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Trends in TIAA-CREF Participant Premium and Asset Allocations: 1986–2000

>>> INTRODUCTION

As participant balances in all types of defined contribution pension plans continue to grow, there has been increasing interest in trends in the allocation of assets managed by plan participants. TIAA-CREF's long history as a provider of defined contribution pensions provides a unique opportunity to examine the portfolio decisions that individuals have made over a relatively long period. This article presents updated data and analysis of the asset allocation choices made by TIAA-CREF participants from 1986 to 2000. It builds upon an earlier issue of *Research Dialogue* (Ameriks, King, and Warshawsky, 1997) in which we first presented detailed historical statistics on the allocation choices made by TIAA-CREF participants.

in this issue

TIAA-CREF Asset Classes and Investment Accounts

As in the earlier article, this analysis focuses on the investment decisions that TIAA-CREF participants have made over time with regard to the four basic asset classes that are available to TIAA-CREF participants: (1) guaranteed, (2) equity, (3) fixed income, and (4) real estate. Table 1 below lists each of the TIAA-CREF pension accounts currently available to pension participants along with the associated asset class.[1] The table also includes information on the inception date of each account and September 2000 end-of-quarter total net assets in each of the accounts.

As indicated by the dates given in the box, before 1952 all TIAA-CREF premiums (the flow of contributions to a TIAA-CREF retirement plan made either by participants or their employers on their behalf) were paid into the TIAA traditional annuity, which is the only account in the guaranteed asset class. The TIAA traditional annuity provides a guarantee of principal, a guaranteed interest rate (currently 3 percent), and additional dividends as declared in advance. These dividends, when declared, remain in effect through the end of the "dividend year" which begins each March 1. While future dividends are not guaranteed, additional dividends have been declared and credited to TIAA participants in every year since 1948. In 1952, CREF became the first organization to offer a variable annuity when it introduced the CREF Stock Account. This account enabled participants to diversify their pension holdings into the equity asset class. In April 1988, following CREF's registration with the Securities and Exchange Commission, the CREF Money Market Account was introduced, adding fixed income as a third asset class. And as indicated in the box, throughout the 1990s, seven additional accounts were added, including a fourth asset class (real estate) with the TIAA Real Estate Account in 1995. The box also shows that, in aggregate, pension assets held by all TIAA-CREF participants are currently split approximately 57%/43% into equities/nonequities.

Table 1: Asset Classes, Inception Dates, and Total Assets Under Management for TIAA and CREF Pension Accounts, as of September 30, 2000

Asset Class and Account Name	Date of Inception	Assets ($ mil.)	% of Total	
Guaranteed				
TIAA Traditional Annuity	April 23, 1918	$114,633 (estimated)	39.1%	39.1%
Equity				
CREF Stock	July 1, 1952	$130,710	44.6	
CREF Social Choice*	March 1, 1990	$4,273	1.5	
CREF Global Equities	May 1, 1992	$9,213	3.1	56.8%
CREF Growth	April 29, 1994	$17,018	5.8	
CREF Equity Index	April 29, 1994	$5,273	1.8	
Fixed Income				
CREF Money Market	April 1, 1988	$6,614	2.3	
CREF Bond Market	March 1, 1990	$2,917	1.0	3.4%
CREF Inflation-Linked Bond	May 1, 1997	$330	0.1	
Real Estate				
TIAA Real Estate	October 2, 1995	$2,203	0.8	0.8%

*The CREF Social Choice Account is a balanced account. It held 62% stocks as of 6/30/2000.
Note: All variable products reported on the SEC (net) assets reporting basis.
Source: TIAA-CREF SEC Financial Reporting and Corporate Actuarial.

TRENDS IN PREMIUM ALLOCATIONS

Table 2 presents data on the premium allocations of all premium-paying TIAA-CREF pension participants from year-end 1986 through June 2000.[2] The table contains data showing the fraction of *individuals* in the participant population who chose to allocate their flow of contributions to TIAA-CREF in the indicated patterns. The table shows some remarkable changes in the investment patterns of the participant population over time. For example, in 1986, only 3.3 percent of participants allocated 100% of their contribution flows to the equity asset class. As of June 30, 2000, 31.2 percent of participants elected to send all their retirement contributions into the equity class, an increase of almost 30 percentage points over 14 years, with the largest increases occurring after 1993. At the same time, the fraction of participants with all their contributions going to the guaranteed class fell from 23.5 percent in 1986 to 6.3 percent in 2000.

Another significant change occurred in the fraction of individuals choosing the classic "50/50" TIAA traditional/CREF Stock allocation. The fraction of the population allocating 50/50 fell from 46.2 percent in 1986 to 11.6 percent as of June 2000, a decline of 34.6 percentage points. Along with the increase in the fraction of individuals allocating 100% to equity, there has also been an increase in the fraction allocating 50% or more to equity, and a decrease in the fraction allocating 50% or more to guaranteed. In addition, the fraction of the population allocating 50% or more to the fixed income accounts rose from 2.3 percent in 1988 to 7.5 percent in 2000, albeit with little or no change since 1991.[3] The fraction of individuals with any premium allocation to the Real Estate Account is listed at the bottom of the table; this fraction has risen at about the rate of two percentage points per year since 1995.

Premium Allocations by Age

Table 3 breaks out the data on premium allocations, by age, for the period at the beginning of the series (December 1986) and the period at the end of the series (June 2000). These data show a significant change in the premium allocation patterns of individuals within each of the age categories over the nearly 14-year period examined. For the youngest group, those under 35, the

Table 2: Premium Allocations to TIAA and CREF Accounts, December 1986 - June 2000

Allocation Pattern	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	6/00
100% Guaranteed ("Gtd.")	23.5%	21.7%	22.4%	21.8%	21.0%	20.0%	18.1%	16.1%	14.2%	13.0%	11.2%	8.6%	7.4%	6.7%	6.3%
100% Equity	3.3	4.5	3.7	4.0	5.0	6.3	8.4	11.5	15.0	17.7	22.2	23.5	26.0	29.6	31.2
100% Fixed Income	-	-	1.5	3.2	3.3	3.8	3.8	3.8	3.5	3.9	4.1	3.9	4.1	4.8	4.3
50% Equity, 50% Gtd.	46.2	46.3	42.7	36.7	32.9	30.8	28.9	27.0	24.9	23.2	20.9	16.8	14.6	12.6	11.6
Mostly Guaranteed															
75.1% - 99.9% Gtd.	0.9	0.9	1.4	1.6	2.0	2.0	1.9	1.9	1.6	1.4	1.2	1.2	1.1	0.9	0.9
50.1% - 75% Gtd.	15.9	15.2	15.1	14.4	13.9	13.0	12.0	10.8	9.6	8.5	7.3	6.2	5.5	4.8	4.5
Mostly Equity															
75.1% - 99.9% Equity	0.3	0.4	0.4	0.4	0.6	0.9	1.4	2.1	3.2	4.0	5.1	8.5	9.4	10.9	11.7
50.1% - 75% Equity	9.8	11.0	9.7	8.5	8.5	9.1	11.1	13.0	15.2	16.3	17.2	19.5	19.6	19.3	19.3
Mostly Fixed Income															
75.1% - 99.9% Fixed Income	-	-	0.1	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
50% - 75% Fixed Income	-	-	0.7	2.4	3.4	4.1	4.1	4.0	3.7	3.6	3.3	4.2	4.6	3.1	3.0
Other combinations	-	-	2.1	6.8	9.2	9.9	10.2	9.7	9.0	8.3	7.4	7.4	7.6	7.1	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Any Real Estate	-	-	-	-	-	-	-	-	-	0.1	0.6	2.3	5.6	8.6	9.9

Note: Percent of premium-paying participants with RA or GRA contracts.
Sources: TIAA-CREF Actuarial Technical (1986-96) and TIAA-CREF Institute Research (1997-2000).
Percentages may not add to 100 because of rounding.

fraction of individuals remitting 100% of their premiums to the CREF equity-based accounts rose from only 3.3 percent in 1986 to 34.9 percent as of June 2000, an increase of over 30 percentage points, representing nearly one-third of the population in that age group. Table 3 reveals that even among the oldest set of individuals (those 55 or over), the shift toward 100% to equities was also large: from 3.8% of the population in 1986 to 28.1 percent in 2000, a difference of nearly 25 percentage points.

Looking at all three categories of "mostly equity" allocations together (100% Equity, 75.1-99.9% Equity, and 50.1-75% Equity) reveals another interesting fact. As of June 2000, over 70 percent of individuals in the under-35 group had more than half of their premiums allocated to equity, while only 51.9 percent of the oldest individuals (55+) had most of their premiums allocated to equity. So, as of June 2000, the young are "more aggressive" than the old. However, in December 1986, only 10.2 percent of the youngest individuals had more than half of their premiums allocated to CREF Stock, while almost twice as large a fraction of the older population, 17.1 percent, had "mostly equity" premium allocations. So in 1986, the old were "more aggressive" than the young. Thus, over the course of the last 14 years, there has been a dramatic change in investing behavior by TIAA-CREF participants. (For a detailed analysis of whether these changes may be driven by age-, cohort-, or time-related effects, see Ameriks and Zeldes (2000).)

While younger individuals currently choose much higher flow allocations to equity than the older individuals, it is also interesting that younger individuals are more likely than older individuals to have a 100% fixed-income allocation. The younger individuals are also far more likely to have at least some of their premiums going into the TIAA Real Estate Account; 18.2 percent of the youngest have some of their premiums allocated to the TIAA Real Estate Account, while only 5.1 percent of the oldest have any Real Estate allocation.

Premium Allocations by Gender

Table 4 shows patterns in premium allocations by gender, again comparing the most recent period, June 2000, to December 1986. The overall shift in allocations toward the equity-based accounts is again apparent in this data, with the data showing only slight differences between men and women in terms of their allocation

Table 3: Premium Allocation Patterns by Age, December 1986 and June 2000

	December 1986				June 2000			
Allocation Pattern	**under 35**	**35-44**	**45-54**	**55+**	**under 35**	**35-44**	**45-54**	**55+**
100% Guaranteed ("Gtd.")	24.8%	20.9%	19.9%	29.5%	4.0%	5.2%	6.5%	9.4%
100% Equity	3.3	3.4	3.6	3.8	34.9	32.6	30.1	28.1
100% Fixed Income	-	-	-	-	7.4	4.1	3.2	3.9
50% Equity, 50% Gtd.	45.5	48.3	47.0	40.8	3.8	8.3	14.1	18.7
Mostly Guaranteed								
75.1% - 99.9% Gtd.	1.2	1.0	0.7	0.9	0.5	0.8	1.0	1.2
50.1% - 75% Gtd.	18.4	17.4	14.1	11.9	2.2	3.6	5.2	6.7
Mostly Equity								
75.1% - 99.9% Equity	0.4	0.4	0.3	0.3	17.1	13.8	10.3	6.6
50.1% - 75% Equity	6.5	8.6	14.4	13.0	19.5	20.4	19.5	17.2
Mostly Fixed Income								
75.1% - 99.9% Fixed Income	-	-	-	-	0.3	0.2	0.2	0.2
50% - 75% Fixed Income	-	-	-	-	3.2	3.2	2.8	2.6
Other combinations	-	-	-	-	7.1	7.8	7.2	5.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Any Real Estate	-	-	-	-	18.2	10.9	7.8	5.1

Note: Percent of premium-paying participants with RA or GRA contracts.
Sources: TIAA-CREF Institute Research (2000), and TIAA-CREF Actuarial Technical (1986).
Percentages may not add to 100 because of rounding.

choices. In both 1986 and 2000, men were slightly more likely to have 100% of their premium contributions allocated to equity than women. The small gender differences appear to have narrowed over time. In comparison to 1986, the 2000 data show that the difference between the fraction of men and women with 100% guaranteed allocations dropped significantly, from 6.6 percentage points in 1986 to one percentage point in 2000. At the same time, the fraction of women allocating between 50.1% and 75% to equities rose over the 14-year period, from 7.0 percent to 19.7 percent. While there was a difference of 6.5 percentage points between the men and women choosing this allocation in 1986, by 2000 that difference had virtually disappeared; and, as of 2000, a larger fraction of women had this premium allocation than men. Finally, roughly the same fraction of men and women had an allocation to the Real Estate Account in June 2000 (women were slightly more likely than men to have the account).

Premium Allocations by Accumulation Level

Table 5 shows differences in premium allocations by the level of total assets accumulated in TIAA-CREF retirement annuities. Again, the table contains data from December 1986 alongside data from June 2000. The population of participants is divided into five equal-sized "accumulation quintiles" on the basis of the dollar amount of accumulations on all contracts held by the participant. The participants with the lowest 20% of accumulations are in the "lowest quintile" and the participants with the highest 20% of accumulations are in the "highest quintile." (Of course, total TIAA-CREF accumulation may be related to age, length of participation, contribution levels, and other factors, so patterns in these data should be interpreted with caution.)

The table shows that there are significant differences between the premium allocations of individuals based on their total accumulation. In 1986, 26.9 percent of those in the lowest accumulation quintile had 100% of their premiums to guaranteed, while only 14.5 percent of those in the highest quintile had the same allocation. At the same time, only 6.1 percent of those in the lowest quintile had between 50% and 75% of their premiums

Table 4: Premium Allocation Patterns by Gender, December 1986 and June 2000

	December 1986		June 2000	
Allocation Pattern	**Women**	**Men**	**Women**	**Men**
100% Guaranteed ("Gtd.")	26.8%	20.2%	6.8%	5.8%
100% Equity	2.7	4.0	29.7	33.2
100% Fixed Income	-	-	4.4	3.6
50% Equity, 50% Gtd.	45.3	46.5	11.0	12.4
Mostly Guaranteed				
75.1% - 99.9% Gtd.	1.0	0.9	1.0	0.8
50.1% - 75% Gtd.	17.0	14.5	4.8	4.3
Mostly Equity				
75.1% - 99.9% Equity	0.3	0.4	11.7	11.8
50.1% - 75% Equity	7.0	13.5	19.7	18.9
Mostly Fixed Income				
75.1% - 99.9% Fixed Income	-	-	0.2	0.2
50% - 75% Fixed Income	-	-	3.2	2.6
Other combinations	-	-	7.5	6.4
Total	**100.0**	**100.0**	**100.0**	**100.0**
Any Real Estate	-	-	10.5	9.3

Note: Percent of premium-paying participants with RA or GRA contracts.
Sources: TIAA-CREF Institute Research (2000), and TIAA-CREF Actuarial Technical (1986).
Percentages may not add to 100 because of rounding.

allocated to equities, while 21.2 percent of those in the highest accumulation category had this allocation. In 1986, there was little difference in the fraction allocating 100% to equities or 50/50 guaranteed/equity across accumulation categories.

Looking at the data from 2000, we see that there are still some large differences across the accumulation categories. This is particularly apparent with regard to the 50/50 allocation pattern, as only 4.0 percent of those in the lowest accumulation category had this allocation, while 21.4 percent of those in the highest category had the "classic" 50/50 premium allocation. As in 1986, in 2000 there is little difference across the accumulation categories in terms of the fraction of participants with 100% to equities. Roughly 30 percent of participants, in all accumulation categories, have this allocation.

Premium Allocations of New Participants

Despite the data here showing dramatic changes in measures of premium allocations of all participants over time, an examination of the historical data also shows that individual participants typically make very few (or no) changes to their allocations once they have chosen an initial allocation. The lack of significant change in asset allocation, or "inertia," is a salient feature of individual participant asset allocations. In a recent paper coauthored with Professor Stephen P. Zeldes of Columbia Business School (Ameriks and Zeldes, 2000), we examined the allocations of a sample of TIAA-CREF participants over the 10-year period from 1986 to 1996 (the same individuals in each year). We found that nearly half of the participants in our sample made no active changes whatsoever to the allocation of either their incoming premiums or their accumulated assets over the entire 10-year period.[4] (Of course, the allocation of their accumulated assets was affected by the ups and downs in the financial markets over time. The next major section in this article examines asset allocations in detail.)

As a consequence of this inertia, an understanding of the patterns in the initial choices of individuals entering the system may explain some of the trends in overall allocations. In fact, the TIAA-CREF participant population in June of 2000 was roughly twice as large as in 1990,

Table 5: Premium Allocation Patterns by Accumulation Quintile, December 1986 and June 2000

Allocation Pattern	December 1986					June 2000				
	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile	Lowest Quintile	2nd Quintile	3rd Quintile	4th Quintile	Highest Quintile
100% Guaranteed ("Gtd.")	26.9%	28.5%	26.8%	20.3%	14.5%	6.3%	7.1%	7.6%	6.3%	4.1%
100% Equity	3.9	2.8	2.9	3.1	3.7	29.6	33.1	31.5	31.2	31.0
100% Fixed Income	-	-	-	-	-	12.6	4.4	2.1	1.3	1.3
50% Equity, 50% Gtd.	46.8	45.2	45.0	48.1	47.3	4.0	7.0	10.5	15.0	21.4
Mostly Guaranteed										
75.1% - 99.9% Gtd.	0.9	1.1	1.0	0.9	0.7	0.5	0.8	1.2	1.1	0.9
50.1% - 75% Gtd.	15.2	16.9	17.7	17.4	12.3	2.7	3.4	4.9	5.9	5.9
Mostly Equity										
75.1% - 99.9% Equity	0.3	0.3	0.3	0.3	0.4	12.1	12.8	12.0	11.9	9.7
50.1% - 75% Equity	6.1	5.3	6.3	9.9	21.2	18.3	19.3	18.5	19.1	21.1
Mostly Fixed Income										
75.1% - 99.9% Fixed Income	-	-	-	-	-	0.3	0.3	0.2	0.2	0.1
50% - 75% Fixed Income	-	-	-	-	-	4.6	4.1	3.1	1.8	1.1
Other combinations	-	-	-	-	-	9.1	7.8	8.4	6.3	3.3
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Any Real Estate	-	-	-	-	-	21.6	12.5	6.3	4.9	4.4

Note: Percent of premium-paying participants with RA or GRA contracts.
Sources: TIAA-CREF Institute Research (2000), and TIAA-CREF Actuarial Technical (1986).
Percentages may not add to 100 because of rounding.

implying that at least half of the individuals in the June 2000 population were "new entrants" at some point during the 1990s. The decisions of these new participants have a large impact on overall allocation patterns.

Figure 1 shows the average year-end equity allocations in the flow of contributions for new TIAA-CREF participants from January 1986 to 2000, by month of entry.[5] (The level of the S&P 500 Stock market index, on a logarithmic scale, is also plotted.) These data show some interesting patterns. First, a strong reaction to the stock market crash of 1987 is immediately apparent. The figure shows that the average equity allocation among entering participants peaked (at 45.0 percent) in September of 1987, then fell steadily following the crash, declining to a low of 16.4 percent in January of 1989. From that point, average premium allocations to equity have risen steadily over time, although the rate of increase appears to have slowed significantly as of the end of 1997. This pattern suggests that the equity allocation choices of participants may be sensitive to recent performance in the stock market.

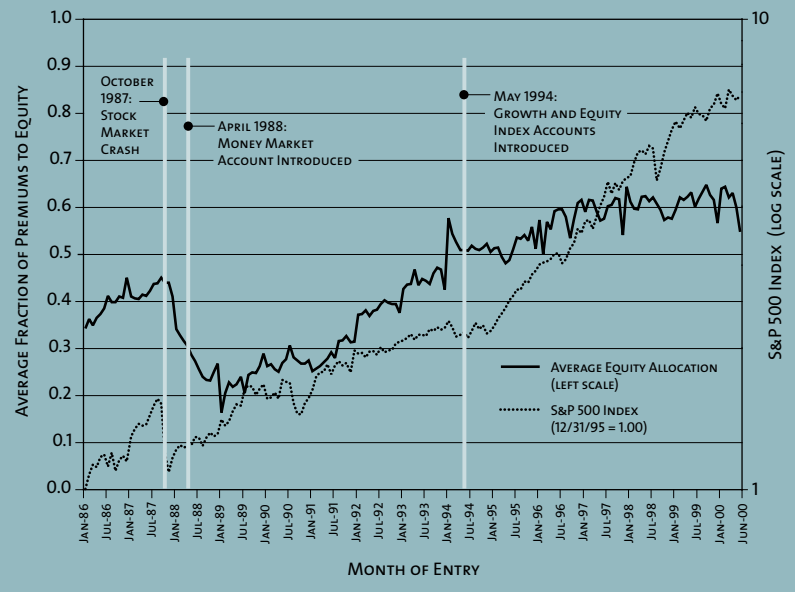
The data in the chart have some other important implications about participant asset allocation behavior. It has been argued (see Benartzi and Thaler, 2000) that many participants in defined contribution retirement plans make asset allocation decisions using a simple rule of thumb: they look at the menu of investments offered to them and divide their contributions equally among the available accounts. This "strategy" has been dubbed the "1/n" or "1/k" strategy. This is an entertaining (if unflattering) theory about the sophistication of the typical investor, and the data assembled in Figure 1 have some bearing on its accuracy as a description of investor behavior.

At first glance, the data in Figure 1 suggest that the menu of available accounts may be related to the average equity allocation that new participants choose. With the exception of the introduction of the Real Estate Account in 1995 (and perhaps the Inflation-Linked Bond Account in 1997), the equity allocations of new participants rose following the introduction of each new equity-based account and fell following the introduction of each new nonequity account.

However, looking more closely, the figure shows no strong evidence of a 1/n tendency. When there were only two investment options (prior to 1988), the average premium allocation of new participants was between roughly 35% and 45% equity, not 50/50 as 1/n would dictate. And when the TIAA-CREF Money Market Account was introduced in 1988, equity allocations declined for the next year, but the average equity allocation quickly fell below the 33% equity that the 1/n strategy would have dictated.

Moreover, the figure shows that shifts in the allocation choices of new participants appear to have preceded the introduction of the new investment accounts: average equity allocations of new participants had already begun to decline immediately following the 1987 crash—before the Money Market Account was opened in April 1988. In addition, equity allocations of new participants began to increase from their lows in 1989 prior to the 1992 introduction of an additional equity option (the Global Equities Account). This may be evidence of a demand effect: as participant demand for a class of investments rises (as revealed by increases in average allocations to a particular class given a fixed menu of choices), the expressed desire for further investment accounts in that class may also generally rise. It seems reasonable that TIAA-CREF would generally respond to these participant demands by supplying new investment vehicles. Viewed in this way, it may be the case that participant investment preferences ultimately

Figure 1: Average Premium Allocations to Equity among New TIAA-CREF RA/GRA Participants, 1986-2000



Source: TIAA-CREF Institute Research.

The S&P 500 is an unmanaged index, and its performance was not identical to the performance of any particular TIAA-CREF account. It is shown here to suggest the performance of equity stocks in general over that period. Past performance is no guarantee of future results.

determine the menu of investment vehicles, not the other way around.

Whatever the exact motivation behind the decisions of new participants, the figure does show dramatic changes in their chosen allocations over time. Interestingly, the chart indicates that average premium allocations to equity among new participants appear to have "hovered" at around the 60% level since the end of 1996. Thus, at least among new participants, increases in equity exposure may have at least slowed following a dramatic increase in the early to mid-1990s.

TRENDS IN ASSET ALLOCATIONS

Instead of looking at data on the "flow" of contributions to participant retirement annuities, the focus now shifts to data on the allocation of the "stock" of assets accumulated by participants. The difference is a crucial one. For several reasons, it is important to examine both the flow of contributions and the allocations of accumulated assets.

First, there are a number of important differences between premium allocations and the allocation of accumulated assets (accumulations) at TIAA-CREF. Premium allocations can be changed at any time (subject to an employer's plan provisions) among the TIAA and CREF accounts. Also, a participant can transfer accumulated assets in any of the CREF accounts, or in the TIAA Real Estate Account, to any of the other TIAA or CREF accounts permitted by their employer's plan. However, for RA and GRA contracts, a participant cannot immediately move accumulations from the TIAA traditional annuity to the other accounts.[6] This is because the TIAA traditional annuity guarantees principal and interest (at a minimum rate of 3% with dividends declared in advance as described previously) and investments supporting its guarantees entail long-term financial commitments. TIAA is able to make these investments knowing that participant accumulations will remain in TIAA for the long term. As a result, participant assets may be transferred out of TIAA traditional only over a 10-year period, in roughly equal installments. Hence, everything else being equal, participants electing to change their allocations will be able to do so immediately with regard to the flow of new premiums, but only gradually with regard to their accumulated assets in the TIAA traditional annuity.

Second, it is not immediately clear whether participants would choose to change the investment allocation of their retirement savings using premium allocation changes or by making accumulation transfers. If participants are at all uncertain about the need to alter their allocations, they may be reluctant to suddenly move large amounts from one investment account to another. Since a change in premium allocations will have a more gradual impact on the allocation of accumulated assets, a participant might feel more comfortable pursuing that strategy. Indeed, evidence reviewed in Ameriks and Zeldes (2000) shows that for a sample of TIAA-CREF participants, those who made changes in their allocations were more likely to change the allocation of the flow of contributions than to make a transfer of accumulated assets.

Third, and finally, it is important to examine both premium and asset allocations because there are a significant number of participants who make an initial choice regarding their premium allocations—and then never change it. For these individuals, the allocation of their accumulated assets will vary over time, as the returns on the various CREF and TIAA accounts vary. Given the historically unprecedented returns on equities in the United States over the last 5 years, it is likely that someone who has always had a 50/50 premium allocation (who never changed it) may have a much larger share of their assets currently in equities than 50 percent.

This inertia in decision making may be reflected in the data shown earlier in Table 1 on page 2. At any point over the last 10 years, TIAA-CREF participants could have (in aggregate) moved their holdings in the CREF Stock Account into some combination of the other accounts, if they had so desired—with neither fees nor tax consequences. Likewise, participants could have at least started a transfer of assets from the TIAA traditional annuity to the other accounts. But despite this flexibility, Table 1 shows that as of June 2000, the TIAA traditional annuity and the CREF Stock Account remained—by far—the largest of the TIAA-CREF pension accounts, accounting for approximately 84 percent of the total assets that TIAA-CREF participants have accumulated. The next largest account, the CREF Growth Account, contained only 6 percent of total assets. In addition, the newer investment accounts added in the late 1990s, the TIAA Real Estate Account (1995) and the CREF Inflation-Linked Bond Account (1997) have garnered less than 1 percent of total accumulated assets. Especially in the

case of these last two accounts, participants now have opportunities to diversify their holdings in ways that were previously unavailable to them; it is puzzling why so few appear to have taken the opportunity to do so.

It is still not known why individuals are so inactive with regard to portfolio allocation decisions. There is some controversy over whether this behavior can be an optimal choice. It is possible that people believe that whatever their allocation is at the moment, that allocation will be best to have going forward, regardless of past returns. They may therefore make a conscious decision to do nothing over time. Or it may be that gathering and processing the financial information needed to make a new allocation decision is costly, outweighing any perceived potential benefit; if so, then again, doing nothing could be consistent with an optimal choice. This may explain some aspects of the behavior of TIAA-CREF participants: CREF Stock Account assets and the assets supporting the guarantees under the TIAA traditional annuity are both highly diversified; it is not clear whether the perceived benefit of further diversification is worth the cost, in terms of time and effort, of altering allocations.[7] While there may be perfectly understandable, rational reasons for individuals to make no changes to their portfolio allocations, it is also possible, however, that inactivity may reflect some form of human irrationality, such as "stress avoidance" or inconsistent discounting of the future. The reasons for participant inaction, and the question of whether this inertia is somehow optimal, is an area of active research at the TIAA-CREF Institute and among academic economists elsewhere.

The allocation of assets held by participants on their annuity contracts determines their ultimate exposure to risk over time. In this sense, therefore, asset allocation is more important than premium allocation; and it is asset allocation that an economist or financial planner might be most interested in examining. The analysis now turns to this detailed data on asset allocation.

TIAA-CREF Account Ownership

Table 6 shows the fraction of premium-paying RA/GRA participants with an accumulation of any size in each of the TIAA-CREF accounts for December 1992-June 2000. The chart shows a slow decline over time in the fraction of participants using the TIAA traditional annuity; in 1992, 91.3 percent of participants had some accumulation in the TIAA traditional annuity, as of June 2000, only 69.3 percent had any accumulation in the TIAA tradi-

Table 6: Percent of Participants with Assets in TIAA-CREF Accounts, 1992- June 2000

Asset Class	1992	1993	1994	1995	1996	1997	1998	1999	June 2000
Guaranteed	91.3%	88.7%	85.9%	83.0%	79.2%	75.7%	72.9%	70.3%	69.3%
Equity	78.0	80.0	82.2	83.3	84.9	87.0	88.1	88.9	89.7
Fixed Income	26.9	27.4	27.4	27.8	27.7	29.4	32.2	33.2	32.3
Real Estate	-	-	-	0.1	0.9	3.0	6.7	10.4	11.9
Investment Account									
TIAA Traditional	91.3	88.7	85.9	83.0	79.2	75.7	72.9	70.3	69.3
CREF Stock	78.0	75.5	75.5	75.1	74.8	75.1	74.8	74.3	74.5
Money Market	26.9	22.1	20.9	20.7	20.0	20.6	21.4	21.9	21.1
Bond	6.8	9.3	10.8	11.7	12.2	13.9	16.2	16.5	16.1
Social Choice	6.8	11.3	12.7	13.6	14.6	17.3	18.8	19.6	19.4
Global Equities	1.3	7.4	18.9	21.5	24.2	29.5	30.9	32.8	35.9
Growth Account	-	-	2.4	9.4	17.1	27.5	33.9	40.9	45.1
Equity Index	-	-	0.7	3.9	8.2	14.1	18.6	21.9	22.9
Real Estate	-	-	-	0.1	0.9	3.0	6.7	10.4	11.9
Inflation-Linked Bond	-	-	-	-	-	0.1	0.9	1.7	2.1

Note: Percent of premium-paying participants with RA or GRA contracts.
Source: TIAA-CREF Institute Research.
Percentages may not add to 100 because of rounding.

tional annuity, a decline of 22 percentage points. Participation in CREF Stock over the years has been quite steady, ranging between roughly 75 and 80 percent of participants. At the same time, use of the new CREF and TIAA accounts has gradually increased. As of June 2000, nearly half of all participants (45.1 percent) had an accumulation in the CREF Growth Account, and over one-third (35.9 percent) had some assets in the CREF Global Equities Account. Participation in the two newest accounts, TIAA Real Estate and CREF Inflation-Linked Bond, has also increased since their introduction. Participation in the TIAA Real Estate Account has grown relatively quickly as compared to the other new accounts, and as of June 2000, 11.9 percent of participants had some funds in the account. The newest account, Inflation-Linked Bond, has grown slowly; but very recently, its use appears to have accelerated as inflation rates have risen.

Average Asset Allocations

Table 7 presents data on the average asset allocations of premium-paying individuals. (These averages are computed as the average, across participants, of the individual participant portfolio shares.) As time has passed, the fraction of assets that participants have allocated to equities has grown dramatically, rising from 38.4 percent of the average participant's portfolio in 1992 to 63.0 percent in June 2000, an increase of 24.6 percentage points. At the same time, the fraction of assets held in the guaranteed class has fallen almost as dramatically, decreasing from 53.0 percent of the average portfolio to 27.0 percent in 2000. There appears to be some evidence that this trend is slowing, however, as the change from the end of 1999 to the middle of 2000 was only –0.4 percentage points. There has been almost no change in the overall average allocation to the fixed-income class, which in 1992 amounted to 8.6 percent of the average portfolio, and as of 2000, amounted to 8.7 percent. The real estate class makes up only a small portion of the overall average portfolio, and has been increasing at a rate of 0.3 to 0.4 percentage points per year since 1997.

While these averages are informative of the "central tendency," they do not provide a complete summary of the range and variation in asset allocations chosen by participants. To give a better sense of the variation in

Table 7: Average Asset Allocations, 1992 - June 2000

Asset Class	1992	1993	1994	1995	1996	1997	1998	1999	June 2000
Guaranteed	53.0%	49.9%	48.1%	43.2%	39.2%	34.3%	30.7%	27.4%	27.0%
Equity	38.4	41.5	43.6	48.4	52.4	57.1	59.8	62.3	63.0
Fixed Income	8.6	8.6	8.4	8.5	8.4	8.2	8.7	9.2	8.7
Real Estate	0.0	0.0	0.0	0.0	0.2	0.4	0.8	1.1	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Investment Account									
TIAA Traditional	53.0	49.9	48.1	43.2	39.2	34.3	30.7	27.4	27.0
CREF Stock	36.1	36.4	34.6	36.2	36.3	36.4	35.7	34.3	33.1
Money Market	7.1	6.6	6.2	6.2	6.1	5.9	6.0	6.8	6.3
Bond	1.5	2.0	2.1	2.3	2.2	2.3	2.6	2.3	2.2
Social Choice	2.1	3.5	3.7	4.1	4.3	4.8	5.1	5.0	4.9
Global Equities	0.2	1.6	4.8	5.2	5.7	6.2	6.0	6.7	6.9
Growth Account	-	-	0.4	2.2	4.4	7.0	9.1	11.7	13.4
Equity Index	-	-	0.1	0.7	1.6	2.8	4.0	4.7	4.8
Real Estate	-	-	-	0.0	0.2	0.4	0.8	1.1	1.3
Inflation-Linked Bond	-	-	-	-	-	0.0	0.1	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note: Percent of premium-paying participants with RA or GRA contracts.
Source: TIAA-CREF Institute Research.
Percentages may not add to 100 because of rounding.

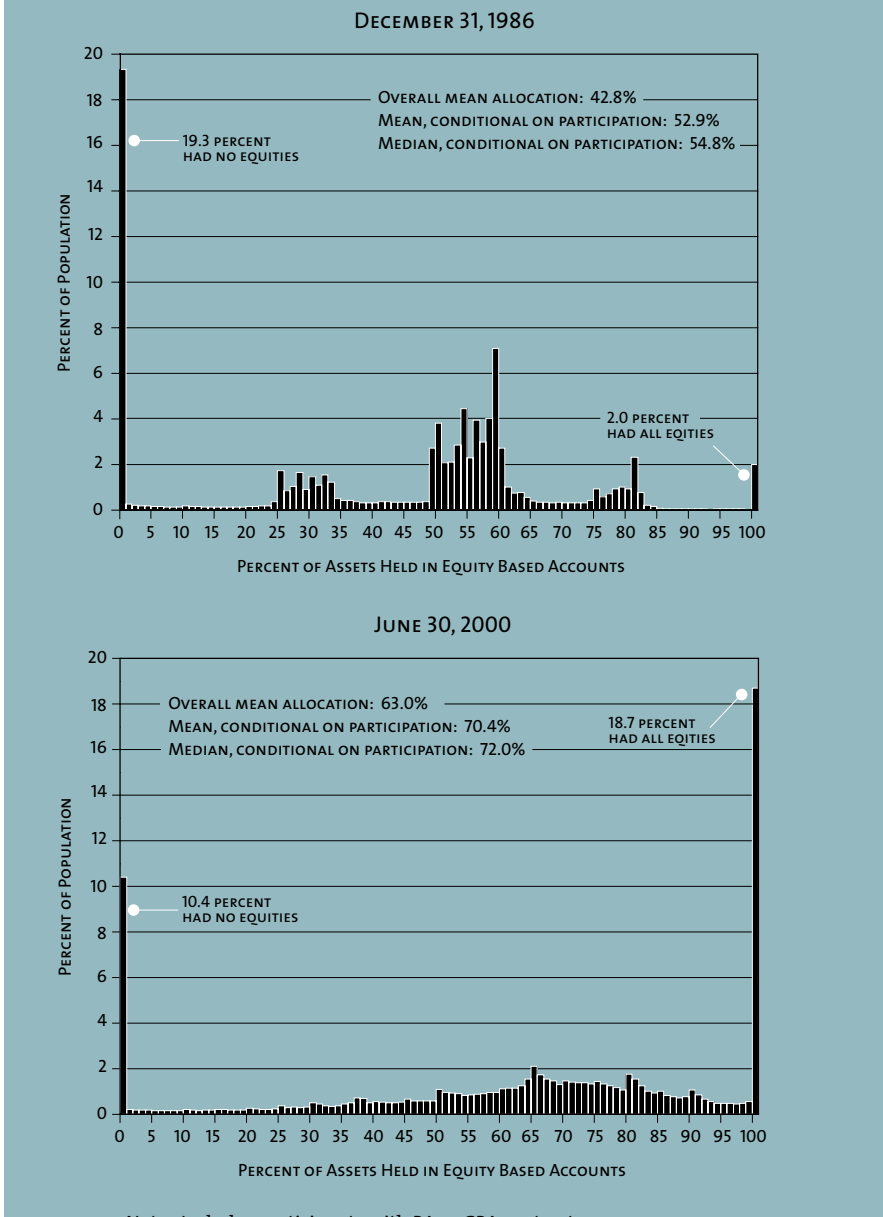
asset allocations and the changes over time, Figure 2 presents two histograms of equity allocations, one from December 1986 and the other from June 2000. These figures show, on the y-axis, the fraction of participants with the asset allocation given on the x-axis. Printed on the figures are also some statistics relating to the distributions, including the data on the fraction of participants at the extremes, the mean of the distribution, and the mean and median of the distribution excluding those with a zero-percent allocation to equity.

The pattern in the 1986 data jumps out immediately: the distribution of allocations is marked by clusters of individuals at allocations of 0%, 25%-35%, 50%-60%, and 75%-85% equities. The pattern in 2000 is marked by two clusters: one at 0% (no equity) and one at 100% (all equity). In addition, there is no significant clustering in the middle ranges as was seen in 1986 (but note there is still some clustering near 50%, 65%, 80%, and 90% equity). Absent the two large spikes at the extremes, the June 2000 distribution is effectively "uni-modal," peaking around 65%-70% percent equity. The change at the extremes of the distribution (partly a function of the significant change in the number of people allocating premiums 100% to equity as discussed earlier) is striking. Also striking is that there is still, as of 2000, a large fraction of the participant population (10.4 percent) with a zero equity allocation—meaning no accumulated assets in the equity-based accounts. Finally, the summary statistics printed on the charts show that in 1986, among those who chose to have some allocation to equity, the median allocation was 54.8% (meaning half of the population with any equity had a greater equity allocation and half had a smaller equity allocation). As of June 2000, the median among those with at least some equity allocation had risen to 72.0%.

Asset Allocations by Age

Table 8 presents data on the average equity allocation among premium-paying participants from 1986 and 2000 (similar to the information in Table 7) broken out by four age groups. Data at the bottom of the table show the fractions of participants in each age category with "extreme" equity allocations (0% or 100% to equity). The data show some very interesting changes over time. In 1986, there were significant differences among the age groups: the most "conservative" investors appear to have been the youngest participants (those under 35), whose average equity allocations were 37.0%. The most "aggressive" were investors in the 45-54 age category, whose average equity allocations were 47.2%. As of 2000, this pattern had disappeared, and investors of all ages were more aggressive. The largest change was among the young—as of June 2000, the youngest participants held, on average, 68.7% of their accumulations in the CREF equity-based accounts, a significant change of 31.7 percentage points. In June 2000, the oldest participants were the most conservative, holding 57.6% of their accumulations in the CREF equity-based accounts. As mentioned earlier, even the oldest individuals had

Figure 2: Distribution of Asset Allocations for Premium-Paying TIAA-CREF Participants



Note: Includes participants with RA or GRA contracts

much higher equity allocations in June 2000 as compared to December 1986: for those age 55 and older, the difference was an increase of 14.4 percentage points.

Asset Allocations by Gender

Table 9 breaks out the allocation data by sex, again comparing 1986 and 2000. The gender differences in allocations were quite large in 1986. On average men had equity allocations that were 7.4 percentage points greater than women in 1986. Moreover, men were more likely to have at least some assets in equities; 23.2 percent of women had "all guaranteed" allocations, while 15.9 percent of men had their entire accumulation in the guaranteed asset class. Again, the data for 2000 show that both men and women have far greater equity exposure. The average equity allocation among women was 23.4 percentage points higher in 2000 than in 1986, while the average among men was 18.6 percentage points greater. As of 2000, the gender difference in the "all guaranteed" allocation had all but disappeared, and there were actually slightly more women with an "all equity" allocation than men.

Asset Allocations by Accumulation

Finally, Table 10 presents data on asset allocations broken out by accumulation quintile. As was the case with premium allocations, there are some significant differences in asset allocation across the accumulation categories—at least in 1986. In 1986, those in the two lowest accumulation quintiles had the lowest equity allocations (36.1% and 36.7%, respectively), and those with the largest accumulations had the highest equity exposure at 55.0%. Interestingly, in 1986, the highest quintile appeared to choose allocations quite different from those in lower quintiles: only the highest quintile had an average equity allocation greater than 50%. In 2000, as in the previous tables, equity allocations were higher across the board, but the largest changes were in the lowest two quintiles: those in the lowest quintile in 2000 had equity allocations 24.3 percentage points higher than those in the same quintile in 1986, while those in the second quintile had equity allocations 28.6 percentage points higher in 2000. Additionally, there were no longer dramatic differences in equity allocations across the accumulation categories: all five accumulation categories in 2000 had equity allocations

Table 8: Average Asset Allocations by Age, December 1986 and June 2000

	December 1986				June 2000			
Asset Class	**under 35**	**35-44**	**45-54**	**55+**	**under 35**	**35-44**	**45-54**	**55+**
Guaranteed	63.0%	57.8%	52.8%	56.8%	16.2%	24.1%	30.4%	34.4%
Equity	37.0	42.2	47.2	43.2	68.7	65.3	61.6	57.6
Fixed Income	-	-	-	-	12.8	9.3	7.1	7.1
Real Estate	-	-	-	-	2.3	1.3	0.9	0.9
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Investment Account								
TIAA Traditional	63.0	57.8	52.8	56.8	16.2	24.1	30.4	34.4
CREF Stock	37.0	42.2	47.2	43.2	24.0	30.6	36.1	39.6
Money Market	-	-	-	-	9.5	6.5	5.0	5.4
Bond	-	-	-	-	2.9	2.6	2.0	1.6
Social Choice	-	-	-	-	5.8	6.1	4.6	2.8
Global Equities	-	-	-	-	9.3	8.0	6.0	4.5
Growth Account	-	-	-	-	22.0	15.2	10.9	7.8
Equity Index	-	-	-	-	7.6	5.4	4.0	2.8
Real Estate	-	-	-	-	2.3	1.3	0.9	0.9
Inflation-Linked Bond					0.4	0.2	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All Equity	2.4	2.1	1.7	1.6	28.7	21.0	15.8	11.9
All Guaranteed	23.5	18.3	15.6	21.0	3.8	4.8	5.8	7.7

Note: Percent of premium-paying participants with RA or GRA contracts.
Source: TIAA-CREF Institute Research.
Percentages may not add to 100 because of rounding.

between 60% and 65%. There is one significant difference in 2000, however: the fraction of participants with "all equity" allocations is much higher among those in the lower accumulation quintiles than in the higher quintiles.

CONCLUSION

This analysis of allocation patterns has demonstrated some significant changes in the premium and asset allocation patterns of TIAA-CREF participants over the 14-year period 1986-2000. Most remarkable has been the significant increase in equity exposure among participants of all ages, both genders, and all levels of accumulated asset holdings.

The dramatic increase in the number of individuals remitting a large fraction of their premiums to the equity-based accounts is certainly noteworthy (some would say troubling; see Shiller, 2000). However, if we admit the possibility that individuals may have become better informed about financial matters as time has passed, then there are additional considerations that would make this development more understandable. First, almost all TIAA-CREF participants also participate in Social Security, which, despite its current financial problems, will almost certainly provide at least some guaranteed, inflation-indexed income in retirement for participants. For many participants, Social Security will make up a substantial part of their retirement income. Balancing this guaranteed income with at least some income based on risky assets would appear to reflect understandable, rational behavior. Second, and perhaps more important, many TIAA-CREF participants have other assets, including other retirement accounts, non-retirement accounts, and for some, defined benefit pensions and housing equity that they will be able to draw upon in retirement. The overall risk-profile of these assets is unknown; however, it may be the case that for many participants, their exposure to the risks and rewards of investing in the stock market in their TIAA-CREF account is only a fractional part of their entire wealth portfolio. As shown by Shoven (1999), for many individuals, retirement accounts may be the optimal vehicle for holding stocks, while tax-exempt bonds may be best held outside of these accounts. Third, it is

Table 9: Average Asset Allocations by Gender, December 1986 and June 2000

	December 1986		June 2000	
Asset Class	**Women**	**Men**	**Women**	**Men**
Guaranteed	61.4%	54.0%	27.7%	26.5%
Equity	38.6	46.0	62.0	64.6
Fixed Income	-	-	9.1	7.6
Real Estate	-	-	1.3	1.3
Total	100.0	100.0	100.0	100.0
Investment Account				
TIAA Traditional	61.4	54.0	27.7	26.5
CREF Stock	38.6	6.0	31.5	35.5
Money Market	-	-	6.5	5.3
Bond	-	-	2.4	2.1
Social Choice	-	-	5.6	4.1
Global Equities	-	-	6.9	6.8
Growth Account	-	-	13.1	13.8
Equity Index	-	-	5.0	4.5
Real Estate	-	-	1.3	1.3
Inflation-Linked Bond	-	-	0.2	0.2
Total	100.0	100.0	100.0	100.0
All Equity	1.8	2.1	19.0	18.4
All Guaranteed	23.2	15.9	6.1	5.0

Note: Percent of premium-paying participants with RA or GRA contracts.
Source: TIAA-CREF Institute Research.
Percentages may not add to 100 because of rounding.

important to note that the vast majority of TIAA-CREF participants work in education and research at colleges and universities. A large number are tenured faculty. The asset allocations in their retirement accounts may be reflective of the relative stability of their incomes and their own assessments of their job security. Finally, the investing patterns we have seen in the data indicate that those currently taking the most risk in their retirement portfolios are relatively younger. If their investment outcomes are not as favorable as they may hope for, they may be able to adjust other aspects of their financial plans (their retirement age or their labor supply) in order to minimize the impact of any adverse results.[8] Their willingness to take higher risk now may reflect a recognition of this flexibility.

It is difficult to draw firm conclusions about the process driving the observed patterns in participant behavior, and even more difficult to know what the ultimate implications of the observed trends in investment behavior will be. Analysis of data on the initial premium allocations of new participants, particularly following the market crash of 1987, reveals that there is some sensitivity, at least among entering participants, to near-term developments in the financial markets. However, the slowing of the "trend toward equity" after 1996 among new participants illustrates that this is not a complete explanation. And, at the same time, many individuals never alter their allocations, perhaps indicating a far lower sensitivity to the ups and downs of the financial markets. It is possible that there may be some degree of "irrational exuberance" affecting participants' decisions. However, it is also possible that participants have, over time, become increasingly aware of financial matters and have made a well-considered decision to increase their exposure to the stock market going forward.

[This article was prepared for *Research Dialogue* by John Ameriks, research economist, TIAA-CREF Institute.]

Table 10: Average Asset Allocations by Accumulation Quintile, December 1986 and June 2000

Allocation Pattern	December 1986					June 2000				
	Lowest quintile	2nd quintile	3rd quintile	4th quintile	Highest quintile	Lowest quintile	2nd quintile	3rd quintile	4th quintile	Highest quintile
Guaranteed	63.9%	63.3%	60.3%	53.6%	53.6%	18.0%	22.8%	29.7%	32.8%	31.5%
Equity	36.1	36.7	39.7	46.4	55.0	60.4	65.3	62.6	62.4	64.6
Fixed Income	0.0	0.0	0.0	0.0	0.0	18.5	10.5	7.2	4.4	3.1
Real Estate	0.0	0.0	0.0	0.0	0.0	3.2	1.5	0.6	0.4	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Investment Account										
TIAA Traditional	63.9	63.3	60.3	53.6	45.0	18.1	22.8	29.7	32.8	31.5
CREF Stock	36.1	36.7	39.7	46.4	55.0	20.1	24.1	30.9	40.2	50.5
Money Market	-	-	-	-	-	14.7	7.0	4.7	2.9	2.1
Bond	-	-	-	-	-	3.1	3.3	2.4	1.5	0.9
Social Choice	-	-	-	-	-	6.0	6.9	6.2	3.8	1.4
Global Equities	-	-	-	-	-	7.7	8.8	8.1	5.8	3.9
Growth Account	-	-	-	-	-	19.4	18.3	13.0	9.5	6.9
Equity Index	-	-	-	-	-	7.2	7.2	4.5	3.0	2.0
Real Estate	-	-	-	-	-	3.2	1.5	0.6	1.4	0.7
Inflation-Linked Bond	-	-	-	-	-	0.7	0.2	0.1	0.1	0.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
All Equity	3.5	2.2	1.8	1.5	0.9	27.8	27.1	19.3	12.3	7.1
All Guaranteed	27.2	26.2	21.9	13.8	6.5	6.1	6.6	7.0	5.4	2.7

Note: Percent of premium-paying participants with RA or GRA contracts.
Sources: TIAA-CREF Institute Research (2000), and TIAA-CREF Actuarial Technical (1986).
Percentages may not add to 100 because of rounding.

ENDNOTES

[1] In 1997, following the loss of its tax-exempt status, TIAA-CREF broadened the array of financial products it offers to its participants and the general public. It is important to note that the analysis here exclusively focuses on the pension accounts of TIAA-CREF participants, and does not include any assets they might own in TIAA-CREF Mutual Funds or nonqualified tax-deferred Personal Annuities, or any non-TIAA-CREF assets. It also does not include any immediate annuities that participants may own. For an analysis of TIAA-CREF participant asset allocation choices across all assets, based on a 1996 survey, see Bodie and Crane (1997).

[2] Participants included in this analysis are only those TIAA-CREF participants who were remitting contributions (or whose employer was remitting contributions for them) to a regular retirement annuity (RA) or a group retirement annuity (GRA) contract; however, all deferred annuity contracts owned by these participants are included when allocations are calculated. Employers typically use the RA and GRA contracts in their basic contributory retirement plans; many also offer supplemental plans that use SRA or GSRA contracts. Note that the asset allocations do not include immediate annuity contracts currently paying annuity benefits.

[3] These statistics are calculated as follows: 2.3 percent is the total of the 100% to fixed group (1.5 percent) the 75.1-99.9% group (0.1 percent), and the 50-75% group (0.7 percent) as indicated on the table for 1988; 7.5 percent is calculated similarly for June 2000.

[4] A similar finding of long-term inactivity with regard to TIAA-CREF participant premium allocation changes was also reported in an earlier study by Samuelson and Zeckhauser (1988).

[5] These data are based on year-end records of total premium remittances for individuals entering TIAA-CREF in each year. For new entrants who fail to provide premium allocation instructions, premiums are initially credited to the TIAA-CREF Money Market Account. Once contracts have been finalized and allocation instructions are received, an adjustment is made; however, for those entering the system in the months of December and November, this "default" rule can create distortions in the data. To adjust for this rule, the data in Figure 1 have been adjusted via a regression procedure to remove a constant, month-specific seasonal effect for all the years in the sample.

[6] This restriction does not apply to SRA and GSRA contracts.

[7] Of course, while this may explain why the newer TIAA-CREF accounts are so much smaller than the TIAA Traditional annuity and CREF Stock Account, it's still not clear why participants would make no changes to the relative allocation of their accumulations in the two accounts if the market moves them in an undesired direction.

[8] See Bodie, Merton, and Samuelson (1992).

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