

# **Psychological Aspects of Decumulation Decisions: The Case of Tontine Insurance**

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## **Abstract:**

Decumulation decisions appear to cause difficulty for many investors, limiting demand for products such as annuities and reverse mortgages. The decumulation process is difficult because it entails two major risks: running out of money by spending too fast versus dying early and unintentionally leaving behind a substantial amount of unused funds. One product that appeared to address both sides of this risk tradeoff is tontine insurance, which became popular in the US in the late 1800's. While tontine insurance is now illegal in the US, an effort to understand the psychological factors like intertemporal optimism and perceived fairness that made tontine insurance so successful in the past may allow us to develop more effective approaches for the annuity products of today.

## Introduction

Much of the effort in behavioral approaches to financial decision making has focused on individuals' problems in failing to adequately save for retirement. However, there has also been recent recognition of the reverse problem: among individuals who do successfully save assets for retirement, the decision to appropriately decumulate (spend) those assets appears to be as difficult to implement as the original savings decision was. One implication of this difficulty is the low demand for products such as annuities and reverse mortgages.

One tool for managing the problem of retirement income is the use of a life annuity. The simplest form of a life annuity is the immediate single payer life annuity, where a consumer exchanges a lump sum for a guaranteed stream of payments for as long as he or she lives. Research on the appropriate level of annuitization, as well as potential explanations for the lack of demand for annuities, has attracted growing attention in the economics and risk literatures. Many of these approaches have focused on rational theories of annuitization (Yaari 1965; Davidoff, Brown, and Diamond 2005) and compared normative levels of annuitization against actual demand (Schulze and Poste 2009, Brown 2007, and Babbel and Merrill 2006). Other decumulation products, such as advanced life deferred annuities, longevity insurance, long term care insurance, and reverse mortgages have also been investigated; like annuities, economic analyses of these products suggest that actual takeup is far below normative levels (Fratantoni 1999, Rasmussen et al 1997, Venti and Wise 1991, Jacobs and Wessert 1987, Mayer 2000, Webb 2009). Recent work on decumulation has begun to focus on the psychological reasons for the low demand for annuity products (see Benartzi, Previtro, and Thaler 2011 for a review). For example, Hu and Scott (2007) model the annuity decision using cumulative prospect theory and are able to show that individuals with high levels of loss aversion are more likely to dislike annuities.

Rather than attempting to analyze what makes annuities and other decumulation products less popular than normative theory suggests, this paper approaches the problem by analyzing a decumulation product that was extremely popular among US consumers: namely, tontine insurance. The paper proceeds by first establishing the major problem that consumers are attempting to solve when managing retirement income, next describes the history of tontine insurance, and then analyzes the psychological principles of extreme outcomes, perceived

fairness, and optimism in intertemporal decisions that may have contributed to the popularity of tontine insurance. It ends by considering how some of these principles could be applied to current annuity products.

### **The Decumulation Problem**

What makes the decumulation process so difficult? Primarily it is a problem of risk tradeoffs for the individual. As the retiree contemplates the speed at which to spend accumulated savings, he faces two major risks: 1) that he runs out of money by spending too fast and living too long, or 2) that he lives frugally and dies early, unintentionally leaving behind a substantial amount of unused funds. The danger of outliving ones' savings is the dominant risk, especially when considering individuals' propensity to underestimate their longevity and recent trends in low savings rates and increased longevity. Decumulation products such as lifetime annuities, longevity insurance, and reverse mortgages provide a solution for this longevity risk; by converting assets into a lifetime stream of payments, the individual receives some level of certainty that he will never run out of income. However, the other side of the risk tradeoff, underuse of assets from dying early, remains, and this risk's negative perception is perhaps exaggerated by the fact that the assets exchanged for the annuity become the property of the financial institution rather than being left to heirs. To better understand the psychology inherent in such a risk tradeoff, and specifically to consider alternative approaches that may be psychologically more appealing, we turn to a historically successful decumulation product: tontine insurance.

### **Case study of tontine insurance**

One product that appeared to address both sides of the decumulation risk tradeoff is tontine insurance, which became popular in the late 1800's. The term "tontine" derives from the name of banker Lorenzo de Tonti, who is generally credited with inventing them to support spending by the French government in the 1650s. Tontines were the first government bonds issued anywhere in the world; for example, the British government issued tontines in 1693 to fund a war against France. However, tontines could sometimes be problematic for the

governments who offered them when average individual longevity increased beyond the life expectations built into the tontine's price. By the mid-18th century, investors figured out how to best take advantage of the system, and it became common to buy tontines for young children, especially young girls since they were expected to live longer. The result was a positive return for the households owning them but high costs for the government that had sold them. To address this problem, the structure of tontines were changed such that they were essentially self-funded; community members all paid an initial sum into the tontine, received small dividends, and then whatever funds remained after a pre-specified number of years were distributed to the remaining survivors. In some open-ended variations, the capital would all go to a single last survivor, thus dissolving the trust. As a result, the longer each member lived relative to other participants, the larger division of funds he or she received. Under this version of the tontine, both the issuer and the participants were protected against longevity costs.

Tontine insurance, sold by insurance companies in the United States, built upon the European idea of tontines with some important changes. Participants in these insurance plans paid an annual premium – one portion of the premium purchased insurance, while the other portion went into an investment fund managed by the insurance company for a specific time period (usually 20 years). If the individual died before the timeframe expired, his beneficiaries received a life insurance payout. If he was still alive at the end of the timeframe, he shared in a division of the entire accumulated amount of original funds and dividends with other fund survivors, where non-survivors were defined as both individuals who have died during the timeframe and individuals who had lapsed on their annual premiums. Issues of moral hazard were avoided since participants were part of “blind” national pools where other members of the same tontine fund could not be identified. Ransom and Sutch (1987), in their review of the history of tontine insurance, called it “life insurance where survivors won.” The product was extremely successful for the insurance companies; for example, Northwestern Mutual began offering tontine insurance in 1881, and doubled their business within 2 years. Estimates suggest that by 1905, tontine insurance may have been held by 50% of American households and totaled \$6 billion in value (Ransom and Sutch 1987).

The overwhelming success of the funds led to enormous amounts of money under discretionary management of the insurance companies, which government investigators claimed was being improperly used to enhance the “social status, political influence, and personal wealth

of industry leaders.” As a result of this misuse, tontine insurance was shut down in 1905 following the Armstrong Investigation. While tontine insurance is now illegal in the US, suggestions for tontine-like products that could be offered in today’s regulatory environment have been provided by Blake & Burrows (2001) and Lin & Cox (2005). Besides the benefits to the consumer of combined life insurance and longevity insurance, tontine insurance benefited the financial provider relative to traditional annuities by shifting longevity risk onto the customers themselves; the provider simply collected a fee to administer the tontine product. Ransom and Sutch (1987) sum up the product by writing, “Considered as a financial innovation, it was very successful. Considered as insurance, it was actuarially sound. Considered as a gamble, it was a fair bet in as much as there was no percentage for the house beyond a charge to cover administrative costs. Considered as a life-cycle asset, it proved to be an excellent investment, earning a rate of return substantially in excess of that generally available on other assets.”

### **Psychology of decumulation products**

Tontine insurance provides an interesting case study of a decumulation product that was popular among consumers, and an examination of the psychology that made them so successful offers useful insight into how current decumulation products might be changed to increase their demand. There are three main psychological benefits that were offered by tontines: protection from two different extreme outcomes (namely, early death and living too long), perceived fairness in fees, and intertemporal comparative optimism (i.e., how each individual expected to fare in the long run relative to other participants in the fund). Each of these psychological aspects of tontine insurance, and their applicability to the annuity market of today, is considered below.

#### *Uncertain futures and extreme outcomes*

Compared to other types of investments, tontine insurance offered the largest benefit when one of two aversive extreme outcomes occurred: the individual died early, or lived beyond the fund’s timeframe. This focus on extreme outcomes is consistent with work on how consumers saving for retirement prefer assets that cover extreme outcomes. Rather than thinking directly about risk, consumers think about distributions of outcomes; they then pay particular

attention to certain parts of the distribution that are important to them, such as extreme upside or downside risks (Goldstein, Johnson, and Sharpe 2008).

The decision to purchase a decumulation product requires consideration of several uncertain outcomes. For instance, among the most important uncertainties that impact the annuitization decision is life expectancy. An individual's ability to accurately judge life expectancy is inherently difficult due to the wide range of possible outcomes and the many unknown factors (health, accidents, etc.) that can influence it. However, beyond this inherent uncertainty, the way in which the individual approaches the judgment can also affect the resultant prediction. For example, thinking about how long one might "live to", as opposed to thinking about how soon one might "die by", can affect the resultant judgment by as much as ten years (Payne et al 2013). Other biases in this judgment also persist, such as the tendency for individuals to underpredict their chances of surviving to younger ages (e.g., 65-75) and overpredict their chances of surviving to older ages (85-95).

Other important sources of uncertainty are future interest rates and company default, which have become even more salient risks in recent years. Another important uncertainty is unpredicted expenditure shocks, such as the need for medical emergencies or long term care. Some research has suggested that retirees decumulate slower than optimal in an attempt to keep buffer stocks on hand for such emergencies (Borsch-Supan et al 2000). Finally, another major uncertainty concern for many individuals is the desire and ability to manage their own capital and expenses in retirement. Just as individuals overestimate their abilities in other domains, people are generally over confident in dealing with their ability to manage their investments during retirement. As consumers decide between decumulation products like annuities versus lump sum payments, highlighting of various uncertainties is likely to influence their decision in specific ways. Since individuals give less weight to outcomes in the more distant (uncertain) future and give outcomes in the present dramatically more weight, annuity choices clearly require consideration of uncertainty along with the intertemporal preferences discussed earlier.

A fuller understanding of how individuals think about extreme outcomes may help to suggest prescriptive solutions for increasing demand of decumulation products. When deciding on savings and decumulation products, consumers are often searching for protection from the two extreme events of early death and long life. Products already exist for each of these outcomes individually –life insurance for early death, and products like annuities or longevity

insurance (also called advanced-life delayed annuities) for long life. Both life insurance and longevity insurance are purchased through relatively small monthly payments during an individual's working years, in contrast to a traditional annuity, in which a single large payment of funds is exchanged usually after the individual is already retired. Little work has been done to examine whether a product designed to cover only one extreme outcome becomes more appealing when bundled with a product covering a different extreme outcome. Such a combined approach should have a significantly stronger appeal for the consumer, since both types of extreme outcomes are covered.

### *Perceptions of Fairness*

Tontine insurance benefited in the marketplace by appealing to consumers' desire for fairness in outcomes. Individuals have strong beliefs about fairness, with one of the principal rules being that it's fair for companies to charge fees that represent underlying actual costs (Kahneman, Knetsch, and Thaler 1986). One problem with traditional annuity products is that it may be perceived as unfair for the financial provider to keep the assets in the event of early death of the customer, even though such outcomes are fair from an actuarial standpoint. With tontine insurance, not only does a participant who dies early receive life insurance, he also has the knowledge that his portion of the assets in the fund will go to other participants rather than to the insurance company. The company receives only a flat fee for managing the fund, which may be perceived as significantly more fair.

Concerns about fairness are consistent with an "affective ease principle" which suggests that when individuals make choices, the weight of a specific attribute may depend on the ease with which the value of that attribute maps onto an affective (emotional) reaction. Substantial research on affective reactions has demonstrated that affect about options can affect both the valuation of outcomes and the weighting of outcome probabilities (see Rottenstreich & Shu 2004 for a review). For example, activities toward which people have negative feelings (e.g., nuclear power generation) tend to be judged as both high risk (probability) and low benefit (valuation) (Finucane, Alhakami & Slovic 2000); similar results have been found for financial products as well (Ganzach 2000). One example of an affective response in financial products is how feelings of fairness may lead consumers to accept or reject options.

Perceived fairness can be affected by underlying costs (Kahneman, Knetsch, and Thaler 1986; Baron and Maxwell 1996), bundled versus separate prices (Sheng, Bao and Pan 2007), and whether the underlying costs are variable or fixed (Nunes, Hsee and Weber 2004). And it is not only consumers who perceive that fairness is essential to smooth transactions in the marketplace. Market regulators are very interested in the principle of "transparency" - the extent to which buying and selling prices, fees, and other transaction information is available to consumers. Transparency increases market efficiency and improves investor confidence. A key concept in transparency is the idea of fairness:

*"The Commission has long believed that transparency - the real time, public dissemination of trade and quote information - plays a fundamental role in the fairness and efficiency of the secondary markets... transparency helps to link dispersed markets and improves the price discovery, fairness, competitiveness and attractiveness of U.S. markets." - SEC Market 2000 Study*

While economists have investigated how transparency (i.e., information availability) affects market prices and efficiency, little research has been done to see how perceptions of fairness affect market participation by consumers. Given our interest in increasing consumer participation in markets for various financial products (e.g., annuities, reverse mortgages), the issue of how perceived fairness (or lack thereof) reduces participation is an important one.

There are a variety of ways in which perceived unfairness can cause reactions within the marketplace. Markets can be constrained when the actions within them are perceived as unfair (Roth 2007), as participants appear to attempt to punish the unfair players. Work that has investigated whether firms and individuals are held to the same standards of fairness finds that firms are thought to be more unfair due to their larger wealth and power (Seligman & Schwartz 1997). Distinctions between firm and individual fairness has become even more salient as firms and individuals decide whether to walk away from their financial obligations in the midst of the current housing crisis (Thaler NYT 1/23/10); the government has encouraged homeowners to keep up payments since walking away is "not honoring obligations", while banks are free to act in their economic best interest. These different expectations of appropriate, or fair, behavior represent a "norm asymmetry" (White 2009) between firms and individuals. Finally, work on procedural fairness has demonstrated that individuals take the process by which outcomes are determined into account in their fairness judgments (Bies, Tripp, and Neale 1993). This suggests

that transparency is not only about prices and outcomes, as the SEC has assumed, but also about the actual process under which the market operates. Understanding whether consumers are willing to reward or punish firms based on perceived fairness, and how this impacts market participation, will assist us in designing interventions for complex financial decisions that unfold over long time periods.

### *Intertemporal optimism*

When considering outcomes that unfold over long time periods, as tontine insurance and annuities do, individuals must forecast their own uncertain futures. Consideration of future costs and benefits is a difficult psychological exercise, and can lead to multiple sources of bias. For example, future benefits are often less discounted than future costs (asymmetric discounting), and the shape of the discount function tends to be hyperbolic rather than exponential (Loewenstein and Prelec 1994). The other intertemporal forecast that individuals must consider in these decisions has to do with uncertainty relative to the future outcomes of other people. Especially for tontine insurance, in which one's future payments depend not only on your own survival but on the survival of the other people in the pool, any bias in judging own outcomes versus others' outcomes can lead to different willingness to purchase the product.

Substantial research on social comparative judgments has shown that individuals do make biased predictions for their own outcomes, in the direction of expecting more positive outcomes for themselves relative to similar others (Brown 1986, Suls, Lemos, and Stewart 2002). These effects include perceptions of being more athletic, better drivers, more polite, and better organized, but also include being less susceptible to heart attacks, being the victim of crime, and less likely to have other undesirable health problems (Alicke and Govorun 2005, Hoorens and Harris 1998). Such biases may affect the perceived benefits of a tontine plan if the individual believes he has a better chance of being one of the survivors and reaping the benefits that are associated with that outcome – in other words, a biased assessment of the probability of surviving will lead to a higher expected value for participating in the tontine.

Intertemporal choice, the study of decisions that span long timeframes, has been well recognized by both economists and psychologists as an important topic for savings and spending behaviors (see Loewenstein & Elster 1992 for a review). Intertemporal choice research has

looked at differential discounting of various outcomes types and found strong evidence that future costs are more heavily discounted than future benefits and that future effort (time) is more heavily discounted than future money (Soman 1998, Shu & Gneezy 2010; also see Soman et al. 2005 for a review). This work is consistent with resource slack theory, which argues that the difference in discounting is due to people's belief that they will have more free time (slack) in the future than they have in the present, and overprediction of future slack is stronger for time than money (Zauberman & Lynch 2005). Thus, future monetary benefits remain nearly as appealing as current benefits, while cost associated with effort diminishes as temporal distance increases. Rather than looking at discounting differences for time versus money, work on temporal distance has looked at perception of purely non-monetary benefits and costs in the short versus long run. For example, temporal construal theory suggests that individuals tend to focus on the desirability of an activity in the long run, but then switch to a focus on the feasibility of the activity as it approaches (Trope & Liberman 2003). Taken together these theories suggest that future costs (especially effort or time) are heavily discounted, while future benefits (especially non-monetary benefits) retain close to their full value.

While much research on intertemporal choice has focused on direct tradeoffs between an outcome now versus an outcome in the future, annuities have the property that they consist of streams of outcomes. In the case of annuities, consumers receive a stream of monthly income payments for the rest of their life. These payments can be identical payments each month or might adjust at predetermined times. While economists often assume that traditional discounting still applies to such streams of payments, it is not entirely clear that the psychology of thinking about a future outcome is the same for repeated outcomes as for single ones. For example, it may be the case that the recurrent aspect of the payments changes the discounting such that one payment becomes roughly equivalent to another, without appropriately adjusting for time differences. Consumers' tendency to collapse a stream of outcomes into a non-discounted "total payment amount" which is treated like an attribute in the choice process suggests that consumers are not considering the present value of the payment stream, but instead find it easier to add up the nominal amounts into an aggregate total (Shu 2007). Substantial work needs to be done to understand whether these existing theories of intertemporal choice, and especially discounting, apply to consumers' decisions about annuities and mortgages. Once a better understanding of implicit discounting in annuities and mortgages is acquired, additional research will be able to

offer prescriptive advice that can simplify the decision and allow description of options that better matches individuals' primary concerns. For example, interventions that increase salience of future outcomes which have been found useful in other domains where individuals' selective focus leads to non-optimal timing decisions could be tested (Shu 2008); such strategies are likely to be helpful in improving household financial decisions as well.

## **General Discussion**

Tremendous progress has been made in recent years in understanding how consumers make their saving and spending decisions, and behavioral economists have led the way in designing solutions to assist consumers in these accumulation decisions. However, less is understood about how consumers make decisions about financial decumulation. For example, we know relatively little about how a typical consumer pays attention to and comprehends the information in the typical annuity offering. We suspect that consumers are overwhelmed, myopic, and prone to judgment errors when trying to interpret such information, but more rigorous study needs to be applied to these decisions. In addition to studying typical errors, a successful program would seek to understand what protections, assistance, and/or information architecture could help consumers interpret information better.

A starting point for understanding the psychology of decumulation is to look at products that have been successful with consumers in the past, such as tontine insurance. The appealing aspects of tontine insurance continue to be psychologically sound and may also appeal to today's financial consumers. First, research on comparative optimism suggests that individuals' beliefs that they are less likely than their peers to experience disease or other risks makes the subjective expected value of the tontine's financial return very appealing. Second, the life insurance aspect of the product reduces anticipated loss aversion from forfeiture due to early death. Third, the perception that the assets deposited into a tontine product are shared among a group of other similar individuals, rather than forfeited to the institution, make the product feel more "fair" to the customer.

This document focuses on a few key ideas regarding the psychology of decumulation products: myopia in intertemporal choices, uncertainty and extreme outcomes, and fairness. There are several additional psychological factors that are highly relevant to these decisions and

are unaddressed here: specifically, context and framing effects, selective attention, task avoidance (including giving up altogether), the use of defaults and/or advisors, affective ease, heterogeneity of tastes and ability, and interactions of individual differences with choice interventions.

The investor psychology underlying tontine insurance can be used to generate proposed variations of decumulation products that may be more popular among consumer. For example, manipulating the number of other participants in any one tontine fund should affect both comparative optimism (the individual's subjective probability for outliving the other members) and the perceived fairness of the product. Perceptions of outcome probabilities can vary according to the size of the group that individuals are compared to, with people assessing their chances better in smaller groups. The use of small groups also contributes to perceived fairness, based on research that shows that "identifiable" individuals are deemed more worthy of charitable contributions than large "faceless" organizations. By perceiving the other members of a group as specific individuals, even if the actual identity of those individuals is unknown, the participant may feel more generous toward them and more willing to allow excess funds to be transferred to the group. Fairness perception can also be manipulated through group identity manipulations – consider, for example, the popularity of group affiliations for stimulating peer-to-peer lending on websites like Prosper.com. Other products which may similarly benefit from these types of fairness and optimism manipulations may include peer-to-peer reverse mortgages and continuing care retirement communities. By better understanding the psychology of successful annuity products like tontines, we become better able to develop effective marketing approaches for the annuity products of today.

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