



Definitions of **bold key terms** are at the end of this article.

## NADINE GATZERT

holds the Chair for Insurance Economics and Risk Management at the [Friedrich-Alexander-Universität Erlangen-Nürnberg](#) in Nuremberg, Germany. Her research focus includes enterprise risk management as well as the valuation of life and pensions products from the perspective of insurers and customers.

**Authors, Titles and Publication Dates of the Articles Addressed in the Insight**  
Maria Alexandrova and Nadine Gatzert. 2019. "[What Do We Know about Annuitization Decisions?](#)" *Risk Management and Insurance Review* 22 (1): 57–100.

Wei-Yin Hu and Jason S. Scott. 2007. "[Behavioral Obstacles in the Annuity Market.](#)" *Financial Analysts Journal* 63 (6): 71–82.

Philipp Schreiber and Martin Weber. 2016. "[Time Inconsistent Preferences and the Annuity Decision.](#)" *Journal of Economic Behavior and Organization* 129 (C): 37–55.

## Who Should Read This Insight:

Retirement investors, financial advisors, annuity manufacturers, regulators, policymakers

## Institute Research Agenda Topic:

New takes on the annuity puzzle

# Insight: THE ANNUITY PUZZLE: DRIVERS OF ANNUITIZATION DECISIONS, BEHAVIORAL BIASES, AND POTENTIAL SOLUTIONS TO UNDER-ANNUITIZATION

## IDEAS IN THIS INSIGHT YOU CAN PUT INTO ACTION

**Retirement investors** and their **financial advisors** should be aware of potential behavioral biases in decision-making when it comes to annuitization. Increasing this awareness could allow investors to make a more rational choice and could reduce retirees' longevity risk.

Regulators and policymakers should strengthen the pension-related education in the population, provide support in decision-making for people with lower income or less education, and help structure annuities so consumers can find them more easily.

**Annuity manufacturers** should aim to increase the attractiveness of their product designs by more effectively taking into account, or better communicating, factors such as a person's health status or the available amount of retirement wealth, and the impact of those factors on annuitization. Annuity plan providers should evaluate whether enhanced annuities could be part of their **annuity product** portfolio; enhanced annuities offer higher pension payments to individuals who have a reduced life expectancy. The product attractiveness could also be increased by offering cost-efficient bundled—but still simple and flexible—products that combine an annuity with more liquid investments or more long-term care components, for instance. Moreover, products that specifically account for behavioral biases in decision-making include annuities that offer a guaranteed minimum number of annuity payments as well as annuities that offer delayed payments starting in the future. In this context, a stronger focus could be laid on precommitment devices or early mandatory choices between a lump sum and an annuity, where individuals commit to an annuity at the time of purchase instead of at retirement, for instance, and where the decision can only be changed at a cost. Furthermore, occupational pension schemes should consider defining the annuity as the default option.

## PRINCIPAL INSIGHTS

In light of a growing elderly population in many countries, combined with an increasing life expectancy, annuities become increasingly important to avert old-age poverty by protecting people against **longevity risk**, or the risk of outliving their money. Life annuities insure against this risk by offering a lifelong guaranteed payment stream. However, despite the fact that early theoretical articles such as Menahem E. Yaari (1965) predict high **annuitization** rates, in the real world, people rarely choose to **annuitize** and annuitization rates remain on a low level; this situation is referred to as the **annuity puzzle**<sup>1</sup>. This puzzle raises questions

about relevant drivers of annuity demand, the role of behavioral biases, and solutions to potential under-annuitization.

To better understand the drivers of annuitization decisions, Maria Alexandrova and Nadine Gatzert collected theoretical, empirical, and experimental evidence from 89 research articles in their paper “What Do We Know about Annuitization Decisions?” Since the optimal annuitization decision also depends on other types of annuitization opportunities such as statutory pensions and other public transfers, the authors first discuss reasons and implications of mandatory annuitization. According to the majority of 13 articles on this issue, most of which are theoretical and a few empirical, mandatory annuitization is generally welfare-improving for society. Furthermore, depending on various personal factors, on the one side it can also be beneficial for individuals due to, for example, a reduction in the costs of incorrect annuitization decisions, commitment mechanisms in case of self-control issues, or behavioral drivers, among other reasons. On the other side, from less flexibility in decision-making on how to spend one’s wealth, or lower levels of disposable income, welfare losses may arise for people with bequest motives.

Alexandrova and Gatzert then contrast optimal annuitization rates predicted from theoretical models (18 articles) with empirical real-world observations (17 articles), where annuitization rates are generally defined as the portion of wealth invested in annuities. As one of the main results of their comparison, they conclude that the predictive capability of theoretical models has considerably improved over the years, and can much better explain the actual real-world annuity demand when taking into account additional factors such as, for example, bequest motives.

Moving to the individual’s perspective, the authors’ third and main focus is on studying 50 factors that may affect the attractiveness of annuities and thus each individual’s annuitization decision. Following previous literature, they sort these factors into the following categories (1) the rational factors arising from personal preferences and circumstances (e.g., bequest motive, risk aversion, income shocks), (2) the rational factors arising from environmental limitations (e.g., high administrative costs, inflation), and (3) the behavioral biases (e.g., cognitive difficulty in evaluating annuities, regret aversion).

The authors’ analysis shows that many of these factors have ambiguous effects on decision-making, depending on model assumptions or the empirical sample that is studied. For example, financial literacy and the level of education both have a clear positive impact on annuitization according to theoretical articles, while empirical and experimental articles show mixed results: individuals with better financial literacy and education have a higher level of general knowledge about financial products, including annuities, but that greater understanding also correlates with other drivers such as life expectancy level or income and wealth, which might themselves increase or decrease annuitization rates. Moreover, the authors find that the vast majority of the articles (72 out of 89) study rational factors arising from personal preferences and circumstances (25 of the 50 factors), with frequent focus on risk aversion, bequest motives, and level of wealth and liquidity problems, and that only a few of the articles include experimental settings. In addition, rational factors arising from environmental limitations such as high administrative costs or inflation are mostly studied theoretically and require more real-world support, whereas only 12 of the articles analyze behavioral biases, and even those focus mostly on only one or another of the biases, which hinders generalization and would require more work that is both theoretical and empirical.

Based on the identified drivers of annuitization decisions and the discussions in the articles they reviewed, Alexandrova and Gatzert present potential solutions to improve annuitization rates. From the state’s perspective, the authors discuss minimum levels of wealth

to be mandatorily annuitized as well as making the annuity a default option for occupational pension schemes. They also discuss the provision of annuities by the state, with an extension of public policies to support more annuitization, especially for people with lower income or who are less educated, and to improve pension-related education in the population. Annuities should also be easy to find and easier to acquire, since their availability is relevant for annuitization. In addition, to increase the attractiveness of the product design for private annuities as well as for occupational and statutory pensions, these products could be designed to take health or the amount of retirement wealth as well as the various behavioral biases into account. For example, so-called enhanced annuities that have high-quality underwriting offer higher pension payments to individuals with reduced life expectancies. Annuities could also be combined with more liquid investments, long-term care product components, as well as options to offer more flexibility and more choices, for example concerning the type and level of guarantees, in order to counteract behavioral biases. Annuities should also be cost-efficient since extensive pricing and high administrative costs represent a significant barrier.

Alexandrova and Gatzert conclude by pointing out the need for more research—for example, cross-country comparisons to study regulatory impacts—as well as for more analysis of important drivers such as inflation, current consumption level, asymmetry of retirement income in families, income volatility, and preference for leisure.

One of the few works focusing on behavioral biases in annuitization decisions is the article by Wei-Yin Hu and Jason Scott, “Behavioral Obstacles in the Annuity Market.” To explain the low annuity uptake, Hu and Scott use cumulative prospect theory, which is a theoretical model from behavioral economics that aims to describe actual choices by individuals faced with risky alternatives.

The authors mainly focus on two aspects: (1) mental accounting and (2) loss aversion. In the article discussed above, Alexandrova and Gatzert write, “Mental accounting describes the categorization and evaluation process for risky economic outcomes by an individual, who assigns these outcomes to different mental accounts and evaluates them separately, instead of assessing their overall impact on total wealth or total income” (p. 87). Applied to the annuitization decision, Hu and Scott state, “Mental accounting can cause a retiree to consider an annuity to be a distinct, risky gamble instead of a way of lessening the risk of having to reduce spending if one lives well beyond life expectancy” (p. 72).

Furthermore, loss aversion as a major concept in cumulative prospect theory implies that avoiding losses is preferred to obtaining equivalent gains in a fair gamble. Again applied to the decision for or against annuities, Hu and Scott (p. 72) emphasize that loss aversion is the “aversion to losses relative to a status quo (assumed to be the state of nonannuitization) can explain investors’ avoidance of annuities even when longevity risk is the only risk.”

In particular, they show that, under cumulative prospect theory, the maximum willingness to pay for an annuity is considerably lower than it is under standard expected utility theory, which does not take into account these behavioral biases, since loss aversion can considerably lessen the attractiveness of annuities.

Hu and Scott further study the impact of time discounting, which is especially relevant in case of **longevity annuities** whose payments start later in life (typically at retirement), despite being purchased today. The lower the discount, the higher the theoretically maximum acceptable annuity price. However, the authors suggest that, in practice, individuals probably underestimate this effect of compound interest rates. Furthermore, they use mental accounting to explain the attractiveness of period-certain annuities with a minimum

number of annuity payments, since “intuitively, the guarantee period minimizes the anxiety associated with possible early death after the annuity investment is made” (p. 77).

They also address various other behavioral factors, but do not provide numerical examples. Since they do not take into account stochastic dates of death but instead assume various potential ages of death of an individual purchasing an annuity, this might be a topic for future research.

Two main recommendations derived from their findings on behavioral biases is the suggestion that annuity providers should offer period-certain annuities with a guaranteed minimum number of annuity payments as well as longevity annuities with delayed payments starting in the future instead of only offering immediate annuities, where payments start immediately after purchase.

In their article “Time Inconsistent Preferences and the Annuity Decision,” Philipp Schreiber and Martin Weber focus on a behavioral bias by empirically studying time inconsistent preferences of individuals and the impact of those preferences on the decision between a single lump-sum payment versus a fair annuity that provides recurring monthly payments.

Time preferences are described by a hyperbolic time-weighting function, which uses a stronger discounting of payouts in the near future and a weaker discounting of payouts in the more distant future. This results in future payments being thought of as having less value than earlier payments. They use this approach to model and explain inconsistent or changing behavior over time.

Starting with hypotheses derived from a theoretical model, the authors conducted an online survey of people reached through a national newspaper in Germany with 3,077 participants aged 18 to 86 years.

In their survey, Schreiber and Weber distinguish between an immediate case, where participants choose between a lump sum paid out today and a fair annuity starting immediately, and the future case, where the choice is to begin receiving payments at retirement age. The present value of the lump sum is thereby calculated to be equal to the expected present value of the annuity, where standard discounting is used (i.e., a fixed interest rate to discount future payments).

Their results strongly indicate that time inconsistent preferences as described above, which are modeled through hyperbolic discounting, seem to be a key factor in explaining the observed lower annuitization rates of individuals closer to retirement, and that younger people especially should find annuities attractive.

From their findings, Schreiber and Weber derive three recommendations on how to increase annuitization rates. First, they suggest introducing precommitment devices to help reduce self-control problems, if these problems are why consumers choose the lump sum. In addition, introduction of those precommitment devices could help to reduce costs of information asymmetry due to private information about life expectancy and thus increase the annuity value for the buyer. Second, they suggest establishment of a mandatory choice between lump sum and annuity earlier in life instead of at retirement—a decision that can be reversed only at a cost. Third, they recommend screening mechanisms to identify the intertemporal time preferences of individuals (i.e., hyperbolic vs. non-hyperbolic decision-makers) would enable firms to charge higher prices to younger hyperbolic people who are willing to pay more for an annuity, which, in theory, could then be used to subsidize non-hyperbolic individuals and to reduce adverse selection, for instance.

Overall, time preferences seem to play an important role in annuitization decisions, as shown not only by the review in Alexandrova and Gatzert, but also by Hu and Scott from a theoretical perspective and by Schreiber and Weber from an empirical viewpoint.

1. Menahem E. Yaari, "Uncertain Lifetime, Life Insurance, and the Theory of the Consumer," *Review of Economic Studies* 32 (2): 137–50, <https://doi.org/10.2307/2296058>.

To learn more, visit the Retirement Income Institute at  
[www.allianceforlifetimeincome.org/retirement-income-institute](http://www.allianceforlifetimeincome.org/retirement-income-institute)

KEY TERMS ARE SOURCED FROM THE ALLIANCE FOR LIFETIME INCOME'S ANNUITIES LANGUAGE GLOSSARY AND INVESTOPEDIA

**Annuitization:** *The process of converting an investment into a series of periodic income payments by buying an annuity or beginning an income flow from an annuity.*

**Annuitize:** *When you turn your current account balance into a series of periodic income payments, either for a specific period of time or for your whole life.*

**Annuity:** *A financial product that can offer protected lifetime income and even potentially grow your money.*

**Annuity manufacturer:** *The insurance companies that produce annuities.*

**Annuity product:** *The types of annuities available.*

**Annuity puzzle:** *The annuity puzzle refers to the fact that few people choose to annuitize even a portion of their accumulated savings even though they have many good and rational reasons to do so.*

**Financial advisor:** *A qualified person who can help you understand your options and make financial decisions to work toward your financial goals.*

**Longevity annuity:** *Annuity with delayed payments starting in the future.*

**Longevity risk:** *The chance that you may live longer than your income will last.*

**Period-certain:** *A payout option that allows the annuity owner to choose when and how long to receive payments, which beneficiaries may also be able to receive.*

**Retirement investor:** *Someone who invests his or her own retirement savings, regardless of type.*

*For industry use only.*