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AN ANNUITY THAT PEOPLE MIGHT ACTUALLY BUY

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Introduction

Immediate annuities provide insurance against outliving one's wealth. Previous research has shown that this insurance ought to be valuable to risk-averse households facing an uncertain lifespan. But rates of voluntary annuitization remain extremely low. Many explanations have been offered for retired households' reluctance to annuitize.[1] One prominent explanation is that annuities suffer from a considerable degree of actuarial unfairness. That is, for the average household, the expected value of the income, discounted by a rate of interest and annual survival probabilities, is considerably less than the premium paid.[2] But it seems likely that households are also influenced by a reluctance to give up access to their life savings.

In the past, households' reluctance to annuitize was not a matter of great policy concern because most households held substantial proportions of their wealth in pre-annuitized form through Social Security and defined benefit pensions. However, the displacement of defined benefit plans by 401(k)s and projected reductions in Social Security replacement rates will increase the importance of a well-functioning and attractive annuity market.

This *brief* evaluates a proposal for an innovative annuity product — the Advanced Life Deferred Annuity (ALDA). The ALDA is an annuity that would be purchased at retirement, or even earlier, but the associated payments would not start until some advanced age, (say) 75, 85, or 90. The long deferral period would result in a very inexpensive product. The authors estimate that a household planning to smooth consumption through its retirement would need to allocate only 15 percent of its age 60 wealth to an ALDA with payments commencing at age 85. The ALDA would thus allow people to preserve liquidity, overcoming one potentially important barrier to increased levels of voluntary annuitization.

How Would an ALDA Work and What Would It Cost?

The ALDA was first brought to the attention of the academic community by Moshe Milevsky.[3] He envisaged a deferred annuity that would be purchased by installments over an individual's working life, but which would only come into payment at an advanced age, (say) 75 or older. The product would also provide inflation protection.

One potential drawback to this idea is the likely reluctance of individuals to contribute during their working lives towards the cost of a product that would only provide benefits in advanced old age. Instead, such a product might be more attractive if purchased at or near retirement. Therefore, Table 1 provides estimates of the cost of an inflation-protected joint life and two thirds survivor benefit ALDA purchased with a lump sum at either age 60 or 65. The authors estimate that a household that wished to secure an in-

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Table 1. Projected ALDA Cost per Dollar of Annual Income

Purchase age	Commencement age			
	75	80	85	90
60	$9.87	$6.42	$3.70	$1.76
65	11.17	7.24	4.14	1.95

Source: Authors' calculations. See endnote 5 for details.

flation-protected income of $20,000 a year starting at age 85 would have to pay a lump sum of just $74,000 at age 60 ($3.70 x $20,000). The cost would be higher if the ALDA were purchased later and/or the annuity payments began sooner.[4]

How Much Longevity Insurance Would ALDAs Provide?

Economists measure the value of the longevity insurance provided by annuities by calculating what they term "annuity equivalent wealth." Calculating this number involves comparing levels of well-being with and without an annuity. The experiment starts with the assumption that an individual has $100,000 of annuitized wealth and then looks at the consequences of eliminating the annuity market. Specifically, it asks, "How much additional wealth would an individual need to be as well off without an annuity as with one?" The answer depends on many factors, such as the individual's attitude towards risk, the extent to which they have access to other sources of annuitized wealth, and whether they are married or single. Because the ability to annuitize has value, annuity equivalent wealth will be greater than $100,000. In the example in Table 2, for a married couple age 60 and a risk aversion coefficient of five (towards the upper end of the range that most economists believe is reasonable), annuity equivalent wealth would be $129,100, and the ratio of annuitized to unannuitized wealth would be 1.291. This means that the couple would be indifferent between $100,000 of annuitized wealth and $129,100 of unannutized wealth.[6]

An analogous calculation can be made of ALDA equivalent wealth, but the calculation is more complex. With an ALDA, the result depends on the assumptions made regarding 1) the proportion of initial wealth that is spent on the ALDA; and 2) the strategy the household uses for decumulating the part of its wealth that is not spent on the ALDA.

Table 2 below presents annuity and ALDA equivalent wealth for married couples age 60 in 2007; these data provide a measure of how much people value longevity insurance. This calculation assumes that both products are "actuarially fair." That is, for the average household, the expected value of the income, discounted by a rate of interest and annual survival probabilities, equals the premium paid. The calculation also assumes that the household spends the optimal proportion of its initial wealth on the ALDA, and that it adopts a simple rule of thumb for decumulating its wealth from retirement to the age at which the ALDA payments start.[7] The optimal proportion is determined by specifying a utility function, and then calculating the proportion that maximizes expected discounted utility.

Table 2. Comparison of Annuity with ALDA Equivalent Wealth Purchased at Age 60

Equivalent wealth	Commencement age	Risk aversion	
		2	5
Annuity	Immediate	1.216	1.291
ALDA	75	1.189	1.259
	80	1.162	1.227
	85	**1.121**	**1.181**
	90	1.064	1.119

Note: The rate of time preference and real interest rate both equal 2.35 percent. Husband and wife are both aged 60 with 1947 birth cohort mortality. Complementarity of consumption is 0.5. The annuity has a two thirds survivor benefit.
Source: Authors' calculations.

Households place a high value on the longevity insurance provided by an annuity. A household with $100,000 of unannuitized wealth and with a coefficient of risk aversion of five would require an additional $29,100 if it were unable to annuitize its wealth on actuarially fair terms, increasing its total wealth to $129,100.

At young commencement ages, ALDAs provide almost as much longevity insurance as annuities. A household would require an additional $25,900 for giving up the right to purchase an ALDA commencing at age 75. But even ALDAs commencing at quite advanced ages still provide substantial amounts of longevity insurance. For example, the household would require an additional $18,100 for giving up the right to purchase an ALDA commencing at age 85.

Table 3 compares the value of longevity insurance provided by an ALDA with that provided by a traditional annuity, as reported in Table 2.[8] Assuming a coefficient of risk aversion of five, an ALDA commencing at age 85 provides 62.4 percent of the longevity insurance of an annuity. And achieving this protection through an ALDA can be done at the cost of only a small loss of liquidity (an issue that will be examined in more detail below).

Table 3. Percent of Annuity Longevity Insurance Provided by an ALDA Purchased at Age 60

Annuity type	Commencement age	Risk aversion	
		2	5
Annuity	Immediate	100%	100%
ALDA	75	87.7	89.1
	80	75.0	78.2
	85	**56.0**	**62.4**
	90	29.7	40.9

Note: For assumptions, see Table 2.
Source: Authors' calculations.

ALDAs and Annuities in Practice

In practice, annuities are actuarially unfair, reflecting both adverse selection and expense loads.[9] Previous research has shown that the money's worth, the expected present value of the payments, discounted by an interest rate and annual survival probabilities, of a traditional immediate annuity is only 75 to 85 cents on the dollar to a household with population average mortality. The precise result depends on whether the corporate or Treasury bond interest rate is used.[10] Calculations made for this *brief* indicate that the money's worth of inflation-protected annuities to someone with average mortality is slightly less than 80 cents on the dollar, when payments are discounted at the Treasury Inflation Protected Securities interest rate. Multiplying the annuity equivalent wealth in Table 2 by 0.8 to adjust for actuarial unfairness results in figures close to one. These results imply that full annuitization at retirement is of only marginal benefit to the average household.

ALDAs are likely to be even more actuarially unfair than traditional annuities to the average household. ALDAs only start to pay benefits at advanced ages, and people who purchase ALDAs are likely to have a much higher than average probability of surviving to such ages.

But actuarial unfairness is a poor indication of the relative attractiveness of ALDAs. As shown earlier, households will have to spend only a small portion of their wealth to purchase an ALDA, so they will experience a relatively small amount of actuarial unfairness in dollar terms.

Table 4 takes account of actuarial unfairness and compares strategies using annuities and ALDAs relative to a base case of undertaking an optimal decumulation of unannuitized wealth. The table shows the ratio of equivalent wealth of a household undertaking an optimal decumulation strategy relative to the alternative. When the factor is greater than one, the household is better off choosing the alternative.

Purchasing a traditional annuity is of marginal benefit to the household. For example, the household is 2.6 percent better off at a coefficient of risk aversion of five. But when the household purchases an ALDA commencing at age 85 and consumes the

Table 4. Annuity and ALDA Equivalent Wealth — Purchase Age 60 — Incorporating Actuarial Unfairness

Equivalent wealth	Commencement age	Risk aversion	
		2	5
Annuity	Immediate	0.967	1.026
ALDA		Optimal strategy	
	75	1.027	1.083
	80	1.049	1.099
	85	**1.059**	**1.103**
	90	1.055	1.093
		Naïve strategy	
	75	1.026	1.076
	80	1.045	1.093
	85	**1.048**	**1.095**
	90	1.028	1.075

Note: The assumptions are those used in Table 2 and authors' estimates of the actuarial unfairness of ALDAs based on calculations of the age-related variation in the actuarial unfairness of inflation-protected annuities currently on the market.
Source: Authors' calculations.

optimal amount every year from 60 to 84, it is 10.3 percent better off. (The result that the household is better off choosing the ALDA than either an immediate annuity or an optimal decumulation of unannuitized wealth is robust to alternative assumptions about mortality, interest rates, and expense loads.)[11]

The above calculations assume that households undertake an "optimal" decumulation strategy with respect to unannuitized wealth. That is, they carefully trade off the risk of outliving their wealth against the cost, in terms of foregone consumption, of decumulating their wealth too conservatively. But determining an optimal consumption plan is a complex task. Most households, to the extent that they plan at all, probably adopt a rule of thumb, such as setting annual consumption equal to some percentage of initial wealth. Such rules of thumb are likely to be far from optimal — unless withdrawal rates are set at a very low level, households are at significant risk of outliving their wealth.

Once a household purchases an ALDA, however, a naïve strategy of consuming an equal amount each period performs almost as well as the optimal strategy. A household would be only 0.8 (1.103-1.095) percent worse off following the naïve strategy than following the optimal strategy. The ALDA transforms the difficult task of managing wealth decumulation over an uncertain period ending on the date of death to the much simpler task of managing decumulation over a certain period ending on the date on which the ALDA payments start.

Finally, Table 5 shows the percent of initial wealth that a household would spend to purchase an ALDA, taking account of actuarial unfairness. A household purchasing an ALDA with benefits starting at age 85 would optimally spend between 13.2 and 15.8 percent of its wealth on the product. As noted above, this ALDA would allow the household to undertake a naïve decumulation strategy between the time of purchase and the start of ALDA payments and be assured of an income for life.

Table 5. Percent of the Household's Initial Wealth at Age 60 Spent on Annuity and ALDA

Annuity type	Commencement age	Risk aversion	
		2	5
Annuity	Immediate	100%	100%
ALDA		Optimal strategy	
	75	39.0	43.0
	80	24.5	28.0
	85	**13.3**	**15.9**
	90	5.8	10.9
		Naïve strategy	
	75	39.0	42.8
	80	24.4	27.9
	85	**13.2**	**15.8**
	90	5.7	7.2

Note: For assumptions, see Table 2.
Source: Authors' calculations.

Conclusion

The ALDA's attractiveness is that it provides a lot of longevity insurance at a relatively low cost. It also makes decumulation much simpler during the period before the ALDA payments kick in.

It remains to be seen whether such a product would overcome annuity aversion. One possible solution might be to make the purchase of an ALDA the default in 401(k) plans. In a forthcoming paper, the authors of this *brief* investigate the distributional consequences of such a policy.

Endnotes

1 For a survey of possible explanations, see Brown and Warshawsky (2001).

2 The degree of actuarial unfairness depends on one's mortality and interest rate assumptions, and the assumptions made about the level of management charges on alternative unannuitized investments. Calculations based on tables in Mitchell, Poterba, Warshawsky, and Brown (1999) show that adverse selection — the greater propensity of low mortality households to purchase annuities — contributes about ten percentage points to their actuarial unfairness.

3 Milevsky (2005).

4 Annuities are able to provide higher returns than unannuitized investments because their returns are boosted by "mortality credits," the reallocation of the contributions of those who die to those who survive. Purchase by installments before retirement, rather than a lump sum at retirement, would at best only slightly reduce the cost of the ALDA because few people die at such ages so mortality credits would have a relatively small effect on returns. In fact, periodic payments might even increase the cost if it were more expensive to collect periodic premiums than a lump sum.

5 The expense loading on a commercially available immediate inflation-protected annuity is calculated by comparing the premium paid with the present value of the income. The present value is calculated using the yield on long-dated Treasury Inflation Protected Securities and survival rates based on annuitant mortality tables.

The mortality table used, "Annuity 2000" is a period mortality table, estimating the mortality rates of people of various ages alive in a certain year. It is converted into a cohort table, forecasting the mortality rates of people born in a particular year, using Projection Scale AA. Both tables are available from the Society of Actuaries at http://www.soa.org.

The same interest rates and tables are then used to calculate ALDA premiums, assuming that ALDAs are subject to the same expense load and degree of adverse selection as existing inflation-indexed annuities.

In practice, ALDAs might suffer from a greater or lesser degree of adverse selection than regular annuities. For example, if ALDAs encouraged higher mortality households to enter the annuity market, then adverse selection would be reduced, and ALDA prices would be more favorable than those reported above.

6 Technically, we assume constant relative risk aversion. We ignore pre-annuitized wealth (such as Social Security) throughout our calculations, or equivalently assume that it is spent on basic living expenses that do not enter into the utility function.

7 The rule of thumb is that the household consumes an equal amount every period up to the age at which the ALDA payments commence, regardless of marital status.

8 The numbers are obtained by dividing the second to fifth rows of Table 2 by the corresponding figure in the top row, first subtracting one from each number to arrive at the additional wealth required.

9 Adverse selection refers to the impact on prices in insurance markets of higher than average rates of purchase by high risk (in the context of annuities, low mortality) households whose risk type cannot be identified by the insurer. Adverse selection may occur not only as a result of purchasers having private information about their risk type, but also when the probability of purchase is affected by unobserved characteristics that are correlated with risk.

10 Mitchell, Poterba, Warshawsky, and Brown (1999).

11 In results that are not reported in the above table, the ALDA performs better than the alternative of simply delaying annuitization, the reason being that the return on the ALDA is enhanced by mortality credits from age 60, whereas mortality credits on the annuity only accrue from the later date of purchase.

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