

A cohort analysis of the investment performance of TIAA Traditional Annuities during working life

Defined contribution (DC) retirement plans are the major source of retirement savings for millions of Americans. While sponsoring employers have primary responsibility for DC plan design, participants choose their contribution amounts, investment allocations, and when and how to take retirement income distributions.

Prior research shows that many participants find making these decisions difficult. Many employers, working with plan vendors and consultants, have simplified their plans' design by offering default features and simplified investment menus to help participants with contribution and allocation decisions. Substantial questions remain, however, on whether additional changes to plan design could help improve the likelihood for participants to achieve retirement security.

To assist retirement savers as well as those who advise them, this research examines the role of TIAA Traditional annuities as part of an investment portfolio during a participant's working life, that is, the accumulation phase of retirement plan participation. Using five standard measures of investment performance, we analyze how allocating a portion of DC contributions to deferred units of TIAA Traditional annuities (hereafter Traditional) affected portfolio performance for 10 distinct cohorts over the 1970 to 2021 period. For each cohort, we find that participants would have improved risk-adjusted portfolio performance by replacing some of their allocation to commonly used fixed-income funds with allocations to Traditional. For all cohorts, we find retirement portfolios with allocations to Traditional had a higher return for a given level of risk (or lower risk for a given level of return). These results suggest that adding Traditional to a retirement investment portfolio improves the chances of a participant achieving retirement security.

Traditional improves risk-adjusted performance by reducing a participant's exposure to interest rate risk. The fixed-income return and interest rate risk of Traditional is pooled and managed internally through the TIAA General Account by holding investments with varying liquidity, duration, and credit characteristics. TIAA provides participants holding units of Traditional an account with crediting rates that are pre-announced annually and are not subject to the volatility of daily interest rate spot rates. In contrast, a participant holding fixed-income or money market mutual funds confronts these risks daily as their holdings are marked-to-market and the funds face volatile inflows and outflows.

This research examines the investment performance of: (i) the TIAA Traditional Retirement Annuity (RA) from 1970 to 2021; (ii) the TIAA Traditional Supplemental Retirement Annuity (SRA) from its inception in 1973 to 2021; and (iii) the TIAA

David F. Babbel

Wharton School,
University of Pennsylvania,
Charles River Associates

Conrad S. Ciccotello

Reiman School of Finance,
University of Denver,
Charles River Associates,
TIAA Institute Fellow

Miguel Herce

Charles River Associates

Mark F. Meyer

Charles River Associates

Traditional Retirement Choice Plus Annuity (RCP) from its inception in 2006 to 2021. The SRA and RCP versions provide more liquidity for participants than the RA but typically have lower crediting rates. Our results apply across all three versions of the Traditional annuities.

To examine relative risk-adjusted performance of portfolios, the analysis includes a range of investment alternatives for comparison. The six other fund investments analyzed in the context of a DC plan retirement portfolio are proxied by expense-adjusted returns of indexes representing large U.S. stocks, small U.S. stocks, 10+ year high-quality corporate bonds, 20+ year U.S. Treasury bonds, intermediate-term U.S. government/ credit instruments, and money market funds. In the context of a DC plan, these investment proxies can be characterized as representative of mutual fund offerings in a plan with that particular investment objective. Our analysis covers successive five-year cohorts (1970, 1975, 1980, etc.) from 1970 to 2010, allowing us to examine performance over a full range of economic and market conditions. We use five standard measures of investment performance in the analysis.

1 Average returns and variability of returns

All versions of Traditional exhibit higher average returns compared to money market and intermediate-term U.S. government/credit funds over all studied cohorts from March 1970 through February 2021. While equities and long-term bonds tend to earn higher average returns than the Traditional annuities over this time frame, the analysis also demonstrates that Traditional annuities exhibit significantly lower variability in returns than any of the six investment alternatives

2 Risk-adjusted returns?

For all cohorts and for each version of Traditional, we find that asset returns per unit of risk, as measured by the Sharpe ratio, substantially exceeded those of all alternative investments studied. Moreover, when focusing on downside risk via the Sortino ratio, Traditional annuities have lower downside risk relative to any alternative investment class examined, for every cohort studied. These results provide robust evidence in favor of the strong downside protection, the high return-to-risk ratio, and the long-term resilience of the investment performance of the Traditional annuities.

3 Efficient investment frontiers

Efficient investment frontier analysis illustrates what mixture of portfolio asset allocations provides the best expected return for a given level of risk. Our analysis finds that, for each cohort studied, adding any version of Traditional to the portfolio improves the efficient investment frontier compared to alternative portfolios without Traditional. For lower levels of return risk, a portfolio adding any version of Traditional provides the highest available return compared to alternative portfolios. The higher expected return per unit of risk achieved by replacing money market and intermediate-term government fund allocations with Traditional annuities is a significant benefit to DC plan participants.

4 Optimal portfolio weights

Analysis of optimal portfolio weights offers insights into how participants can best allocate funds across different asset classes within a retirement portfolio. For participants without access to Traditional annuities through their DC retirement plan investment menu, the set of optimal portfolio weights include significant allocations to money market and intermediate-term government/credit bond funds. Adding any version of Traditional to the investment menu significantly changes the optimal portfolio weights, with allocations to Traditional eliminating allocations to money market and intermediate-term government/ credit bond funds. Once Traditional annuities are added to a participant's retirement investment portfolio, the lowest average returns attainable are higher than those available with money market and intermediate-term government/credit bond funds.

5 Stochastic dominance

Stochastic dominance (SD) is a statistical approach that compares the performance of investments based on the entire distribution of historical investment returns (instead of relying only on summary parameters such as the mean and variance), providing insights into the relative desirability of an asset under very general conditions. If an investment exhibits first-order SD over other investments, then it should be preferred as an investment choice by any rational investor. If an investment exhibits second-order SD over other investments, then it should be preferred as an investment choice by any risk-averse investor. The Traditional RA exhibited first-order SD over money market

funds for the six cohorts between 1985 and 2010 and second-order SD for the 1973, 1975, and 1980 cohorts. It also exhibited second-order SD for all ten cohorts over intermediate-term government/credit bond funds. The implication is that for all cohorts after 1980, any rational investor, regardless of risk preferences, would choose to allocate contributions to the Traditional RA over money market funds and any risk-averse investor would prefer the Traditional RA over intermediate-term government/credit bond funds for all studied cohorts. The Traditional SRA exhibited first-order SD over money market funds for the 1985, 1990, and 2010 cohorts. For every cohort studied, the Traditional SRA exhibited second-order SD over money market funds and intermediate-term government/credit bond funds. Any risk-averse investor would choose to allocate contributions to the Traditional SRA over the two fund alternatives. This level of stochastic dominance by the Traditional annuity over short- and intermediate-term fixed-income funds is rarely seen in financial instrument returns.

In summary, this research examines the relative financial performance of TIAA Traditional annuities in DC plan retirement portfolios over the period from March 1970 through February 2021. Using five different metrics of portfolio performance, our analysis shows that adding Traditional annuities to a participant's portfolio improves risk-adjusted performance relative to portfolios without Traditional. The benefits are especially notable for participants whose risk tolerance would lead to higher fixed income allocations in their retirement portfolio. The clear dominance of Traditional annuities over alternatives like money market and intermediate-term government/credit bond funds traces to the advantages of harnessing the illiquidity premium. Rather than directly holding fixed-income funds whose market value fluctuates daily, participants in Traditional annuities benefit from allowing TIAA to manage interest rate risk through its general account. TIAA can then offer participants higher and smoother returns over time in exchange for investors' longer holding periods.

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