TIAA Institute

Trends and Issues
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How long-term care costs shape the demand for annuities in the context of defined contribution plans

Introduction

Our recent research study addresses the crucial question of how older Americans can best prepare to finance the potentially quite expensive final phase of life, using financial instruments currently available in the marketplace (Horneff et al., 2025). Of central concern is that a majority (70%) of those age 65+ will require some type of long-term care (LTC) due to their poor health over their remaining lifetimes, spending an average of 3.2 years in such care, often at very high cost. Because the government-run Medicaid program only covers nursing home costs after retirees spend down most of their wealth and income and the private long-term care insurance market is virtually moribund, most Americans must self-insure against the high costs of LTC by continuing to hold assets as they age.

Retirees often hold savings in defined contribution (DC) plans and individual retirement accounts, now totaling more than $29 trillion (ICI, 2025). These accounts typically hold liquid assets like stocks, bonds, or mutual funds that can be drawn down to cover expenses. Another option would be to convert part of these assets into a guaranteed lifetime income stream, in the form of an annuity. Since regulatory changes in 2014, along with the SECURE Acts of 2019 and 2022, lifetime income products have become more attractive, leading many plan sponsors to add options like qualified longevity annuity contracts (QLACs) or deferred annuities in target date funds. The latter products start paying benefits later in life (no later than age 85) and offer retirees higher payouts at lower cost by pooling longevity risk. Because LTC needs often arise late in life, such income streams can help offset those expenses.

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In what follows, we describe how we use an economic life cycle model to evaluate how much of their retirement savings people should optimally use to buy lifetime income products, and at what age those payments should begin, given that they might need money to pay for LTC later in life. We account for differences across individuals and real-world institutional rules regarding taxes, retirement plan regulations, and Social Security, as well as how Medicare and Medicaid affect care costs. A key issue we address is when to begin one's annuity payouts. If payments start too soon, the product will cost more and may deter buyers. If they start too late, fewer retirees will live long enough to benefit.

This research addresses three questions: (1) Should LTC costs be paid only using retirement savings, or should some assets be converted into guaranteed income? (2) What's the best starting age for longevity annuities, considering factors like lifetime earnings, gender, health, and bequest motives? And (3) How might the answers to these first two questions differ between fixed payout annuities versus variable annuities tied to stock and bond returns? To highlight our conclusions at the outset, we find:

- Given current regulatory and tax rules as well as empirical evidence on health transition rates and medical costs in old age, better-educated retirees would do well to annuitize part of their 401(k) assets as they can benefit from longevity protection and earn the survival credit. Less-educated retirees tend to have little wealth and are at greater risk of entering nursing homes at earlier ages, so they prefer to keep their assets liquid in order to better manage unexpected health care and LTC expenses.
- Better-educated retirees favor annuity payouts deferred to age 80 as they have a longer investment horizon, while the less educated do better with immediate annuities having lower annual payouts. Overall, utility gains for men are lower than for women due to the former's higher mortality rates.
- Women experience greater welfare gains from variable versus fixed annuities, with no change in their optimal deferral ages. For men, welfare improvements are smaller but still positive, though their optimal deferral age declines. Variable payout annuities would offer most retirees with greater retirement security, relative to fixed annuity options.

Our work contributes to the literature by connecting two strands of prior research: one analyzes annuity decisions in DC retirement plans, and the other focuses on health risks, LTC needs, and mortality. We also extend earlier work by evaluating how different annuity designs differentially shape retiree well-being across demographic groups.

Methodology: A brief overview

This research builds on our previous work using a dynamic life cycle model that incorporates risks from workers' uncertain earnings, market returns, health surprises, the chance of needing nursing home care when retired, and mortality (Horneff et al., 2020, 2023a, 2023b). We model health shocks following a Markov process based on data from the Health and Retirement Study. As noted above, if LTC costs exceed retirees' assets, they can obtain Medicaid support, but only after exhausting their assets. We also account for important institutional rules for DC plans including legal contribution limits for tax-deferred retirement saving, and we integrate the option to buy deferred annuities. This framework generates optimal choices for spending, investing, and annuity purchases at retirement.

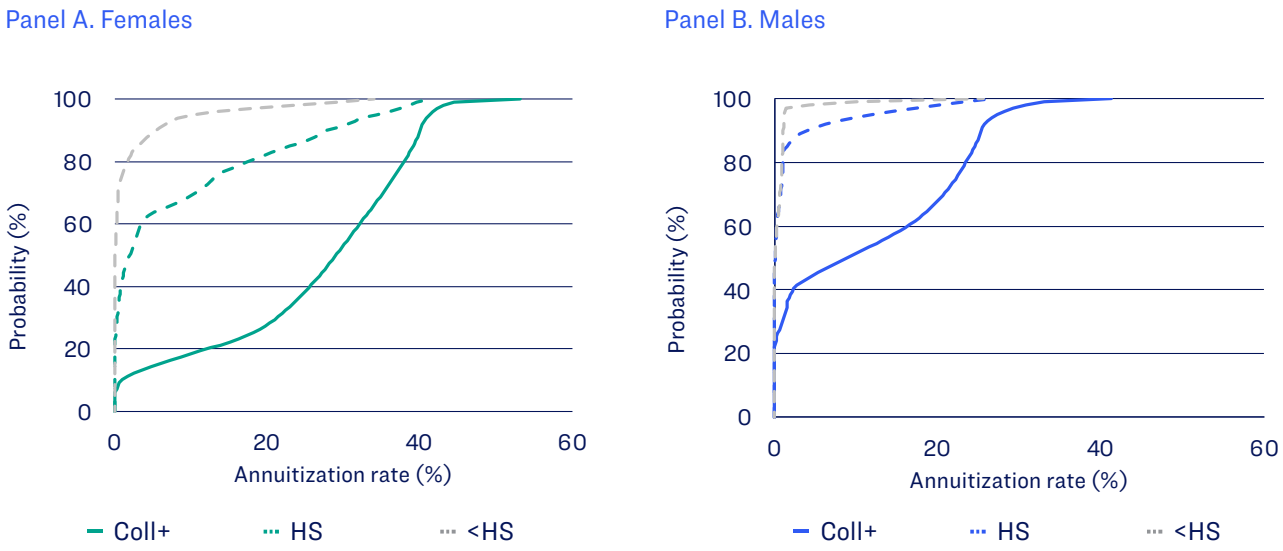
A key aspect of our empirical work is that we acknowledge that people differ with respect to their labor earnings, health transition rates, and mortality rates. We model these by retirees' sex (male, female) and education level (*<HS* or high school dropout, *HS* or high school graduate, or *Coll+* at least some college). In total, we calibrate and evaluate the model for six distinct demographic subgroups, defined by the intersection of sex and educational attainment. We also use data on mean wealth in DC accounts taken from the Panel Study of Income Dynamics for respondents in five age brackets (25–29, 30–39, 40–49, 50–59, and 60–69), to estimate values of key preference parameters including risk aversion, the discount factor, the elasticity of intertemporal substitution, the luxury bequest parameter, and the strength of the bequest. These are consistent with other life cycle models in the literature and also closely match our outcomes to empirical evidence. Our model also explicitly takes into account the regulations governing tax-deferred retirement saving plans regarding contributions and withdrawals. The annuity products we consider are compatible with QLAC regulatory limits, which can start immediately when the individual retires at age 67, or else can be deferred to three later ages, namely 75, 80, and 85. We also compare (deferred) investment-linked variable payout annuities, where benefit levels can fluctuate based on the realized returns of an underlying portfolio composed of stocks and bonds.[1] As is the case in practice, differential annuity pricing based on sex isn't permitted in 401(k) plans by law, resulting in an implicit loading on the actuarially fair price.

1 Although these aren't currently permitted under QLAC regulations (IRS, 2014), Horneff et al. (2023a) document that they would be welfare-enhancing for many retirees.

Key results for fixed immediate annuities

Relying on 1,000,000 simulations from our life cycle model for each of the six education/sex subgroups of interest, we first compute the optimal fraction of 401(k) assets that retirees would convert to an immediate fixed annuity payable from age 67. Figure 1 summarizes our results.

FIGURE 1. CUMULATIVE DISTRIBUTION OF THE FRACTION OF 401(K) WEALTH ANNUITIZED FOR SIX SEX/EDUCATION SUBGROUPS



Notes: This figure displays the cumulative distribution of the fraction of 401(k) wealth allocated to immediate annuities at retirement (age 67) for females and males, differentiated by educational attainment. For example, about 30% of Coll+ females annuitize at most 20% of their 401(k) wealth. One driver for differences across groups is the unisex annuity pricing: Individuals with higher annuity loadings relative to the unisex mortality (e.g., lower-educated males) annuitize less, whereas individuals benefiting from more favorable pricing (e.g., better-educated females) allocate more to annuities. Source: Authors' calculations (see text).

Figure 1 depicts the cumulative probability of the fraction of 401(k) wealth that each of the groups would optimally annuitize. The vertical axis reflects the probability in percent, and the horizontal axis represents the fraction of the 401(k) plan assets that would be optimally used to buy the annuity. Panel A refers to females, and Panel B to males. Among Coll+ women, half would choose to annuitize 30% or less of their plan assets, and many would prefer to buy more lifetime income but are constrained by the regulatory cap on annuities purchased via the 401(k). By comparison, the demand for annuities among less-educated females is lower, with only about a third of HS dropouts seeking to annuitize anything from their retirement plans. Even then, they would use only about 2% of their plan assets to buy lifetime income. These educational differences are due, in part, to the fact better-educated persons tend to live longer, yet unisex pricing doesn't take this into account. Moreover, they usually have more wealth by age 67, permitting them to pay for nursing home costs themselves. Accordingly, instead of buying annuities mainly to pay for LTC, they buy them to protect against living a long time, while benefiting from the survival credit. Males are less likely to demand annuities than females, with the Coll+ (<HS) group using only 11% (1%) of their 401(k) wealth for such an annuity. This is due to the fact that employer-based plans must use unisex tables and men have shorter life expectancies. The least educated face a higher risk of having to pay for LTC costs early in retirement and also have less financial wealth at retirement. Both reasons explain why they keep more of their retirement assets to mitigate potential health care and nursing home cost shocks.

We next evaluate how health uncertainty and the desire to leave bequests affect optimal annuity demand in 401(k) plans. Both factors tend to reduce annuitization, but they haven't been studied together in this setting. Table 1 shows annuitization rates by sex and education under four model scenarios: (1) a base case with both bequests and health shocks, (2) a variant with no health shocks or medical costs, (3) another scenario without bequests, and (4) a final case that removes both bequests and health shocks. Each model starts with the same 1,000,000 simulated households at age 66, ensuring that any difference in results flows only from changes in assumptions about bequest motives and health care costs.

TABLE 1. ANNUITIZATION RATES BY SEX AND EDUCATIONAL SUBGROUP WITH/WITHOUT MEDICAL COSTS AND WITH/WITHOUT BEQUEST MOTIVE (%)

Subgroup	With bequest		Without bequest	
	With health shocks	Without health shocks	With health shocks	Without health shocks
F Coll+	25.7	17.7	28.33	41.1
F HS	8.2	15.6	8.94	52.2
F <HS	2	5.8	2	47.0
M Coll+	11.4	9.5	20.4	39.1
M HS	1.7	5.9	5.7	48.4
M <HS	0.6	1.4	2	49.1

Notes: This table reports the annuitization rates of 401(k) wealth for four different life cycle model specifications: Column 1 refers to our base case with both health state shocks and a bequest motive. Column 2 has no health shocks (medical costs set to zero and mortality determined by sex/education-specific tables only). Column 3 has no bequest motive, and Column 4 has no health shocks and no bequest motive. Results are shown separately for females (F) and males (M) in three education groups: college (Coll+), high school (HS), and high school dropouts (<HS). All scenarios use the identical values at age 66, generated using our baseline model to isolate the effect of bequests and health shocks.
Source: Authors' calculations (see text).

Columns 1 and 2 compare the demand for annuities for retirees with a bequest motive, with and without health shocks. When health shocks are included, this has the largest impact on less-educated retirees, as they prefer to hold onto liquid assets in case they need nursing home care. Having to go on Medicaid would greatly reduce their consumption, so they prefer to avoid this if possible. In contrast, for the best-educated women, annuity demand rises when health shocks are included. This happens because they expect to have sufficient wealth to pay for nursing home care without Medicaid. They're less likely to need long stays and often recover faster, and they can manage health-related uncertainty by either buying bonds outside their 401(k)s or purchasing annuities that provide steady lifetime income. Not surprisingly, annuity demand is greater when people aren't interested in leaving bequests (Columns 3 and 4 versus 1 and 2). And finally, as anticipated, including health care costs reduces annuity demand for all groups (Column 4 versus 3).

Key results: Immediate versus deferred and fixed versus variable annuities

Next, we explore which retirees benefit the most if they can buy a deferred annuity starting at ages 75, 80, and 85, versus an immediate annuity. We also compare who benefits most from having access to a variable annuity versus a fixed annuity, where a variable annuity pays benefits linked to an underlying portfolio of mutual funds. Variable annuities aren't currently allowed in the context of U.S. DC plans, but they could be interesting for many retirees, as we show below.

Immediate versus deferred annuities: A deferred annuity can be more attractive than an immediate annuity because it pays higher benefits from a later age, for the same upfront cost. Therefore, it provides retirees with a lower-cost way to protect against outliving their money. For example, $100,000 would buy about $5,900 a year for life starting at age 67, but if payments started at age 80, the benefit would rise to $15,600 a year, and to $27,600 if starting at 85. The downside is that some retirees may not live long enough to reach the payout age.

We document that all groups we examine would have a lower demand for deferred annuities, compared to our immediate annuity base case. College-educated retirees still value them, but less-educated retirees with higher mortality are far less interested. Moreover, a college-educated woman lacking access to a deferred annuity paying benefits from age 80 would need $34,000 more in her 401(k) plan at age 67, to be equally well off as with the deferred annuity. Less-educated women prefer immediate annuities, due to this group's shorter life expectancy and higher nursing home risk early in retirement. For men, patterns are qualitatively similar, but their demand for deferred annuities is lower than for women. Coll+ male retirees would need only $11,500 more in their 401(k) plans (one-third as much as for Coll+ women) if their deferred annuities began paying from age 80 versus at age 67.

Fixed versus variable payout annuities: We next turn to an evaluation of variable payout annuities, where the lifetime payouts are linked to a mutual fund portfolio that offers both investment returns and insurance against outliving assets. Assuming the underlying portfolio consists of a 50/50 stock–bond mix, we see that most groups would demand additional annuitization, with the greatest increase among college-educated males and females where immediate annuity demand rises by about 10 percentage points. Among less-educated groups, the response is smaller.

Conclusions and implications

Our research confirms that payout annuities are quite valuable even when retirees face having to pay substantial LTC costs as they age. Annuities are particularly valued by the better educated who anticipate living longer, whereas the less educated have lower life expectancies and face a higher chance of needing nursing home care while young. As a result, the latter demand less lifetime income protection from annuities.

We believe that our work will interest both individuals and institutions seeking better guidance for those moving into and through retirement. Our results provide clear direction as to when to purchase these annuities, how much to purchase, and when the deferred benefits should start. In addition, some have expressed interest in helping integrate lifetime income protection into DC plans (e.g., Gale et al., 2008). Regulators will therefore benefit from our assessment of risks associated with DC plan payouts, along with a possible role for regulation to protect individuals from the downside risk of fluctuating capital markets, health care costs shocks and the risk of running out of money in retirement.

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