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The Retirement Patterns and Annuitization Decisions of a Cohort of TIAA-CREF Participants

In this issue:

Introduction

Previous Studies of Retirement
Income Choices at TIAA-CREF

The Retirement Decision

Income Options and the Choice to
Begin Receiving Income

Changes in Annuitization Rates

Conclusions

Appendix: Calculating the Option
Value of Postponing Annuitization

This issue of Research Dialogues examines the retirement patterns and annuitization decisions of a large cohort of TIAA-CREF participants (more than 200,000 individuals) as they passed through retirement ages during 1987–1996. We use these data to illustrate, analyze, and attempt to explain the decline in the number of annuitizations among TIAA-CREF participants over this period. Along the way, we present statistics showing trends in retirement behavior of this cohort of TIAA-CREF participants. We also briefly describe and discuss some of the considerations that might be affecting participants' decisions regarding the annuitization of accumulated retirement wealth, focusing on the effects of increased retirement wealth. (An appendix to this issue examines, in detail, some of the trade-offs inherent in delaying the start of life-annuity income.) Finally, we assess the hypothesis that those whose wealth has increased the most over this period (parti-

pants holding relatively more equities in their retirement portfolios) also have been most likely to delay the annuitization decision.

Introduction

Over the last ten years, TIAA-CREF has greatly expanded participants' options for receiving retirement income from their accumulated assets. Participants can use currently available options singly or in combination to customize many aspects of their retirement income, including their asset allocation, the amount of periodic income they expect to receive, the timing of income distributions, the scope of the income guarantee, as well as the amount of wealth available for bequests. (Of course, all participants are still constrained by their available resources, legal requirements, and the performance of the financial markets.)

Previous research has shown that as the number of TIAA-CREF income options has expanded, there has been an overall decline in the number of TIAA-CREF participants choosing to begin lifetime annuity income from their plan balances (King, 1996; TIAA-CREF, 1998). Several explanations for this decline have been offered, such as the following:

- Participants may be choosing to work longer and retire later than in previous years. Evidence from the Bureau of Labor Statistics indicates that the rate of decline in the average age of retirement in the United States may have slowed or flattened out in the late 1980s and early 1990s. Moreover, those who retire

early are increasingly continuing to work after "retirement" (Gendell, 1998; Herz, 1995). Additionally, when age-based mandatory retirement ended for tenured faculty in 1994, many TIAA-CREF participants for the first time had the opportunity to postpone retirement beyond age 70. If relatively fewer older individuals are retiring now than in the past, one would expect fewer annuitizations to occur.

- Before TIAA-CREF introduced the Transfer Payout Annuity (TPA) and the Minimum Distribution Option (MDO) contract in 1991, some participants may not have wanted to purchase a life annuity when they reached age 70½ but had no other alternative. Many participants may now be using the TPA, MDO, and other new options as alternatives to the life annuity.
- As a result of the unexpected and unprecedented rise of the stock market in recent years, many retiring and retired TIAA-CREF participants have experienced large increases in the value both of their retirement plan assets and, importantly, of their other financial assets. Because these individuals are now wealthier than they may have anticipated, it is possible that their need or desire to begin retirement income streams may have been reduced. Many may now wish to defer, as long as possible, the tax liabilities that withdrawal of retire-

ment assets will impose, preferring instead to use other assets to fund at least the first few years of retirement. Increases in wealth may also have pushed a large number of individuals over a “wealth threshold,” enabling them to consider bequeathing a substantial portion of their wealth to their heirs or other beneficiaries.

In this article, we first briefly discuss previous analyses of TIAA-CREF participants’ income choices and explain how the current study’s cohort approach represents an improvement in methodology. We then review the various explanations given for changes in income-choice behavior by examining the retirement patterns and retirement income elections made from 1987 to 1996 by the cohort of TIAA-CREF participants who were between the ages of 49 and 71 in 1986.

We focus on three factors in particular: first, we estimate age-specific retirement rates among these individuals over this period, and we present and analyze these data in detail. Second, we examine changes in the fraction of individuals who retire at specific ages and begin to receive income from a life-annuity product. Finally, we examine the relationship between asset allocation and the annuitization decision. We use the data to evaluate the hypothesis that the “annuitization rate” has declined the most among those for whom wealth has increased the most (those with greatest exposure to the stock market).

Previous Studies of Retirement Income Choices at TIAA-CREF

Previous reports from TIAA-CREF provide a great deal of information regarding trends in the income options that TIAA-CREF participants have chosen over the years. In *Research Dialogues*, No. 48 (King, 1996), we reviewed the choices made by TIAA-CREF participants who began to receive income in each year from 1978 to 1994. The report documented that men beginning a life-annuity income stream have increasingly been more likely to choose two-life annuities, while women have been more likely to

choose a single-life annuity. It also documented the decline that has occurred since 1978 in the relative number of first-time annuitizations at age 65 among TIAA-CREF participants. In 1978, of those starting a life annuity, 41.7 percent started at age 65. Since then, individuals

purchasing an annuity for the first time have been more likely to do so at ages both later and earlier than 65. In 1994, only 20.8 percent of life annuities issued were started at age 65. (As of 1997, 18.5 percent of first-time annuitizations were by individuals age 65.)

The September 1998 issue of the *Benefit Plan Counselor* reported additionally that the number of TIAA-CREF participants choosing to convert their accumulated assets into any type of periodic income stream has declined in recent years. In 1997, those choosing to start a life annuity (11,700) were roughly 30 percent fewer than in 1988 (17,100). At the same time, the number of participants over 55 with unannuitized TIAA-CREF assets increased by 47 percent from 1992 to 1997, while the number age 65 and older has risen 72 percent. The article also reported the increasing use of TIAA-CREF’s nonannuity income options by those who did elect to start receiving distributions: While 80 percent of those starting an income stream in 1987 converted their entire accumulation to a life annuity, only 60 percent did so in 1997.

Both these articles suggest that there have been large changes over time in the rate at which individuals are retiring and starting to use TIAA-CREF’s annuity and other income options. However, because these studies use cross-sectional data, measurement of the size of such changes is not possible. For example, while the number of participants over age

55 with unannuitized assets has grown by 47 percent since 1992, it is also the case that the population of all TIAA-CREF participants with unannuitized assets has increased by roughly 42 percent (from 1.2 million in 1992 to 1.7 million in 1997). This raises obvious

questions: How much of the 47 percent increase among the over-55 population is a result of population growth, and how much is a result of the decision of participants older than age 55 not to retire or begin retirement income?

We attempt to answer these questions by using different data and taking a different approach from that of the previous studies. Instead of examining the choices of only those who decided to begin an income stream in each year, we examine the behavior of a large group, or cohort, of TIAA-CREF participants over a period of time. In particular, we examine the choices made by the entire 1986 population (over 200,000 individuals) of TIAA-CREF participants who were between 49 and 71. The fundamental difference of this approach is that it explicitly recognizes that participants’ decisions not to begin an income stream are as important as their choosing to do so. After all, before deciding *which* income option to choose, participants must make a choice *whether* to begin receiving income.

The Retirement Decision

It is important to recognize that at any given time there are two possibly very different groups of individuals with unannuitized assets at TIAA-CREF: those who are making current contributions under their retirement contracts, and those who are not. Knowing an individual’s “contribution status” is useful because it tells us something about his or

There have been large changes over time in the rate at which individuals are retiring and starting to use TIAA-CREF’s annuity and other income options.

her retirement status. Almost all those making contributions to their retirement contracts are not retired. On the other hand, we can't draw such conclusions about the group not making contributions: Some may be working, while some may not. Some participants may simply be on temporary leave, while others may have permanently changed jobs and now work at an institution where TIAA-CREF is not available. Still others may have in fact retired but are using other sources of income to their expenses.

Using historical account data for a cohort of participants, we can observe when participants stop making contributions on their TIAA-CREF contracts. Since TIAA-CREF plan contributions are typically related to employee salary, the point at which contributions stop should be a good proxy for determining when individuals are "retiring," at least among the older individuals who are the members of this cohort.¹

We divide the ten-year span for which we have data into three periods (1987–

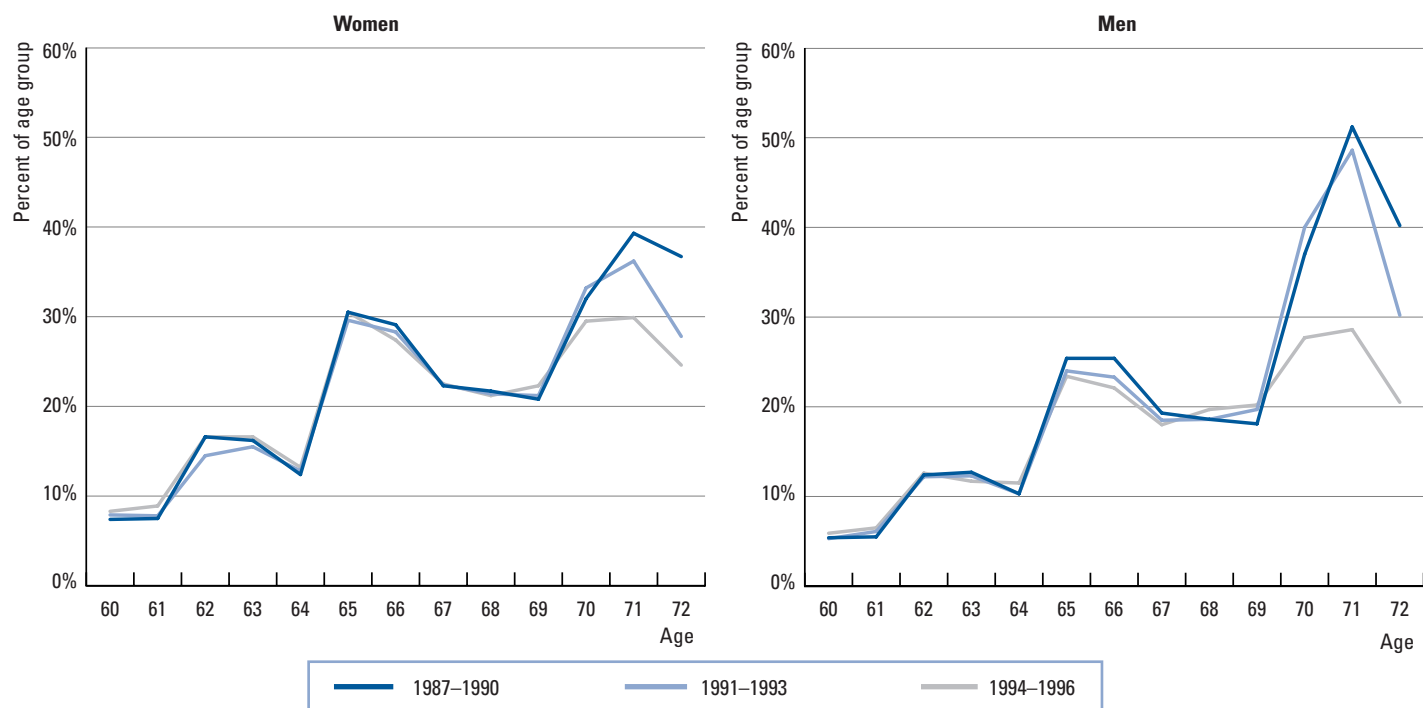
1990, 1991–1993, and 1994–1996) and calculate the number of individuals who stop contributing in each period at each age from 60 through 72 as a percentage of those of each age who were contributors in each period.² We call this percentage the "retirement rate" of individuals of a given age in each period. Figure 1 presents these retirement-rate data for men and women.

For both men and women, the data show peaks at typical retirement ages of 62–63, 65–66, and 70–71, suggesting that sizable fractions of cohort members worked and made contributions up until these ages and then retired. There is some indication of difference in retirement rates for men and women. At each age below 69, in each of the three periods, women in the cohort were slightly more likely to retire than were men. For example, roughly 30 percent of women working in the year that they turned 65 retired in that year. (As shown in Figure 1, the retirement rates were 30.5 percent in 1987–1990, 29.6 percent in 1991–1993,

and 30.5 percent in 1994–1996.) At the same time, roughly 24 percent of men working at this age retired in the year they turned 65; the retirement rates for 65-year-old men were 25.4 percent, 24.0 percent, and 23.4 percent in each of the three periods respectively. The differences between men and women are not large (on the order of 5 percent to 6 percent) and do not appear to have been growing over time.

There are several possible explanations for gender differences in retirement rates, one of which is occupational differences. In the higher education population of 1986 (from which the cohort is drawn), men were more likely to be tenured professors than were women. It seems reasonable to assume that professors might be (at all ages) less likely to retire from work than individuals employed in other positions. In addition, married couples may retire together. To the extent that married women are younger than their husbands, women would therefore appear to be retiring earlier than men.

Figure 1
Retirement Rates, by Age



Source: TIAA-CREF Institute Research.

[Note: The retirement rate is the percent of contributors whose contributions to TIAA-CREF plans stop at each age in selected time periods.]

The most striking feature of the data is the over 20 percent decline in the male retirement rate at age 71 from the period 1987–1990 to the period 1994–1996. Figure 1 shows that in 1987–1990, 51.2 percent of men who were making contributions in the year they turned 71 retired at some point during that year. In 1994–1996, only 28.6 percent of 70-year-olds making contributions retired. The changes from 1987–1990 to 1994–1996 for men age 70 (-9.3 percent) and 72 (-19.7 percent) are also significant. While changes among individuals over age 68 are quite large, the changes in retirement rates at ages younger than 69 are very small for both men and women—in almost all cases, retirement rates have changed by less than 2 percent, although for men, the retirement rates at ages 65 and 66 have fallen by roughly 2 percent to 3 percent. These data strongly suggest that among this cohort of individuals there has been little or no change in the rate at which individuals under age 69 are retiring.

The dramatic decline in the retirement rate for men at ages 69 to 71 is likely to be the result of the end of age-based mandatory retirement rules for tenured faculty in higher education, which occurred in January 1994. Further support for this speculation is the fact that the decline in the retirement rates at ages 69 and above among women in the cohort (relatively fewer of whom are tenured professors) has been much smaller than among men, although still large. These data on changes in retirement rates following the removal of mandatory retirement rules are consistent with other data regarding the impact of the ending of mandatory retirement, discussed in detail in *Research Dialogues*, No. 58 (Clark and Hammond, 1998). The article describes preliminary data from two other empirical studies showing that retirement rates among faculty members ages 70 or more have indeed fallen since 1994.

Income Options and the Choice to Begin Receiving Income

Table 1 provides a basic description of the income options generally available

to TIAA-CREF participants.³ The list of current retirement income options includes several nonannuity options added since 1989, each of which became available to cohort members (and all other participants) as time passed.

The list of many choices, however, masks the very stark, basic choice that participants must make when they decide to take distributions from their retirement accumulations: whether or not to purchase the insurance provided by the life annuity. None of the nonannuity options (minimum distributions, lump-sum withdrawals, systematic withdrawals, and period-certain annuities) provides an insurance component guaranteeing that assets distributed via these mechanisms will not be exhausted before death.

The decision whether or not to annuitize an accumulation is one of the most significant financial decisions facing TIAA-CREF participants, and indeed all defined contribution plan participants. There are substantial risks that must be considered and counterbalanced: The choice to annuitize an accumulation can mitigate the significant risk that an individual will otherwise outlive assets necessary to provide for living expenses in retirement. However, annuitization may reduce the amount of wealth immediately available for unanticipated health costs or other emergencies. Annuitization also lowers the amount of wealth that would otherwise be left to beneficiaries or heirs.

It is important to recognize that for the cohort members we study (as well as current participants) the irreversibility of the decision to start an annuity generates an incentive, or an “option value,” to postponing annuitization until more information about possible future outcomes can be obtained.⁴ In other words, because uncertainty about the future may be greater at time t than it is at time $t + 1$, there is a value to postponing annuitization until $t + 1$. For individuals considering the purchase of a life annuity, the valuable new information generally relates to changes in health status and the prospects of living longer than average.

Of course, there are also costs inherent in postponing the annuitization decision. Whether the benefits of waiting exceed the costs is a very important question—and one that is sometimes quite difficult to answer. (An appendix to this issue of *Research Dialogues* discusses some of the considerations involved in determining the option value of waiting to purchase an annuity.)

While the option value is an important factor for all individuals to consider when deciding whether to begin annuity income, the existence of the option value cannot by itself explain why annuitization rates have fallen. To cause this change, something must have increased the value of waiting to purchase an annuity over the period we study. We hypothesize that the substantial increase since 1987 in the value of equities may have played just such a role in enhancing the option value of waiting to annuitize. Several separate factors may be particularly important.

First, there may be a simple “wealth effect”: Because the financial markets have performed so well, individuals are now generally wealthier than they may have expected when they began saving for retirement. This extra wealth may make them more confident that they will have enough resources to prosper throughout even the very longest retirement. As a result, they may feel less need to insure themselves against longevity risk.

Second, since participants’ accumulations are larger, the cost of guessing wrong about longevity after having purchased an annuity may be perceived as higher. Although participants do not need to annuitize their entire accumulations at once, and can purchase annuity options that will provide some benefits even in the case of an early death, some participants may not realize this. They may simply avoid starting an annuity altogether, since they don’t wish to “give up” the option to use their larger accumulations in other ways.

Third, the tax benefits of postponing the withdrawal of retirement plan assets through an annuity, or indeed through any mechanism, may have increased.

Table 1
Income Options Currently Offered by TIAA-CREF

Income Options

Life Annuity (since 1918)

Provides income for the life of the annuitant (or annuitants, if a two-life annuity is purchased). An irrevocable contract between TIAA-CREF and the annuitant(s), this option is the only one that provides insurance against the risk that the annuitant(s) may live longer than their assets would otherwise support. Additional options can be elected (at a specified cost) that will ensure that payments will continue for at least a set minimum number of years (i.e., assuring that payments would be made to a designated beneficiary even in the case of an early death of the annuitant(s)).

Nonannuity Options

Minimum Distribution Option (MDO) (since 1991)

Provides an amount of income just sufficient to avoid penalties that the federal government assesses on individuals who do not use the assets accumulated in tax-deferred retirement accounts to provide income in retirement. While lump-sum withdrawals from accumulated assets are allowed, and conversion to an annuity is generally possible, selection of particular income calculation options can preclude the later selection of a life annuity.

Systematic withdrawals and transfers (SWAT) (since 1994)

The participant specifies a desired schedule of payments, and regular withdrawals or transfers are made from their accumulated assets according to the schedule. Payments can be stopped or changed at any time, but will otherwise be made as long as there are assets left to fund them.

Interest Payment Retirement Option (IPRO) (since 1989)

For individuals who don't yet want to purchase an annuity, but wish to begin receiving systematic income payments from amounts accumulated in the TIAA traditional annuity. The interest credited to TIAA traditional annuity accumulations is distributed to the participant as an income payment, while the principal balance of the accumulation remains undistributed and must later be annuitized or converted to a Minimum Distribution contract.

Retirement Transition Benefit (lump-sum withdrawal) (since 1990)

For individuals who may need larger amounts of cash immediately following retirement, most TIAA-CREF retirement plans allow a lump-sum withdrawal of at least a portion of accumulations.

Transfer Payout Annuity (TPA) (since 1991)

This option provides for regular payments to be made from TIAA traditional annuity accumulations to an annuitant or beneficiaries over a ten-year period. The payments are made regularly over the set period, regardless of how long the annuitant lives. (This option is available only for TIAA traditional annuity accumulations.)

Individuals retiring in recent years may have other after-tax assets that, like their retirement accumulations, have greatly appreciated in value as the stock market has risen. Bodie and Crane (1997) present data on a subset of TIAA-CREF participants that indicates that while TIAA-CREF assets make up the largest part of the financial wealth of most participants, many individuals have substantial amounts of other assets. For individuals who intend to spend the majority of both their after-tax savings and their retirement wealth in their retirement, it may make sense from a tax standpoint to use

after-tax savings first, deferring income taxes on retirement accumulations as long as possible. The tax issues involved are in general quite complicated, and individual situations may differ dramatically.

Finally, interest rates generally declined in the 1980s. As a result, for individuals starting TIAA traditional annuities, starting annuity income payments (per dollar annuitized) have been generally lower than they were in the early eighties. (All CREF life annuities used a constant assumed interest rate of 4 percent throughout this period, so initial income payments were not affected by

interest rate changes.) Individuals may not understand or be aware that all TIAA-CREF annuities have at least some variable component (TIAA traditional annuities guarantee an interest rate of 2.5 percent, with dividends as declared each year; there are no investment return guarantees for CREF annuities). The lower starting income levels for TIAA annuities may have made the TIAA life annuity less attractive than it was when prevailing interest rates were higher.

All these factors may have played an important role in the decline in the frequency of annuitizations over the period 1987–1996. In the next two sections, we examine the changes in annuitization rates over time and then attempt to assess whether these changes are at all related to increased retirement wealth.

Changes in Annuitization Rates

Figure 2 illustrates, for three different periods (1987–1990, 1991–1993, and 1994–1996), the percentage of retirees of each age who started their first life annuity at the time they retired.⁵

The age patterns in the data are fairly stable over time, with peaks at ages 62, 65, and 70–71. The data indicate that the annuitization probability is highest for those who retire at age 70–71 in each of the periods analyzed. For both men and women, the data show a decline over time in annuitization rates at all ages. The decline appears to have been slightly larger for older individuals. For men age 70, the annuitization rate fell from 83.4 percent in the period 1987–1990 to 57 percent in 1994–1996, while at age 62, the decline was from 66.3 percent to 52.1 percent. The drop was greatest for both men and women from the 1991–1993 period to the 1994–1996 period. Overall, the declines were greater in magnitude for men (there was an average decline of 17 percent for women and 20 percent for men over all ages shown from the 1987–1990 period to the 1994–1996 period). While some drop in annuitization rates at the older ages (particularly above age 70) is perhaps a predictable result of the introduction of the

Minimum Distribution Option contract in 1991, the reason for large declines at earlier ages is more difficult to explain.

Certainly some of the drop in annuitization rates is simply a result of the introduction of alternatives to the life annuity. Those participants who would have liked to begin receiving retirement income in a form other than the life annuity were able to do so through an increasing variety of options in the late 1980s and early 1990s, and certainly some of those individuals have chosen alternative income options.

However, if participants are simply substituting other forms of income for the life annuity, then we should see either an increase or no change over time in the rate at which they are electing to receive income of any form from their retirement annuities when they retire. Using the cohort data, we can check to see whether this is in fact the case. Figure 3 shows the rates at which retiring individuals elected any form of income from their TIAA-CREF annuity contracts. (Individuals are considered to take income if they start a

life annuity, take a cash withdrawal, start income under an IPRO or MDO, start a period-certain annuity, systematic withdrawals, or a Transfer Payout Annuity that pays a cash benefit.)

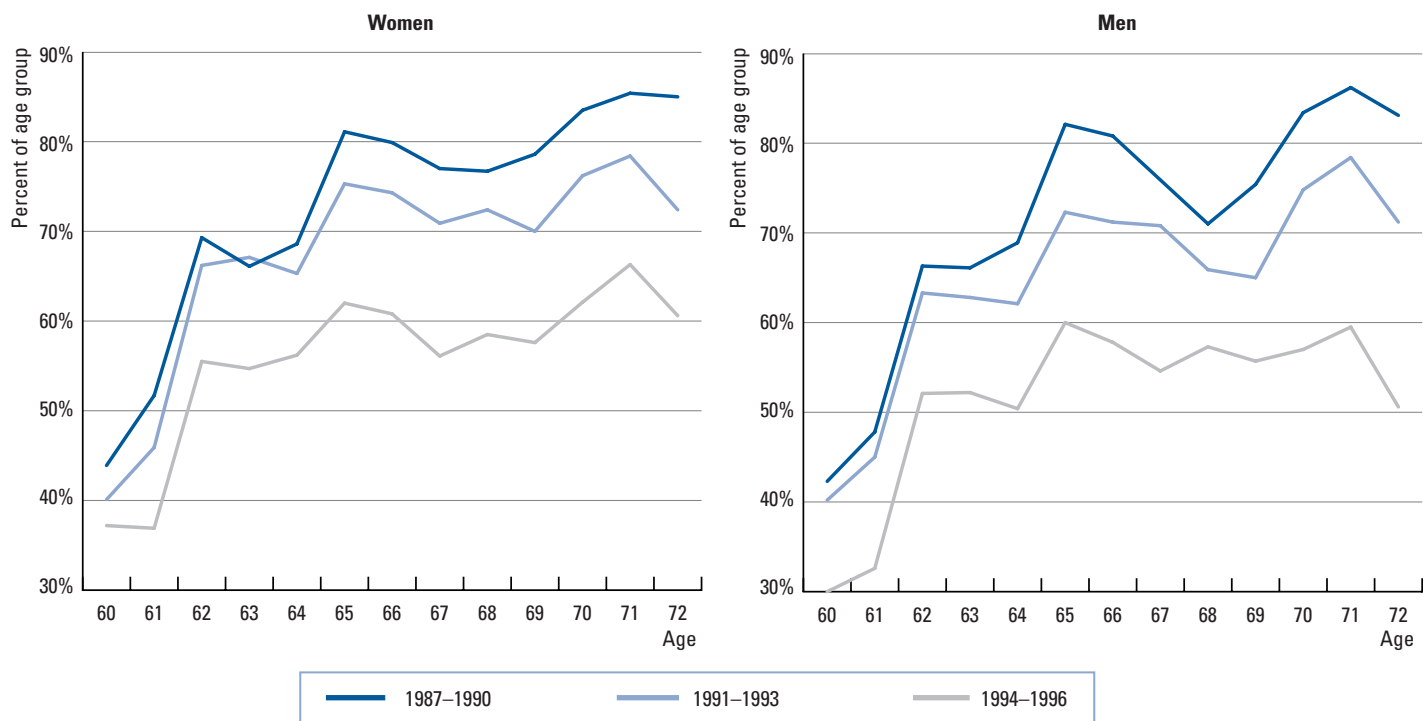
The data show that among both men and women retiring at age 60 or 61, there has in fact been little or no change overall in the rate at which individuals elect to receive income. Coupled with the data regarding the decline in annuitizations among these individuals, the data suggest that younger retirees have shifted to other forms of distribution to receive income immediately upon retirement. An interesting question that we may be able to answer in the future is what fraction of these individuals ultimately choose to take an annuity or other form of distribution later on in retirement (say after ten years in retirement). This question can't be answered now, since those retiring at age 60 in 1994–1996 have only been retired a few years.

The data also show that among women retiring at ages 62 to 68 and men

retiring at ages 64 to 68, there has been a decline in the rate at which individuals are choosing to receive income of any kind from their accumulations. For women age 65, the fraction of retirees starting to receive income within a year of retirement fell from 88.6 percent in 1987–1990 to 80.6 percent in 1994–1996. For men, the decline was from 89.5 percent in 1987–1990 to 82.1 percent in 1994–1996. Declines at ages around 65 are similar in size, averaging roughly 5 percent to 7 percent. This behavior suggests that a portion of the observed decline in annuitization rates at retirement is a result of participants' electing not to take any distributions at all from their retirement assets, as opposed to a shift away from the life annuity as a form of distribution.

Finally, among those retiring at age 69 and above, there has been almost no change over time in the rates at which individuals begin to receive income from their retirement assets. As shown in Figure 3, nearly all of those retiring after

Figure 2
Rates of Annuitization among Retirees, by Age



Source: TIAA-CREF Institute Research.

[Note: The annuitization rate is the percent of retirees starting first life-annuity income within one year of retiring.]

age 69 receive some form of distribution within the next calendar year. For women, the rates of income receipt for those retiring in the year they turn 71 were 98.6 percent in 1987–1990, 99.1 percent in 1991–1993, and 97.4 percent in 1994–1996. For men, the rates were 97.8 percent, 99.2 percent, and 97.7 percent, respectively. Certainly the most important factor in this consistency is that federal minimum distribution requirements require that at least a minimum amount of income be distributed beginning at age 70½ for virtually all retirees. For those who do not have a life annuity, TIAA-CREF's MDO contract allows them to meet these requirements with the smallest amount of withdrawals possible. (For a detailed description and analysis of the minimum distribution requirements, see Warshawsky, 1998.)

However, the fact that annuitization rates among retirees ages 69 and above have dropped does not necessarily indicate that individuals over this age who want to receive income from their retire-

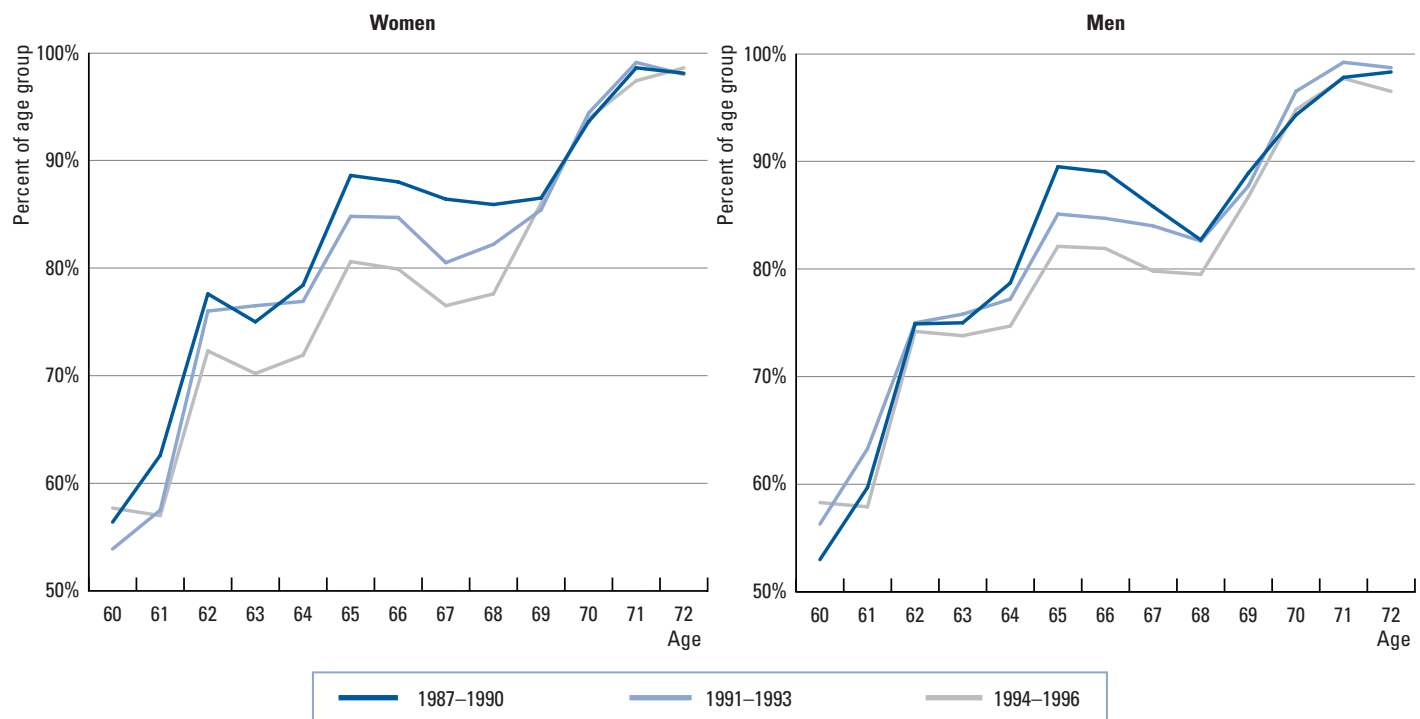
ment assets have chosen the MDO in favor of the life annuity. Since every retiree over 70½ must begin some kind of distribution, it is possible that many of those using the MDO contract are those who would simply prefer to delay withdrawals even longer but have no choice. The fact that there has been an increase in the fraction of individuals at ages 65 to 68 who are delaying receipt of income suggests that many of those over 69 might also like to delay income, but would face severe tax penalties for doing so.

One way to test the hypothesis that individuals are postponing annuitization decisions as a result of unanticipated increases in wealth is to examine the behavior of those individuals for whom the increases in wealth have been relatively larger. We can identify the individuals who have had systematically larger increases in retirement wealth in recent years by examining data on asset allocation in unannuitized contracts. Those individuals who have higher allocations in equity-based accounts will, by virtue of

the extremely favorable recent stock market results, have experienced greater increases in retirement wealth than others (assuming all else the same). If increased wealth plays a role in the decision to annuitize, we should therefore see that the annuitization rates for those individuals with higher equity allocations have fallen further since 1987–1990 than annuitization rates among individuals with lower equity allocations.

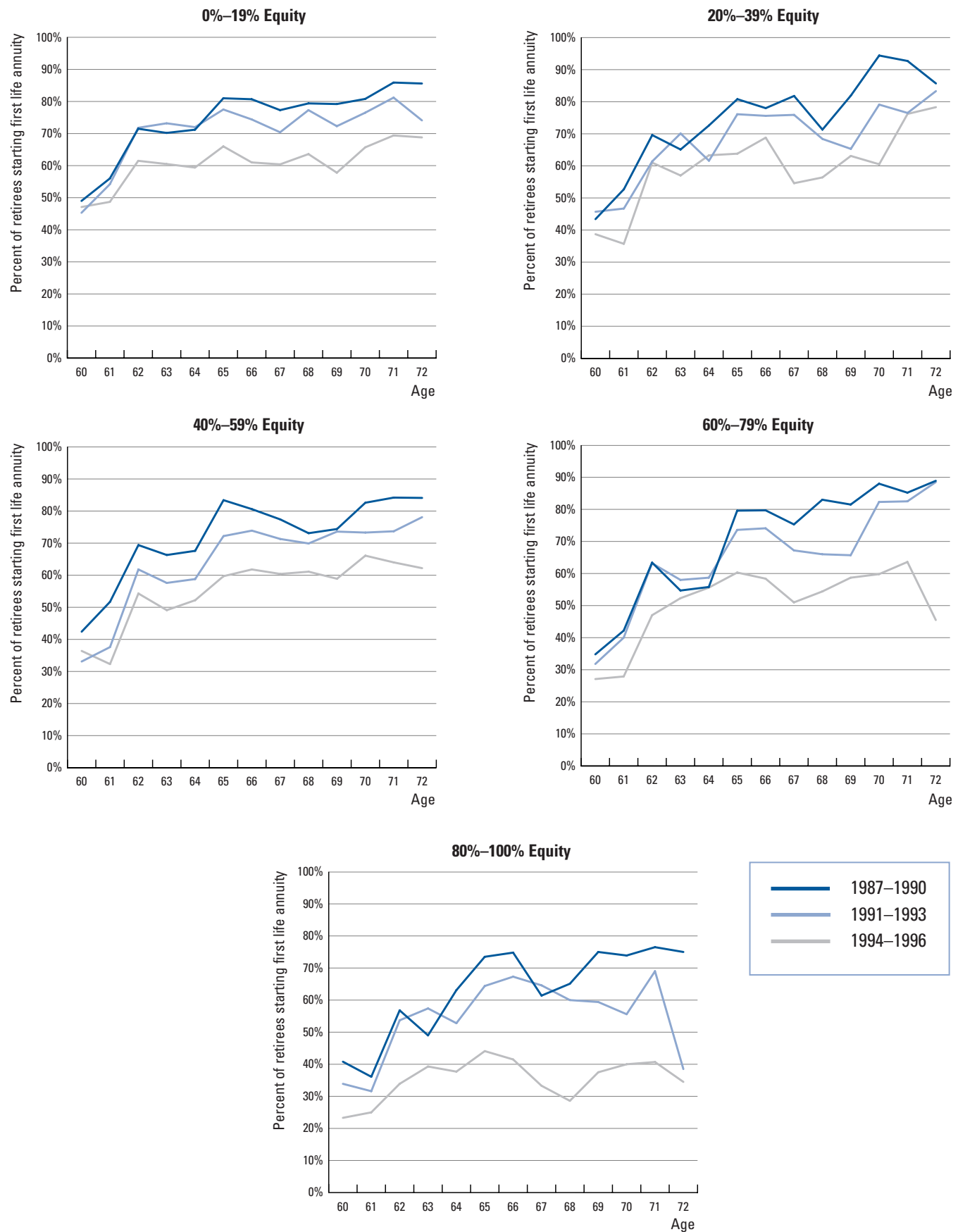
Figures 4a and 4b present data on annuitization probabilities at retirement for the cohort, broken out by the percent of the total unannuitized accumulation held in equities in the year prior to retirement. The data show that the decline in the fraction of individuals purchasing an annuity from 1987–1990 to 1994–1996 was generally slightly higher for both men and women with more than 79 percent of their unannuitized accumulations in equities than it was for individuals with lower equity allocations. For example, for men age 65 with between 20 percent and 39 percent equities, the fraction

Figure 3
Rates of Income Receipt among Retirees, by Age



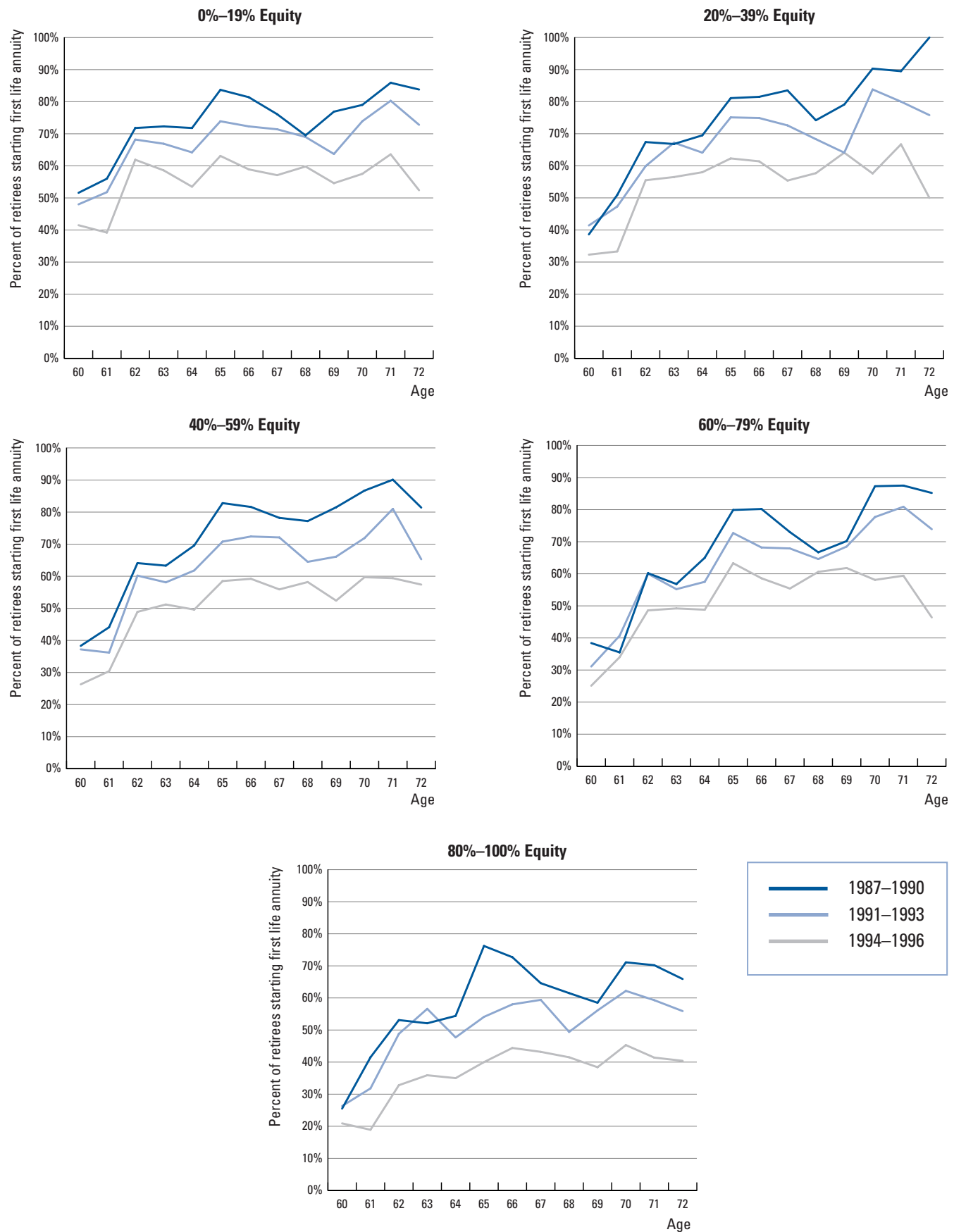
Source: TIAA-CREF Institute Research.

Figure 4a
Annuity Rates for Female Retirees by Age, Time Period, and Equity Allocation at Retirement



Source: TIAA-CREF Institute Research.

Figure 4b
Annuitization Rates for Male Retirees, by Age, Time Period, and Equity Allocation at Retirement



Source: TIAA-CREF Institute Research.

starting an annuity within a year of retiring was 81.1 percent in 1987–1990 and 62.3 percent in 1994–1996, a difference of 19 percent. At the same time, for men age 65 with between 80 percent and 100 percent equities, the change in the annuitization rate was from 76.2 percent in 1987–1990 to 40 percent in 1994–1996, a difference of over 36 percent. The pattern is more uniform among women: Figure 4a clearly shows that the gap between the line for 1987–1990 and the line for 1994–1996 is much larger for women in the 80 percent to 100 percent equities category than it is for the other categories. The fact that the result shows up much more clearly for women may be related to the fact that women are more likely to purchase single-life annuities than men (see *Research Dialogues*, No. 48). If women are in fact more frequently purchasing annuities for themselves only, then they may perceive a given increase in retirement wealth as greater than men would, since men are more likely to purchase two-life annuities, in which the benefits of any increased wealth are shared by both annuitants.

While the data do seem to support the claim that the decline in annuitization rates has been higher among individuals with greater equity allocations, the results do vary a great deal depending on the age at which the comparison is made. (Figure 4b shows, for example, that among men age 68, with between 60 percent and 79 percent in equities, the change in the annuitization rate was only –6.1 percent from 1987–1990 to 1994–1996. This is less than the declines at most ages even in the lowest equity-allocation category.) In addition, it is possible that equity allocation may be correlated with other important variables that may affect the decision to purchase a life annuity. In particular, it is likely that individuals with higher equity allocations are more likely to take financial risks. These risk-taking individuals may be less worried about the longevity risks they face at retirement, and so are predisposed to avoid

purchasing an annuity if an alternate option is available.

Conclusions

As TIAA-CREF's menu of income options has grown, participants have greater freedom to postpone decisions about when to start an income stream. The data we have reviewed have detailed several interesting changes—and interesting consistencies—in the behavior of TIAA-CREF participants over time:

- The rate at which members of the TIAA-CREF population over the age of 69—particularly men—are retiring declined dramatically from 1987–1990 to 1994–1996, with much of the decline occurring following the end of mandatory retirement policies for tenured faculty in higher education.
- The rate at which members of the TIAA-CREF population, both men and women, retire at ages 68 and under has remained relatively constant since 1987. There have been slight declines in retirement rates among men at age 65, but almost no change at all at other ages.
- The frequency at which participants are choosing to begin a life annuity immediately following retirement has declined steadily for both men and women of all ages as the number of alternative options available to TIAA-CREF participants has expanded.
- Many participants retiring at ages 62 to 68 are postponing distribution of their retirement assets until later ages. A majority continue to use the life annuity as the mechanism for receiving income in retirement.
- Unexpected increases in retirement wealth and other assets may have played an important role in the drop in annuitization rates. Individuals may see themselves as wealthier than they expected, and they may feel that annuitization is

too costly in terms of preventing the use of wealth for emergencies and limiting its availability for bequests.

- The data indicate that, in general, the decline in annuitization rates has been slightly larger among individuals with greater equity allocations. This is consistent with the hypothesis that increases in retirement wealth are at least partially responsible for the observed decline in annuitizations.

Appendix

Calculating the Option Value of Postponing Annuitization

Determining the option value of delaying annuitization involves considering both the benefits of waiting for more information and the costs of delaying.

While the benefit of acquiring information about potential longevity can be large, there are also substantial costs to postponement. Most significantly, postponing annuitization means forgoing at least some current and/or future income. It also means that time must continually be spent paying attention to the situation—so as to be sure to make the decision to annuitize at the right time.

The option value of postponing annuitization therefore tends to decline over time, as uncertainty about the future decreases, the costs of postponing the decision rise, and the value of additional information declines. At some point, the benefits of waiting an additional year are less than the cost of putting off the decision, and the best thing to do is to go ahead with annuitizing.

It is important to note that for individuals considering the purchase of a variable annuity that allows the annuitant to select and change the type of investments funding the annuity benefit, financial uncertainty (uncertainty about future investment returns) should not affect the timing of annuitization. Participants in this type of variable annuity control their asset allocation, and therefore their exposure to financial risks,

Table A1
Projected Income and Accumulation Patterns Based on Different Annuity Start Ages,
for Hypothetical Single-Life Annuity with No Guarantee Period

Age	Scenario A Annuitize at 65		Scenario B Annuitize at 70		Scenario C Annuitize at 75		Scenario D Annuitize at 80		Scenario E Annuitize at 85	
	Annual Payment	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Unannuitized Accumulation
65	\$25,026	\$292,848	\$25,026	\$292,848	\$25,026	\$292,848	\$25,026	\$292,848	\$25,026	\$292,848
66	\$25,026	\$285,230	\$25,026	\$285,230	\$25,026	\$285,230	\$25,026	\$285,230	\$25,026	\$285,230
67	\$25,026	\$277,118	\$25,026	\$277,118	\$25,026	\$277,118	\$25,026	\$277,118	\$25,026	\$277,118
68	\$25,026	\$268,478	\$25,026	\$268,478	\$25,026	\$268,478	\$25,026	\$268,478	\$25,026	\$268,478
69	\$25,026	\$259,277	\$25,026	\$259,277	\$25,026	\$259,277	\$25,026	\$259,277	\$25,026	\$259,277
70	\$25,026	\$0	\$23,826	\$249,477	\$25,026	\$249,477	\$25,026	\$249,477	\$25,026	\$249,477
71	\$25,026	\$0	\$23,826	\$239,041	\$25,026	\$239,041	\$25,026	\$239,041	\$25,026	\$239,041
72	\$25,026	\$0	\$23,826	\$227,926	\$25,026	\$227,926	\$25,026	\$227,926	\$25,026	\$227,926
73	\$25,026	\$0	\$23,826	\$216,089	\$25,026	\$216,089	\$25,026	\$216,089	\$25,026	\$216,089
74	\$25,026	\$0	\$23,826	\$203,483	\$25,026	\$203,483	\$25,026	\$203,483	\$25,026	\$203,483
75	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$25,026	\$190,057	\$25,026	\$190,057
76	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$25,026	\$175,758	\$25,026	\$175,758
77	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$25,026	\$160,530	\$25,026	\$160,530
78	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$25,026	\$144,312	\$25,026	\$144,312
79	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$25,026	\$127,040	\$25,026	\$127,040
80	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$25,026	\$108,645
81	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$25,026	\$89,055
82	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$25,026	\$68,191
83	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$25,026	\$45,971
84	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$25,026	\$22,306
85	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
86	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
87	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
88	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
89	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
90	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
91	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
92	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
93	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
94	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0
95 on	\$25,026	\$0	\$23,826	\$0	\$21,153	\$0	\$15,397	\$0	\$3,253	\$0

Systematic withdrawals equal to the age-65 annuity payment are made in each year before the annuity is started.
Once started, all annuity payments (in bold) continue for the rest of the annuitant's life.

Annuity benefit levels relative to age-65 start:
100%
Assumptions: Accumulation at retirement (age 65) is \$300,000. Annual annuity payments or systematic withdrawals are made once a year, at the beginning of each year. Annuity is a standard single-life annuity, assuming a hypothetical 6.5% total interest rate. Mortality based on Annuity 2000 (merged gender) table, with ages set back 2 years.

95%
85%
62%
13%

Table A2
Projected Income and Accumulation Patterns Based on Different Annuity Start Ages,
for Hypothetical Single-Life Annuity with Guaranteed Payments through Age 84

Age	Scenario A Annuitize at 65			Scenario B Annuitize at 70			Scenario C Annuitize at 75			Scenario D Annuitize at 80			Scenario E Annuitize at 85		
	Annual Payment	End-of-Year Value of Certain Payments*	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Value of Certain Payments*	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Value of Certain Payments*	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Value of Certain Payments*	End-of-Year Unannuitized Accumulation	Annual Payment	End-of-Year Value of Certain Payments*	End-of-Year Unannuitized Accumulation
65	\$23,064	\$263,676	\$294,937	\$23,064	\$0	\$294,937	\$23,064	\$0	\$294,937	\$23,064	\$0	\$294,937	\$23,064	\$0	\$294,937
66	\$23,064	\$256,252	\$289,545	\$23,064	\$0	\$289,545	\$23,064	\$0	\$289,545	\$23,064	\$0	\$289,545	\$23,064	\$0	\$289,545
67	\$23,064	\$248,345	\$283,803	\$23,064	\$0	\$283,803	\$23,064	\$0	\$283,803	\$23,064	\$0	\$283,803	\$23,064	\$0	\$283,803
68	\$23,064	\$239,925	\$277,687	\$23,064	\$0	\$277,687	\$23,064	\$0	\$277,687	\$23,064	\$0	\$277,687	\$23,064	\$0	\$277,687
69	\$23,064	\$230,957	\$271,173	\$23,064	\$0	\$271,173	\$23,064	\$0	\$271,173	\$23,064	\$0	\$271,173	\$23,064	\$0	\$271,173
70	\$23,064	\$221,406	\$0	\$22,921	\$220,037	\$264,237	\$23,064	\$0	\$264,237	\$23,064	\$0	\$264,237	\$23,064	\$0	\$264,237
71	\$23,064	\$211,235	\$0	\$22,921	\$209,928	\$256,849	\$23,064	\$0	\$256,849	\$23,064	\$0	\$256,849	\$23,064	\$0	\$256,849
72	\$23,064	\$200,402	\$0	\$22,921	\$199,162	\$248,981	\$23,064	\$0	\$248,981	\$23,064	\$0	\$248,981	\$23,064	\$0	\$248,981
73	\$23,064	\$188,865	\$0	\$22,921	\$187,697	\$240,602	\$23,064	\$0	\$240,602	\$23,064	\$0	\$240,602	\$23,064	\$0	\$240,602
74	\$23,064	\$176,579	\$0	\$22,921	\$175,486	\$231,679	\$23,064	\$0	\$231,679	\$23,064	\$0	\$231,679	\$23,064	\$0	\$231,679
75	\$23,064	\$163,493	\$0	\$22,921	\$162,482	\$0	\$22,445	\$159,106	\$0	\$23,064	\$222,175	\$0	\$23,064	\$222,175	\$0
76	\$23,064	\$149,558	\$0	\$22,921	\$148,632	\$0	\$22,445	\$145,544	\$0	\$23,064	\$212,053	\$0	\$23,064	\$212,053	\$0
77	\$23,064	\$134,716	\$0	\$22,921	\$133,882	\$0	\$22,445	\$131,101	\$0	\$23,064	\$201,274	\$0	\$23,064	\$201,274	\$0
78	\$23,064	\$118,910	\$0	\$22,921	\$118,174	\$0	\$22,445	\$115,719	\$0	\$23,064	\$189,793	\$0	\$23,064	\$189,793	\$0
79	\$23,064	\$102,076	\$0	\$22,921	\$101,444	\$0	\$22,445	\$99,337	\$0	\$23,064	\$177,567	\$0	\$23,064	\$177,567	\$0
80	\$23,064	\$84,148	\$0	\$22,921	\$83,627	\$0	\$22,445	\$81,890	\$0	\$20,818	\$75,955	\$0	\$23,064	\$164,546	\$0
81	\$23,064	\$65,054	\$0	\$22,921	\$64,652	\$0	\$22,445	\$63,309	\$0	\$20,818	\$58,720	\$0	\$23,064	\$150,679	\$0
82	\$23,064	\$44,720	\$0	\$22,921	\$44,443	\$0	\$22,445	\$43,520	\$0	\$20,818	\$40,366	\$0	\$23,064	\$135,910	\$0
83	\$23,064	\$23,064	\$0	\$22,921	\$22,921	\$0	\$22,445	\$22,445	\$0	\$20,818	\$20,818	\$0	\$23,064	\$120,181	\$0
84	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$23,064	\$103,430	\$0
85	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
86	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
87	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
88	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
89	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
90	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
91	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
92	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
93	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
94	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0
95 on	\$23,064	\$0	\$0	\$22,921	\$0	\$0	\$22,445	\$0	\$0	\$20,818	\$0	\$0	\$15,081	\$0	\$0

*These present value calculations assume a 6.5% rate of interest.

Systematic withdrawals equal to the age-65 annuity payment are made in each year before the annuity is started.

Once started, all annuity payments (in bold) continue for the rest of the annuitant's life.

Annuity benefit levels relative to age-65 start:
100%

99%

97%

90%

65%

Assumptions: Accumulation at retirement (age 65) is \$300,000. Annual annuity payments or systematic withdrawals are made once a year, at the beginning of each year. Annuity is a standard single-life annuity, assuming a hypothetical 6.5% total interest rate. Mortality based on Annuity 2000 (merged gender) table, with ages set back 2 years.

both before and after annuitizing. Whether they begin an annuity or not, they will continue to benefit from the positive (or suffer from the negative) investment performance that results from their asset allocation choices. Therefore, while uncertainty about financial markets should affect the asset allocation decision, such uncertainty should have no role in the decision whether to begin annuity income.

A numerical example of the consequences of delaying the decision to begin annuity income may be useful. Table A1 shows five hypothetical scenarios in which a participant with the same initial accumulation amount (\$300,000) at age 65 compares various hypothetical life-annuity starting ages. In all the scenarios in which the annuity is started after age 65, we assume the participant will make systematic withdrawals in an amount equal to the age-65 annuity payment in each year up until starting the annuity. Given these assumptions (and the other financial assumptions listed at the bottom of the table), the table shows the total single-life annuity benefit that the participant would hypothetically receive after starting the annuity. It also shows the amount of unannuitized accumulation remaining in each year before starting the annuity.

The boldface figures at the bottom of the table show the relative amounts of survival-contingent income that can be purchased in each scenario. By delaying the start of the annuity from age 65 to age 70, the participant at age 70 would be able to fund up to 95 percent of the annuity income benefit that he or she would have had if the annuity had been started at age 65. (These percentages do not depend on the size of the accumulation at age 64. The absolute size of the payments or withdrawals will be larger or smaller in proportion to the initial accumulation, but the relative comparisons being made will be exactly the same.)

We could say, then, that delaying the start of the annuity until age 70 is at least 95 percent as good as starting annuity income at age 65. By not starting the

annuity at age 65, the participant maintains the option to use the accumulation in other ways before turning 70. For example, if the accumulation is cashable, the participant could withdraw it during this period if extra money were needed for an emergency. In addition, if the participant were to die between the ages of 65 and 70, the entire unannuitized accumulation would then become the property of a chosen beneficiary. If the participant had purchased the hypothetical single-life annuity at age 65 with no guarantee period, there would be no death benefit.

The exact value of a delay will vary from participant to participant, depending on a number of factors, such as whether the remaining unannuitized balance is cashable or not, the participant's health, and how much he or she cares about leaving a bequest. In light of their individual circumstances, each participant must decide if the benefit of annuitizing at age 65 (a 5 percent higher income at ages 70 and beyond) is worth giving up the option to wait.

Table A1 also shows that as the period of delay increases, the cost increases. Participants who delay annuitization until age 75 will only be able to fund 85 percent of the remaining age-65 annuity payments. A ten-year delay, therefore, "costs" the participant 15 percent of the after-75 income. Similarly, the table shows the severe consequences that a fifteen-year delay could entail: Waiting till age 80 would cost the participant 38 percent of the income otherwise payable at that age. A twenty-year delay would cost almost all (87 percent) of the after-85 income payable if the annuity were started at age 65.

Table A2 shows another calculation of the "cost" of delaying annuitization, under slightly different circumstances: In this case, the participant is considering a life annuity with a guarantee period that will ensure that, if the annuitant dies before age 85, some annuity benefits will be paid to beneficiaries up until the participant would have been 85. Here, waiting ten years to annuitize means hav-

ing 3 percent less annuity income (and 3 percent less guaranteed income) at age 75. The reason the numbers are so different is that as the participant approaches age 85, less and less of the accumulation is used to purchase the guarantee for beneficiaries.

Both tables illustrate that, initially, the costs of waiting to purchase an annuity are quite modest. If the benefits of delaying—which are specific to each individual—are at all significant, it may make sense for retired individuals at younger ages to hold off on annuitization. However, once participants are in their 70s, the costs of further postponement are significant, and increase rather quickly.

[This report was prepared for *Research Dialogues* by John Ameriks, research economist, TIAA-CREF Institute (jameriks@tiaa-cref.org).]

Endnotes

¹The main problem with the approach is that contributions can stop for reasons other than retirement, and may begin again after having been stopped. Indeed, among the cohort we studied, more than 10,000 individuals had a year in which they made no contributions under their retirement plan contracts but then later resumed contributions. The data we have collected gathers together all TIAA-CREF contracts owned by an individual, and contributions are not considered to have stopped unless an entire calendar year has passed in which no contribution is received under any contract. This definition of retirement should eliminate a large number of "false retirements"—such as individuals on summer breaks, leaves of less than a year, or job changes.

²This percentage is basically an empirical hazard rate, measuring the likelihood of retirement at each age in each period, conditional on not having retired by that age in each period. We calculate age on the last day of the year in which contributions stopped; age will therefore tend to slightly overstate the participant's actual age at retirement, since age, of course, will have increased between the date of retirement within the year and the end of the year.

³Some income options may not be available to some participants, depending on individual retirement plan features and rules. This list is not intended to substitute for the many publications available from TIAA-CREF describing its products; a comprehensive description of TIAA-CREF income

options can be found in *Choosing Income Options*, number 6 in the TIAA-CREF Library Series.

⁴The basic idea underlying the notion of an option value as an aspect of irreversible investment decisions is discussed in detail in Dixit and Pindyck, 1994.

⁵These data are constructed as follows: The base of the percentage is all individuals of each age whose contributions stop in year t , for any reason other than death, and who do *not* have a preexisting life annuity. The numerator is those in the same group who were issued any form of life annuity as the first annuitant in year t , $t-1$, or $t+1$.

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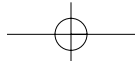
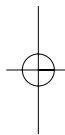
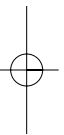
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