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WHAT IS THE VALUE OF ANNUITIES?

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Introduction

The first cohorts reliant on defined contribution pensions are now entering retirement, leading to a new challenge: how to balance current needs against the risk of outliving one's assets? Annuities, which offer guaranteed lifetime income, are a leading solution to this problem. However, take-up of annuities is low, with their expected cost cited as a main explanation.

This *brief,* based on a recent paper, explores trends in the value of retail annuities.[1] This topic has not been addressed in two decades, a period during which interest rates have declined, life expectancy has increased, and new annuity products have emerged.[2] The *brief* looks first at "money's worth" – the ratio of expected lifetime benefits to cost – and then at "wealth equivalence" – a measure that takes into account the insurance value of annuities. It also explores how both measures vary by socioeconomic status (SES).

The discussion proceeds as follows. The first section describes the data and methodology for calculating money's worth and wealth equivalence. The second section explores trends in these measures for three types of annuities – immediate, indexed, and deferred – for the full population. The third section provides the current money's worth and wealth equivalence of immediate annuities for different SES groups.

The final section concludes that money's worth has remained stable over time, with an expected payout of about 80 cents per premium dollar for immediate and indexed annuities and about 50 cents per dollar for deferred annuities. But, accounting for the insurance value, the wealth equivalence measure suggests that everyone gains from purchasing annuities. And Blacks actually benefit more from annuities than whites, despite having a lower life expectancy, because their lifespans are more uncertain.

Calculating Money's Worth and Wealth Equivalence

This section explains the calculations of money's worth and wealth equivalence for the full population and how mortality for the different SES groups is estimated in order to make these calculations for each group.[3]

Calculating Money's Worth

The money's worth of an annuity is the ratio of the expected present value (EPV) of its payouts to its premium (generally quoted per $100,000). A ratio

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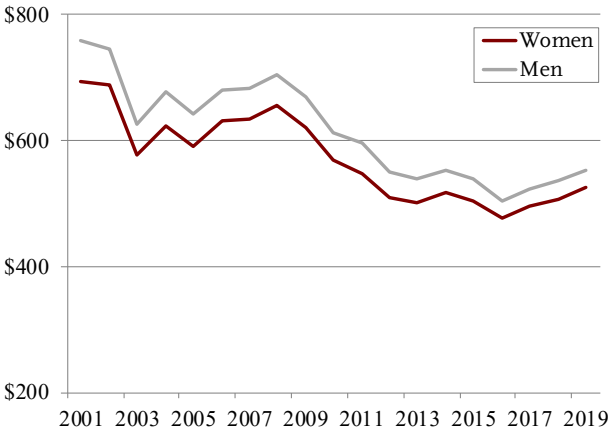
of 1 means that consumers would expect to receive every dollar of premium back with interest over their lifetime. Typically, the money's worth of insurance products such as annuities is less than 1 since insurance companies face an array of costs and need to earn a profit.[4]

The EPV depends on three factors: interest rates, survival probabilities, and annuity payouts. Interest rates are calculated based on the term structure of U.S. Treasury bonds, with a risk premium added corresponding to the difference in yields between Treasuries and BAA corporate bonds. Survival probabilities for the full population are taken directly from the U.S. Social Security Administration. Average annuity payouts for men and women are gathered for each type of annuity from Annuity Shopper archives for annuities purchased at age 65.[5]

We are interested in how these factors affect money's worth today and in trends over the past two decades. On the one hand, interest rates have declined since 2000, which would increase the value of an annuity, all else equal. And life expectancy has increased, which would also increase annuity values. On the other hand, immediate annuity payouts for both men and women have declined since 2001 (see Figure 1), which means that the trend in money's worth is ambiguous.[6]

Figure 1. Average Monthly Immediate Annuity Payment for $100,000 Premium at Age 65, by Gender, 2001-2019



Source: Annuity Shoppers' archive files for the month of July in each year, average of firms' quotes.

Calculating Wealth Equivalence

Moreover, money's worth is only a partial measure of the value of an annuity because it neglects the insurance that the product provides against outliving one's assets. The next step, therefore, is to calculate wealth equivalence: the share of starting wealth an individual would require to be as well off with annuitization as without it. The smaller the necessary share of wealth, the better the product.

The assumption is that individuals have a specific period utility function and reach age 65 with $100,000 of financial assets. Lifetime utility is simply the discounted sum of period utilities.[7] The individual consumes the optimal amount of assets each period in the absence of any annuity. Then, the same calculation is performed with the annuity; if lifetime utility is higher (lower), starting wealth is reduced (increased) in an iterative process until lifetime utility is equivalent with and without the annuity.[8]

Estimating Mortality by SES

Calculating money's worth and wealth equivalence for specific population segments requires estimating each group's expected survival probabilities from age 65 onward. The first step is to define the groups themselves. In the current analysis, the focus is on non-Hispanic Blacks and whites by gender.[9] Each of these groups is then divided into three equal-size education groups by cohort.[10] Finally, death rates are estimated for each age-gender-race-education tercile using mortality data from the *National Vital Statistics System* coupled with population estimates from the *American Community Survey*.[11]

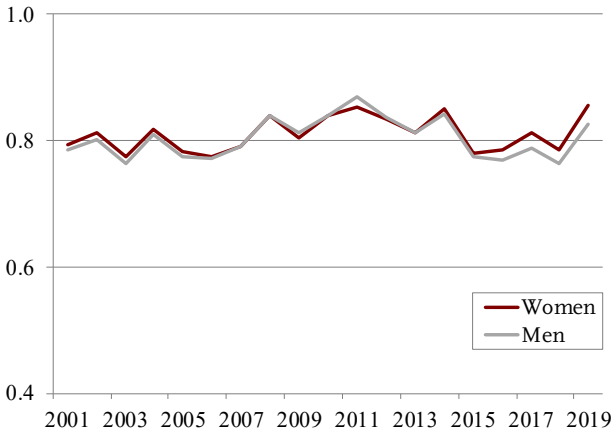
Money's Worth and Wealth Equivalence for Full Population

The methodology described above yields estimates of money's worth and wealth equivalence for three types of annuities: nominal immediate annuities, immediate annuities with a fixed 3-percent annual escalation (referred to here simply as indexed annuities); and deferred annuities bought at age 65 that start payments at age 85.

Money's Worth

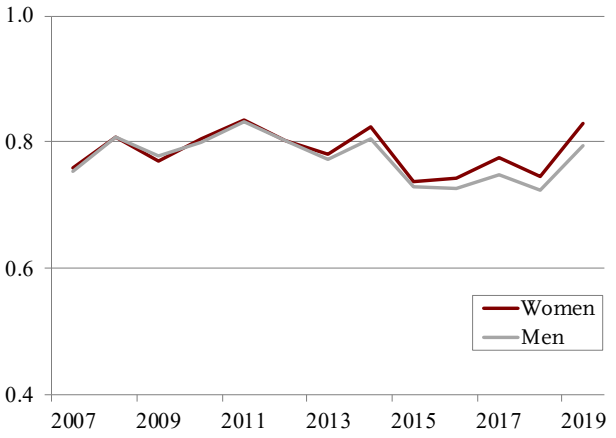
Figures 2-4 show the trends in money's worth over time for immediate, indexed, and deferred annuities, respectively. Year-to-year variations in values are apparent, but these are at least partially driven by estimation noise. The first takeaway is that, for all three products, the values show no trend over time. That is, in the face of large changes in mortality and interest rates over the last two decades, insurers have adjusted pricing to keep money's worth from increasing. Moreover, the estimates are also comparable to those presented in Mitchell et al. (1999), implying that this stability has persisted at least since 1985.

Figure 2. Money's Worth for Immediate Annuities at Age 65, by Gender, 2001-2019



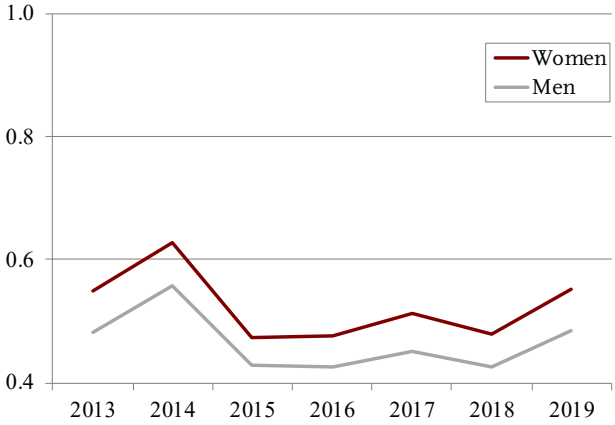
Source: Authors' calculations.

Figure 3. Money's Worth for Indexed Annuities (3-Percent COLA) at Age 65, by Gender, 2007-2019



Source: Authors' calculations.

Figure 4. Money's Worth at Age 65 for Deferred Annuities Starting at Age 85, by Gender, 2013-2019



Source: Authors' calculations.

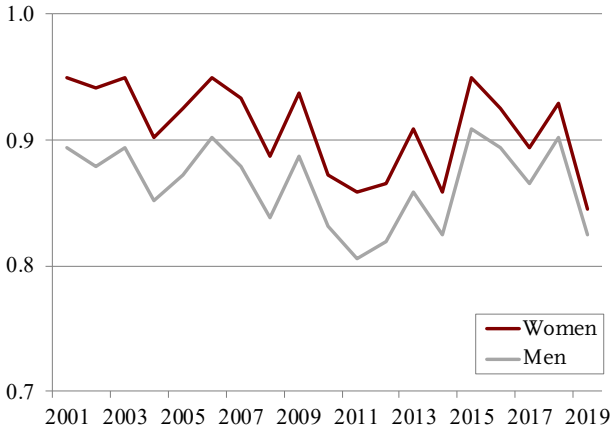
The second takeaway is that the money's worth of immediate and indexed annuities is consistently around 80 cents per dollar, while the money's worth for deferred annuities is much lower, hovering around 50 cents per dollar. This low expected value of deferred annuities may be surprising given how much attention these products have received recently.[12] However, the widely-touted benefits of deferred annuities are not based on their expected values, but rather their insurance value. The next step, therefore, is to estimate the insurance value of the three products.

Wealth Equivalence

The purpose of an insurance product is not to make money but rather to protect against losses. In the case of annuities, the goal is to protect against outliving one's assets. The appropriate question to evaluate these lifetime income products is therefore the share of starting wealth an individual would require to be as well off with annuitization as without it. That is, what is the wealth equivalence of the annuities?

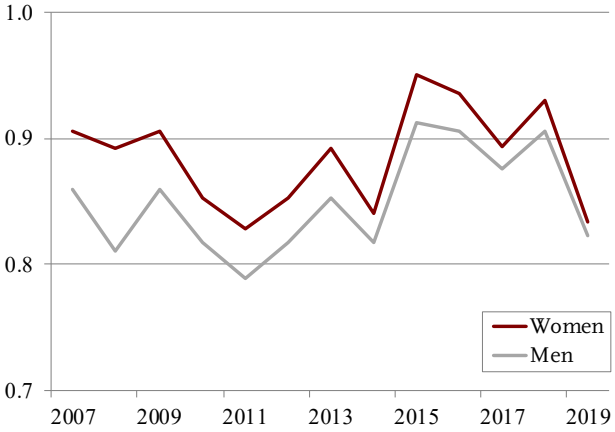
Figures 5-7 show the wealth equivalence of immediate annuities, indexed annuities, and deferred annuities, respectively. As with money's worth, the wealth equivalence of these products shows little time trend. More interesting is the comparison of wealth equivalence across products. As noted above, a smaller wealth equivalence number indicates a more valuable product, because less wealth is necessary to make an individual as well off with the annuity as without it.

Figure 5. Wealth Equivalence for Immediate Annuities at Age 65, by Gender, 2001-2019



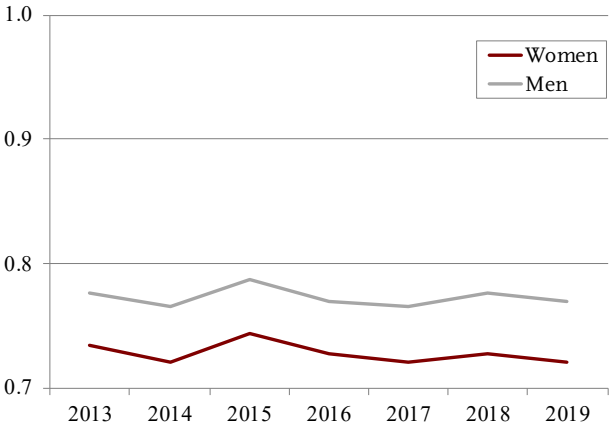
Source: Authors' calculations.

Figure 6. Wealth Equivalence for Indexed Annuities (3-Percent COLA) at Age 65, by Gender, 2007-2019



Source: Authors' calculations.

Figure 7. Wealth Equivalence at Age 65 for Deferred Annuities Starting at Age 85, by Gender, 2013-2019



Source: Authors' calculations.

The value to consumers of both types of immediate annuities is similar. However, the insurance value of deferred annuities is appreciably greater than that of the immediate annuities. This finding is in sharp contrast to the relatively low money's worth of deferred annuities. The high insurance value for deferred annuities stems from their unique focus on protecting against the small probability of living a *very* long time.

All these results pertain to the average individual of each gender. Gender is accounted for by insurers when setting premiums. However, it is the only personal characteristic besides age that annuity providers typically use in pricing their products in the United States. Both money's worth and insurance value may vary along other dimensions, such as race and education.

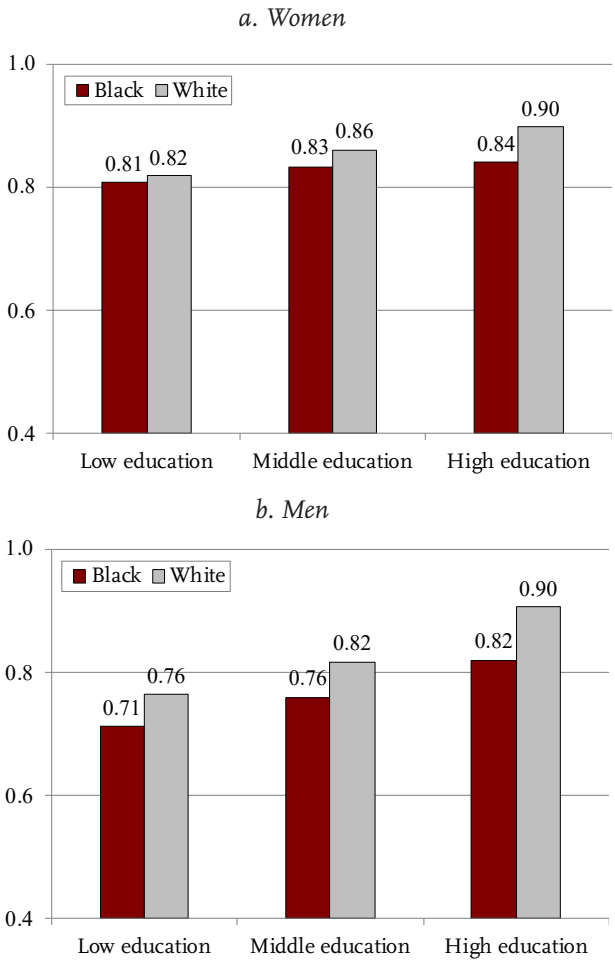
Money's Worth and Wealth Equivalence by SES

The following analysis is limited to immediate annuities. We look first at money's worth and then wealth equivalence by SES.

Money's Worth by SES

Figures 8a and 8b (for women and men, respectively) show the money's worth of immediate annuities in 2019 by education tercile for Blacks and whites. In terms of education, the pattern shows that lower-education groups receive less value from immediate annuities, which is due to their expected shorter average lifespans.

FIGURE 8. MONEY'S WORTH OF AN IMMEDIATE ANNUITY AT AGE 65 FOR EDUCATION TERCILES, BY RACE, 2019



Source: Authors' calculations.

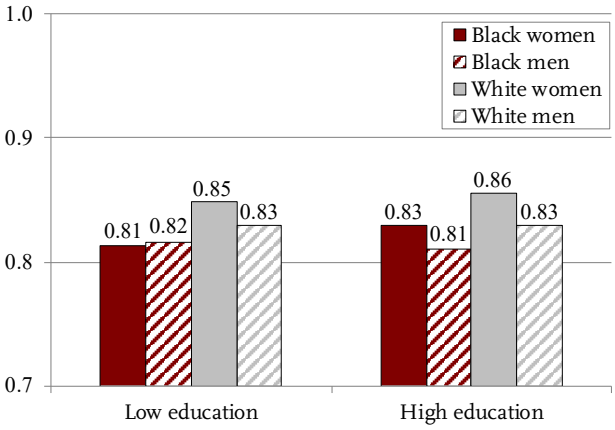
The other pattern that emerges is that, at all education levels, Blacks receive less than whites, also due to shorter lifespans. For example, in 2019, Black men in the top tercile of their education distribution had a money's worth that was eight cents less than white men in the same relative position in their educational distribution. For women in the top educational tercile, the gap was six cents. In the bottom tercile, the gap was five cents for men, and one cent for women. These differences reflect the varying mortality rates of the different groups.

As with the full population, money's worth does not tell the whole story for different SES groups, because it neglects the longevity insurance value of the products. Next, then, the focus turns to estimates of the wealth equivalence of immediate annuities by SES.

Wealth Equivalence by SES

Figure 9 shows the wealth equivalence of an immediate annuity for the bottom and top education groups by race and gender in 2019. The most striking result is that annuities are preferred to non-annuitization for all groups, even though – by the money's worth measure – no group receives more than 90 cents per dollar.

FIGURE 9. WEALTH EQUIVALENCE OF IMMEDIATE ANNUITIES FOR TOP AND BOTTOM EDUCATION TERCILES, BY RACE AND GENDER, 2019



Source: Authors' calculations.

In terms of gender and education, no particular pattern is apparent in the estimates. All those analyzed would be willing to part with 14-19 percent of starting wealth in return for longevity insurance.

In terms of race, annuitization appears to be consistently more valuable for Blacks than for whites. The reason is that wealth equivalence is influenced by the *uncertainty* of the length of the lifespan, not by the length of the lifespan itself. That is, even though Blacks do not live as long, their longevity tends to be much more uncertain.[13]

Conclusion

This *brief* estimates the money's worth and the wealth equivalence of three types of commercial annuities to capture both the expected value of such products and the value of the insurance they provide.

The main findings for the full population are that individuals receive about 80 cents on the dollar for immediate and indexed annuities and about 50 cents on the dollar for deferred annuities. And these values have remained stable since the turn of the century as rising life expectancies and falling interest rates have been offset by lower payouts per dollar of premium. Furthermore, the value of these products including their function as insurance has also remained constant. Finally, while the expected value of deferred annuities is substantially lower than that of immediate annuities, their insurance value is greater because they protect more effectively against outliving one's assets.

Regarding heterogeneity in the value of immediate annuities, the results confirm the intuition that groups with lower life expectancies have lower expected returns from lifetime income products. Blacks have lower returns than whites of similar relative education, and those with lower education have lower returns than those with higher education within racial groups. However, this pattern does not hold when accounting for the insurance value of annuities. In particular, Blacks tend to get better value than whites despite their lower expected returns from such products, because Blacks have more uncertain longevity alongside lower expected lifespans.

These results highlight the costs and benefits of annuities. They also provide some evidence of the disparities across SES groups in the cost of such products. However, the results also raise the possibility that some groups with particularly high costs may stand to gain the most from longevity insurance.

Endnotes

1 Wettstein et al. (2021).

2 Mitchell et al. (1999) analyze immediate annuities up to 1995. Some work has been done since exploring various aspects of the money's worth of annuities, but generally assuming actuarial fairness at the population level (for example, Brown 2002). Money's worth of annuities in other countries has been analyzed more recently (for example, in Mitchell, Piggott and Takayama 2011). Gong and Webb (2010) analyze Advanced Life Deferred Annuities with survivor benefits. However, they do not consider single life annuities, and they use institutional, not retail, prices in their calculations because such commercial products were not widely available at the time.

3 For more details, see the full paper (Wettstein et al. 2021).

4 Such actuarial unfairness results from some combination of adverse selection (where those who buy annuities live longer than the population average); insurer overhead costs (such as management and administration, advertising, etc.); the opportunity costs that insurers bear for holding capital reserves in case of adverse outcomes; and insurer profits.

5 The data include about a dozen insurers every year. For immediate annuities, quotes are available for 1986-2019; for indexed annuities for 2007-2019; and for deferred annuities for 2013-2019.

6 The trends in payouts for indexed and deferred annuities are also declining for the years in which data are available.

7 The utility function assumed is a constant relative risk aversion function common to the literature. This function implies that the share of assets devoted to insurance does not depend on the level of starting assets. The risk aversion parameter chosen is 2, as in Mitchell et al. (1999). An individual discount rate of 0.03 is also assumed, consistent with Mitchell et al.

8 The share of starting wealth devoted to each annuity product is also assumed. For immediate annuities, both indexed and nominal, this share is 100 percent, which would be the optimal share in this model (Yaari 1965). For deferred annuities, 100 percent is not optimal; here, we assume 20 percent annuitization, similar to the optimal amount found in recent literature (15 percent in Horneff et al. 2020).

9 Hispanics display very different patterns of mortality by education, and so are excluded from the analysis.

10 This method follows Bound et al. (2014).

11 These death rates are then used to estimate a Gompertz-Makeham survival function that alleviates the small sample size of individual age-gender-race-education cells, as in Brown (2002).

12 See Horneff et al. (2020) and Munnell, Wettstein, and Hou (2021 forthcoming).

13 See Sasson (2016) and estimates in Wettstein et al. (2021).

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