Example 12.4
Adverse Selection in Annuity Markets*

In theory, risk-averse individuals should want to purchase an annuity in retirement in order to insure themselves against the possibility of outliving their wealth. In practice, the voluntary purchase of annuities is much less common in many countries than theory would predict. A number of explanations have been put forward for this, including poor understanding of annuities and people's desire to hold onto a stock of wealth to meet either unexpected spending needs and/or the desire to leave bequests.

Another possible explanation is that annuity markets, like other markets for insurance, suffer from adverse selection. Annuities are most attractive to those who expect to live for a long time since they will enjoy the stream of income for more years. To avoid making a loss, insurers will price annuities to match the life expectancy of these high-risk people, making annuities unattractive to low-risk people who have shorter life expectancies.

Insurers can discriminate between high- and low-risk individuals on the basis of easily observable characteristics. It is well-known that women typically live longer than men, for example. Reflecting this, the annuity rate for women is lower than for men. For the same stock of wealth (£100,000), a 65-year old woman in the U.K. would receive a lower annual income than a 65-year old man (7,332 compared with £7,812).[1] Smokers can get a higher income – up to £9,000 a year for a 65-year old male smoker – reflecting the negative effect of cigarettes on life expectancy. Impaired life annuities also pay higher rates to people with cancer, kidney, heart, or lung disease.

But the evidence shows that, aside from these obvious (and fairly easily verifiable) differences in life expectancy, individuals have important additional private information about how long they are likely to live that insurance companies are unlikely to be able to glean. Mike Hurd and Kathleen McGarry (2002) have studied the link between individuals' subjective life expectancy (how long individuals say they expect to

* Example prepared by Sarah Smith, University of Bristol.
[1] All figures are the best prices quoted on the Financial Service Authority's pension annuity tables on 18 June 2008.

live) and their actual mortality. Surveys of older individuals, such as the Health and Retirement Survey in the U.S., ask individuals about their subjective life expectancy in the following way:

Using any number from 0 to 10 where 0 equals absolutely no chance and 10 equals absolutely certain, what do you think are the chances you will live to be 75 or more?

Because these surveys follow the same individuals over time, the researchers can look at how the responses to these questions correlate with how long individuals actually do live. Hurd and McGarry find that not only are the subjective life expectancies predictive of subsequent mortality, but that this is the case even when controlling for a wide range of individual characteristics including age, gender, ethnicity, income, education, and health conditions. This points to a genuine asymmetry of information between individuals and the insurance company that is likely to result in adverse selection.

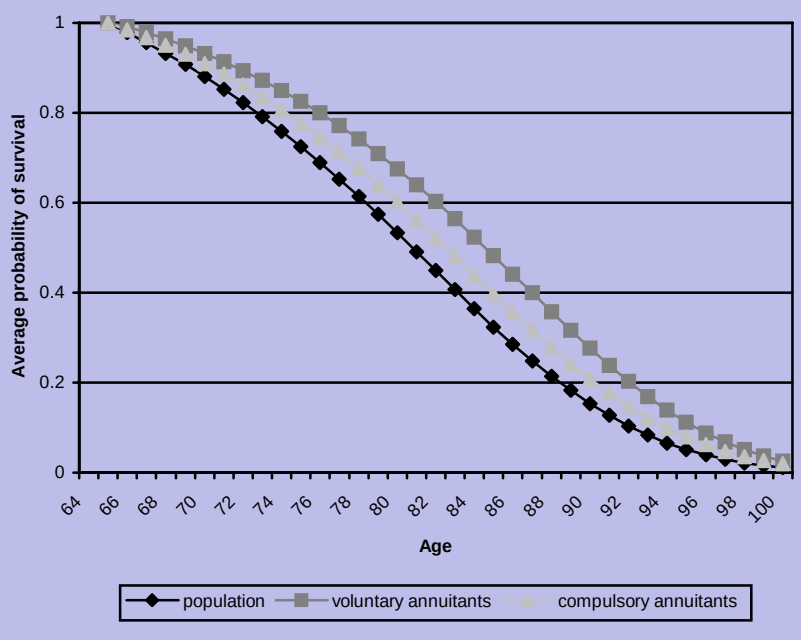
Amy Finkelstein and James Poterba (2002) provide further evidence on the extent of adverse selection in the market for annuities by looking at the pricing of different types of annuities in the U.K. People who have saved in a tax-privileged defined contribution pension in the U.K. are compelled to use at least 75% of their accumulated stock of pension wealth to buy an annuity. This is known as the compulsory annuity market. Alongside this is a voluntary annuity market in which anyone can buy an annuity.

Finkelstein and Poterba first compare the mortality experience of individuals in the different annuity markets. This is shown in Figure 1 below which plots survival probabilities for the population (a typical individual), for compulsory annuitants, and for voluntary annuitants. It clearly shows that annuitants have a much higher probability of surviving to older ages than the typical individual, which is consistent with individuals having private information about their longevity and selecting into the market accordingly. The fact that voluntary annuitants are even longer-lived than compulsory annuitants is exactly what would be expected if the scope for selection based on private information were reduced by forcing people to purchase annuities.

Of course, there is another possible mechanism that might explain why annuitants are longer lived. Aside from individuals actively selecting on the basis of private information, it may simply be that annuitants are wealthier than the typical individual and that wealthier people live longer. Finkelstein and Poterba therefore distinguish between "active selection" and "passive selection," although their analysis cannot tell which is more important in practice.

Whether the difference arises as a result of active selection or passive selection, however, the end result is the same. Mortality among annuitants is lower than it is among the population as a whole. Insurance companies price annuities based on the mortality of the annuitant population. This makes annuities relatively poor value for a typical individual who might want to purchase an annuity.

Figure 1 Probability of survival (men), population and annuitants



Source: Mortality figures from Poterba (2001) p. 258.

To see this, Finkelstein and Poterba calculate the money's worth ratio of annuities using different survival probabilities (Table 1). This ratio is a measure of the value of an annuity – in essence it is the sum of the expected annuity payments relative to the initial sum paid. A ratio of 1 would indicate that someone would expect to get back exactly what he or she paid. Obviously, the money's worth ratio depends on how long someone expects to live; the lower the life expectancy, the lower the value of an annuity.

Based on population life expectancy, voluntary and compulsory annuities represent fairly poor value (shown in column 1). While this is necessary for insurance companies to earn a profit, it means that annuities will not be attractive to a typical individual. When the ratios are calculated using mortality rates appropriate to the specific market (columns 2 and 3), annuities look to be a much better value, suggesting that individuals can expect to get back more than 97% of what they paid (leaving a small profit margin for the insurance companies).

Table 1 Expected annuity value relative to initial investment, 65-year old male

	(1) Population life expectancy	(2) Voluntary annuitant life expectancy	(3) Compulsory annuitant life expectancy
Voluntary annuity	0.844	0.974	-
Compulsory annuity	0.908	-	0.971

Source: Poterba (2001) p. 260.

This evidence supports the idea that adverse selection is a real problem in the market for annuities and offers an explanation for why annuities may not be attractive to the typical individual. One solution is to make annuitization compulsory. As seen in the U.K., this reduces the extent of selection. However, if individuals have some choice over the age at which to buy an annuity or what type of annuity to buy, they are likely to make choices with a view to maximizing the value of their annuity purchase. For example, given a choice between level annuities (fixed in nominal terms) or escalating annuities (fixed in real terms), individuals with longer life expectancies are more likely to go for escalating annuities. Only a one-size-fits-all approach can get rid of selection, and this is costly in terms of denying individuals an annuity that best matches their preferences.

Sources

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Poterba, J. M. (2001) Annuity Markets and Retirement Security, *Fiscal Studies,* Institute for Fiscal Studies, **22**(3): 249–70