



Definitions of **bold key terms** are at the end of this article.

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**Authors, Titles and Publication Dates of the Articles Addressed in the Insight**  
Finkelstein, Amy, and James Poterba. 2004. "[Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market.](#)" *Journal of Political Economy* 112 (1).

Doyle, Suzanne, Olivia S. Mitchell, and John Piggott. 2004. "[Annuity Values in Defined Contribution Retirement Systems: The Case of Singapore and Australia.](#)" *Australian Economic Review* 37 (4): 402–16.

James, Estelle, and Xue Song. 2001. "[Annuity Markets Around the World: Money's Worth and Risk Intermediation.](#)" Paper, available on SSRN.

**Who Should Read This Insight:**  
Retirees and their financial advisors, annuity manufacturers, policymakers and regulators, plan sponsors

**Institute Research Agenda Topic:**  
Understanding differences in consumer behavior and decision-making

# Insight: WHAT FACTORS INFLUENCE ANNUITY VALUE FOR MONEY: LESSONS FROM OTHER COUNTRIES

## IDEAS IN THE INSIGHT YOU CAN PUT INTO ACTION

### Retirees and Their Financial Advisors

The studies reveal considerable dispersion in money's worth (i.e., the percent of premiums that **annuity** manufacturers return to purchasers as income), both across product types and between manufacturers. Relative to annuities that pay a level dollar benefit, inflation-indexed and escalating annuities have a lower money's worth. But, annuity purchasers should not base their decision on money's worth alone. Purchasers and their **financial advisors** also should consider the benefits offered. To illustrate, inflation-indexed annuities give households the certainty of being able to maintain their standard of living however long they survive, a certainty that is both valuable and prohibitively expensive to replicate by investing in financial assets.

### Annuity Manufacturers

Annuities suffer from adverse selection—low mortality risk individuals (who are likely to live unusually long) are more likely to purchase annuities than high mortality risk individuals. Annuity manufacturers must charge higher prices that reflect the low mortality risk of annuity purchasers, limiting the size of the market. The experience of Singapore suggests that measures to promote annuitization may bring higher mortality risk purchasers into the risk pool, reducing adverse selection, and perhaps further increasing take-up. Product design may further reduce adverse selection. To illustrate, the annuities sold in Singapore are usually **deferred annuities**, purchased in middle age but with payments commencing at retirement. Deferred annuities may suffer from lower levels of adverse selection than **immediate annuities**, perhaps because individuals are less able to estimate their relative mortality risk many years in the future.

### Policymakers and Regulators

The 2019 SECURE Act contains safe harbor protections for plan sponsors that offer annuity options within their retirement plans. More guidance from the Department of Labor would help plan sponsors make appropriate offers.

International experience shows that policies to promote annuitization can reduce adverse selection, benefiting both those who would have purchased anyway as well as those induced to purchase by the policies that promote annuitization. But, policymakers should ensure that policies to promote annuitization do not stifle competition. The United Kingdom used to mandate annuitization of balances in the U.K.-equivalent of individual retirement accounts. Although

participants had the right to purchase an annuity from a manufacturer other than the plan provider, few chose to do so, resulting in a lack of competition and low money's worth.

The lower money's worth of inflation-indexed annuities in the United States may reflect the difficulties that manufacturers face in finding investments with returns that match their obligations to annuity purchasers. Policymakers should consider how best to develop markets in inflation-indexed long-term corporate and infrastructure bonds.

### Plan Sponsors

When evaluating annuities, plan sponsors should weigh all the costs and benefits to participants and not focus exclusively on money's worth.

## PRINCIPAL INSIGHTS

Before evaluating these studies, this Insight first explains how annuity money's worth is calculated and the implications of the assumptions made regarding mortality risk and interest rates.

### Defining Annuity Money's Worth

An annuity purchaser pays a manufacturer a lump sum premium and in return receives an income stream, typically for life. For example, a 65-year-old individual might pay an insurance company \$100,000 in return for an income stream of, say, \$500 a month (\$6,000 a year) for the rest of his/her life. The income stream can be a fixed monthly or annual dollar amount (also called nominal annuities, as in the above example), can increase at a fixed percentage each year, or can be indexed for inflation. Some annuities provide a deferred income, so that the annuity is purchased (say) at age 50, with income starting at (say) age 65 (so-called deferred annuities). Other annuity products guarantee that the income will be paid for a minimum number of years in the event of early death (so-called **guaranteed annuities**).

The expected present value of the income stream equals the sum of the income payments, with each payment discounted by an interest rate from the date of receipt by the **annuitant** back to the date of the annuity purchase and multiplied by the probability that the annuitant survives to receive it. For example, at a 5 percent interest rate \$100 payable in 20 years is worth only \$38 today, and if the purchaser has only a 50 percent probability of being alive to receive that \$100 payment, then its expected present value is just \$19 (50 percent of the \$38).

The money's worth of an annuity is this expected present value of the income stream as a percent of the premium paid. For example, if the income payments of an annuity with a purchase price of \$100,000 have an expected present value of \$90,000, the money's worth is 90 percent (90 percent = \$90,000 / \$100,000). When the money's worth exceeds one, the annuity is more than actuarially fair, so the expected present value of future payments exceeds the purchase price. When the money's worth is less than one, the annuity is less than actuarially fair. We expect annuities to be less than actuarially fair because annuity manufacturers bear administrative and other costs.

Economic models demonstrate that annuities should benefit households even if the annuities are less than actuarially fair because annuities provide valuable protection against the risk of outliving one's wealth. Indeed, economic models show that purchasing an annuity would still be beneficial even if the money's worth was as low as 80 percent, far lower than most estimates. But annuities will be more attractive the closer they are to being actuarially fair (i.e., have money's worth of 100 percent).

Money's worth calculations use either population or annuitant life tables. Population life tables report the average annual mortality risk of the population as a whole, by age and gender.

Annuitant mortality tables report the lower mortality risk of the people who actually purchase annuities. Annuities have higher money's worth to annuitants than to the population as a whole, reflecting the lower mortality risk of the people that actually purchase annuities, and the difference between annuitant and population money's worth provides an indication of the effect of adverse selection. As annuitants are disproportionately likely to survive to advanced ages, the gap between annuitant and population money's worth is greatest for inflation-indexed and deferred annuities because larger shares of benefits are paid at advanced ages.

Money's worth calculations can discount future income using either the risk-free interest rate on government bonds or the higher interest rate on corporate bonds. Money's worth will be higher when the lower government bond interest rate is used because, at lower discount rates, future income has a higher present value. This insight reports money's worth calculations using government bond interest rates. In the United States, the risk to the purchaser of manufacturer default is negligible because manufacturers hold substantial financial reserves and are regulated by state insurance commissioners, and payments are protected by state-level guaranty funds. Most other countries also provide explicit or implicit guarantees.

### THE THREE STUDIES

#### **Finkelstein and Poterba, "Adverse Selection in Insurance Markets: Policyholder Evidence from the U.K. Annuity Market"**

Finkelstein and Poterba studied the UK annuity market. They found that **inflation-indexed annuities**, that pay larger shares of benefits at older ages had a lower money's worth than annuities with level payments. They attributed the lower money's worth to a preference of purchasers with the lowest mortality risk for annuities paying larger shares of benefits at ages to which they were disproportionately likely to survive.

Their study was published in 2004, using data for 1981–98. During most of that period, participants in UK tax-deferred retirement plans were required to **annuitize** a portion of their savings, the so-called compulsory market. But, others purchased annuities voluntarily, in the voluntary market. In both markets, purchasers could choose among **fixed, increasing**, and inflation-indexed annuities. Purchasers could also choose whether to have payments guaranteed for a period in the event of early death (e.g., 10 years). Purchasers in the compulsory market were not required to buy from their plan provider, but few availed themselves of the right to shop around.

Assuming population mortality and discounting annuity income using the interest rate on UK government bonds, Finkelstein and Poterba found that the average money's worth in the compulsory market was 91 percent—that is, the expected present value of the annuity income equaled 91 percent of the premium paid. In the voluntary market, the money's worth was 99 percent, almost exactly actuarially fair. The difference in money's worth between the compulsory and voluntary market is surprising and was not discussed by the authors. One would expect money's worth to be lower in the voluntary than in the compulsory market because the select group of individuals who purchase annuities voluntarily will have a lower average mortality than those who are compelled to purchase. A reasonable interpretation is that the higher money's worth in the voluntary market reflects stronger competition between manufacturers. A lesson from the United Kingdom is that poorly crafted measures to promote **annuitization** can lead to increased prices.

Finkelstein and Poterba also find that, in both the compulsory and voluntary market, annuities with guarantee periods had higher money's worth, and inflation-indexed annuities had substantially lower money's worth than annuities providing a level lifetime income with no

guarantee period—4.6 percentage points lower in the voluntary market and 9.6 percent lower in the compulsory market. They attributed these differences in money's worth to differences in mortality risk between the purchasers of the different types of annuities. For example, low mortality risk individuals prefer inflation-indexed annuities with benefits backloaded to older ages, higher mortality risk individuals prefer annuities with guarantee periods that ensure that money is paid to their estate in the event of an early death, and manufacturers set the prices for the various annuity types based on the mortality risk of likely purchasers. A limitation of the study is the use of population mortality tables which will understate the money's worth of inflation-indexed relative to nominal annuities because larger shares of inflation-indexed annuity payments are made at advanced ages. The difference in money's worth to the low mortality individuals who actually purchase any type of annuity will be smaller than that reported by the authors of the study.

Besides the role that mortality differentials may play in influencing relative prices, another factor may also play a role. It may be more costly for an insurer to hedge an obligation to pay an inflation-indexed income than an income fixed in nominal terms. Policymakers could help manufacturers lower costs by developing markets in inflation-indexed securities.

**Doyle, Piggott, and Mitchell, "Annuity Values in Defined Contribution Retirement Systems: Australia and Singapore Compared"**

Doyle, Mitchell, and Piggott compared the annuity markets in Singapore and Australia. The study finds higher money's worth in Singapore than in Australia, likely reflecting wider participation. The study lends support to the belief that measures to promote annuitization can increase money's worth by bringing higher mortality risk purchasers into the risk pool.

Singapore does not have a Social Security-type pension. Singaporeans are entirely dependent on balances accumulated in their defined-contribution accounts to finance post-retirement consumption, and they risk destitution if they outlive their savings. To reduce this risk, at the time of the study Singaporeans were restricted from withdrawing their account balances as a lump sum. The default was phased withdrawals, while workers with larger account balances could purchase annuities. These factors likely contribute to Singapore's relatively high annuitization rate. The authors report that one-sixth of Singaporean retirees purchase an annuity, much more than in the United States. In contrast, Australia has a means-tested, Social Security-type benefit (known as the Age Pension), and there are very few restrictions on post-retirement withdrawals of defined-contribution account balances. Likely due to the safety net the Age Pension provides and the lack of restrictions on pension withdrawals, the authors report that only about 3 percent of Australian retirees purchase annuities.

Assuming population mortality and discounting the income payments at the rate of interest on government bonds, the authors calculated money's worth of 94.5 percent for both men and women in Singapore. In contrast, Australian money's worth was just 87.9 percent for men and just 90.3 percent for women. The higher Singaporean money's worth likely reflects participation by higher mortality individuals, resulting from the structure of the Singaporean retirement system. As in the United Kingdom, both countries exhibit a wide dispersion of annuity prices for annuities offering identical benefits. The authors do not report the shares of annuities purchased at each price point, nor whether price differentials reflect differences in the financial standing of the manufacturers. But, the wide dispersion of prices may indicate a lack of competition in the market.

Neither Singapore nor Australia compiles annuitant life tables based on its own annuitant mortality data. In both countries, actuaries and regulators use modified versions of UK life tables. Using these modified life tables, the authors calculated that annuities are close to actuarially

fair for the low mortality risk Australians who actually purchase annuities, with moneys' worth of 93.9 and 93.8 percent for Australian men and women, respectively. Adverse selection reduced money's worth by 6 percentage points for men (from 93.9 to 87.9 percent) and 3.5 percentage points for women (from 93.8 to 90.3 percent). In contrast, the Singapore annuity market appeared to suffer from almost zero adverse selection, likely due to much wider participation. Using annuitant mortality tables, Singapore moneys' worth increased imperceptibly, from 94.5 to 94.7 percent for men and from 94.5 to 96.4 percent for women. A potential concern with the calculations is the absence of country-specific annuitant mortality data. But the findings appear to be robust. A more recent estimate of the difference between Singaporean annuitant and population money's worth, using more precise mortality and interest rate assumptions, estimates a gap of just 2.9 and 4.2 percentage points for men and women, respectively.

**James and Song, "Annuity Markets Around the World: Money's Worth and Risk Intermediation"**

The paper by James and Song studied annuity markets in eight countries: the United Kingdom, Australia, Singapore, Canada, Chile, Israel, Switzerland, and the United States. The authors found high money's worths in almost all of the countries studied, but they were unable to identify common factors affecting cross-country variation in money's worth. One might tentatively conclude that the high Chilean inflation-indexed money's worth reflected the wide availability of inflation-indexed securities in Chile and that, as discussed in the review of Doyle, Piggott, and Mitchell, the high Singaporean money's worth reflected the relatively high participation rate in Singapore.

At the time the data were collected, the United Kingdom was the only country in which both nominal and inflation-indexed annuities were available. Only inflation-indexed annuities were available in Chile and Israel, and only nominal annuities whose income is not adjusted for inflation were available in the other countries. At the time the study was undertaken, five countries—the United Kingdom, Singapore, Chile, Israel, and Switzerland—incentivized annuitization in a variety of ways and had larger shares of retirees purchasing annuities. The other three countries—Australia, Canada, and the United States—did not incentivize annuitization and had smaller shares of retirees purchasing annuities.

Consistent with the Finkelstein and Poterba and the Doyle, Mitchell, and Piggott paper, James and Song found considerable dispersion in annuity prices and thus in money's worth within countries for identical annuities. But they also found considerable dispersion in money's worth between countries. Assuming population mortality and a risk-free interest rate, James and Song estimated average money's worth ranging from 76.5 percent (Israeli women) to 105.6 percent (Singaporean women). The money's worth of the Singaporean annuity was 29.1 percentage points, or almost 40 percent higher than that of the Israeli annuity, a differential that does not reflect differences in interest rates because local interest rates are used in each country's money's worth calculations. Assuming annuitant mortality, the money's worth ranged from 90.4 percent (Israeli women) to 108.8 percent (Singaporean women), a differential of 18.4 percentage points, with most countries having money's worths of close to 100 percent.

Annuity manufacturers incur administrative costs. So how are they able to offer money's worth of over 100 percent to people who actually purchase annuities? James and Song argue that insurers are able to earn higher returns than those earned on risk-free government bonds—by holding a diversified portfolio of longer-term assets. In effect, annuity purchasers benefit from lower annuity prices than those that would occur if annuity manufacturers only invested in risk-free government bonds.

The sample of countries is too small to permit a statistical analysis of factors correlated with higher or lower money's worth. The data reveal no clear relationship between, on the one

hand, the share of retirees purchasing annuities and the incentives for households to purchase annuities, and on the other hand, the difference between annuitant and population money's worth. Although the authors replicate the finding of Finkelstein and Poterba that money's worth for UK inflation-indexed annuities are lower than for UK nominal annuities, and find that Israeli inflation-indexed annuities also have relatively lower money's worth, the same is not true for Chile. Assuming annuitant mortality, Chilean inflation-indexed annuities have money's worth of close to 100 percent, perhaps reflecting the widespread availability of inflation-linked investment options for insurers there.

### Future Research

The data in the three studies comes from 1981–98 (Finkelstein and Poterba), 2000 (Doyle, Mitchell, and Piggott), and 1999 (James and Song). Although a more recent study has reported Singapore money's worth for 2007, more recent cross-country comparisons are required because money's worth may have changed as interest rates have declined, retirement systems have been reformed, and new annuity types have been introduced. Singapore has moved toward an annuity mandate, while the United Kingdom now gives workers complete access to their retirement funds, and it would be interesting to find out whether these reforms are reflected in trends in annuitant-population money's worth differentials. A consistent finding of the studies is that money's worth is high enough for annuity purchase to improve the financial well-being of most retirees. At the same time, however, relatively few individuals purchase annuities voluntarily. Although a substantial literature examines this so-called **annuity puzzle**, reasons for participation are still not fully understood.

To learn more, visit the Retirement Income Institute at [www.allianceforlifetimeincome.org/retirement-income-institute](http://www.allianceforlifetimeincome.org/retirement-income-institute)

#### KEY TERMS ARE SOURCED FROM THE ALLIANCE FOR LIFETIME INCOME'S ANNUITIES LANGUAGE GLOSSARY AND INVESTOPEDIA

**Annuitant:** A person who will receive the income payments from an annuity.

**Annuitize:** When you turn your current account balance into income payments.

**Annuitization:** When you turn your current account balance into a series of periodic income payments, either for a specific period of time or for your whole life.

**Annuity:** A financial product that can offer protected lifetime income and even potentially grow your money.

**Annuity puzzle:** The annuity puzzle refers to the fact that few people choose to annuitize even a portion of their accumulated savings even though they have many good and rational reasons to do so.

**Deferred annuity:** A type of annuity that delays payments until you choose to receive them, while providing an opportunity for growth or income during the deferral period.

**Defined-contribution system:** A defined-contribution plan is a retirement plan that's typically tax-deferred, like a 401(k) or a 403(b), in which employees contribute a fixed amount or a percentage of their paychecks to an account that is intended to fund their retirements.

**Financial advisor:** A qualified person who can help you understand your options and make financial decisions to work toward your financial goals.

**Fixed annuity:** An annuity that delivers 100% protection from market downturns with the potential for earned interest.

**Guaranteed annuity:** Annuities are financial products that offer a guaranteed income stream, used primarily by retirees.

**Immediate annuity:** An annuity that begins paying out guaranteed income within one year after the date of purchase, either for life or for a selected time period.

**Inflation-indexed annuity:** An annuity that guarantees a real rate of return at or above inflation (inflation-protected annuity) or an annuity designed to increase the monthly income payout each year based on a predetermined formula.

**Increasing annuity:** An annuity where the payments grow at a particular rate ([financeformulas.net](http://financeformulas.net)).

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