



*Evaluating the Advanced Life  
Deferred Annuity - An Annuity People  
Might Actually Buy*

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# The Advanced Life Deferred Annuity (ALDA) Concept

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- Brought to our attention by Milevsky (2005).
- An annuity purchased at retirement (or before) with payments commencing at some advanced age.
- Insures against the risk of being unlucky enough to live unusually long.
- Analogy — homeowner's insurance with a large deductible.

# Why do economists think annuities are a good idea?

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The retirement decumulation problem.

- Age of death is unknown.

- Households trade off the risk of outliving their wealth against the cost of foregoing valuable consumption opportunities.

- Annuities reallocate wealth that would otherwise pass as unintended bequests, increasing consumption.

# But households rarely voluntarily annuitize.

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Multiple explanations (Brown, 2007).

- Ignorance
- Framing — “the insurance company wins if you die young” (Anderson, Gerlach, and Szykman, 2008).

# But households rarely voluntarily annuitize.

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Multiple Explanations (Brown 2007).

- High levels of pre-annuitized Social Security and defined benefit pension wealth
- Bequests
- Desire to maintain liquidity for medical costs
- Actuarial unfairness

# Why annuities are a particularly effective way of financing consumption at advanced old age.

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*An individual wants to enjoy \$1 consumption at age 100*

→ Interest rate is 3%

→ Probability of surviving to 100 is 1%

→ Annuity is 50% fair

- Amount of annuitized wealth required at age 60

$$(1 / 1.03)^{40} = \$0.31$$

- Cost of annuity =  $\$0.31 * 0.01 * 2 = <\$0.01$

# The ALDA attempts to put annuitization to work at ages when it is most effective.

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- If annuities are actuarially fair, full immediate annuitization is optimal.
- But if they are unfair, best to start with insuring consumption at the oldest age — ALDAs may dominate full or partial immediate or delayed annuitization.

# Objective of paper

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- How much longevity insurance do ALDAs provide?
- Assuming plausible levels of actuarial unfairness, what annuitization strategy should households follow:
  - Full or partial immediate or deferred annuitization.
  - Purchase of an ALDA — at what benefit commencement age.
  - Optimal decumulation of unannuitized wealth.



# How economists measure the value of annuitization.

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## Annuity equivalent wealth

- 1) Take a couple at aged 60. Compel the couple to purchase an annuity at some level of actuarial unfairness. Calculate expected utility.
  - 2) Now close the annuity market and (using numerical optimization) calculate the household's utility assuming it undertakes an optimal decumulation of unannuitized wealth.
  - 3) By what factor must the household's wealth be multiplied so that it is as well off undertaking an optimal decumulation as annuitizing?
- When annuity equivalent wealth  $> 1$  the household is better off annuitizing.
- If  $< 1$ , better off not annuitizing.
- Can apply the same principle to valuing the ALDA.

# Results depend on:

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- Willingness to risk very low consumption in any period (we assume CRRA  $\gamma=2$  to 5).
- Subjective mortality beliefs (we assume Social Security Administration population average mortality for the 1947/1942 birth cohort).
- Age ALDA payments commence.
- Assumed level of actuarial unfairness.
- Other stuff—interest rate, rate of time preference, complementarity of consumption, ratio of single to joint life annuity payouts.

# What assumptions do you make regarding the decumulation strategy used prior to the age the ALDA payments commence?

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- a) An optimal decumulation of unannuitized wealth
- b) Some simple rule of thumb — consume equal amounts every period.

An actuarially fair ALDA can provide almost as much longevity insurance as an actuarially fair annuity—at a fraction of the cost.

Sophisticated Strategy

Commencement age	ALDA equivalent wealth	% of initial wealth invested in ALDA	% of annuity longevity insurance provided by ALDA
70	1.291	53.8%	100.0%
75	1.269	35.4	92.4
80	1.234	21.0	80.6
85	1.190	10.7	65.2
90	1.138	4.3	47.5

# But the naive strategy performs almost as well.

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Commencement age	ALDA equivalent wealth	% of initial wealth invested in ALDA	% of annuity longevity insurance provided by ALDA
70	1.278	53.1%	95.8%
75	1.259	35.2	89.1
80	1.227	20.9	78.2
85	1.181	10.6	62.4
90	1.119	4.2	40.9

# But annuities and ALDAs are both actuarially unfair.

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→ Can't assume ALDA money's worths equal those annuities—ALDA payouts are concentrated at older ages to which annuitants are disproportionately likely to survive.

# Calculating annuity money's worths is not straightforward.

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→ At what interest rate should the household discount the income stream?

→ Treasury STRIP rate:

- How do you treat income payable  $> 30$  years hence?
- Are annuities truly risk-free?
- What if the alternative investment is high grade corporate bonds?

→ AA Corporate bond rate

# Calculating ALDA money's worths is harder.

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→ Real ALDAs don't exist and only a few companies even offer nominal ALDAs.

→ Strategy

- All companies selling real annuities also sell nominal annuities

- All companies selling nominal ALDAs also sell nominal annuities.

→ Can infer money's worth of real ALDAs from above relationships.



# Annuities have surprisingly high money's worths.

## To Households with Annuitant Mortality

Commencement age	Inflation indexed	Nominal		
	TIPS rate	Treasury STRIPS	AA Corporate	BAA Corporate
60	1.114	1.132	1.029	0.916
65	1.115	1.113	1.039	0.935
70	1.110	1.126	1.045	0.951
75	1.113	1.128	1.058	0.975
80	1.012	1.093	1.034	0.965
85	1.043	1.073	1.073	1.013

# Although money's worths are obviously lower to households with population mortality.

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## To Households with Population Mortality

Commencement age	Inflation indexed	Nominal		
	TIPS rate	Treasury STRIPS	AA Corporate	BAA Corporate
60	0.995	1.047	0.959	0.861
65	0.981	1.030	0.953	0.865
70	0.965	1.012	0.946	0.869
75	0.950	0.995	0.940	0.874
80	0.841	0.937	0.893	0.840
85	0.813	0.907	0.873	0.832

Relative money's worth of nominal annuities and nominal ALDAs is very sensitive to the interest rate used—because ALDA payments are back-loaded.

For both of the companies we examined, ALDA annuitant money's worths were similar to that company's annuity annuitant money's worth, when we used the AA corporate bond rate.

*Example-Company D*

		Treasury STRIPS	AA Corporate	BAA Corporate
Annuity commencing at age 60		1.073	0.978	0.873
ALDA purchased at 70 and commencing at 60	70	1.153	0.985	0.805
	75	1.216	1.006	0.788
	80	1.311	1.051	0.790
	85	1.392	1.082	0.779

# And ALDA money's worth is extremely low to households with population mortality.

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		Treasury STRIPS	AA Corporate	BAA Corporate
Annuity commencing at age 60		0.986	0.905	0.815
ALDA purchased at 60 and commencing at	70	0.978	0.841	0.694
	75	0.975	0.811	0.640
	80	0.977	0.788	0.596
	85	0.940	0.734	0.531

# So what annuitant money's worth should we assume?

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- If the alternative investment is TIPS, then numbers as high as 1.10 could be appropriate.
- But households rarely invest much or any of their wealth in TIPS.
- So our preference is for an annuitant money's worth of 1.00, close to the values obtained when the AA Corporate bond rate is used.
- And we experiment with an alternative of 0.90—this biases our results against ALDAs.

# Results: Commencement age 60 — 100% annuitant moneys worth.

Risk Aversion		2	5
Annuitization immediately on retirement		1.089	1.156
Annuitization at optimal age		1.089	1.156
Sophisticated strategy—ALDA commencing at	70	1.093	1.160
	75	1.094	1.152
	80	1.091	1.146
	85	1.083	1.132
	90	1.065	1.108
Naive strategy—ALDA commencing at	70	1.093	1.155
	75	1.093	1.152
	80	1.087	1.143
	85	1.071	1.124
	90	1.039	1.089

# Results: Commencement age 60 — 90% annuitant money's worth

Risk Aversion		2	5
Annuitization immediately on retirement		0.980	1.040
Annuitization at optimal age		1.057	1.077
Sophisticated strategy—ALDA commencing at	70	1.031	1.091
	75	1.051	1.104
	80	1.065	1.115
	85	1.068	1.115
	90	1.059	1.110
Naive strategy—ALDA commencing at	70	1.031	1.087
	75	1.050	1.103
	80	1.060	1.112
	85	1.057	1.107
	90	1.033	1.081

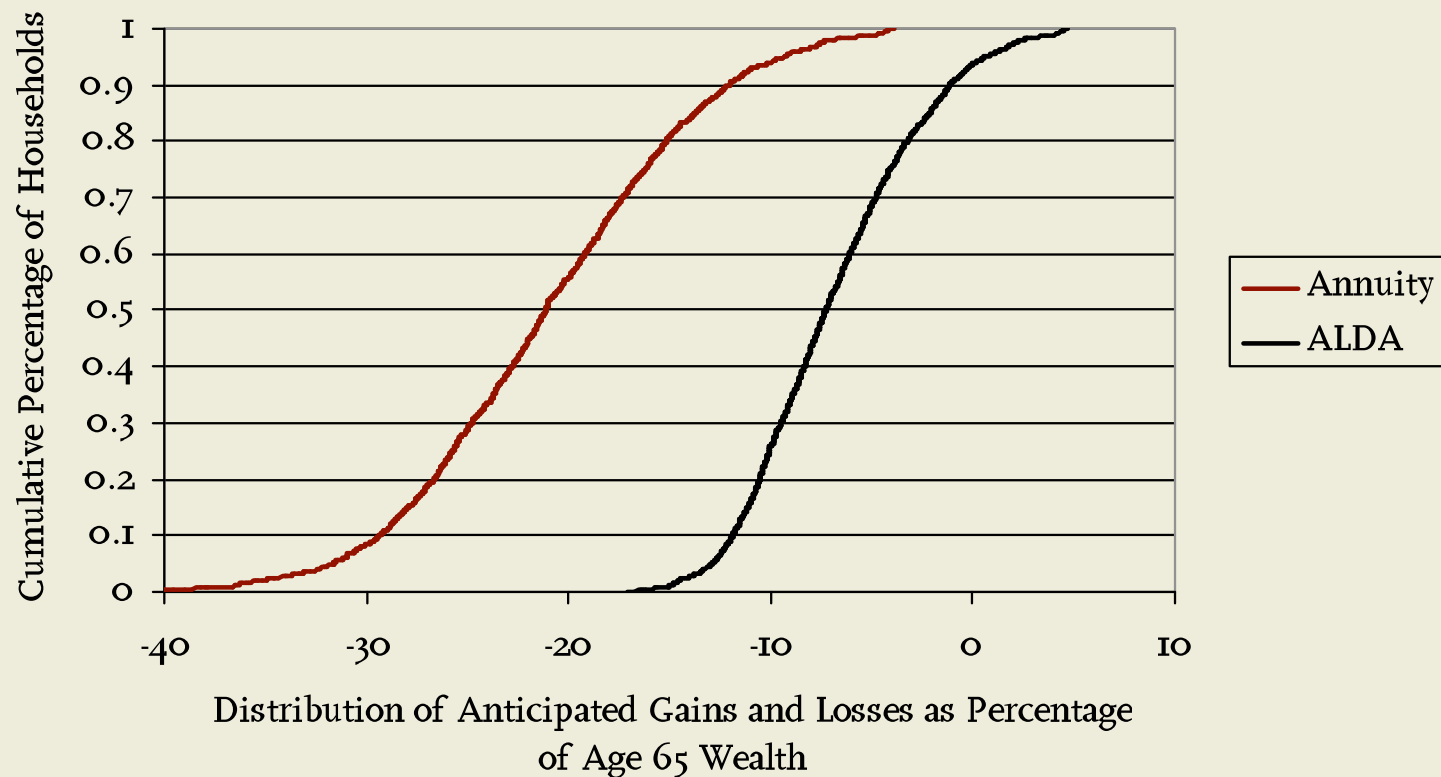
# Should the ALDA be a 401(k) default?

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- Even in expected utility terms, defaulting people into annuities can leave a substantial proportion of households worse off.
- Defaulting people into ALDAs doesn't produce as large gains for the low mortality types.
- But substantially reduces the losses of the high mortality types.
- Distributions of gains and losses depends on whether the default results in pricing reflecting annuitant mortality (at one extreme) or population mortality (at the other extreme).



# Distribution of Annuity and ALDA Money's Worths — When Priced Using Annuitant Mortality Tables



# Distribution of Annuity and ALDA Money's Worths — When Priced Using Population Mortality Tables

