equity							
100%	11.3	10.3	9.7	8.9	8.2	8.0	7.6
50.1 - 99%	41.1	40.0	37.7	35.2	31.9	31.1	30.0
0.1 - 50%	26.6	27.5	27.7	27.2	26.1	24.0	23.2
0%	21.0	22.2	24.9	28.7	33.8	36.9	39.2
Fixed Income							
100%	8.9	9.1	8.5	8.2	9.0	8.9	8.6
50.1 - 99%	3.2	2.7	2.3	2.6	3.3	3.0	2.8
0.1 - 50%	30.9	33.6	34.1	34.5	32.8	31.8	31.1
0%	57.0	54.6	55.1	54.7	54.9	56.3	57.5
Real Estate							
100%	0.4	0.4	0.5	0.4	0.2	0.2	0.3
50.1 - 99%	0.9	0.9	0.5	0.9	0.5	0.5	0.5
0.1 - 50%	39.0	40.9	40.5	38.9	35.9	33.3	32.4
0%	59.8	57.8	58.1	59.9	63.4	66.0	66.9
Balanced							
100%	1.2	2.8	6.7	10.7	13.7	16.9	20.1
50.1 - 99%	1.6	1.7	1.9	2.1	1.9	1.9	2.1
0.1 - 50%	12.0	12.2	12.4	12.2	11.5	11.5	11.5
0%	85.3	83.3	79.0	75.1	72.9	69.8	66.3
50% Equity, 50% TIAA Traditional							
	0.9	0.8	0.6	0.5	0.6	0.5	0.5

Source: Author tabulations of TIAA-CREF administrative records.

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

FIGURE 1. PERCENT OF PARTICIPANTS CONTRIBUTING TO ASSET CLASSES, 2005-2011



Asset class participation by gender

Table 4 shows the distribution of premium allocations, by gender and asset class, for year-end 2006 and 2011. Women were slightly more likely to participate in the guaranteed and fixed-income classes in 2006, but had roughly comparable participation rates with men in these classes by year-end 2011. Among those contributing anything to these asset classes, women tended to allocate a relatively higher proportion of their premiums than men. Conversely, women were less likely to participate in the equity class and tended to contribute less when allocating any premiums to that class. Interestingly, women were slightly more likely to allocate premiums to the real estate but to allocate a smaller proportion of their premiums to that class.

Women were slightly more likely to allocate premiums to the guaranteed class, but both genders were substantially less likely to allocate any premiums to this asset class by year-end 2011, with slightly less than half allocating any premium dollars. The sharpest participation decline for both was in the equity asset class, with about 17% more women and 15% more men not contributing any premiums to that asset class. The biggest increase in participation was in the balanced class, with about 16% more women and 14% more men allocating some premiums to this asset class. A higher percentage of women, relative to men, allocated all of their premiums to this asset class in December 2011. Of those allocating any premiums to the balanced asset class, women were slightly more likely to use the class as a “fund-of-funds,” with about 58% of women allocating all their premiums to these funds, relative to about 54% of men who participated in this class.

TABLE 3: PREMIUM ALLOCATION PARTICIPATION RATES, BY ASSET CLASS AND AGE COHORT, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006					DECEMBER 2011				
	Under 35	35-44	45-54	55-64	65 +	Under 35	35-44	45-54	55-64	65 +
Guaranteed										
100%	2.7%	3.2%	5.9%	9.2%	14.6%	2.9%	2.7%	4.8%	8.9%	13.5%
50.1 - 99%	5.3	6.2	10.7	15.1	18.1	3.4	5.1	9.2	15.3	18.6
0.1 - 50%	49.1	47.9	44.7	39.1	30.3	23.7	34.6	35.6	31.9	24.9
0%	43.0	42.6	38.6	36.6	37.0	70.1	57.6	50.4	44.0	43.1
Equity										
100%	5.3	11.4	12.6	13.2	14.8	3.2	6.5	9.1	9.0	11.3
50.1 - 99%	46.6	45.1	36.7	27.7	19.3	22.8	35.4	34.6	28.0	21.1
0.1 - 50%	22.3	24.6	30.8	36.1	35.4	12.7	18.0	23.9	31.1	33.1
0%	25.9	18.9	19.9	23.1	30.5	61.3	40.1	32.4	31.9	34.6
Fixed Income										
100%	14.9	8.6	6.6	5.7	6.9	12.1	8.6	7.3	7.3	8.8
50.1 - 99%	1.1	1.4	1.5	1.7	2.0	2.1	2.2	2.6	3.6	4.5
0.1 - 50%	42.3	35.5	30.9	26.0	19.2	26.1	32.8	33.4	32.2	26.4
0%	41.8	54.5	61.0	66.5	71.9	59.7	56.4	56.7	56.9	60.3
Real Estate										
100%	0.2	0.3	0.5	1.0	1.9	0.1	0.2	0.2	0.3	0.6
50.1 - 99%	0.5	0.7	0.8	1.1	1.5	0.3	0.4	0.5	0.6	0.8
0.1 - 50%	56.3	46.5	36.3	29.9	20.5	26.8	38.4	34.9	30.7	24.4
0%	43.0	52.5	62.5	68.0	76.1	72.8	61.0	64.3	68.4	74.2
Balanced										
100%	6.0	3.6	2.6	2.0	1.4	42.7	24.8	15.3	9.7	5.7
50.1 - 99%	1.0	1.3	1.3	1.1	0.7	2.2	2.4	2.2	1.9	1.2
0.1 - 50%	8.7	13.8	13.1	10.4	6.3	7.3	11.9	13.8	12.5	9.1
0%	84.4	81.3	82.9	86.5	91.7	47.7	60.9	68.7	75.9	84.0
50% Equity, 50% TIAA Traditional										
	0.2	0.8	2.6	4.4	5.6	0.1	0.1	0.4	1.0	1.6

Source: TIAA-CREF Institute analysis of DA inflow data.

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

TABLE 4: PREMIUM ALLOCATION PARTICIPATION RATES, BY ASSET CLASS AND GENDER, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006		DECEMBER 2011	
	Women	Men	Women	Men
Guaranteed				
100%	5.6%	5.4%	5.9%	5.8%
50.1 - 99%	10.0	9.3	10.0	9.7
0.1 - 50%	46.8	44.2	32.8	31.9
0%	37.6	41.1	51.3	52.7
Equity				
100%	9.2	12.9	6.7	9.9
50.1 - 99%	39.8	42.0	30.1	32.9
0.1 - 50%	28.7	25.7	24.3	23.2
0%	22.4	19.4	38.9	34.0
Fixed Income				
100%	9.0	7.1	8.6	7.1
50.1 - 99%	2.7	2.5	2.9	2.8
0.1 - 50%	34.6	32.2	32.4	31.2
0%	53.7	58.2	56.1	59.0
Real Estate				
100%	0.3	0.6	0.2	0.4
50.1 - 99%	0.9	1.1	0.4	0.6
0.1 - 50%	42.6	38.5	34.0	32.7
0%	56.2	59.9	65.4	66.3
Balanced				
100%	2.9	2.5	19.4	16.5
50.1 - 99%	1.8	1.7	2.1	2.1
0.1 - 50%	12.8	12.1	11.8	12.0
0%	82.5	83.8	66.7	69.4
50% Equity, 50% TIAA Traditional				
	0.7	0.9	0.5	0.7

Source: Author tabulations of TIAA-CREF administrative data.

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

Asset class participation by asset accumulation quintile

Table 5 provides information on changes in the allocation of premiums by asset accumulation quintile for year-end 2011. The overall trends are similar to those found in Table 3 because asset accumulation is highly correlated with participant age. For example, participants in the lowest asset quintile were the least likely to contribute any premiums to the guaranteed asset class but most likely to contribute some amount to the balanced asset class. As shown in previous tables, the general trend for all asset quintiles between year-end 2006 and 2011 was a lower likelihood of contributing any premiums to the guaranteed and equity classes. There is, however, a difference in where the premiums were allocated by different asset quintiles. For participants in the lowest asset quintile, the change in premium allocations was heavily

concentrated in the balanced class. For the lowest quintile at year-end 2011, about 87% of participants participating in this class allocated all of their premiums to balanced funds. By contrast, participants in top two quintiles spread their allocations between the balanced, fixed-income, and real estate classes.

TABLE 5: PREMIUM ALLOCATION PARTICIPATION RATES, BY ASSET CLASS AND ACCUMULATION QUINTILE, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006					DECEMBER 2011				
	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile
Guaranteed										
100%	3.6%	4.5%	5.3%	6.8%	7.8%	3.7%	4.1%	4.7%	6.5%	9.3%
50.1 - 99%	5.7	8.4	8.2	10.8	15.8	3.2	6.3	8.6	11.2	17.2
0.1 - 50%	42.6	52.3	48.4	43.7	41.4	15.5	30.0	39.2	37.8	32.2
0%	48.1	34.9	38.1	38.8	34.9	77.7	59.7	47.6	44.5	41.2
Equity										
100%	2.9%	6.7%	11.9%	14.3%	16.0%	3.4%	4.9%	7.6%	10.5%	12.3%
50.1 - 99%	33.9	43.6	44.2	41.4	37.8	12.4	26.6	37.4	38.4	32.6
0.1 - 50%	24.1	28.9	27.1	27.6	30.4	10.9	19.2	24.5	27.2	32.7
0%	39.2	20.8	16.8	16.7	15.9	73.3	49.3	30.6	23.8	22.5
Fixed Income										
100%	23.9%	10.0%	5.1%	3.1%	2.2%	18.0%	9.3%	5.9%	4.4%	3.7%
50.1 - 99%	3.4	2.7	2.8	2.4	1.9	2.6	2.8	2.7	2.9	3.4
0.1 - 50%	43.1	38.6	32.5	31.2	23.3	18.2	31.9	36.2	35.6	31.6
0%	29.6	48.7	59.6	63.3	72.6	61.1	56.1	55.1	57.1	61.3
Real Estate										
100%	0.3%	0.3%	0.3%	0.4%	0.9%	0.3%	0.2%	0.2%	0.2%	0.4%
50.1 - 99%	0.6	0.9	1.0	0.9	1.4	0.3	0.5	0.5	0.5	0.6
0.1 - 50%	48.9	56.0	44.0	31.9	24.2	16.2	33.5	43.2	36.9	28.7
0%	50.3	42.7	54.7	66.8	73.6	83.2	65.8	56.1	62.4	70.2
Balanced										
100%	7.9%	1.9%	1.6%	1.5%	0.9%	47.5%	31.1%	14.9%	7.6%	4.1%
50.1 - 99%	1.4	1.6	1.9	2.2	1.4	1.7	2.4	2.5	2.6	2.0
0.1 - 50%	6.5	10.9	15.6	17.0	11.5	5.5	8.9	12.6	16.6	14.6
0%	84.2	85.6	80.9	79.3	86.2	45.3	57.7	70.0	73.2	79.3
50% Equity, 50% TIAA Traditional										
	0.1	0.3	0.5	1.0	1.9	0.1	0.2	0.3	0.6	1.5

Source: Author tabulations of TIAA-CREF administrative data.

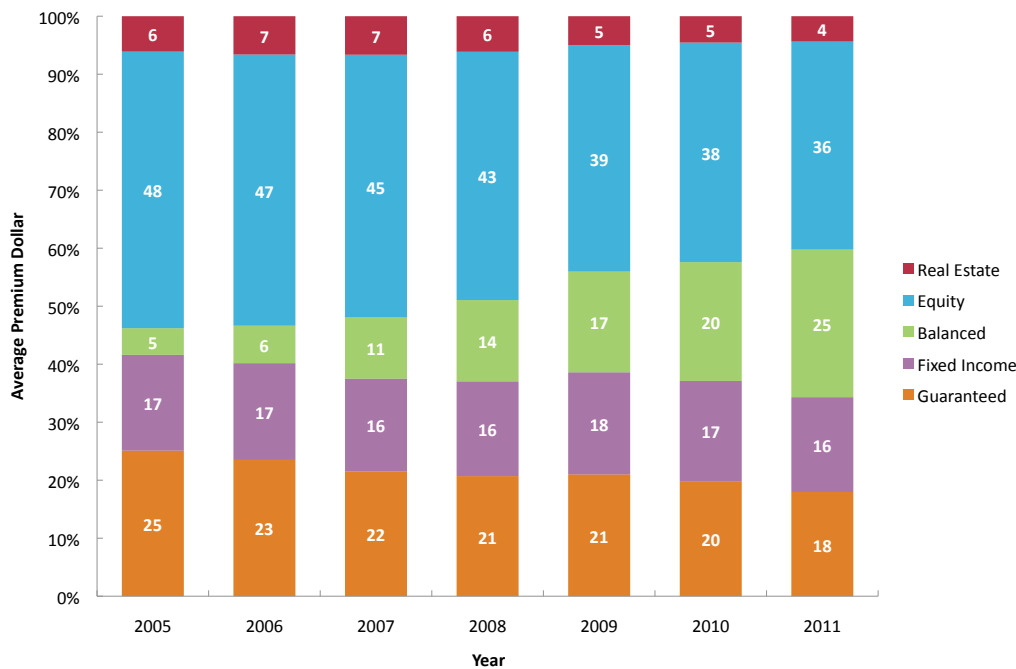
Note: Percent of participants contributing to an RA or GRA contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

Average premium allocations

Figure 2 provides information on participants’ average premium allocations by asset class. The trend over the period 2005 – 2011 was consistent with previous research by Ameriks (2000) and Rugh (2004) who found evidence of a long-term transition of average premium allocations out of the guaranteed and fixed-income classes, and into equity, real estate, and

balanced asset classes. In 2005, the average premium dollar was divided about 42% to the guaranteed and fixed-income classes and about 58% to other asset classes. With the exception of 2009 when allocations to the guaranteed and fixed-income classes increased slightly, in each year the proportion of the average premium dollar to these asset classes fell and was about 34% in 2011. Figure 2 shows that this decline was concentrated in the guaranteed class, with the proportion allocated to the fixed-income class holding steady at around 17% throughout the seven-year period.

FIGURE 2. AVERAGE PREMIUM ALLOCATION BY ASSET CLASS, 2005 TO 2011



The equity and real estate classes also saw a decline in share of the average premium dollar. The equity class had the sharpest decline of any asset class, falling from 48% to 36% over the seven-year period. In contrast, the balanced class share of an average premium dollar rose from 5% to 25%. The average real estate class share fell slightly from 6% to 4%.

Table 6 provides additional insights into the breakout of the average premium dollar by showing average allocations by investment account.⁷ The data indicate that most of increase in average premiums to the balanced class was concentrated in the lifecycle funds. These funds, which were first offered in late 2004, received on average about 22 cents of every premium dollar in 2011. This share of the 2011 average premium dollar is more than 10 times the average share those funds received in 2006, and marked the first year that lifecycle funds received the largest share of any investment option.

⁷ Retirement mutual funds are presented as aggregated in the investment accounts but each option is allocated to the appropriate asset class. Table 1 gives a breakout of retirement mutual funds by asset class.

TABLE 6: AVERAGE PREMIUM ALLOCATIONS, BY ASSET CLASS AND INVESTMENT ACCOUNT 2005 TO 2011

	2005	2006	2007	2008	2009	2010	2011
Asset Class							
Guaranteed	25.1%	23.5%	21.5%	20.7%	21.0%	19.8%	18.0%
Equity	47.7	46.8	45.3	42.8	39.0	37.8	35.9
Fixed Income	16.5	16.7	16.0	16.3	17.6	17.3	16.3
Real Estate	6.1	6.6	6.6	6.1	5.0	4.5	4.4
Balanced	4.6	6.5	10.6	14.0	17.4	20.5	25.4
Investment Account							
TIAA Traditional	25.1	23.5	21.5	20.7	21.0	19.8	18.0
CREF Stock	27.4	27.4	26.3	23.9	21.1	19.8	18.2
CREF Money Market	11.0	11.3	10.7	10.5	11.2	10.5	9.6
CREF Bond Market	3.5	3.5	3.4	3.5	3.8	4.0	3.9
CREF Social Choice	4.5	4.3	4.1	3.7	3.3	3.3	3.3
CREF Global Equities	6.2	6.1	6.1	6.0	5.3	5.1	4.7
CREF Growth	8.4	7.3	6.3	5.9	5.5	5.3	4.9
CREF Equity Index	4.9	4.6	4.4	4.2	4.0	3.8	3.7
TIAA Real Estate	6.0	6.5	6.5	6.0	4.9	4.4	4.3
CREF Inflation-Linked Bond	2.0	1.9	1.8	2.3	2.5	2.6	2.6
Retirement Mutual Funds	0.8	1.4	2.2	2.9	3.4	4.1	4.7
Lifecycle Funds	0.1	2.2	6.4	10.4	14.0	17.2	22.1

Source: Author tabulations of TIAA-CREF administrative records.

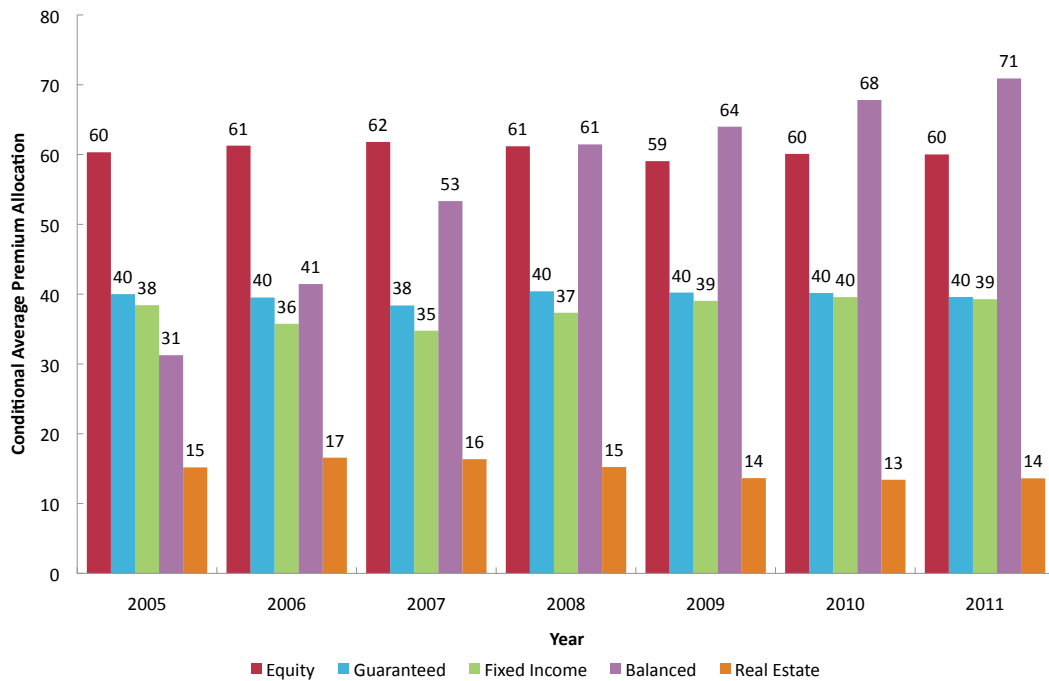
Note: Participants contributing to an RA or GRA contract. Percentages may not sum to 100 due to rounding. Statistics shown are as of December 31 of each year unless otherwise noted.

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Conditional average premium allocations

Figure 3 provides information on conditional premium allocations by asset class and Table 7 provides additional information on conditional premium allocations by investment option over the period from 2005 to 2011. The conditional average premium allocation is defined by calculating the average share including only those participants who allocated some premiums to a particular asset class or investment option. For example, Table 6 shows that among all participants, the average allocation in 2009 to TIAA traditional averaged about 21 cents per premium dollar, but Table 7 shows that the average allocation was about 40 cents per premium dollar when counting only those who contributed some amount to this fund.

FIGURE 3. CONDITIONAL AVERAGE PREMIUM ALLOCATIONS, 2005 TO 2011



The data indicate a number of interesting trends over the past seven years. First, conditional average allocations to the equity and guaranteed asset class were surprisingly stable through the years before, during and after the financial crisis. This suggests at least two possibilities: (1) participants did not attempt to market-time their premium allocations, whether due to inertia or by employing an investment strategy such as dollar-cost averaging, or (2) participants who decreased their premium equity allocations were approximately offset by those increasing their allocations to this class. A second trend was that the financial crisis had a marked effect on the conditional average allocation to the real estate asset class. The conditional average allocation to this asset class has declined by three percentage points (about 20%) since hitting a peak conditional allocation of 16.6% in 2006. Third, conditional average premium allocations to the guaranteed class rose in 2008 and 2009 but returned to approximately the 2006 conditional allocation by 2011. By comparison, conditional average premiums to the fixed-income and balanced asset classes have risen since 2007. The increased conditional average share to the fixed-income and guaranteed classes were likely due, in part, to participants rebalancing their premium allocations to less risky asset classes during the financial crisis. For example, conditional average premium allocations to the fixed-income asset class increased by about 4.8 cents per dollar between 2007 and 2010, an increase of about 14% over that period.

TABLE 7: CONDITIONAL AVERAGE PREMIUM ALLOCATIONS, BY ASSET CLASS AND INVESTMENT ACCOUNT, 2005 TO 2011

	2005	2006	2007	2008	2009	2010	2011
Asset Class							
Guaranteed	40.0%	39.5%	38.4%	40.4%	40.2%	40.2%	39.6%
Equity	60.3	61.3	61.8	61.2	59.1	60.1	60.0
Fixed Income	38.4	35.8	34.8	37.3	39.0	39.6	39.3
Real Estate	15.2	16.6	16.4	15.2	13.6	13.4	13.6
Balanced	31.3	41.5	53.3	61.5	64.0	67.8	70.9
Investment Account							
TIAA Traditional	40.0	39.5	38.4	40.4	40.2	40.2	39.6
CREF Stock	40.2	41.9	41.7	40.5	38.6	38.6	38.1
CREF Money Market	57.1	62.8	59.7	56.7	54.8	54.9	54.6
CREF Bond Market	16.8	16.5	16.2	16.8	16.6	17.8	17.9
CREF Social Choice	30.8	31.7	31.4	30.6	28.6	28.6	28.5
CREF Global Equities	20.9	22.6	23.0	22.3	20.8	21.1	20.7
CREF Growth	25.7	25.8	25.4	24.8	23.3	23.7	23.5
CREF Equity Index	27.8	28.3	27.6	26.6	24.6	24.9	24.8
TIAA Real Estate	15.1	16.5	16.3	15.1	13.5	13.2	13.4
CREF Inflation-Linked Bond	15.4	14.7	14.2	15.9	14.8	15.5	15.4
Retirement Mutual Funds	44.3	51.6	52.2	50.9	45.1	46.7	46.2
Lifecycle Funds	52.4	89.8	90.6	91.5	88.3	89.5	90.2

Source: Author tabulations of TIAA-CREF administrative records.

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

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

The most significant increase was in the conditional average premiums allocated to the balanced asset class, which more than doubled over the seven-year period. As evidenced in Table 7, all of the increase in conditional average premiums in the balanced class was attributable to the increased popularity and use of lifecycle funds. The data suggest that many TIAA-CREF participants use these target-date funds as a “fund-of-funds” because the conditional average premium allocation was about 90 cents per premium dollar over the period 2006 to 2011. These data, consistent with VanDerhei et al. (2012) analysis of 401(k) participants, suggests an increasing acceptance and usage of packaged “fund-of-funds” investment products by retirement plan participants.

TRENDS IN ASSET ALLOCATION

Next we examine how the stock of assets held by TIAA-CREF participants changed over the period 2005-2011. As noted in Ameriks (2000), there are a number of important differences between the allocation of premium flows and the allocation of the stock of assets for participants within the TIAA-CREF system. First, participants can generally change their entire premium allocation at any time (subject to employer limitations) between the various investment options offered by TIAA-CREF. A participant can also transfer assets (subject to plan limitations) between the CREF accounts, the TIAA real estate account, and the retirement, lifecycle, and other mutual fund accounts. For RA and GRA contracts, however, a participant cannot immediately transfer accumulations of TIAA Traditional into other investment options. This lack of liquidity is because the TIAA Traditional annuity guarantees principal and dividends and the underlying investments

supporting these guarantees entail long-term financial commitments.⁸ TIAA is able to make these investments knowing that participant accumulations will remain in TIAA for the long term. Yet TIAA Traditional is not completely illiquid; RA and GRA participants can transfer accumulations out of TIAA in roughly equal amounts over a 10-year period.

Second, many participants make an initial choice regarding their premium allocations and never change it thereafter.⁹ Given differences in the returns to various asset classes and investment options, these participants' asset allocations will likely differ over time from their premium allocation. Third, participants may respond to volatile market conditions by changing the asset allocation, premium allocation, or both. Participants, however, may have preferences for changing their accumulations and the premiums in different ways. For example, Ameriks and Zeldes (2001) found that a sample of TIAA-CREF participants was more likely to change their contribution allocation than to make a transfer of accumulated assets across funds.

Participants' asset allocations determine their ultimate exposure to risk over time. Because the allocation of a participant's assets can be more important to retirement security than his allocation of new contributions, ensuring retirement plan participants have adequate asset diversification is a primary interest of financial market regulators and financial planners and advisors.

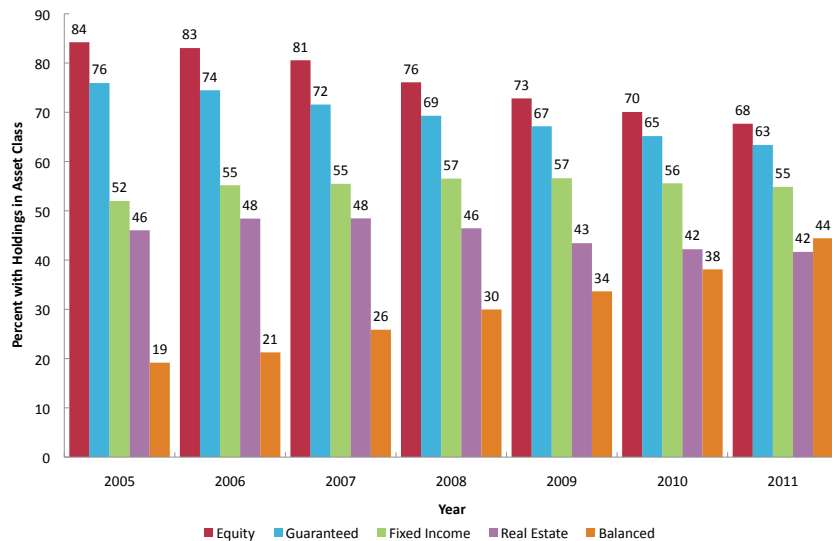
Asset class and investment account ownership

Figure 4 shows the percentage of premium-paying participants with an accumulation in any TIAA-CREF asset classes as of year-end 2005-2011. Consistent with previous studies by Ameriks (2000) and Rugh (2004), the data show a long-term gradual decline in the percentage of participants with guaranteed class assets in their investment portfolios. As noted by Rugh (2004), the fraction of participants holding guaranteed assets began rising after the 2001 recession, but appears to have peaked at about 76% in 2005. The lagged peak in asset class participation may reflect two underlying effects. As noted above, TIAA Traditional assets held within an RA or GRA are not "cashable." That is, once a participant allocates funds to this investment option, the money must generally stay in this investment fund until normal retirement distributions begin (or the participant may transfer the funds out over a 10-year period). Second, older participants may have delayed retirement and receipt of their TIAA traditional annuities in the wake of the 2001 recession. This second trend is supported by Rugh (2004) who showed that, for participants aged 55 and older, the average asset allocation to the guaranteed class rose substantially between 2000 and 2004.

⁸ Interest credited to TIAA Traditional Annuity accumulations includes a guaranteed rate, plus additional amounts may be established on a year-by-year basis by the TIAA Board of Trustees. The additional amounts, when declared, remain in effect through the "declaration year," which begins each March 1 for accumulating annuities and January 1 for payout annuities. Additional amounts are not guaranteed for the 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 premiums.

⁹ Samuelson and Zeckhauser (1988) analyze status quo bias for a sample of TIAA-CREF participants.

FIGURE 4. PERCENT OF PARTICIPANTS WITH HOLDINGS IN ASSET CLASSES, 2005 TO 2011



In contrast to previous studies, Table 8 shows that the fraction of premium-paying participants holding their assets in the equity class fell substantially between 2005 and 2011. Particularly striking is the decline in the fraction of participants holding the CREF stock fund, with this investment option experiencing an ownership drop of about 18 percentage points between 2005 and 2011. This decline, which reversed years of consistent stable participation in CREF stock ownership, is likely attributable to the combined effects of the financial crisis and the increasing popularity of lifecycle funds.

TABLE 8: PERCENT OF PARTICIPANTS WITH ASSETS IN TIAA-CREF ACCOUNTS, BY ASSET CLASS AND INVESTMENT ACCOUNT, 2005 TO 2011

	2005	2006	2007	2008	2009	2010	2011
Asset Class							
Guaranteed	75.9%	74.5%	71.6%	69.3%	67.2%	65.2%	63.4%
Equity	84.2	83.0	80.6	76.1	72.8	70.1	67.7
Fixed Income	52.0	55.2	55.5	56.5	56.6	55.6	54.9
Real Estate	46.1	48.4	48.5	46.5	43.4	42.2	41.7
Balanced	19.2	21.3	25.9	30.0	33.7	38.1	44.4
Investment Account							
TIAA Traditional	75.9	74.5	71.6	69.3	67.2	65.2	63.4
CREF Stock	75.1	74.2	71.4	66.5	62.8	59.6	57.2
CREF Money Market	25.5	27.9	28.8	31.1	31.7	30.5	30.0
CREF Bond Market	26.5	28.0	28.5	28.9	29.5	29.6	29.3
CREF Social Choice	18.9	18.3	17.6	16.8	16.5	16.5	16.3
CREF Global Equities	37.6	37.0	36.2	34.8	33.9	32.7	31.7
CREF Growth	41.1	37.6	35.5	33.6	32.6	31.2	30.0
CREF Equity Index	23.1	22.6	22.4	22.2	21.9	21.3	20.8
TIAA Real Estate	45.8	48.1	48.1	46.1	43.1	41.8	41.2
CREF Inflation-Linked Bond	16.0	17.2	18.0	20.5	21.6	21.7	22.1
Retirement Mutual Funds	2.8	4.5	6.9	8.9	10.5	12.1	13.1
Lifecycle Funds	0.3	3.3	9.1	14.4	18.7	23.6	27.5

Source: Author tabulations of TIAA-CREF administrative records.

Note: Participants contributing to an RA or GRA contract. Statistics shown are as of December 31 of each year unless otherwise noted.

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Asset class ownership by year of entry

Table 9 shows asset class and investment account participation by premium-paying tenure cohort as of year-end 2011 provides insights into how changes in the investment menu impacted the composition of asset holdings for different tenure cohorts.¹⁰ Several interesting observations emerge. As expected, ownership of the guaranteed and equity classes remained very high for participants who joined the TIAA-CREF system prior to the expansion of the investment menu in the early 1990s. As first noted by Rugh (2004), participation in the guaranteed class declined sharply for tenure cohorts that entered during the stock market boom of the late 1990s and who opted for the choices available in the expanded investment menu. Guaranteed class participation rebounded for cohorts joining the system during and immediately after the 2001 recession. Participation began declining for cohorts who entered after 2004, with the decline in guaranteed class participation accelerating rapidly for cohorts who entered the system after the introduction of lifecycle funds in late 2004.

TABLE 9: PERCENT OF PARTICIPANTS WITH ASSETS IN TIAA-CREF ACCOUNTS, BY YEAR OF ENTRY, AS OF DECEMBER 31, 2011

	Pre-1985	1985-89	1990-94	1995-99	2000-04	2005	2006	2007	2008	2009	2010	2011
Asset Class												
Guaranteed	95.8%	94.4%	84.4%	70.3%	77.9%	72.6%	59.4%	44.9%	38.3%	30.9%	24.6%	18.5%
Equities	89.5	87.3	85.1	86.3	83.5	80.6	68.0	52.8	41.7	32.7	28.5	18.5
Fixed Income	53.9	54.3	60.5	60.0	60.4	79.5	68.8	55.4	47.4	44.0	36.1	30.5
Real Estate	41.0	38.1	38.0	45.4	64.9	68.2	56.0	37.5	26.4	19.4	15.9	11.2
Balanced	25.5	27.3	38.6	37.3	29.9	29.9	42.1	53.5	57.8	57.7	62.5	63.3
Investment Account												
TIAA Traditional	95.8%	94.4%	84.4%	70.3%	77.9%	72.6%	59.4%	44.9%	38.3%	30.9%	24.6%	18.5%
CREF Stock	84.7	82.0	77.1	71.6	73.5	71.5	58.4	39.7	26.7	19.1	14.7	10.5
Money Market	24.0	29.6	32.0	31.0	31.9	34.3	33.0	33.9	30.9	30.3	23.9	22.6
Bond Market	32.2	28.4	37.8	37.2	33.1	42.2	35.4	26.5	21.5	18.4	15.0	9.2
Social Choice	17.9	18.7	30.6	28.2	17.3	12.5	10.6	10.0	9.1	6.9	5.8	3.6
Global Equities	34.1	34.8	43.7	49.0	44.6	23.8	19.9	21.0	20.3	14.9	11.7	8.0
Growth Account	26.6	31.1	35.8	54.4	45.0	19.7	15.5	16.7	17.1	14.0	11.4	8.0
Equity Index	21.1	22.2	25.5	36.6	24.2	16.7	13.6	16.1	15.6	12.4	10.5	7.1
Real Estate	40.6	37.7	37.6	45.0	64.5	67.6	55.5	37.0	25.9	19.0	15.3	10.8
Inflation linked Bond	30.3	23.4	22.5	22.9	23.8	35.6	28.9	22.3	20.2	15.5	12.1	8.4
Retirement MF	19.2	16.7	15.2	13.9	12.8	13.5	13.8	14.1	11.6	9.6	10.0	5.8
Lifecycle Funds	9.3	10.9	11.7	12.9	15.3	19.7	33.5	45.4	50.2	52.0	57.6	60.2

Source: Author tabulations of TIAA-CREF administrative records.

Note: Participants contributing to an RA or GRA contract. Statistics shown are as of December 31 of each year unless otherwise noted.

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Participation in the equity asset class was at least 80% percent for all cohorts with entry dates before 2005. As with the guaranteed class, participation in the equity class declined sharply for cohorts who entered after the introduction of lifecycle funds, with fewer than 20% percent of new 2011 entrants with any equity class accumulation. Participation for the fixed-income and real estate classes followed a similar trend for cohorts entering after 2005. Notably, cohorts that joined the system around the time of the 2008 financial crisis were more likely to hold fixed-income assets than equity class assets. These cohorts were also significantly more likely to hold lifecycle fund assets.

¹⁰ A tenure cohort is defined by the participant year-of-entry into the TIAA-CREF system.

The likelihood of holding lifecycle fund assets was strongly correlated with the introduction of these funds and a participant joining the TIAA-CREF system. Fewer than 20% of participants who joined prior to 2005 held any lifecycle fund assets. By contrast, the likelihood of holding lifecycle fund assets has increased significantly for each successive cohort since 2006, with over half of the cohorts from 2008-2011 holding this investment option. Given that members of these tenure cohorts tended to be younger and held the age-appropriate lifecycle fund, the participants in these cohorts that held lifecycle fund assets tended to maintain heavily equity-weighted portfolios.

Average asset allocations

Figure 5 shows the average allocation of a dollar of assets among the five asset classes by premium-paying participants over the period 2005-2011. The data indicate that, on average, participants transferred heavily out of the equity class between 2007 and 2008, coinciding with the onset of the global financial crisis. Over those two years, the average participant reduced his exposure to equity class funds by about 20%, or a reduction of almost 10 cents per dollar of assets. The average participant moved the reallocated assets into the guaranteed (4 cents), fixed-income (3 cents), and balanced (4 cents) classes. In the years after the financial crisis, the average participant then continued to reduce the share of assets devoted to the equity class; he also reduced the share of assets placed in the real estate and guaranteed classes while holding the share in the fixed-income class relatively constant. As with premium allocations, the data show a substantial shift of assets into the balanced class, with averaging holding per dollar more than doubling from 9 cents to 22 cents between 2007 and 2011.

FIGURE 5. AVERAGE ASSET ALLOCATIONS, 2005 TO 2011

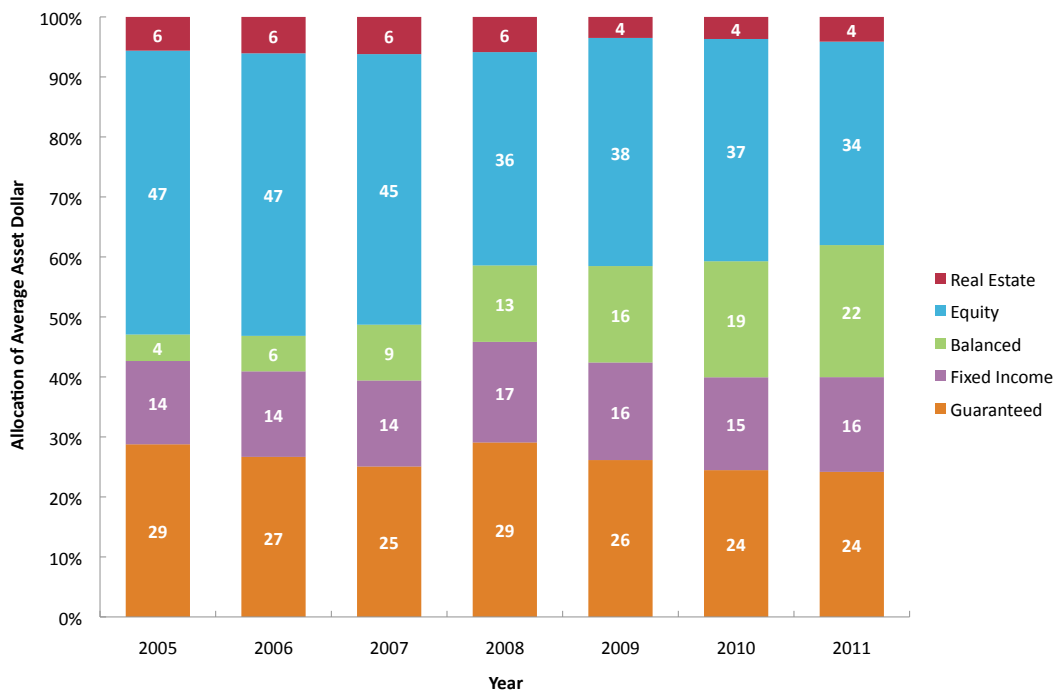


Table 10 shows additional detail of the average allocation of a dollar of assets by investment account. The decline in equity class exposure and the rise in allocations to the fixed-income class were spread across the various investment options under each class. By contrast, the increase to the balanced class share was completely attributable to increasing allocations in lifecycle funds. Indeed, the average asset allocation to lifecycle funds increased by about 70% between 2007 and 2008. The average allocation to lifecycle funds has continued to grow and now accounts for about 19 cents of the average participant's asset allocation, an increase of almost 350% relative to 2007.

TABLE 10: AVERAGE ASSET ALLOCATIONS, BY ASSET CLASS AND INVESTMENT ACCOUNT 2005 TO 2011

	2005	2006	2007	2008	2009	2010	2011
Asset Class							
Guaranteed	28.8%	26.7%	25.1%	29.1%	26.1%	24.5%	24.2%
Equity	47.3	47.1	45.1	35.5	38.0	37.0	33.9
Fixed Income	13.9	14.3	14.3	16.8	16.3	15.5	15.8
Real Estate	5.6	6.1	6.2	5.9	3.5	3.7	4.1
Balanced	4.4	5.9	9.3	12.7	16.1	19.3	22.0
Investment Account							
TIAA Traditional	28.8%	26.7%	25.1%	29.1%	26.1%	24.5%	24.2%
CREF Stock	28.0	28.6	26.7	19.8	20.7	19.7	17.5
CREF Money Market	9.1	9.7	9.7	10.6	10.2	9.5	9.3
CREF Bond Market	3.1	3.0	3.0	3.8	3.6	3.6	3.8
CREF Social Choice	4.3	4.1	3.9	3.6	3.5	3.5	3.4
CREF Global Equities	6.2	6.3	6.1	4.8	5.2	4.9	4.3
CREF Growth	7.7	6.5	6.3	5.1	5.4	5.2	5.0
CREF Equity Index	4.6	4.5	4.1	3.6	3.7	3.7	3.5
TIAA Real Estate	5.6	6.0	6.1	5.8	3.4	3.6	4.0
CREF Inflation-Linked Bond	1.6	1.5	1.6	2.3	2.3	2.2	2.5
Retirement Mutual Funds	0.8	1.3	2.0	2.4	3.2	3.8	3.9
Lifecycle Funds	0.1	1.8	5.4	9.1	12.5	15.9	18.6

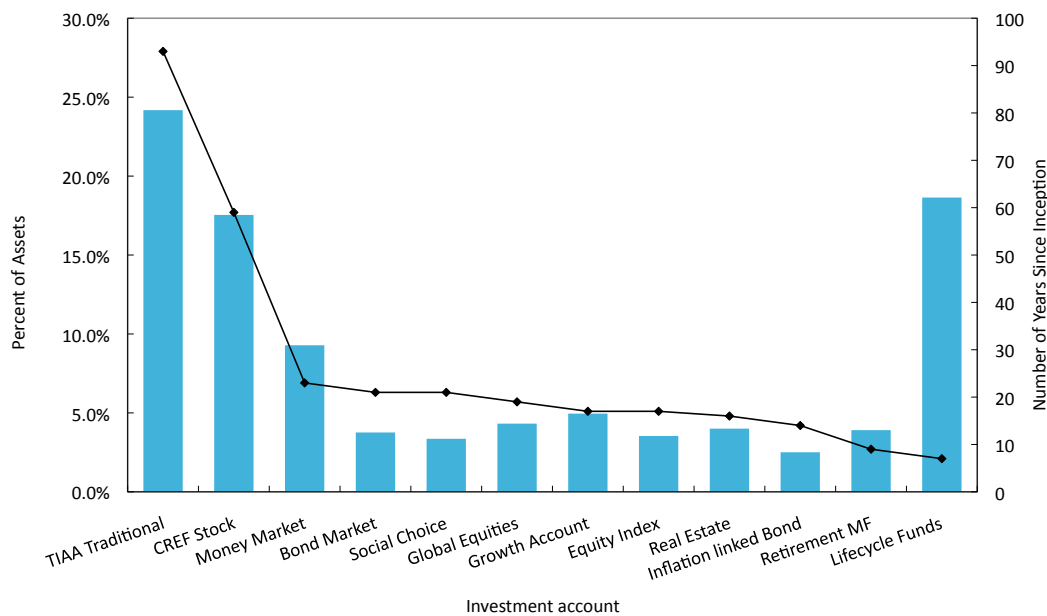
Source: Author tabulations of TIAA-CREF administrative records.

Note: Participants contributing to an RA or GRA contract. Statistics shown are as of December 31 of each year unless otherwise noted.

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

The growth of asset allocations into lifecycle funds was unprecedented in TIAA-CREF's history. Rugh (2004) presented evidence that indicated that average asset allocations were highly correlated to the length of time an investment option had been offered within the TIAA-CREF system. Figure 6 shows that at year-end 2011 this correlation held for all investment options with the exception of lifecycle funds. These funds, which were in their 7th year since inception in 2011, accounted for a larger average share of assets than any other investment with the exception of TIAA traditional (in its 93rd year of existence).

FIGURE 6. AVERAGE PARTICIPANT ASSET ALLOCATION BY ACCOUNT AND NUMBER OF YEARS FROM ACCOUNT INCEPTION, DEC 31, 2011



Average asset allocation by age cohort

Table 11 presents average asset allocations by age cohort for year-end 2006 and 2011. For both years, each successively older cohort had a larger average asset allocation to TIAA traditional. Between 2006 and 2011, participants age 54 and younger reduced their average allocation to the guaranteed class, while those ages 55 and older maintained their average allocation to this class.

The statistics show that the various age cohorts changed their average portfolio holdings but they may not have substantially changed their overall investment risk exposure because of the increased use of lifecycle funds. In 2006, the age 35-44 cohort had an average allocation of about 52% in the equity class and around 35% combined in the guaranteed and fixed-income classes. By 2011, the average allocation to the equity class had fallen to about 36%, the combined guaranteed and fixed-income classes fell to about 33%, and the average allocation to lifecycle funds had risen to about 23%. Noting that the 2040 lifecycle fund maintained portfolio weights of 90% to equity and 10% to fixed income in that year, the average portfolio allocation for the age 35-64 cohort was about 57% to equities and 35% to guaranteed and fixed income. On average, the younger 2011 tenure cohorts had investment risk exposure similar to younger 2006 through cohorts through the utilization of automatically diversified lifecycle funds. However, about 37% and 17% of the 2011 under-35 and 35-44 cohorts, respectively, increased their equity risk exposure relative to the average 2006 cohorts by having all of their assets allocated to lifecycle funds.

By comparison, the successively older cohorts maintained average portfolio allocations with less equity and more guaranteed and fixed-income holdings in 2006. The 2011 older cohorts also made relative changes to average allocations but tended to reduce equity risk exposure and were less reliant on lifecycle funds. In both periods the younger cohorts relied relatively more on lifecycle funds to achieve their desired asset allocations than did older cohorts. By 2011 the younger cohort participants were, on average, significantly more likely to hold a substantial proportion of their assets in lifecycle funds.

TABLE 11: AVERAGE ASSET ALLOCATIONS, BY AGE COHORT, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006					DECEMBER 2011				
	Under 35	35-44	45-54	55-64	65 +	Under 35	35-44	45-54	55-64	65 +
Asset Class										
Guaranteed	19.8%	20.4%	28.0%	35.0%	42.3%	11.0%	16.6%	24.0%	34.4%	43.6%
Equity	44.4	51.2	48.3	45.1	39.8	22.8	36.1	38.9	35.1	31.5
Fixed Income	21.1	15.0	12.3	10.3	10.2	18.1	15.9	15.2	15.0	14.9
Real Estate	7.2	6.7	5.9	4.5	2.7	3.4	4.9	4.4	3.8	3.3
Balanced	7.5	6.7	5.4	5.1	5.0	44.7	26.4	17.5	11.8	6.7
Investment Account										
TIAA Traditional	19.8%	20.4%	28.0%	35.0%	42.3%	11.0%	16.6%	24.0%	34.4%	43.6%
CREF Stock	28.0	27.1	28.9	30.2	29.5	10.2	16.7	19.5	20.3	20.6
CREF Money Market	16.3	10.2	7.9	6.1	6.2	13.3	10.0	8.6	7.4	6.7
CREF Bond Market	3.1	3.3	3.1	2.7	2.3	2.7	3.5	4.0	4.4	4.4
CREF Social Choice	2.9	4.8	4.9	3.9	2.4	1.7	3.4	4.2	3.8	2.6
CREF Global Equities	5.6	7.9	6.7	5.4	4.0	3.1	4.9	5.2	4.1	3.1
CREF Growth	5.7	9.0	6.9	4.8	3.0	3.1	6.0	6.3	4.4	3.1
CREF Equity Index	3.4	5.7	4.8	4.0	2.8	2.7	4.0	4.2	3.3	2.5
TIAA Real Estate	7.4	6.6	5.3	5.0	4.9	3.3	4.8	4.3	3.7	3.2
CREF Inflation-Linked Bond	1.7	1.5	1.4	1.5	1.6	2.0	2.2	2.4	2.9	3.5
Retirement Mutual Funds	1.8	1.6	1.0	0.8	0.7	4.1	4.8	3.9	3.4	2.6
Lifecycle Funds	4.3	1.9	1.0	0.6	0.3	43.0	23.0	13.2	8.0	4.1
Percent Allocating 100% to an Asset Class										
All Equity	3.4	6.2	5.4	4.4	3.7	2.3	3.5	4.2	3.2	2.9
All Guaranteed	2.6	2.7	4.1	5.8	9.4	2.5	2.2	3.4	5.7	8.8
All Lifecycle	3.8	1.5	0.8	0.4	0.2	36.9	16.9	9.4	5.4	2.7

Source: Author tabulations of TIAA-CREF administrative records.

Note: Participants contributing to an RA or GRA contract. Statistics shown are as of December 31 of each year unless otherwise noted.

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Average asset allocations by gender

Table 12 presents statistics on average asset allocations for premium-paying participants, by gender, for year-end 2006 and 2011. The data show a strong shift of average allocations into the balanced class and out of the guaranteed, equity, and real estate asset classes for both women and men. Both also had a modest increase in the average allocation to the fixed-income class. In both periods, women on average maintained slightly more conservative portfolios, allocating slightly more to the guaranteed and fixed-income classes and less to the equity and real estate classes. In both periods, women on average allocated slightly more to the balanced class. Both men and women significantly increased their holdings in lifecycle funds. Women on average allocated more to lifecycle funds and were more likely to allocate 100% of assets to that investment option.

TABLE 12: AVERAGE ASSET ALLOCATION RATES, BY GENDER, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006		DECEMBER 2011	
	Women	Men	Women	Men
Asset Class				
Guaranteed	27.1%	26.2%	24.2%	24.3%
Equity	46.2	50.2	32.2	36.4
Fixed Income	14.4	12.1	16.5	14.8
Real Estate	6.0	6.1	4.0	4.3
Balanced	6.2	5.4	23.1	20.2
Investment Account				
TIAA Traditional	27.1%	26.2%	24.2%	24.3%
CREF Stock	28.2	30.0	16.8	18.6
CREF Money Market	9.8	7.8	10.1	8.2
CREF Bond Market	3.1	2.9	3.8	3.7
CREF Social Choice	4.5	3.9	3.5	3.2
CREF Global Equities	6.2	6.9	4.1	4.6
CREF Growth	6.4	7.0	4.7	5.3
CREF Equity Index	4.5	4.8	3.4	3.7
TIAA Real Estate	5.9	5.9	3.9	4.2
CREF Inflation-Linked Bond	1.5	1.4	2.4	2.6
Retirement Mutual Funds	1.1	1.5	3.4	4.5
Lifecycle Funds	1.8	1.5	19.6	17.1
Percent Allocating 100% to an Asset Class				
All Equity	4.5	5.4	3.0	3.7
All Guaranteed	4.3	3.9	4.1	3.8
All Lifecycle	1.5	1.2	15.9	13.0

Source: Author tabulations of TIAA-CREF administrative data.

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

Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Average asset allocations by accumulation quintile

Table 13 shows average asset allocations for premium-paying participants, by asset accumulation quintile, for year-end 2006 and 2011. The statistics indicate that the average investment risk profile was highly correlated with asset accumulations in 2006. Participants in the lowest quintile had the highest average allocations to fixed income and the lowest average allocation to the equity class, relative to participants in higher asset quintiles. Average holdings of guaranteed assets rose monotonically from the lowest to highest quintile. Combining the average holdings of guaranteed and fixed-income assets, the average asset mix of equity to fixed/guaranteed income was lowest for the bottom quintile and highest for the third quintile. This is interesting because asset accumulations were also highly correlated with age and, if the age-weighted recommendation imbedded in lifecycle funds held in practice, participants in the lower accumulation quintiles should have held average asset allocations that were more heavily weighted to the equity class relative to people in the higher quintiles in 2006.

TABLE 13: AVERAGE ASSET ALLOCATION RATES, BY ACCUMULATION QUINTILE, DECEMBER 2006 AND DECEMBER 2011

	DECEMBER 2006					DECEMBER 2011				
	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile
Asset Class										
Guaranteed	18.7%	24.3%	24.9%	29.5%	35.9%	10.9%	18.4%	24.2%	29.1%	38.3%
Equity	34.0	46.7	51.9	51.6	51.4	14.9	28.2	40.2	44.0	41.8
Fixed Income	30.4	16.1	10.9	8.3	5.5	23.7	17.9	14.3	12.7	10.9
Real Estate	7.0	8.2	6.5	4.6	3.9	2.4	4.4	5.7	4.6	3.5
Balanced	9.9	4.7	5.7	6.0	3.3	48.2	32.7	15.6	9.6	5.5
Investment Account										
TIAA Traditional	18.7%	24.3%	24.9%	29.5%	35.9%	10.9%	18.4%	24.2%	29.1%	38.3%
CREF Stock	24.8	27.3	25.6	28.3	37.1	5.6	14.6	20.5	21.6	25.4
CREF Money Market	25.2	10.9	6.1	4.0	2.5	19.1	11.1	7.5	5.3	3.3
CREF Bond Market	3.0	3.4	3.5	3.2	2.0	2.4	3.4	4.1	4.6	4.4
CREF Social Choice	2.3	3.9	5.4	5.8	3.2	1.6	2.7	3.8	5.0	3.8
CREF Global Equities	3.0	6.6	8.7	8.1	5.4	2.2	3.6	5.2	6.1	4.5
CREF Growth	2.7	7.2	10.3	8.2	4.1	2.5	3.8	6.3	7.5	4.6
CREF Equity Index	2.0	4.1	6.2	6.1	3.9	2.1	2.9	4.0	4.9	3.8
TIAA Real Estate	6.9	8.1	6.5	4.5	3.8	2.3	4.3	5.5	4.5	3.4
CREF Inflation-Linked Bond	2.2	1.8	1.3	1.2	1.1	1.9	2.6	2.6	2.6	2.8
Retirement Mutual Funds	1.6	1.6	1.2	1.0	0.9	2.8	4.2	4.4	4.2	4.0
Lifecycle Funds	7.5	0.8	0.3	0.2	0.1	46.6	28.5	11.8	4.6	1.8
Percent Allocating 100% to an Asset Class										
All Equity	2.8	5.0	7.8	6.3	2.7	2.9	3.1	4.0	4.4	2.4
All Guaranteed	4.4	4.1	4.1	4.6	3.5	4.2	3.6	3.5	4.2	4.3
All Lifecycle	6.5	0.4	0.1	0.0	0.0	42.7	21.3	6.3	1.4	0.3

Source: Author tabulations of TIAA-CREF administrative records.

Note: Participants contributing to an RA or GRA contract. Statistics shown are as of December 31 of each year unless otherwise noted.

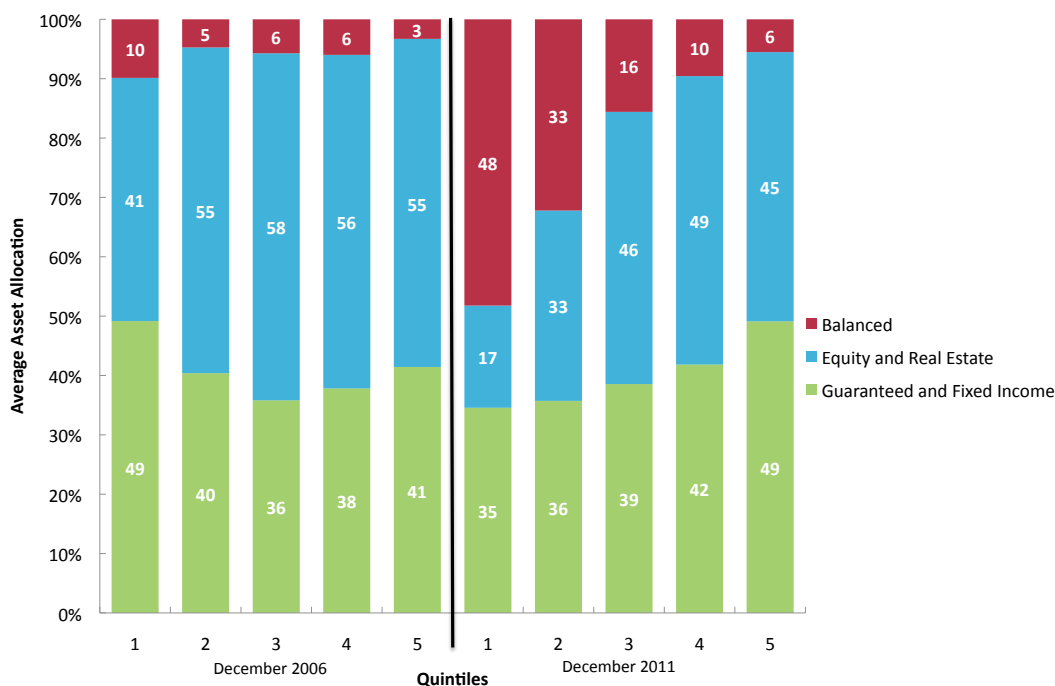
Note: Tabulations exclude Lifestyle funds and the Managed Allocation fund because of small amounts.

Age-weighted asset allocations between quintiles were more likely at year-end 2011. Table 13 and Figure 7 show that each accumulation quintiles decreased average allocations to the equity and real estate classes relative to 2006, with the two lowest quintiles reducing their combined average equity allocation by about 19 percentage points. The two lowest quintiles also reduced their combined average allocations to the guaranteed and fixed-income classes by over 9 percentage points. Both lower quintiles however significantly increased their holdings in lifecycle funds. Given the majority of the participants in these quintiles used a lifecycle fund with 90/10 weights for equity to fixed income, then the bottom two quintiles actually increased average equity holdings by about 15 percentage points relative to 2006.

By comparison, the top three quintiles also decreased average holdings in the equity class but increased their average allocations to the combined guaranteed and fixed-income classes. The average allocations to lifecycle funds was also significantly lower for the top three quintiles compared to the bottom two quintiles. The overall effect in 2011 was that, on

average, participants with lower retirement assets held more heavily equity-weighted portfolios relative to participants in higher asset accumulation quintiles. This reversal of investment risk positions between asset quintiles was likely due to lingering portfolio effects from the financial crisis and the increased usage of lifecycle funds by younger and less-wealthy participants.

FIGURE 7: AVERAGE ASSET ALLOCATIONS BY ACCUMULATION QUINTILE, DECEMBER 2006 AND DECEMBER 2011



Participants with the largest asset accumulations were the least likely to allocate any assets to lifecycle funds. There are at least three possible explanations for this observation. First, these participants might have had relatively greater financial literacy and sophistication and thereby had more confidence in managing their investment portfolio. Second, these participants had greater access to the services of financial advisers (including wealth management) and relied on this professional expertise to build custom portfolios that provided the best returns relative to their relative risk aversion. Third, both reasons might have applied, with these participants having both greater financial literacy and more confidence in meeting with financial advisers.

CONCLUSIONS

This analysis has highlighted several important changes in the premium and asset allocation decisions of TIAA-CREF participants over the period 2005-2011. Most remarkable has been the unprecedented shift in premium and asset allocations into lifecycle funds. These funds, first offered in late 2004, received about 22 cents of the average premium dollar flowing into the TIAA-CREF system in 2011. Lifecycle funds were most heavily utilized by younger participants with relatively lower total asset accumulations. Younger participants tended to use lifecycle funds as a “fund-of-funds” while older workers were more likely to use them as a component of a broader asset diversification strategy.

This paper also provides a link to earlier papers by Ameriks, King, and Warshawsky (1997), Ameriks (2000), and Rugh (2004). Taken together, these papers provide a long cross-sectional time-series on the premium and asset allocation decisions of TIAA-CREF participants over a variety of economic conditions and facing an evolving investment menu. The analysis in this paper documents a third distinct trend over the past 20 years. Ameriks (2000) concluded that an expanded investment menu and strong stock market provided strong incentives for the average participant to reallocate premiums

and asset accumulations into the equity class. Rugh (2004) concluded that the economic recession and bursting of the tech bubble resulted in the average participant reallocating into the guaranteed and fixed-income classes. This paper provides evidence that the introduction of age-appropriate lifecycle funds, combined with the market effects of the 2008 financial crisis, provided strong incentives for many younger participants to allocate the majority of their premiums and asset allocations to the balanced class and specifically to lifecycle funds.

The analysis in this paper also documented the continuation of longer-term trends – namely the long-term decreased utilization of TIAA traditional as part of an overall investment strategy, in particular by younger participants with lower total accumulations. Older workers and those with larger asset accumulations continued to customize their investment portfolio by allocating their holdings across investments in the various asset classes. Younger and less-wealthy participants relied on lifecycle funds to achieve automatic diversification across equity and fixed-income classes. Given the relatively short time that lifecycle funds have been in existence, more data are needed to assess whether younger cohorts will eventually reallocate contributions and accumulations into customized portfolios as their total wealth grows.

REFERENCES

- Ameriks, John (2000). "Trends in TIAA-CREF Participant Premium and Asset Allocations: 1986 – 2000." TIAA-CREF Institute *Research Dialogue*, no. 65.
- Ameriks, John, Francis P. King and Mark Warshawsky (1997). "Premium Allocations and Accumulations in TIAA-CREF – Trends in Participant Choices among Asset Classes and Investment Accounts." TIAA-CREF Institute *Research Dialogue*, no. 51.
- Ameriks, John and Stephen P. Zeldes (2001). "How do Portfolio Shares Vary with Age?" TIAA-CREF Institute Working Paper series.
- Benartzi, Shlomo and Richard Thaler (2007). "Heuristics and Biases in Retirement Savings Behavior." *Journal of Economic Perspectives* Vol. 21. No. 3.
- Lusardi, Annamaria and Olivia Mitchell (2014). "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature*. Vol. 52, no. 1, pp. 5-44.
- Rugh, Jacob S. (2004). "What Happened to TIAA-CREF Participant Premium and Asset Allocations from 2000 to 2004?" TIAA-CREF Institute *Research Dialogue*, no. 80.
- Samuelson, William and Richard Zeckhauser (1988). "Status Quo Bias in Decision Making." *Journal of Risk and Uncertainty*, 1: pp 7-59.
- U.S. Department of Labor (2013). "Private Pension Plan Bulletin Historical Tables and Graphs." Employer Benefits Security Administration.
- VanDerhei, Jack, Sarah Holden, Luis Alonso and Steven Bass (2012). "401(k) Plan Asset Allocation, Account Balances, and Loan Activity in 2011." EBRI Issue Brief #380, December 2012.