



How people evaluate defined contribution, annuity-based pension arrangements: A behavioral exploration

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ABSTRACT

The shift from defined benefit (DB) to defined contribution (DC) private pension arrangements coupled with the widespread reluctance to annuitize retirement savings is causing growing economic concern in developed countries. This study considers the impact of the salient decision point made explicit in DC schemes, but masked in DB schemes; namely, the exchange of accumulated savings at retirement for a future income stream. We investigate issues affecting the evaluation of a potential annuity purchase at an aggregate level (whether the purchase provides value for money), at a disaggregate level (whether the income stream is adequate in meeting expected needs) and in terms of preferred patterns of future income stream. Our results indicate that annuities do not evaluate well on these criteria, but we provide insight for policy makers, product developers and financial advisors into the issues affecting such evaluations, and into the sort of changes that might make annuitization more attractive.

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1. Introduction

In recent years, private pension provision in many countries such as the UK and the US has moved from defined benefit (DB) to defined contribution (DC) schemes, partly driven by the costs of DB schemes given increased longevity (Watson, 2008). In DC schemes, contributions are invested in a pension fund, while working, that is then used to provide income in retirement; usually via an annuity, which insures against longevity risk.

There has been longstanding academic interest in annuities (e.g., Yaari, 1965), but despite theoretical innovations (e.g., Davidoff, Brown, & Diamond, 2005) there is a mismatch between the predictions of academic models and observed behavior. Davidoff et al. (2005) conclude that “[t]he near absence of voluntary annuitization is puzzling in the face of theoretical results that suggest large benefits to annuitization” (p. 1589). Given the key role of annuities in DC pensions, this lack of public enthusiasm for them is problematic, having a potentially adverse effect on pension saving and hence social welfare, as consumers seek other means of saving for retirement. Greater understanding of attitudes to annuities might help financial advisors and product developers better meet their customers’ needs.

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Descriptive behavioral models are now well established in many areas of economics and finance. In particular, [Hu and Scott \(2007\)](#) use a number of well-known biases (such as loss aversion and mental accounting) to explain the low demand for annuities. [Brown, Kling, Mullainathan, and Wrobel \(2008\)](#) show that people have a more positive attitude to annuity offerings when presented within a consumption frame, emphasizing the amount of money available to spend, rather than in an investment frame, making clear the inherent risk of annuity products. [Benartzi, Previtro, and Thaler \(2011\)](#) revisit behavioral explanations relating to mental accounting, loss aversion and framing to argue that the same behavioral and institutional factors that help understand savings behavior during the accumulation phase of the life cycle are also important in the decumulation phase. They conclude that “[c]ompared to the accumulation phase, much less is known, and many interesting puzzles are waiting to be solved” (p. 161).

We therefore take up the challenge, seeking to add to behavioral understanding of annuitization decisions by investigating attitudes at a decision point made salient in DC schemes. While DC savings and annuity purchase together produce a retirement vehicle conceptually similar to a DB scheme, the separation of these two aspects (savings and income generation) creates a novel and highly salient decision point where accumulated savings are exchanged for a future income stream. This prompts comparison at an *aggregate* level of evaluation (considering total values of the elements being exchanged); a comparison that is effectively hidden in a DB scheme, where the focus of evaluation is a *disaggregate* exchange of a percentage of salary saved regularly for a given percentage of salary received as a pension after retirement. The level of aggregation used in evaluating a pension plan is important, since behavioral studies (see, e.g., [Gourville, 1998](#)) have shown in other contexts that all levels of evaluation may not be used, potentially leading to sub-optimal outcomes. Our results indicate that people do not find the pensions provided by annuity-based DC schemes attractive, even when considering a substantially larger pension fund than is the norm.

The rest of the paper is structured as follows. We first discuss the theoretical background to annuities and the need for a behavioral approach to understanding the annuitization decision. We then consider how the level of aggregation used may influence the evaluation of annuities. Next we outline key features of the UK pension system, before moving onto discuss the data sample employed. We then provide empirical evidence relating to the issues raised, in particular the importance of aggregation levels. We also explore evaluations of annuity income stream patterns, with the aim of informing policy and providing insight for product designers and financial advisors. We conclude by discussing our findings and their implications.

2. Theoretical background to annuities

2.1. The puzzle in the existing literature on annuities

People saving for retirement are increasingly having to decide whether saving in a DC pension to purchase an annuity is an attractive option. There is a literature of considerable pedigree (beginning with [Yaari, 1965](#)) analyzing the purchase of annuities. This literature tends to use von Neumann–Morgenstern expected utility maximizers within Arrow–Debreu complete and incomplete market settings, and generally concludes that the reasons for the low level of voluntary annuitization observed are unclear. [Mitchell, Poterba, Warshawsky, and Brown \(1999\)](#), for example, conclude that even if the expected present discounted value of payouts from the annuity is only 75% of the purchase price, “individuals with preferences such as those modeled here would still prefer to purchase the annuity rather than pursue an optimal consumption strategy without such insurance products” (p. 1315). In light of this, [Finkelstein and Poterba \(2004\)](#) find the small size of the voluntary annuity market in the UK a puzzle, and outline a number of possible explanations: bequest motives; the prevalence of public sector social security programmes and private deferred benefit pension schemes; the need for buffer stock savings to pay for medical and long-term care needs; and poor value for money, due either to charges or to lower-than-average individual longevity. However such explanations seem inadequate to explain the disparity between theory and reality, and [Davidoff et al. \(2005\)](#) conclude: “These results suggest that lack of annuity demand may arise from behavioral considerations” (p. 1589).

2.2. Behavioral explanations of the low demand for annuities

Several behavioral explanations have been put forward; that loss aversion may deter people from annuity purchase because the potential loss for heirs should an annuitant dies early ([Mitchell & Utkus, 2004](#)); that people adopt excessive discount rates when evaluating future payments ([Warner & Pleeter, 2001](#)); that the low take-up of annuities may be due to a general tendency to prefer lump sums over flows of payments ([Munnell, Sundén, Soto, & Taylor, 2002](#), although evidence is mostly unrelated to annuity purchase).

In response to [Davidoff et al. \(2005\)](#), [Hu and Scott \(2007\)](#) develop a behavioral explanation for the unexpectedly low demand for annuities, by drawing on key ideas from the behavioral literatures: mental accounting ([Thaler, 1999](#)) and prospect theory ([Kahneman & Tversky, 1979](#)). If individuals adopt a narrow frame of reference and evaluate annuities in isolation from other retirement savings (i.e., in a separate mental account), then annuity purchase might be seen as a gamble that increases risk, rather than as longevity insurance. If the initial investment (i.e., the annuity cost) exceeds the value of payments received when the annuitant dies, the annuity gamble will be evaluated as a loss; while, if the reverse is true, the gamble will be evaluated as a gain. Post-mortem, evidently, the retiree cannot make this evaluation, but there is evidence that *anticipated* regret impacts on decision making generally (see [Zeelenberg, 1999](#), for a review) and that emotions influence

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