Journal of Financial Literacy and Wellbeing (2026), **4**, e3, 1–17
doi:10.1017/flw.2026.10012

CAMBRIDGE UNIVERSITY PRESS

ARTICLE

How do financial and longevity literacy affect annuity demand?

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(Received 19 January 2026 UTC; revised 21 May 2026 UTC; accepted 3 July 2026 UTC)

Abstract

Deciding whether to use an annuity to draw down accumulated retirement wealth is among the most complex financial decisions individuals face. It requires reasoning about longevity risk, stochastic income streams, and largely irreversible trade-offs, often at older ages and with limited opportunities to learn from experience. This paper reviews theoretical, empirical, and experimental research to examine how financial literacy and longevity literacy shape annuitization decisions. While some extensions of the standard lifecycle model can rationalize low annuity demand, their explanatory power depends on individuals' ability to optimize over a set of complex risks and trade-offs. Evidence shows that, although financial and longevity literacy are only weakly and inconsistently related to annuity take-up, they are strongly associated with retirement planning, the coherence of annuity valuations, and sensitivity to framing and choice architecture. These patterns suggest that literacy should be understood not as a direct determinant of annuity demand, but as a constraint on the extent to which observed annuitization behavior can be interpreted as revealing true preferences.

Keywords: guaranteed income; annuities; longevity; financial literacy; retirement

1. Introduction

This paper is motivated by an uncomfortable incongruency of two important strands of economic literature, both of which are highly relevant for thinking about the financial aspects of retirement. The first literature is about the decision of how to optimally draw down assets in retirement in the face of substantial uncertainty about length-of-life. The second literature focuses on the critical role of financial and longevity literacy as a form of human capital that enables better decision-making in such settings. These literatures differ markedly in their treatment of human ability to optimally make cognitively difficult decisions in highly complex environments.

The lifecycle model in economics makes strong assumptions about an individual's ability to evaluate complex tradeoffs, properly value highly uncertain and state-contingent cash flows and make optimal choices. In such a model, life annuities are typically an optimal solution to longevity risk. By pooling mortality risk, annuities provide an efficient mechanism for transforming wealth into guaranteed lifetime income. An influential literature shows that access to annuities can generate substantial welfare gains for risk-averse individuals facing uncertain lifespans (e.g., Davidoff et al. 2005; Yaari 1965). Yet despite these theoretical predictions, voluntary annuitization rates outside of Social

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Security and traditional pensions remain much lower than theory suggests, not only in the United States but across numerous countries (Cannon and Tonks 2008). This persistent gap between theoretical prescriptions and observed behavior – often referred to as the "annuity puzzle" – has motivated an extensive body of research seeking to understand why individuals appear reluctant to insure late-life consumption.

A parallel literature has documented widespread financial illiteracy among adults, including those approaching or in retirement (Lusardi and Mitchell 2023). Research consistently shows that many individuals lack a basic understanding of fundamental economic concepts such as compound interest, inflation, and risk diversification – concepts that are directly relevant to retirement planning (Lusardi and Mitchell 2011, 2014). Moreover, lower levels of financial literacy are associated with poorer financial outcomes across a wide range of domains, including saving, portfolio choice, debt management, and retirement planning more broadly (Hastings et al. 2013). A closely related literature on longevity literacy focuses on how effectively individuals think about issues related to the distribution of survival outcomes. Both concepts are potentially important for an individual's ability to make optimal annuitization decisions.

The juxtaposition of these literatures – one stressing perfect optimization and the other establishing that most people are incapable of engaging in such sophisticated decision-making – is intellectually uncomfortable. Nobel Laureate in economics Bill Sharpe has referred to the issue of how to optimally draw down assets in retirement as "the nastiest, hardest problem in finance."[1] If that is the view of one of the most brilliant minds in finance, imagine how hard the problem is for a worker who is unable to compute simple interest or who lacks a basic understanding of conditional survival probabilities.

It is hard to overstate the real-world significance of these issues. In recent decades, a well-known shift in the U.S. and many other economies from reliance on traditional defined benefit (DB) pension plans to defined contribution (DC) plans has placed increased responsibility for asset accumulation and decumulation decisions on individuals. While this transition has expanded individual choice and portability, it has also exposed tens of millions of households to a set of risks – most notably longevity risk, market risk, and sequence-of-return risk – that were previously pooled or insured within pension systems. As a result, retirement income security depends not only on how much individuals save, but also on how effectively they convert accumulated wealth into sustainable income streams. If individuals lack the human capital required to make these decisions optimally, then this has meaningful implications for how we design retirement plans and for the policy environment in which those plans operate.

This paper examines what we know about the relationship between financial and longevity literacy and annuitization decisions. A review of the literature indicates that there is not a robust correlation between literacy and the probability of annuitizing. Perhaps this should not be surprising: as discussed below, there are many trade-offs associated with annuitizing and thus the optimal decision for every individual is not necessarily to purchase annuities. Rather, financial and longevity literacy are likely to help individuals do a better job of determining whether additional annuitization is appropriate for them. As such, the sign of any correlation between financial and longevity literacy and annuitization is ambiguous, at least once one recognizes that the stylized full annuitization result from the literature is not a realistic guide to every individual's behavior.

The paper then turns to examining the role of literacy in mediating how other factors influence the annuitization decision. This more recent literature *does* find that higher financial literacy is positively associated with making better assessments of annuity valuation and of being less sensitive to framing and default options. These findings support

[1] https://www.bloomberg.com/opinion/articles/2017-06-05/tackling-the-nastiest-hardest-problem-in-finance

the idea that financial literacy is not directly a demand shifter, but rather a factor that enables better optimization.

An implication of this view is that it raises doubts about the validity of using revealed preferences as a guide to interpreting observed patterns of limited annuitization. If, as the evidence suggests, annuitization decisions are shaped by human capital limitations, framing, and institutional design – all factors that disproportionately affect individuals with lower levels of financial literacy – then one should not assume that the dearth of voluntary annuity purchases is evidence of well-defined preferences for non-annuitized wealth.

The remainder of the paper proceeds as follows. Section 2 reviews the standard lifecycle framework for annuity demand and discusses the insights and limitations of papers that seek to rationally generate low levels of annuitization. Section 3 then reviews evidence on financial literacy, longevity literacy, framing, and choice architecture, and examines the empirical findings to document how annuity decisions are shaped by individual capabilities and decision environments. Section 4 interprets these patterns by examining why literacy alone is insufficient to ensure fully optimizing annuitization behavior, focusing on cognitive constraints, aging, limited opportunities for learning by doing, market complexity, and the role of defaults. Section 5 discusses the implications of this analysis for retirement plan design and communication. Section 6 concludes.

2. Annuities in standard economic models

2.1. The lifecycle framework

The theoretical case for annuitization traces to Yaari's (1965) seminal work that incorporates mortality risk into a lifecycle model. Individuals are assumed to derive utility from consumption while alive and place little or no value on wealth at death. By pooling mortality risk across individuals, life annuities allow survivors to enjoy higher consumption than would be feasible under self-insurance through non-annuitized assets.

The stark result of a model with no bequest motive, access to actuarially fair annuities, and complete markets is that the consumer optimally annuitizes all of his or her wealth. The intuition behind this result is straightforward: if an individual cares only about consumption while alive, then an asset that pays more in states of survival and nothing in states of death will strictly dominate an otherwise comparable asset that pays regardless of survival. Mitchell et al (1999) show that, under such assumptions, access to actuarially fair annuity markets generates welfare gains equivalent to a 30 to 50 percent increase in non-annuitized wealth.

Davidoff et al. (2005) extend Yaari's result by showing that the optimality of annuitization does not depend on many of the restrictive assumptions typically imposed in the lifecycle literature. Whereas Yaari's original analysis assumes expected utility, time-separable preferences, actuarially fair annuities, and complete markets, they demonstrate that full annuitization remains optimal under much weaker conditions. In particular, they show that as long as individuals place no value on wealth at death and annuities provide a higher return to survivors than non-annuitized assets with comparable financial risk, annuitization dominates conventional assets even when preferences depart from expected utility and markets are incomplete. The key intuition is that annuities offer an arbitrage-like advantage by transferring resources from states in which wealth has no value (death) to states in which it does (survival), an insight that holds quite generally. This "mortality credit" (Milevksy 1998), which is the additional return one receives while living in exchange for the income stopping upon death, is the fundamental source of the welfare gains from annuitization.

Importantly, this more general analysis clarifies when departures from full annuitization may arise. When annuity markets are incomplete – such as when available annuity payout streams do not align well with desired consumption paths, or when annuities are illiquid in the presence of uninsured expenditure risk – partial rather than full annuitization may be optimal. Even in these cases, however, simulations suggest that optimal annuitization levels remain high across a wide range of plausible parameter values, thus deepening the puzzle posed by the observed low levels of voluntary annuitization.

2.2. Rational explanations of low annuitization rates

Over the decades, researchers have explored a wide range of extensions to the canonical lifecycle model in an effort to reconcile theoretically high annuity demand with the empirically low rates of voluntary annuitization. A comprehensive review of this literature is beyond the scope of this paper, but it is useful to highlight several prominent mechanisms that have been proposed and to briefly summarize their implications. Taken together, these studies relax key assumptions underlying Yaari's (1965) full annuitization result to illustrate how optimal annuitization may be reduced in more realistic settings, even if it is rarely eliminated altogether.

One line of research emphasizes the role of bequest motives. If individuals derive utility from leaving wealth to heirs, annuitization becomes less attractive because annuities typically eliminate or reduce the ability to bequeath principal. Lockwood (2012) formalizes this intuition and shows that sufficiently strong bequest motives – particularly when combined with uncertainty about medical expenditures – can substantially reduce optimal annuitization. Under some parameterizations, his framework can generate very low or even zero annuity demand, suggesting that bequest preferences may play a central role for some households. At the same time, whether the bequest motives are strong enough to fully explain observed annuitization behavior remains an empirical question and evidence is mixed.

A second set of explanations focuses on annuity pricing and market imperfections. Early work by Warshawsky (1988) and subsequent studies by Mitchell et al. (1999) and others document that private annuities are often priced above actuarially fair levels, reflecting administrative costs, adverse selection, and capital requirements. Higher pricing loads reduce the attractiveness of annuities relative to non-annuitized assets and can rationally lower demand. While actuarially unfair pricing can meaningfully reduce optimal annuitization, most calibrated models still predict positive annuity holdings unless loads are extremely high.

Relatedly, several authors highlight the importance of preexisting annuitization through public pension systems and employer-sponsored DB plans. Brown (2001) shows that when households already receive a substantial fraction of lifetime income from Social Security or DB pensions, the marginal value of additional private annuitization is diminished. In such cases, low demand for voluntary annuities may be consistent with optimizing behavior, even if annuitization remains valuable at the margin.

Other work emphasizes risk-sharing outside formal insurance markets. For example, Kotlikoff and Spivak (1981) show theoretically that implicit family arrangements – such as intra-household or intergenerational risk-sharing – can partially substitute for market-provided annuities. However, the extent to which such informal arrangements are reliable or sufficient late in life is uncertain and empirical evidence suggests that family risk-sharing may be incomplete (Attanasio et al. 2018).

A further rational explanation concerns heterogeneity in wealth accumulation. Many households approach retirement with relatively modest financial assets, limiting their ability to annuitize in a meaningful way. Poterba et al. (2011) document substantial

dispersion in retirement wealth and argue that for households with low balances, annuitization decisions may be of limited practical relevance. In such cases, low annuitization rates reflect constraints rather than preferences, although it does not address low annuitization rates among households with sufficient wealth.

Additional extensions address specific forms of market incompleteness, such as the lack of inflation protection, exposure to uninsured health risks, or concerns about insurer default. Brown et al. (2001) show that the absence of inflation-indexed annuities can reduce the desirability of annuitization, particularly for risk-averse households concerned about the stability of real consumption. Reichling and Smetters (2015) emphasize the interaction between longevity risk and stochastic medical expenditures, demonstrating that when individuals face uninsurable health shocks, retaining liquid, non-annuitized wealth can be optimal. Under certain assumptions, their framework can generate very low annuity demand, even in the absence of behavioral frictions. Briggs et al. (2026) illustrate that consumer beliefs about potential insurer defaults can also rationally reduce the demand for insurance products, including annuities.

2.3. Why rational explanations are insufficient

The rational extensions reviewed above demonstrate that low annuitization can arise within lifecycle models as various assumptions are relaxed. In this sense, these models narrow the gap between theoretical predictions and observed behavior and provide valuable insight into why full annuitization is unlikely to be optimal for many households. At the same time, whether these explanations are sufficient to account for observed annuitization patterns remains an open question.

One reason is that many rational explanations effectively shift, rather than fully resolve, the puzzle. For example, if bequest motives are central to explaining low annuitization, then it becomes necessary to understand why individuals with weak or absent bequest motives continue to avoid annuities. Similarly, if exposure to uninsured medical risk rationally discourages annuitization, this raises related questions about the low demand for insurance products designed to hedge those risks. In these cases, rational models often replace the annuity puzzle with secondary puzzles that themselves warrant explanation.

More fundamentally, rational explanations of low annuitization rest on the assumption that individuals are able to evaluate the relevant tradeoffs embedded in these models. Even when annuitization is reduced or eliminated, it is because individuals are presumed to be optimizing given their preferences, constraints, and beliefs. Whether this assumption provides an accurate description of real-world annuitization decisions is ultimately an empirical question, particularly in a setting that requires individuals to value stochastic lifetime income streams, reason about joint risks, and make largely irreversible choices.

This distinction is crucial: if individuals possess the knowledge and cognitive capacity required to navigate these tradeoffs, then low annuitization may reasonably be interpreted as reflecting informed preferences or binding constraints. If, however, individuals face limitations in understanding longevity risk, valuing lifetime income, or integrating complex financial information, then observed annuitization behavior may instead reflect constrained decision-making rather than well-informed choice (Benartzi et al. 2011). Under those conditions, the existence of rational explanations does not diminish the relevance of financial literacy; rather, it heightens the importance of determining whether individuals possess the human capital necessary to evaluate and act on those explanations effectively.

These competing interpretations also carry different policy implications. Rational models view low annuitization as the outcome of optimization under heterogeneous preferences, institutional constraints, and market imperfections, suggesting limited scope

for intervention beyond improving market efficiency. Behavioral models, by contrast, imply a greater role for nudges, simplification, framing, and financial education to support decision-making in complex retirement environments. Importantly, bounded rationality and limited financial literacy may interact with otherwise rational economic forces, jointly shaping observed annuitization behavior.

The sections that follow examine this issue by reviewing evidence on financial literacy, longevity literacy, framing, and choice architecture. This literature sheds light on whether individuals are equipped to make effective annuitization decisions and on how limitations in knowledge and decision capability may interact with otherwise rational economic forces to shape retirement income outcomes.

3. Financial and longevity literacy: evidence and mechanisms

A central feature of standard lifecycle models is that they abstract from the cognitive demands of the annuitization decision itself. Individuals are assumed to understand the trade-offs they face, to evaluate stochastic streams of income accurately, to understand the joint probability distributions of multiple risks, to know their own future preferences, and to optimize accordingly. Even when preferences, constraints, and decision-making tasks are complex, valuation is treated as conceptually straightforward. While this abstraction is useful for theoretical clarity – and for simplifying the mathematics of the model – it stands in sharp contrast to the real-world decision environment in which annuitization decisions are made.

In practice, annuitization requires individuals to compare a lump sum with a probabilistic stream of payments, to assess longevity risk, and to weigh liquidity, bequest, and other considerations, all in a context where choices are often irreversible and where opportunities to learn by doing are limited. These features create a natural role for individual capabilities – such as financial literacy, longevity literacy, and broader cognitive capacity – in shaping the quality of annuitization decisions. This section reviews what is known about these capabilities, the empirical evidence linking them to annuitization-related behavior, and the mechanisms through which they influence observed outcomes.

3.1. Financial literacy and annuitization

The concept of financial literacy has been developed most systematically in the work of Lusardi and Mitchell (2011, 2014, 2023), who define it as knowledge of and the ability to use fundamental financial concepts in economic decision-making, including decisions related to financial planning, wealth accumulation, debt, and retirement. Financial literacy is not simply familiarity with financial products, nor is it synonymous with education or intelligence. Rather, it reflects a form of human capital that enables individuals to understand key economic concepts, evaluate trade-offs over time and under uncertainty, and apply this knowledge in real-world contexts.

Rather than attempting to capture an exhaustive set of financial skills, Lusardi and Mitchell focus on three core concepts that are both foundational and widely applicable: compound interest, inflation, and risk diversification. These concepts are relevant across a broad range of financial decisions and are especially central to retirement planning. Importantly, standard economic models implicitly assume that individuals understand these concepts.

Empirically, financial literacy is most commonly measured using responses to a small set of survey questions designed to test understanding of these core ideas. The now-standard "Big Three" questions have been included in numerous surveys across countries and age groups, allowing for consistent measurement and comparison. Across a wide range

of settings, only a minority of respondents answer all three questions correctly. Even among individuals approaching retirement age, basic financial knowledge is often incomplete.

A robust finding in the financial literacy literature is that literacy is strongly associated with whether individuals engage in retirement planning and with the sophistication of that planning (Lusardi and Mitchell 2011, 2014). Individuals with higher levels of financial literacy are more likely to report having thought about retirement needs, attempted to calculate how much they need to save, and used formal planning tools such as calculators, seminars, or professional advisors. Conversely, individuals with lower literacy are more likely to report never having planned or to rely on informal advice and simple heuristics.

Although most planning measures focus on accumulation rather than decumulation, these patterns remain highly relevant for annuitization decisions. Annuitization typically occurs late in the lifecycle and is conditional on a long sequence of earlier choices. Individuals who have not developed a coherent framework for thinking about retirement income during the accumulation phase may reach retirement without a clear sense of desired consumption, the role of Social Security and pensions, or the risks associated with longevity and inflation. In such cases, annuitization decisions may be driven less by deliberate evaluation and more by inertia, default options, or decision avoidance.

The direction of causality may also run in both directions. While financial literacy may improve retirement planning and annuitization decision-making, individuals may also acquire financial knowledge through the process of engaging with retirement planning itself. As households begin to evaluate payout options, Social Security claiming strategies, or guaranteed income products, they may become more familiar with annuity concepts and longevity risk. This possibility further complicates interpretation of simple cross-sectional correlations between literacy and annuitization behavior.

Direct evidence linking financial literacy to annuity take-up is surprisingly limited, reflecting data constraints stemming from the relatively small size of voluntary annuity markets. Where annuitization is observed – such as within DC plans offering annuity options or in payout choices from DB plans – simple correlations between literacy and annuitization rates are not stable across studies. For example, Clark et al. (2011) find that higher financial literacy is associated with lower rates of annuitization in qualified plans, while Agnew and Szykman (2011) find that more financially literate individuals are less likely to choose an annuity over an alternative investment option, possibly reflecting overconfidence in investment ability.

Importantly, similar patterns of weak or counterintuitive correlations between financial literacy and annuitization have been documented in international settings, suggesting that these relationships are not unique to U.S. pension institutions but reflect more general features of annuitization decisions (e.g., Boyer et al. 2020; Butler and Teppa 2007; Goedde-Menke et al. 2014). These findings underscore the difficulty of interpreting annuity take-up as a direct measure of preferences or welfare and motivate closer attention to valuation, framing, and institutional context.

An additional complication is that annuitization decisions are often made at the household rather than the individual level. Brown and Poterba (2000) explore annuitization by couples with a well-defined joint utility function and show that risk-sharing within couples can reduce the demand for annuities. But the functional form of the joint utility function is a strong simplification of what is likely a more dynamic and heterogeneous approach to joint decision-making. Many empirical studies frequently observe annuitization choices for only one component of retirement wealth, such as a defined benefit pension or a particular retirement account, even though households may jointly optimize across Social Security, pensions, financial wealth, housing wealth, and spousal resources. Moreover, measures of financial literacy are typically collected from a single survey respondent despite the fact that retirement income decisions are often made

jointly within households. These considerations further complicate efforts to interpret observed annuitization choices as direct revealed-preference measures of underlying welfare.

3.2. Longevity literacy

Closely related to financial literacy is what recent research has begun to describe as *longevity literacy*, defined as individuals' understanding of lifespan risk and its economic implications (Yakaboski et al. 2023). Longevity literacy extends beyond knowledge of average life expectancy to include appreciation of the uncertainty surrounding length of life, the dispersion of survival outcomes at older ages, and the conditional nature of remaining life expectancy. From the standpoint of retirement income decisions, longevity literacy is particularly important because annuitization is designed precisely to insure against the risk of living longer than expected and thereby suffering a decline in consumption.

A growing empirical literature documents that individuals' knowledge of longevity risk is limited and often biased. Many people underestimate survival probabilities at advanced ages, while others express overconfidence in their ability to predict how long they will live (Hurd and McGarry 1995, 2002). Even when average subjective life expectancy aligns reasonably well with actuarial benchmarks, individuals frequently fail to appreciate the substantial probability of living well beyond the mean. This tendency to focus on point estimates rather than on the distribution of possible lifespans can lead individuals to underweight tail risk – the very risk that lifetime income products are intended to address (Gan et al. 2015). Evidence of biased survival beliefs and limited understanding of annuities is not unique to the United States; survey-based studies in Germany, for example, report similarly low levels of longevity and annuity-related literacy (Goedde-Menke et al. 2014). Recent experimental evidence suggests that longevity awareness can be improved through targeted informational interventions, although individuals vary substantially in how they process and retain such information (Hurwitz et al. 2022).

Related evidence suggests that limited understanding of annuities themselves further compounds these misperceptions. Goedde-Menke et al. (2014) show that *annuity literacy* – knowledge of how annuities function and what risks they insure – is low even among individuals with relatively high general financial literacy. Using survey data from a representative sample of German households, they find that lower annuity-specific literacy is strongly associated with reduced willingness to annuitize, even after controlling for subjective life expectancy, bequest motives, and other rational determinants of annuity demand.

Longevity literacy is only imperfectly correlated with standard measures of financial literacy. Understanding longevity risk requires grappling with the interaction of health, aging, and mortality, as well as with the conditional nature of remaining life expectancy. As a result, annuitization decisions may remain challenging even for individuals who are otherwise financially knowledgeable.

3.3. Framing, valuation, and choice architecture

Experimental studies provide evidence on the mechanisms linking literacy and cognition to annuity decisions. Brown et al. (2008) show that presenting annuities using a consumption-based frame – emphasizing guaranteed income for life – dramatically increases their perceived attractiveness relative to framing that emphasizes investment returns contingent on survival. Importantly, the underlying economic information is unchanged; only the framing differs. This result highlights the difficulty many individuals face in translating investment-oriented descriptions into consumption implications.

Similar patterns appear in Social Security claiming decisions, which can be interpreted as choices over the level of annuitized income. Framing these claiming decisions in terms of break-even ages induces substantially earlier claiming, while framing in terms of higher lifetime income or consumption leads to later claiming (Brown et al. 2016). Sensitivity to these frames is systematically greater among individuals with lower financial literacy and weaker numeracy, suggesting that framing interacts with underlying decision-making capacity rather than merely shifting preferences.

Complementary evidence comes from studies that focus on annuity valuation rather than annuity take-up. Brown et al. (2017) elicit individuals' willingness to buy and sell annuitized income streams and document substantial dispersion and internal inconsistency in valuations. A central finding is the presence of large buy–sell valuation wedges that cannot be explained by liquidity constraints or standard endowment effects. The magnitude of these wedges is strongly negatively correlated with numeracy, education, and financial literacy. Individuals with higher literacy appear better able to map annuity tradeoffs into a consistent economic metric, even if they do not ultimately choose to annuitize.

A related literature highlights the importance of institutional design and choice architecture in shaping financial behavior. Evidence from retirement savings shows that default options exert powerful influences on participation and asset allocation decisions (Choi et al. 2004; Madrian and Shea 2001). Analogous patterns appear in the decumulation phase. In settings where annuitization is the default payout option – such as traditional defined benefit plans or certain international pension systems such as Switzerland – annuitization rates are substantially higher than in plans that require individuals to actively opt out rather than opt in to annuitization (Butler and Teppa 2007).

3.4. Summary of empirical patterns

Taken together, the evidence reviewed in this section supports three broad conclusions. First, voluntary annuitization rates are low even among financially sophisticated individuals. Second, simple correlations between financial literacy and annuity take-up are not robust and can vary in sign across studies. Third, framing, valuation complexity, and default options exert powerful influences on annuitization-related behavior, with effects that are systematically larger among individuals with lower levels of financial and longevity literacy.

A natural interpretation of these patterns is that financial and longevity literacy should not be viewed primarily as demand shifters reflecting preferences for or against annuities. Instead, literacy appears to influence whether individuals can meaningfully evaluate annuitization choices, form stable valuations, and resist framing effects in environments characterized by complexity and uncertainty. This interpretation motivates the next section, which examines why even higher levels of literacy may be insufficient to ensure fully optimizing annuitization decisions.

4. Why financial literacy is not enough

The evidence reviewed in the preceding section indicates that financial and longevity literacy play important roles in shaping annuitization-related behavior, particularly through their effects on planning, the ability to value annuities, and sensitivity to framing and defaults. At the same time, the literature also makes clear that improvements in literacy alone are unlikely to resolve the annuity puzzle or to align observed behavior with the predictions of standard lifecycle models. This section discusses the role of cognitive constraints, learning limitations, market complexity, and institutional context.

4.1. Cognitive limits and the complexity of the annuitization decision

Annuitization decisions impose cognitive demands that extend well beyond the basic concepts captured by standard measures of financial literacy. Answering questions about compound interest, inflation, and diversification correctly indicates familiarity with foundational economic principles, but annuitization requires individuals to integrate these principles with probabilistic reasoning about survival, intertemporal trade-offs, and the valuation of irreversible commitments. Even in stylized experimental settings, individuals exhibit substantial difficulty forming stable valuations of annuitized income streams, suggesting that the challenge lies not only in a lack of information, but in limits to cognitive processing.

These difficulties are compounded by the timing of annuitization decisions. Retirement income choices are typically made at older ages, when declines in numeracy, memory, and processing speed become more prevalent (Agarwal et al. 2009; Boyle et al 2025). Importantly, even mild cognitive impairment adversely affects the quality of risk-related decision-making (Sinclair et al. 2023). As a result, even individuals who were financially sophisticated earlier in life may struggle to evaluate annuity products at the point when such decisions are most consequential. This limits the effectiveness of education-based interventions that presume stable decision-making capacity over the lifecycle.

4.2. Limited opportunities for learning by doing

A second constraint arises from the nature of annuitization as a decision problem with little opportunity for learning. Many financial decisions allow individuals to update beliefs and refine strategies through repeated experience and relatively rapid feedback. Annuitization, by contrast, is typically a one-time, or at least very infrequent, decision with delayed and noisy feedback. Whether an annuity "pays off" depends on realized lifespan, which unfolds slowly and cannot be observed counterfactually. Individuals therefore cannot easily learn from experience whether annuitization was a good decision, nor can they correct errors once the decision is made. Misunderstandings about longevity risk may even contribute to financial regret at older ages (Hurwitz and Mitchell 2025).

This absence of feedback interacts with limited literacy in important ways. Even well-designed educational interventions may struggle to improve decision quality when individuals lack opportunities to apply knowledge repeatedly or to observe the consequences of alternative choices. In such environments, individuals are more likely to rely on heuristics, rules of thumb, or salient cues rather than on fully articulated optimization. Annuitization decisions thus fall into a class of problems where bounded rationality is likely to be particularly salient, such as Medicare plan selection (Abaluck and Gruber 2011).

4.3. Market complexity and product heterogeneity

The structure of annuity markets further limits the extent to which financial and longevity literacy can translate into improved outcomes. Real-world annuity products differ along multiple dimensions, including payout profiles, inflation protection, survivor benefits, fees, liquidity provisions, and embedded options with a bewildering array of product names and acronyms, such as Single Premium Immediate Annuity (SPIA), Qualified Longevity Annuity Contract (QLAC), or Guaranteed Minimum Withdrawal Benefit (GMWB). Evaluating these features and comparing products across providers requires substantial information-processing capacity and imposes nontrivial search costs. Even financially sophisticated individuals may find it difficult to determine which features are welfare-relevant and how to weigh trade-offs among them.

In addition, pricing in annuity markets is often opaque, with costs embedded in spreads rather than presented as explicit fees. This complicates comparison across product types and may discourage participation. Evidence from a variety of other markets suggests that choice complexity can deter decision-making even among individuals with adequate knowledge (e.g., Iyengar and Lepper 2000), and similar forces are likely at work in annuity markets. As a result, low annuitization rates may reflect avoidance of complex and opaque products rather than informed rejection of longevity insurance.

These complexities also create a potential role for financial advisors and other intermediaries. Professional advice may partially substitute for limited financial literacy by helping households interpret longevity risk, evaluate payout trade-offs, and navigate product complexity. At the same time, reliance on advisors introduces additional concerns related to conflicts of interest, variation in advisor quality, and the extent to which households are willing or able to delegate high-stakes retirement income decisions.

4.4. Choice architecture and the limits of literacy

Finally, a large literature highlights the importance of institutional design and choice architecture in shaping financial behavior, often in ways that dwarf the effects of individual knowledge. Defaults exert powerful influences on participation and outcomes in both the accumulation and decumulation phases of retirement. In environments where annuitization is the default or a focal option, annuitization rates are higher than in systems that require individuals to actively opt in (Butler and Teppa 2007).

The power of defaults does not imply that individuals are indifferent to annuitization. Rather, it reflects the fact that when decisions are complex, irreversible, and emotionally salient, many individuals prefer to rely on institutional guidance rather than active deliberation. Financial literacy may increase individuals' willingness to override defaults when they have strong preferences, but it does not eliminate the behavioral influence of choice architecture. Annuitization outcomes therefore reflect not only individual capabilities, but also how systems allocate responsibility for complex decisions.

Taken together, these considerations suggest that financial and longevity literacy should be viewed as necessary but not sufficient conditions for effective annuitization decisions. Literacy improves individuals' ability to plan, to form coherent valuations, and to resist some framing effects, but it cannot fully overcome cognitive limits, learning constraints, market complexity, or the influence of defaults. As a result, low annuitization rates should not be interpreted simply as evidence of weak preferences for lifetime income, nor as a failure of education alone.

5. Implications for retirement system design

The evidence reviewed in this paper has implications for how annuitization behavior is interpreted and for how retirement income choices are structured and communicated, even if it does not point to a single optimal policy response. Low annuitization rates are not easily attributable to any single factor – such as weak preferences for lifetime income or insufficient education – but instead arise from the way complex decisions are embedded within real-world choice environments. This section offers some observations about what this means for the design of retirement systems, in particular with regard to the structure of retirement payout decisions. Additional discussion of implications for policy and plan design can be found in Hershfield et al. (2026).

5.1. Should employers offer annuities in retirement plans?

In policy discussions about whether employers should be required, or at least provided with incentives, to offer an annuity payout option to participants in their 401(k) plans, a common objection is essentially "why should we offer something that nobody wants?" A DC Plan Sponsor Survey from investment manager MFS, for example, found that a primary reason behind employers not offering an annuity option is the lack of demand from employees.[2]

The results of the research reviewed here suggest that one should be cautious using the lack of observed demand as evidence that individuals would not value access to lifetime income. When valuation is unstable, beliefs about longevity are malleable, and framing effects are large, observed choices may reflect difficulty navigating the decision environment rather than well-defined underlying preferences. In essence, observed annuitization choices may not provide reliable welfare inferences. Instead, annuitization choices may reflect avoidance of complex, irreversible decisions or reliance on defaults and heuristics (Beshears et al. 2008). From this viewpoint, annuitization behavior is better understood as the outcome of boundedly rational decision-making in a high-stakes, low-feedback environment, rather than as an expression of preferences.

5.2. Framing as an integral feature of retirement plan communication

Experimental evidence consistently shows that economically equivalent annuitization choices can elicit sharply different responses depending on whether they are framed in terms of investment returns, break-even horizons, or lifetime consumption (Brown et al. 2008; Payne et al. 2013). These framing effects are not confined to individuals with low financial literacy, although they are typically larger among that group.

Importantly, framing should not be viewed as a superficial feature of communication, but rather as an unavoidable aspect of translating complex financial products into a simpler choice environment. Any description of annuitization necessarily highlights certain attributes and deemphasizes others. The relevant question, therefore, is not whether framing influences behavior – it clearly does – but how different frames interact with individuals' cognitive constraints and beliefs about longevity to shape perceived value.

From this perspective, framing that emphasizes consumption outcomes may reduce cognitive burden by performing some of the integration that individuals otherwise struggle to do themselves. Conversely, framing that emphasizes mortality or break-even calculations may exacerbate known biases in longevity beliefs and further distort valuation. These insights help explain why similar annuity products may be viewed very differently across institutional settings, even when objective features are comparable.

Blanchett and Finke (2021) emphasize that guaranteed income may provide retirees with a psychological "license to spend" by increasing confidence that consumption can be sustained throughout retirement. This perspective reinforces the broader point that framing annuities in consumption terms may reduce cognitive burden and alter how individuals perceive retirement income security and may provide guidance to plan sponsors on how to communicate more effectively about payout options.

5.3. Choice architecture and literacy as complements

Evidence from both the accumulation and decumulation phases of retirement suggests that default options exert powerful influences on behavior (Choi et al. 2004; Madrian and

[2] https://www.businesswire.com/news/home/20250225378791/en/Plan-Sponsor-Confidence-in-Worker-Retirement-Readiness-Merits-Only-a-C-MFS-Survey-Reveals

Shea 2001). In the context of annuitization, defaults can effectively substitute for complex individual optimization by providing a focal outcome in environments characterized by uncertainty and cognitive limits.

This suggests that financial literacy is best viewed as a complement to, rather than a substitute for, institutional design. Literacy improves individuals' ability to engage with complex choices, but it does not eliminate cognitive limits, learning constraints, or emotional responses to mortality-related decisions. As a result, education alone is unlikely to produce annuitization outcomes that mirror those predicted by frictionless models. Instead, the effectiveness of financial literacy depends critically on the environment in which knowledge is applied.

The power of defaults does not imply that individuals are indifferent to annuitization. Rather, it suggests that when decisions are difficult, irreversible, and emotionally salient, many individuals prefer to rely on institutional guidance rather than active deliberation. Financial literacy may increase individuals' willingness to override defaults when they have strong preferences, but it does not eliminate the behavioral influence of default structures. Annuitization outcomes therefore reflect not only individual capacities, but also how systems allocate responsibility for complex decisions.

Of course, caution should be exercised when considering the use of defaults in the context of annuitization decisions because the cost of getting the default wrong can be quite high for individuals. Contrast default options for annuitization with that of a default for saving in a 401(k). In the case of saving, a person who is opted in to participating in a plan can choose to opt out at any time. Furthermore, they can even withdraw their money from their 401(k), albeit with a tax penalty. As such, the cost of reversing the default is relatively minor. In contrast, the nature of an annuity contract is such that it is generally an irreversible decision, or at least one that is extremely costly to reverse because annuity providers (i.e., the insurer) do not want to be adversely selected against as individuals learn private information about their mortality. Now imagine an individual retiring because they were diagnosed with a terminal disease with only a few months to live. Defaulting such an individual into an annuity would be extraordinarily costly to them (and almost surely form the basis for litigation by his or her heirs).

To partially address these issues, Gale et al. (2008) proposed a default option in which retirees have two years to "test drive" an annuity before the decision becomes irreversible. At least one company – TIAA – has offered a product along these lines, although evidence is limited on the causal impact of this offering (Brown et al. 2026). Horneff et al. (2025) suggest defaulting 20 percent of a retiree's assets over a minimum threshold to an immediate annuity, an approach they deem provides a "pretty good" level of lifetime income without imposing extreme costs on those who are defaulted inappropriately.

A different approach would be to offer more tailored forms of choice architecture that are not one-size-fits-all defaults. Allcott and Kessler (2019), in the context of home energy reports, find that the use of targeted nudges can have substantially larger welfare effects than uniform nudges, although implementing such approaches raises important practical and policy challenges, and thus it seems that more research would be warranted to understand how to optimally design such interventions.

Another idea is to use qualified plan balances to "bridge" the period between retirement and the start of delayed Social Security benefits. By providing income during the years prior to Social Security claiming, bridge products may help retirees capture the value of delayed claiming while simplifying the transition from asset accumulation to lifetime income.

5.4. Accounting for declining cognition in the timing of decisions

Financial literacy, cognitive ability, and longevity beliefs vary widely across individuals and evolve over the lifecycle. Annuitization decisions tend to occur around the point when cognitive decline becomes more prevalent and when the costs of error are highest (Agarwal et al. 2009; Banks et al. 2010).

This temporal mismatch complicates the interpretation of both behavior and interventions. Educational efforts undertaken earlier in life may improve knowledge, but their effects may attenuate by the time annuitization decisions are made. Conversely, decision environments that reduce reliance on late-life optimization may be better suited to accommodating heterogeneity in cognitive capacity. These considerations further reinforce the view that annuitization behavior cannot be fully understood – or improved – by focusing on individual literacy alone.

More broadly, these findings suggest that retirement policy should account for the possibility that observed choices reflect decision frictions as well as underlying preferences. Recent policy initiatives, including provisions in the SECURE Acts intended to facilitate lifetime income offerings within DC plans, can be viewed as attempts to improve the institutional environment in which retirement income decisions are made rather than as efforts to mandate annuitization itself.

One approach that addresses this tension would be to design products and plans in a manner such that the annuitization decision is made earlier in life or gradually along the way to retirement. For example, a number of retirement industry participants are now integrating annuities into target date retirement funds as a partial substitute for fixed income allocations.[3] This approach has the advantage of encouraging participants to think about the role of annuities as part of their portfolio when they are young and not yet subject to cognitive decline.

6. Conclusion and directions for future research

This paper has reviewed what is known about financial literacy and annuitization decisions, emphasizing the mechanisms through which financial knowledge shapes retirement income choices. Annuitization decisions are best understood as cognitively demanding valuation problems embedded within complex institutional contexts. Thus, financial and longevity literacy should be viewed not as direct determinants of annuity demand, but as constraints on the extent to which observed annuitization behavior can be interpreted as revealing preferences.

Financial literacy may improve individuals' ability to engage with retirement income decisions, but it does not guarantee that individuals are able to value annuities appropriately, nor is it likely to eliminate sensitivity to decision environments. Framing and defaults play central roles not just because individuals are uninformed, but because annuitization is an unusually demanding decision problem.

Recognizing these interactions helps reconcile the strong theoretical case for annuitization with persistent reluctance to annuitize in practice, without attributing observed behavior solely to preferences. It emphasizes individual decision-making capacities as well as the environments in which those decisions are made.

Future research would benefit from deeper integration of cognitive limitations and limited literacy into formal models of retirement income choice. The empirical literature could also pay closer attention to how heterogeneity in decision-making abilities and financial knowledge vary over the lifecycle, how they influence annuity valuations, and how they interact with institutional design.

[3] https://www.psca.org/news/psca-news/2025/12/new-tdf-embedded-annuity-launched-by-vanguard-tiaa/.

Acknowledgments. The author thanks Jason Fichtner, Annamaria Lusardi, Olivia Mitchell, and participants in the Stanford Financial Literacy Colloquia for helpful comments. The author is also grateful to three anonymous referees for their suggestions.

Conflict(s) of Interest. (i) The author is a Trustee for TIAA, a provider of annuities and guaranteed income products. (ii) AI-assisted tools were used solely for editing. All substantive analysis, arguments, and conclusions are the author's own.

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Cite this article: Brown, Jeffrey R. (2026). How do financial and longevity literacy affect annuity demand? *Journal of Financial Literacy and Wellbeing*. https://doi.org/10.1017/flw.2026.10012