Securing Lifelong Retirement Income: Global Annuity Markets and Policy

EDITED BY

Olivia S. Mitchell, John Piggott, and Noriyuki Takayama

OXFORD
UNIVERSITY PRESS

OXFORD
UNIVERSITY PRESS

Great Clarendon Street, Oxford OX2 6DP

Oxford University Press is a department of the University of Oxford.
It furthers the University's objective of excellence in research, scholarship,
and education by publishing worldwide in

Oxford New York

Auckland Cape Town Dar es Salaam Hong Kong Karachi
Kuala Lumpur Madrid Melbourne Mexico City Nairobi
New Delhi Shanghai Taipei Toronto

With offices in

Argentina Austria Brazil Chile Czech Republic France Greece
Guatemala Hungary Italy Japan Poland Portugal Singapore
South Korea Switzerland Thailand Turkey Ukraine Vietnam

Oxford is a registered trade mark of Oxford University Press
in the UK and in certain other countries

Published in the United States
by Oxford University Press Inc., New York

First published 2011

British Library Cataloguing in Publication Data
Data available

Library of Congress Cataloging in Publication Data
Data available

Typeset by SPI Publisher Services, Pondicherry, India
Printed in Great Britain
on acid-free paper by
MPG Books Group, Bodmin and King's Lynn

ISBN 978–0–19–959484–9

1 3 5 7 9 10 8 6 4 2

Chapter 5

The United States Longevity Insurance Market

Anthony Webb

Although the annuity market in the United States is well developed by international standards, households rarely voluntarily annuitize any of their wealth. Most of the longevity insurance enjoyed by American households is provided by Social Security and defined benefit (DB) pensions. Social Security pays benefits in the form of a lifetime inflation-protected annuity, while DB pensions, until recently, typically paid benefits in the form of a nominal annuity. While these sources of longevity insurance are declining in importance over time, it is also true that only a very small proportion of households voluntarily annuitize, and a majority appears to show a strong preference for converting annuity income into lump sums.

In what follows, we first discuss theoretical calculations of the value of annuitization. We argue that, once account is taken of pre-annuitized wealth, longevity risk pooling within marriage, and the risk posed by uninsured medical costs, the value of annuitization may be less than sometimes believed. Next, we consider why households appear to be so reluctant to annuitize. Then, we turn to a discussion of the US annuity market in more detail, along with product innovations. We conclude by considering policy options to increase annuitization rates.

Theoretical calculations of the value of annuities

In the absence of annuities, households must trade off the risk of outliving their wealth against their desire to maximize lifetime consumption. An annuity is said to be actuarially fair, or to have a money's worth ratio (MWR) of one, if the benefit stream discounted by an interest rate and annual survival probabilities equals the premium paid. An actuarially fair annuity enables a risk-averse household facing an uncertain life span to increase lifetime consumption, because it is able to offer a rate of return in excess of that obtainable on equivalent unannuitized investments. But in practice, annuities are not actuarially fair; they also involve a loss of liquidity. This lack of liquidity may be a particular disadvantage in the

United States, where most households face substantial uncertainty as to the level of their out-of-pocket health care costs.

A series of papers has attempted to calculate the actuarial unfairness of annuities around the world, to investigate whether the longevity insurance they provide is sufficient to outweigh that actuarial unfairness, and to determine optimal annuitization strategies. The latter calculations require computationally intensive numerical optimization techniques, and it is only in the past two or three years that models have begun to incorporate the level of realism required to support financial planning recommendations. A first paper to calculate the value of annuities and take account of the value of the longevity insurance they provide was by Mitchell et al. (1999). Assuming constant relative risk aversion (CRRA) utility with plausible coefficients of risk aversion, they calculated that the value of the longevity insurance to single individuals with no pre-annuitized wealth greatly exceeded plausible estimates of the actuarial unfairness of annuities. The value of this longevity insurance was lower, but it was still substantially greater than the estimates of actuarial unfairness, when an assumed 50 percent of wealth was held in pre-annuitized form – for example, through Social Security and DB pensions. The small size of the US annuity market was therefore somewhat puzzling. Brown and Poterba (2000) extended the analysis to married couples, and they found that longevity risk pooling within marriage substantially reduced the value of annuitization.

A follow-on study by Dushi and Webb (2004) analyzed data from the Health and Retirement Study, a panel of Americans born between 1931 and 1941, and it found that the average household held much more than half of its wealth in pre-annuitized form. Again assuming CRRA utility, the value of annuitizing the small remaining proportion of wealth held in unannuitized form was now barely sufficient to offset the actuarial unfairness of annuities.[1] Those that did annuitize were found to be better off delaying until their late 70s or early 80s.

These earlier models assume that the household faces no uncertainty regarding the marginal utility of consumption during retirement, and that the household has no bequest motive. It is unclear to what extent most households have a bequest motive, and we believe it is unlikely that the marginal utility of consumption remains constant during retirement. Households may prefer greater consumption at younger ages, when they are better able to enjoy leisure pursuits, and marginal utility may spike in the event of uninsured medical expenses. Models are only now being developed (Pang and Warshawsky 2008; Turra and Mitchell 2008; Yogo 2009) that incorporate the risk of incurring uninsured medical expenses. But these sophisticated models do not as of yet fully incorporate the house, an asset that plausibly functions as self-insurance against one of the largest sources of uninsured medical costs, namely the cost of long-term care.

These earlier models are also sensitive to assumptions made regarding interest and mortality rates. One alternative would be to use population mortality tables, but many high-mortality households have little annuitizable wealth. Conversely, households that actually purchase annuities tend to have much lower than average mortality. The results also depend upon the assumed interest rate on alternative investments. One alternative might be to use the Treasury STRIP interest rate, on the grounds that a portion of annuity payments is protected by state-level guarantees, but one might choose the term structure of high-grade corporate bonds if that is the household's alternative investment. One must also decide whether to take the average of the prices charged by all insurance companies, or to assume that the household shops around, and what assumptions to make about the level of management charges on alternative investments.

From a modeling standpoint, then, it is possible to construct a model in which many households might choose not to annuitize. Nevertheless, the almost total absence of voluntary annuitization in practice is still somewhat puzzling. In 2007, immediate annuity sales excluding structured settlements totaled only $6.8 billion in the United States compared with the approximately $458 billion of initial Social Security benefit claims in 2008 expected present value.[2] This has led to a considerable discussion of both rational and behavioral explanations for non-annuitization. Brown (2007) summarizes the principal candidates, and the behavioral reasons appear to go beyond mere inertia. Evidence from the Health and Retirement Study suggests that many near-retirement-age respondents state a preference for receiving a lump sum in place of the annuity from Social Security, even when the lump sum is favorably priced relative to its actuarial value (Brown 2009). One explanation might be that households are simply incapable of making the necessary actuarial calculations, but it is also possible that households frame the decision not as an opportunity to retain valuable longevity insurance but as a risky gamble that the household will lose if it dies young. A controlled experiment by Agnew et al. (2008) supports this view. Individuals who received a presentation that emphasized the benefits of annuities were significantly more likely to annuitize than those who received a presentation emphasizing the benefits of unannuitized investments. Yet, the authors found that the financially literate were actually less likely to annuitize. Perhaps the more financially sophisticated, or those who believe they are more financially sophisticated, overestimate their investment abilities or are less willing to relinquish control over their investments. It is noteworthy that the one annuity type that has enjoyed substantial sales is the deferred annuity, a product with a cash surrender value, even though it provides a lower retirement income than an immediate annuity.

The declining role of Social Security and DB pensions

US nationals have traditionally obtained most of their longevity insurance from Social Security and DB pensions. Both of these sources of retirement income are declining in relation to preretirement income. Social Security is a mainly pay-as-you-go social insurance program funded by a payroll tax. Retired worker benefits can be claimed at any age from 62 to 70, and they receive an inflation-indexed annuity. The benefits of individuals claiming before their full retirement age are actuarially reduced, and those of individuals claiming after their full retirement age are actuarially increased. The normal retirement age was 65 for individuals born before 1938, but it has been gradually increased to 67 for individuals born after 1959. This increase is equivalent to a 13.3 percent cut in benefits for individuals who claim benefits at age 65.

Increased female labor force participation has further reduced Social Security replacement rates. Married women are entitled to claim the greater of their own retired worker benefit and a spousal benefit, which, if claimed at the wife's full retirement age, equals one half of the husband's benefit payable at his full retirement age.[3] If the wife is still better off claiming spousal rather than retired worker benefit, an increase in female earnings reduces the replacement rate by increasing the denominator (the household's earnings), but not the numerator (Social Security benefits).

In the long run, Social Security replacement rates may fall still further.[4] Prior to 1984, Social Security benefits were not subject to income tax. From 1984 until 1993, 50 percent of benefits became potentially taxable for single individuals with incomes of more than $25,000 and married couples with incomes over $32,000. Beginning in 1994, the maximum taxable proportion was increased to 85 percent. Importantly, the tax thresholds were not indexed, so increases in nominal incomes result in an increasing proportion of retirees facing taxation of benefits.

Historically, DB pensions have been an important source of longevity insurance in the United States, traditionally providing benefits in the form of a nominal annuity. But there has been a dramatic increase in the proportion of DB pension plans that offer a lump-sum option – up from 15 percent in 1995 to 52 percent in 2005 (BLS 1995, 2005). Although DB pension plans over the past twenty years still predominate in the public sector, they have largely been displaced in the private sector by 401(k) and other defined contribution (DC) plans. Figure 5.1 shows the percentage of private sector workers with pension coverage who have a DB, DC, or both types of plan.

Brown and Warshawsky (2004) forecast future DB pension plan coverage and annual benefit payments from a base year of 1999, using the Pension Benefit Guaranty Corporation Pension Insurance Modeling System. They

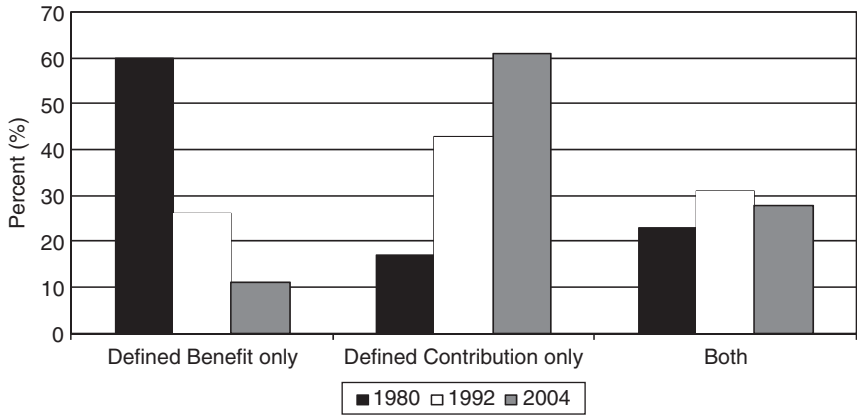

Figure 5.1 Fraction of workforce covered by pension plan of given type over time. *Source*: Authors' calculations; see text.

forecast that the number of active plan participants will remain stable at 11 million over the twenty-year period, while annual benefits will increase in inflation-adjusted terms from $94 billion in 1999 to $160 billion in 2019. If a large proportion of participants exercises the newly acquired right to take benefits in the form of a lump sum, then benefits could actually fall in real terms, even without an accelerated decline in DB pension plan coverage.

The extent to which the displacement of DB by DC pension plans reduces annuitization rates will also depend on the extent to which individuals voluntarily annuitize their DC plan balances. This is because, in contrast to other countries (e.g., the United Kingdom, which, prior to April 2006, required participants in DC plans to annuitize their plan balances by age 75 at the latest), there is no legal requirement for participants to annuitize at any age. After attaining age 59½, individuals may withdraw their balances without penalty. Starting in the year that they attain age 70½, they must take a 'required minimum withdrawal' of an amount equal to their plan balance divided by their remaining life expectancy, as specified in unisex life tables published by the Internal Revenue Service (2009).

Currently, only 20 percent of plans offer an annuitization option and only 2 percent of participants exercise it (Reno et al. 2005).[5] But Brown (2001) found that 48 percent of Health and Retirement Study households stated that they expected to annuitize at least part of their DC account balances. The first cohort with substantial DC account balances has yet to reach the point when mortality credits become substantial, and it is possible – but probably unlikely – that the remaining households will eventually act in accordance with their stated intentions.

The individual annuity market

The United States is one of the few countries with a significant private annuity market.[6] Poterba (2001) documents the history of annuities in the United States. Published statistics on the current size and recent growth of the individual annuity market give a highly misleading picture of the extent to which households are voluntarily purchasing longevity insurance. This is because the overwhelming majority of annuity purchases are so-called deferred, as opposed to immediate, annuities.

Deferred annuities are investment products that give the policyholder the option to annuitize, but they also permit prior withdrawal of the investment.[7] It seems likely that only a small percentage of deferred annuity holders will eventually exercise the annuitization option. For instance, Brown and Poterba (2006) report that only about 1 percent of holders currently receive annuity payments. Reno et al. (2005: 78) report that in 2004, about $10 billion of deferred annuities was converted into immediate annuities. They typically give the right to receive a guaranteed minimum payment for life. For example, 5 percent of the premium, a right that has provided considerable protection during the recent market downturn. But they lack the essential feature of immediate annuities that enables them to give an enhanced income return over similar unannuitized investments, namely the reallocation of wealth from those who die young to those who live unusually long. In consequence, they offer a lower guaranteed lifetime income than an immediate annuity, but they also have a cash surrender value. The amount of that surrender value will depend on withdrawals taken, investment returns, the guarantees provided, and the insurance company charges associated with both investment management and the provision of these guarantees. Trading off lower income in return for the option to surrender for cash may be attractive to households with a bequest motive and who place some value on liquidity.

Although voluntary purchases of immediate annuities have increased in recent years, the increase has been insignificant in relation to the amounts of longevity insurance provided by Social Security and DB pensions. Table 5.1 reports sales of various annuity types, in billions of dollars, from 1996 onward. Sales of variable deferred annuities predominate. Total immediate annuity sales increased from $3.0 billion in 1996 to $6.8 billion in 2007. Variable immediate annuity sales represented 5 percent of total immediate annuity sales in 1996. This proportion peaked at 21 percent in 2000 before steadily dropping over the decade to a low of 1 percent by 2008. Industry representatives have attributed the decline in variable immediate annuity sales to competition from deferred annuity products with income and withdrawal guarantees.

The taxation of annuities depends on whether they are purchased with taxed (non-qualified) or tax-deferred (qualified) wealth (such as IRA or 401(k) balances). If they are purchased with tax-deferred wealth, both the

TABLE 5.1 Annuity sales by product types for the period 1996–2008 (dollars in billions)

Annuity type	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total variable annuities	74.3	88.2	99.8	123.0	137.4	113.3	15.0	129.4	132.9	136.9	160.4	184.1	155.6
Variable immediate annuities	0.2	0.2	0.3	0.5	0.8	0.7	0.6	0.5	0.3	0.3	0.4	0.3	0.1
Variable deferred annuities	74.1	88.0	99.5	122.5	136.6	112.6	14.4	128.9	132.6	136.6	160.0	183.8	155.5
Total fixed annuities	38.0	38.2	32.0	41.7	52.7	74.3	103.3	89.4	87.9	79.5	78.3	73.0	109.4
Fixed immediate annuities	2.8	2.8	2.1	2.4	3.0	3.6	4.8	4.8	5.3	5.3	6.1	6.5	8.0
Fixed deferred annuities	32.8	32.7	26.6	35.3	44.7	64.7	92.6	78.6	76.6	68.3	66.3	60.3	95.1
Structured settlements	2.4	2.7	3.3	4.0	5.0	6.0	5.9	6.0	6.0	5.9	5.9	6.2	6.3
Total immediate annuities	3.0	3.0	2.4	2.9	3.8	4.3	5.4	5.3	5.6	5.6	6.5	6.8	8.1

Source: Beatrice and Dinkwater (2007) and LIMRA International (2008*b*).

income and the capital components of the annuity income are subject to tax. But if they are purchased with taxed wealth, the portion of the annuity payments that represent the return of that capital is excluded from tax.[8] Table 5.2 analyzes immediate annuities between qualified and non-qualified sales. There appears to be no clear trend pattern in the data.

Annuity money's worth in the United States

James and Song (2002) calculated the MWR for the United States and seven other high- and middle-income countries, and the author found that the MWRs for the average annuitant exceed 95 percent in almost every country when discounting at the risk-free Treasury rate. Among annuitants, the money's worth for the United States, the United Kingdom, and Canada, which operate in the freest markets, was found to be less than that of Switzerland (120 percent) and Israel (109 percent), which operate in quasi-mandatory, heavily regulated systems. Gong and Webb (2010) found that money's worth figures exceeded 100 percent of the premium paid to households with annuitant mortality when the income flow was discounted using either the Treasury STRIP or the term structure of the AA corporate bond interest rate.[9] They were around 100 percent for households with population-average mortality when the Treasury STRIP interest rate was used, and came close to 100 percent when the AA corporate bond interest rate was used. The money's worths were higher than those calculated by Mitchell et al. (1999) using 1995 data, perhaps because Gong and Webb (2010) use institutional prices, though it may also reflect a long-term trend toward higher money's worths documented by James and Song (2002).

Annuity product innovation

A number of product innovations in both the immediate and deferred annuity market have appeared recently. Next, we review these in the immediate annuity market, though sales have been modest, and to date most are for traditional nominal annuities.

Variable immediate annuities

Traditional fixed annuities have bond-like investment characteristics, in that they provide a guaranteed fixed income. In contrast, variable immediate annuities provide a lifetime income, the amount of which depends on the performance of an underlying fund. If the return on the underlying fund exceeds a certain target rate, typically around 4 percent, the annuity income increases. If the return falls short, the annuity income declines.

TABLE 5.2 Immediate annuity qualified and non-qualified sales 2001–6

Annuity type	2001		2002		2003		2004		2005		2006	
	Amount	% of total	Amount	% of total	Amount	% of total	Amount	% of total	Amount	% of total	Amount	% of total
Variable immediate[a]												
Qualified	481	67.9	378	62.2	237	45.8	146	52.1	87	29.5	145	39.7
Non-qualified	227	32.1	229	37.8	281	54.2	134	47.9	208	70.5	220	60.3
Total	708	—	607	—	518	—	280	—	295	—	365	—
Fixed immediate[a]												
Qualified	1.8	50	1.5	31	1.2	25	1.2	23	1.4	26	1.9	31
Non-qualified	1.8	50	3.3	69	3.6	75	4.1	77	3.9	74	4.2	69
Total	3.6	—	4.8	—	4.8	—	5.3	—	5.3	—	6.1	—

[a] Amounts of variable immediate annuities measured in millions of dollars; amounts of fixed immediate annuities measured in billions of dollars.

Source: Beatrice and Dinkwater (2007) and LIMRA International (2008*a*).

Variable immediate annuities overcome an argument in favor of deferred annuitization (Milevsky 1998; Milevsky and Young 2007), namely that at younger ages, households are better off foregoing mortality credits in order to obtain the benefit of the equity premium. With variable immediate annuities, households can enjoy both.

There would seem to be a strong case that retired households should invest at least part of their wealth in variable immediate annuities. According to both economic theory and the recommendations of financial planners, households should invest mainly in stocks when young and rebalance in favor of bonds as they age.[10] Most life-cycle funds have a significant equity allocation at the age of retirement. It is unlikely to be optimal to switch from a mixed equity/bond portfolio the day before the household annuitizes to zero equity exposure the day after. But as mentioned earlier, sales of variable immediate annuities remain extremely small.

Medically underwritten annuities

There is a strong relationship between longevity and socioeconomic status (Attanasio and Hoynes 2000). In theory, this ought to provide an incentive for insurance companies to try to select 'better' – that is, high-mortality – risks, much as providers of life insurance try to screen out high-mortality lives. In practice, and with the exception of medically underwritten annuities providing larger payouts to individuals able to demonstrate that they have shorter than average life expectancy due to health-related conditions, the only underwriting seen in the United States is by sex. In 2004, medically underwritten annuities comprised only 4 percent of the total market (Drinkwater et al. 2006). These products have the potential to improve welfare if purchasers of medically underwritten annuities would otherwise have chosen not to annuitize.

In one state (Montana), insurance companies are refusing to use unisex pricing. The state of Massachusetts has recently enacted a similar law that prohibits the use of sex-distinct mortality tables for individual or group annuities or pure endowment contracts (Currin 2008).

Zip-code underwriting

There are substantial geographic variations in average longevity. Zip-code or post-code pricing allows insurers to manage longevity risk and reduce adverse selection by exploiting this relationship. Post-code pricing was introduced in the UK market in 2007, and several major insurance companies have announced plans to issue post-code annuities (Hill 2008). Those living in less affluent neighborhoods will be offered up to a 5 percent increase in annuity rates (Milner 2008). As yet, no company uses zip-code pricing in the United States.

Inflation-protected annuities

An individual purchasing a nominal annuity faces the risk of his income being eroded by the effects of inflation. At a 2.5 percent inflation rate, a couple aged 65 faces a 31 percent risk of surviving long enough to see their real income halved (assuming population mortality for the 1945 cohort). Households can, of course, purchase increasing nominal annuities, but these do not protect against unexpected inflation. The overwhelming majority of purchasers choose a level nominal annuity, possibly because these offer the highest initial income.

Treasury inflation-protected securities (TIPS) have existed in the United States since 1997, but the market for inflation-protected annuities has been slow to develop. TIAA-CREF has for some time offered a variable immediate annuity invested in TIPS, but it is not a true inflation-indexed annuity because changes in real interest rates could affect the value of the investment and, therefore, the payouts from the annuity. Irish Life was the first company to offer a true inflation-indexed annuity (Brown et al. 2002). Although additional companies have entered the market, the size of the inflation-protected immediate annuity market remains very small. It was estimated that sales of inflation-indexed immediate annuities were less than $200 million a year, representing less than 3 percent of total immediate annuities sold in 2006 (Woolley 2006).

Gong and Webb (2010) calculate that inflation-indexed annuities have similar money's worths to those of nominal annuities. They should therefore be attractive to households seeking to hedge inflation risk. The lack of demand to date may reflect a preference for higher real income early in retirement, or a lack of awareness of the likely effect of inflation on the real income provided by a level nominal annuity.

Advanced life deferred annuity

Annuities are most effective when used to finance consumption at advanced old age. Consider a consumer aged 60 who wants to enjoy $1 of consumption at age 100. Assume that the probability of survival to 100 is 1 percent, the real interest is 3 percent, and the insurance company applies a 100 percent markup on actuarially fair rates. One option for the household would be to deposit 31 cents in a bank account. With accumulated interest, that amount would provide the required $1.00 at age 100. But the consumer would do much better by purchasing an annuity paying out $1 at age 100, conditional on survival to that age. An insurance company applying a 100 percent markup would sell that annuity for less than 1 cent.

The advanced life deferred annuity (ALDA) by Milevsky (2005) envisages an inflation-protected annuity that would be purchased at retirement or

even earlier. But in contrast to a traditional annuity, income payments start only at some advanced age, providing insurance against the risk of living exceptionally long. The deferral period reduces the cost of the longevity insurance provided by the ALDA just as a large deductible can reduce the cost of homeowner's insurance. Although a few insurance companies have very recently begun to offer ALDA-type products with benefits fixed in nominal terms, no company has thus far launched the type of inflation-protected product proposed by Milevsky.

Gong and Webb (2010) compare retirement wealth decumulation strategies based on an inflation-protected ALDA with three alternatives: buying of an inflation-protected annuity immediately on retirement, postponing the purchase of an annuity until some advanced age, or undertaking an optimal decumulation of unannuitized wealth. They show that the ALDA approach has three important advantages. First, it enables households to preserve liquidity at least until the ALDA payments commence, because the purchase cost is a fraction of the cost of immediate annuities, thus overcoming a potentially important psychological barrier to annuitization. A consumer planning to smooth consumption through his retirement would need to allocate only 15 percent of his age 60 wealth to an ALDA with payments commencing at age 85, holding the remainder of its wealth in unannuitized form, to finance consumption from age 60 to 85. Second, although a risk-averse consumer facing an uncertain life span would prefer the full longevity insurance provided by an actuarially fair annuity to the partial longevity insurance provided by an actuarially fair ALDA, the consumer would prefer the ALDA to full annuitization at plausible projected levels of actuarial unfairness. The intuition is simply that the consumer buys and gets almost as much longevity insurance. An ALDA also dominates an optimal decumulation of unannuitized wealth. Third, ALDAs have the potential to improve and simplify the process of retirement wealth decumulation, using simple rules of thumb that perform almost as well as the optimal and can be applied to the management of wealth decumulation over a period ending on the date that the ALDA income commences. In contrast, widely advocated rules for managing the decumulation of unannuitized wealth over an entire lifetime are highly suboptimal. Nevertheless, it is understood that ALDA sales have, as yet, been only modest.

Life care annuity

Annuities involve a loss of liquidity, which need not be a serious drawback if the consumer's financial needs are known in advance. But US households are exposed to substantial uninsured medical and long-term care costs, meaning that a need for liquidity might therefore lead to annuitization. Warshawsky et al. (2001) propose an annuity structure to address this issue

by providing increased benefits in the event of the annuitant requiring long-term care. They argued that a combination product might be less affected by adverse selection than products sold separately. In fact, though combined annuity/long-term care products have been in the market for about eight years, they have achieved only modest sales to date. A recent study of long-term care insurance professionals has nonetheless suggested that the market is headed for moderate to strong growth over the next few years (Matso Lysiak 2007).

Aggregate mortality risk sharing

An annuity provider faces three kinds of mortality risk. The first is that it could obtain a bad draw of mortality outcomes from a given risk pool. The insurer can largely eliminate this risk by increasing the size of the risk pool. The second is that the insurer may experience a greater-than-expected level of adverse selection, for example, if other insurers develop a means of selecting the 'better,' that is, higher mortality risks. The third is that the average mortality of the whole population may decline more rapidly than expected.

From the perspective of the insurance company, aggregate mortality risk is far greater than the risk of having a single bad draw from the annuitant pool. Of course, the opposite is true from the perspective of the annuitant. One approach might therefore be for the annuitant to share aggregate mortality risk with the annuity provider. For the annuitant, the risk of outliving his wealth far exceeds the risk of a small reduction in his annuity income in the event of average mortality rates decreasing more rapidly than expected. The Teachers Insurance and Annuity Association (TIAA) actually has such a product on offer, selling participating annuities through its companion organization College Retirement Equities Fund (CREF). Here, annuity payments are linked to participant's mortality, and historical experience is used as a guide in the annual adjustment to the mortality participation factor (Piggott et al. 2005).

Conclusion

In this chapter, we have reviewed prospects for the market for longevity insurance in the United States. While the US annuity market is well developed in terms of product diversity, the evidence suggests that most consumers do not voluntarily annuitize much of their financial wealth at or near retirement. Accordingly, a question arises as to whether annuities might be further encouraged or mandated. Mandatory annuitization would reduce annuity prices if consumers at high risk of early death were required to annuitize and join the risk pool, though the gains may be small empirically, if high-mortality-risk households have little liquid wealth (Dushi and Webb 2004). Mandating

would also adversely affect those households that would rationally prefer not to annuitize, even at the more favorable rates made possible by compulsion; indeed Gong and Webb (2010) calculate that some 16 percent of households in the US Health and Retirement Study would be made worse off (in expected utility terms) if annuities were mandated on actuarially fair terms. Furthermore, experience in the United Kingdom suggests that mandatory annuitization is quite unpopular.

Encouraging annuitization would be an alternative policy, either by making them the default option in 401(k) plans or by requiring 401(k) plans to offer an annuitization option. In fact, this may be compared to the success of automatic enrollment in 401(k) plans, as mentioned by Brown and Warshawsky (2004). But circumstances are very different at retirement. While consumers could favor automatic enrollment as a means to overcome their own tendency to procrastinate around saving for retirement, it is far from clear that most consumers understand the importance of annuities as an appropriate tool for managing wealth decumulation. Also, there is agreement that defaulting workers into contributing to their employer's 401(k) plan does little harm; anyone saving more than desired can reduce saving subsequently. By contrast, the annuitization decision is usually irreversible, and there is no consensus on what might represent an appropriate default. For instance, households might be required to annuitize only enough wealth to pay for basic subsistence (as in Singapore; see Fong et al. 2010). This would, of course, require providers to have access to information on the retiree's entire portfolio. Other questions would also have to be addressed, including the age at which consumers might be defaulted into annuities, whether the produce should be a level or rising nominal, inflation-protected, or variable annuity. Similarly, policymakers would need to evaluate whether spousal consent should be required before a married individual elected a single life annuity (similar to the consent required of DB plan participants).

In sum, it seems clear that financial products affording consumers' protection against longevity risk will become increasingly important in the United States in the future. Nevertheless, more work must be done on both the demand and the supply side, to ensure that the industry creates products that are both effective and suitable for the marketplace.

Notes

[1] The assumption regarding the way in which consumption enters the utility function can substantially affect the results. For example, the value of annuitization would be much higher if one were to assume that pre-annuitized wealth met basic living expenses that did not enter the utility function.

[2] Author's calculations, assuming population mortality for the 1944 birth cohort, a 3 percent interest rate, and the number of new benefit claims reported in SSA (2009).

[3] Married men can also claim a spousal benefit if their earnings are sufficiently large in relation to those of their wives.

[4] The Social Security Trustees project that in the absence of tax increases or benefit cuts, the Social Security Trust Fund will be exhausted by 2042, at which point benefits, including benefits in payment, would be cut by approximately 30 percent.

[5] The remaining 80 percent can still access the annuity market by rolling over their 401(k) balance into an Individual Retirement Account (IRA) offering an annuity option.

[6] Other countries are Canada, Chile, the Netherlands, Switzerland, and the United Kingdom (Mackenzie 2006: 24).

[7] For a review, see Brown and Poterba (2006). Many deferred annuities appear to have high investment management, insurance, and surrender charges.

[8] For further information, see http://www.irs.gov/publications/p939/ar02.html#d0e819

[9] The authors used institutional rates supplied by Hueler Associates that are slightly more favorable than retail rates. Population mortality was obtained from Social Security cohort life tables, and annuitant mortality was projected using Projection Scale AA.

[10] Financial planners often argue that younger households should hold a greater proportion of their financial assets in stocks because stocks are relatively less risky over long horizons, a questionable claim. A more convincing justification (Jagannathan and Kocherlakota 1996) is that a large proportion of the wealth of younger households is held in relatively low-risk human capital.

References

Agnew, Julie R., Lisa R. Anderson, Jeffrey R. Gerlach, and Lisa R. Szykman (2008). 'Who Chooses Annuities? An Experimental Investigation of the Role of Gender, Framing, and Defaults,' *American Economic Review*, 98(2): 418–22.

Attanasio, Orazio and Hilary Hoynes (2000). 'Differential Mortality and Wealth Accumulation,' *Journal of Human Resources*, 35(1): 1–29.

Beatrice, Dan and Matthew Drinkwater (2007). *The 2006 Individual Annuity Market: Sales and Assets*. Windsor, CT: LIMRA International. http://www.limra.com

Brown, Jeffrey R. (2001). 'Private Pensions, Mortality Risk, and the Decision to Annuitize,' *Journal of Public Economics*, 82(1): 29–62.

—— (2007). 'Rational and Behavior Perspectives on the Role of Annuities in Retirement Planning.' Working Paper 13537. Cambridge, MA: National Bureau of Economic Research.

—— (2009). 'Financial Education and Annuities,' *OECD Papers*, 2008(3): 171–214.

Brown, Jeffrey R. and James M. Poterba (2000). 'Joint Life Annuities and the Demand for Annuities by Married Couples,' *The Journal of Risk and Insurance*, 67 (4): 527–53.

———— (2006). 'Household Demand for Variable Annuities,' in J.M. Poterba, ed., *Tax Policy and the Economy*, Vol. 20. Cambridge, MA: The MIT Press, pp. 163–92.

—— Mark J. Warshawsky (2004). 'Longevity Insured Retirement Distributions from Pension Plans: Market and Regulatory Issues,' in W. Gale, J. Shoven, and M. Warshawsky, eds., *Public Policies and Private Pensions*. Washington, DC: The Brookings Institution, pp. 332–78.

—— Olivia S. Mitchell, and James M. Poterba (2002). 'Mortality Risk, Inflation Risk, and Annuity Products,' in O.S. Mitchell, Z. Bodie, B. Hammond, and S. Zeldes, eds., *Innovations in Retirement Financing*. Philadelphia, PA: University of Pennsylvania Press, pp. 175–97.

Bureau of Labor Statistics (BLS) (1995). *Employee Benefits in Medium and Large Private Establishments – Table 113*. Washington, DC: Bureau of Labor Statistics. http://www.bls.gov/ncs/ebs/sp/ebbl0015.pdf

——(2005). *National Compensation Survey: Employee Benefits in Private Industry in the United States – Table 51*. Washington, DC: Bureau of Labor Statistics. http://www.bls.gov/ncs/ebs/sp/ebbl0022.pdf

Currin, Cailie (2008). *Gender Equity in MA Annuities*. Greenwich, NY: Currin Compliance Services, LLC. http://www.lifeinsurancelawblog.com

Drinkwater, Matthew, Joseph Montminy, Eric T. Sondergeld, Christopher G. Rahamn, and Chad R. Runchey (2006). *Substandard Annuities*. Schaumburg, IL: LIMRA International and the Society of Actuaries, in collaboration with Ernst and Young, LLP. http://www.soa.org/files/pdf/007289-Substandard%20annuities-full%20rpt-REV-8-21.pdf

Dushi, Irena and Anthony Webb (2004). 'Household Annuitization Decisions: Simulations and Empirical Analyses,' *Journal of Pension Economics and Finance*, 3 (2): 109–43.

Fong, Joelle H.Y., Olivia S. Mitchell, and Benedict S.K. Koh (2010). 'Longevity Risk and Annuities in Singapore,' in R.L. Clark and O.S. Mitchell, eds., *Reorienting Retirement Risk Management*. Oxford, UK: Oxford University Press, pp. 156–78.

Gong, Guan and Anthony Webb (2010). 'Evaluating the Advanced Life Deferred Annuity – An Annuity People Might Actually Buy,' *Insurance: Mathematics and Economics*, 46: 210–21.

Hill, Jennifer (2008). *UK Insurer Aviva Joins Postcode Annuity Fray*. London, UK: Reuters. http://uk.reuters.com/article/idUKL1383215920080613

Internal Revenue Service (2009). *Individual Retirement Arrangements*. Publication 590. Washington, DC: Internal Revenue Service.

Jagannathan, Ravi and Narayana Kocherlakota (1996). 'Why Should Older People Invest Less in Stocks That Younger People?,' *Federal Reserve Bank of Minneapolis Quarterly Review*, 20(3): 11–23.

James, Estelle and Xue Song (2002). 'Annuities Markets Around the World: Money's Worth and Risk Intermediation.' American Economic Association Meetings and CERP Working Paper 16/01. Turin, Italy: Center for Research on Pensions and Welfare Policies.

LIMRA International (2008a). *US Individual Annuities Second Quarter 2008 Report*. Windsor, CT: LIMRA International. http://www.limra.com

—— (2008b). *US Individual Annuities Fourth Quarter 2008 Report*. Windsor, CT: LIMRA International. http://www.limra.com

Mackenzie, George A. (2006). *Annuity Markets and Pension Reform*. New York, NY: Cambridge University Press.

Matso Lysiak, Fran (2007). *Combo Deal: Hybrid Long-term-Care/Annuity Products are Life Insurers' Newest Weapon in Their Battle for Retirement Assets*. Oldwick, NJ: A.M. Best Company. http://www.thefreelibrary.com/Combo+deal%3a+hybrid+long-term-care%2fannuity+products+are+life+insurers'...-a0160641464

Milevsky, Moshe A. (1998). 'Optimal Asset Allocation Towards the End of the Life Cycle: To Annuitize or not to Annuitize?,' *The Journal of Risk and Insurance*, 65(3): 401–26.

—— (2005). 'Real Longevity Insurance With a Deductible: Introduction to Advanced-Life Delayed Annuities (ALDA),' *North American Actuarial Journal*, 9(4): 109–22.

—— Virginia R. Young (2007). 'Annuitization and Asset Allocation,' *Journal of Economic Dynamics and Control*, 31(9): 3138–77.

Milner, Leah (2008). *Prudential Postcode Annuity Move marks Tipping Point, says Hargreaves Lansdown*. Adad, London, UK: Centaur Media. http://www.money-marketing.co.uk/news/prudential-postcode-annuity-move-marks-tipping-point-says-hargreaves-lansdown/171014.article

Mitchell, Olivia S., James Poterba, Mark J. Warshawsky, and Jeffrey R. Brown (1999). 'New Evidence on the Money's Worth of Individual Annuities,' *American Economic Review*, 89(5): 1299–318.

Pang, Gaobo and Mark Warshawsky (2008). 'Optimizing the Equity – Bond-Annuity Portfolio in Retirement: The Impact of Uncertain Health Expenses.' Pension Research Council Working Paper 2008-05. Philadelphia, PA: Pension Research Council.

Piggott, John, Emiliano Valdez, and Bettina Detzel (2005). 'The Simple Analytics of a Pooled Annuity Fund,' *The Journal of Risk and Insurance*, 72(3): 497–520.

Poterba, James (2001). 'The History of Annuities in the United States,' in J. Brown, O.S. Mitchell, J. Poterba, and M. Warshawsky, eds., *The Role of Annuity Markets in Financing Retirement*. Cambridge, MA: MIT Press, pp. 23–56.

Reno, Virginia P., Michael J. Greatz, Kenneth S. Apfel, Joni Lavery, and Catherine Hill (2005). 'Uncharted Waters: Paying Benefits from Individual Accounts in Federal Retirement Policy.' Study panel final report, January. Washington, DC: National Academy of Social Insurance.

Social Security Administration (SSA) (2009). *Annual Statistical Supplement to the Social Security Bulletin, 2009*. Washington, DC: Social Security Administration. http://www.ssa.gov/policy/docs/statcomps/supplement/

Turra, Cassio and Mitchell, Olivia S. (2008). 'The Impact of Health Status and Out-of-Pocket Medical Expenditures on Annuity Valuation,' in John Ameriks and Olivia S. Mitchell, eds., *Recalibrating Retirement Spending and Saving*. Oxford, UK: Oxford University Press, pp. 227–50.

Warshawsky, Mark J., Christopher M. Murtaugh, and Brenda C. Spillman (2001). 'In Sickness and in Health: An Annuity Approach to Financing Long-Term Care and Retirement Income,' *The Journal of Risk and Insurance*, 68(2): 225–54.

Woolley, Scott (2006). *Retire Relaxed*. New York, NY: Forbes Magazine. http://www.forbes.com/forbes/2006/1211/158.html

Yogo, Motohiro (2009). 'Portfolio Choice in Retirement: Health Risk and the Demand for Annuities, Housing, and Risky Assets.' NBER Working Paper 15307. Cambridge, MA: National Bureau of Economic Research.