

HOW SHOULD WE INSURE LONGEVITY RISK IN PENSIONS AND SOCIAL SECURITY?

BY JEFFREY R. BROWN*

Executive Summary

As baby boomers approach retirement, individuals and policymakers are increasingly concerned about retirement income security. Thanks to dramatic advances in life expectancy over the last century, today's typical 65-year old man and woman can expect, on average, to live to ages 81 and 85 respectively. Perhaps even more impressive, over 17 percent of 65-year old men and over 31 percent of 65-year old women are expected to live to age 90 or beyond. Most people would agree with President Clinton that increasing life expectancy is "something wonderful."¹ However, *uncertainty* about length of life carries the risk that individuals may outlive their resources and be forced to substantially reduce their living standards at advanced ages.

Fortunately, financial products exist that allow individuals to protect themselves from this risk. In particular, a *life annuity* is an insurance product that pays out a periodic (e.g., monthly) sum of income that lasts for life, in exchange for an up-front premium charge. The primary appeal of the life annuity is that it offers retirees the opportunity to insure against the risk of outliving their assets by exchanging these assets for a lifelong stream of guaranteed income.

In the United States, the two primary sources of life annuities for most retirees are the Social Security system and employer-provided, defined benefit (DB) pension plans. The first and most important of these, the Social Security system, is facing significant future imbalances that have led to numerous proposals for reform, including supplementing or partially replacing the existing

* Jeffrey R. Brown is Assistant Professor of Public Policy at Harvard University's John F. Kennedy School of Government, and a Faculty Research Fellow of the National Bureau of Economic Research (Jeffrey_Brown@harvard.edu). The author wishes to especially thank Olivia Mitchell, James Poterba, and Mark Warshawsky for helpful comments and for their collaboration on much of the research on which this *issue in brief* is based. The author also thanks Peter Diamond, Andy Eschtruth, Martin Feldstein, Jeffrey Liebman, Alicia Munnell, Peter Orszag, and Annika Sundén for helpful discussions. Any errors or opinions expressed in this *issue in brief* are solely those of the author.

¹ In discussing the future insolvency of the Medicare trust fund on June 29, 1999, President Clinton stated, "I've often said that this is a high class problem. It is the result of something wonderful—the fact that we Americans are living a lot longer."

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system with an individual accounts program. The second of these sources, employer-provided pensions, is undergoing a dramatic shift towards defined contribution (DC) plans, in which over 70 percent of participants are not even offered a life annuity as a payout option. As the U.S. retirement landscape shifts to one that places more emphasis on self-directed accounts, it is important to consider the impact of these changes on retirees' ability to adequately protect against the risk of outliving their resources.

This *issue in brief* summarizes a growing body of research on the important role of annuities in the U.S. retirement system. This review yields five policy-relevant conclusions:

- *Inflation-protected life annuities should be a central component of any retirement income system that seeks to provide retirement income security.* If individuals do not have access to annuities, they must trade off two risks. First, if they consume too aggressively, they risk running out of resources. Second, if they consume too conservatively, they forgo consumption opportunities and thus have a lower standard of living. Life annuities simultaneously solve each of these problems and thus offer substantial benefits to retirees. These annuities should be indexed to inflation to protect retirees from fluctuations and declines in the real purchasing power of their retirement income. Even a relatively modest annual inflation rate of 3 percent will cut the real purchasing power of a fixed nominal income stream by 45 percent in 20 years.
- *Existing public policy towards private pensions does not encourage annuitization of private retirement resources.* Historically, most employees covered by pension plans were participants in defined benefit plans. According to federal law, these plans must “provide systematically for the payment of definitely determinable benefits to [a firm’s] employees over a period of years, usually for life, after retirement,”² a requirement that is typically met by paying benefits as an annuity. In contrast, defined contribution plans,

most notably including the fast-growing 401(k) plans, are under no such obligation to pay benefits as a life annuity, or even to offer participants the option to annuitize. As a result, over 70 percent of 401(k) plan participants lack a payout option that insures them against longevity risk.

- *The existing Social Security system is currently the only meaningful source of inflation-indexed annuities for most U.S. households, although the recent introduction of indexed government bonds should allow private insurance companies to offer these products in the future.* Social Security benefits are indexed to the Consumer Price Index, and thus protect the purchasing power of retiree benefits. Defined benefit plans, on the other hand, rarely index benefits, and most individually-purchased annuities provide a level nominal payout for life, thus subjecting retirees to significant inflation risk. However, the availability since 1997 of Treasury Inflation Protected Securities (TIPS) now provides private insurance companies with an inflation-linked asset with which to underwrite inflation-indexed annuities. While a significant market in inflation-indexed annuities has so far failed to emerge, such a market could develop if pension or Social Security reforms stimulated sufficient demand for these products.

- *Individual Accounts proposals for reforming Social Security should consider mandating a minimum amount of annuitization in order to minimize old-age poverty and reliance on means-tested government programs.* In the absence of an annuity mandate, retirees who choose not to annuitize would not be protected against longevity risk, thus increasing the likelihood that these individuals will run out of money before they die. In order to avoid rising poverty rates among the elderly and increased reliance on Supplemental Security Income or other similar programs, some level of mandatory annuitization is desirable. The annuity mandate would also need to consider the income security of spouses. One approach is to mandate the use of joint-and-survivor annuities that continue to pay benefits to a surviving spouse.

² Treasury Regulation Section 1.401-1(b)(1)(i).

- Because an annuity mandate may have undesirable distributional effects, policymakers 1) should be careful not to over-annuitize households beyond an amount sufficient to prevent poverty; and 2) may wish to consider policies to offset the redistribution. Mandatory annuitization can result in substantial redistribution due to the fact that lower-income people tend to die younger than higher-income people. As such, these implicit financial transfers are often away from economically disadvantaged groups and towards groups that are better off financially. This is true in any mandatory annuitization system, including the current Social Security system. However, the progressive benefit structure of Social Security is largely effective at offsetting this reverse redistribution. An individual accounts system can also address the redistribution problem directly through a progressive benefit structure or a system of government matching contributions, although not all proposals consider this issue. Importantly, other methods of reducing redistribution, such as offering *period certain* guarantees (which provide additional payments to a beneficiary if the insured individual dies shortly after annuitization), often do so at the cost of reduced insurance provision.

In the coming years, policymakers in the United States will be faced with many decisions that will impact the nation's public and private retirement income systems. Numerous proposals exist to address the financial stability of the Social Security system, and many of these proposals call for some form of individual accounts. While many economic and political issues are relevant to this debate, it is important not to forget that one essential element of ensuring lifelong, retirement income security is to provide adequate insurance against the financial risks of longevity. Regardless of whether Social Security in the year 2050 more closely resembles the existing system or an individual accounts system, the provision of inflation-protected, annuitized income should continue to play a central role.

Introduction

The United States is in the midst of an important shift in how individuals fund their retirement. While the Social Security system continues to be the primary source of retirement income for most households, in recent years there have been many calls for major reform. Among the proposals are many that would supplement or partially replace the existing program with a system of individual accounts. If such a proposal is adopted, it will in many ways simply mirror the dramatic shift that has already occurred with private pensions over the past quarter century. Since the passage of The Employee Retirement Income Security Act (ERISA) in 1974, the U.S. pension landscape has dramatically altered from one in which most retirees received life annuities through defined benefit pension plans, to a system of defined contribution plans (such as 401(k) plans) in which individuals have more control over the disposition of these assets.

While defined benefit (DB) plans, including the current Social Security system, and defined contribution (DC) plans, including proposals for individual accounts, differ in many ways, one of the most important differences is the method of distributing retirement income. Social Security and most traditional DB plans pay benefits in the form of a (possibly joint) life annuity and thus provide retirees with a form of insurance against outliving their resources. This longevity insurance is quite valuable to consumers, as it provides a higher sustainable level of consumption than is available in its absence. The majority of workers covered by private DC pension plans, in contrast, are not even offered an annuitization option. And while many individual accounts proposals to reform Social Security would mandate some form of annuitization, this provision is not universal. While alternative distribution mechanisms, such as lump-sum payments or periodic withdrawals, offer retirees a high degree of flexibility, they fail to provide a formal mechanism by which individuals can insure against longevity risk.

The extent to which individuals insure their mortality risk has a number of important policy implications. First, by providing a guaranteed minimum level of income, annuities ensure that no individual will outlive his or her retirement resources. Second, the provision of a minimum income floor directly impacts the extent to which retirees, and elderly widows in particular, are at risk of falling into poverty. As such, the degree of dependence on means-tested social assistance programs such as Supplemental Security Income (SSI) and Medicaid will be impacted. Third, because assets that are annuitized are no longer available for bequests, the extent of annuitization can affect the size of transfers to the next generation.

This *issue in brief* begins with a brief discussion of how annuities work, and why they are important to retirees. It also discusses many of the institutional features of annuity markets in the United States, highlighting the fact that very few individuals annuitize resources outside of Social Security and defined benefit pension plans. It then explores a number of reasons for this limited annuity demand, followed by a discussion of the benefits and costs of mandating annuities. The *brief* concludes with a discussion of the policy implications for pensions and Social Security.

A Primer on Annuities and Annuity Markets

What are Annuities and Why are they Important to Retirees?

Annuities are generally defined as contracts that provide periodic payments for an agreed-upon span of time. They include *annuities certain*, which provide periodic payouts for a fixed number of years, and *life annuities*, which provide such payouts for the duration of one or more persons' lives. This *issue in brief* is primarily concerned with life annuities, the principal insurance role of which is to protect individuals against outliving their resources.³

³ *Annuities certain* contracts, because they are paid for a fixed number of periods regardless of the survival of the insured, offer no insurance against outliving one's resources.

In order to understand the value of a life annuity, imagine a 65-year old woman preparing to retire with a significant stock of accumulated assets, in a world without the existing Social Security system or a defined benefit pension. If she knew her date of death with certainty, it would be a fairly simple exercise to optimally allocate this wealth over her remaining years. In the presence of uncertainty about length of life, however, determining how much to consume is a more difficult calculation because she must consider two competing risks. The first is *longevity risk*, or the risk that she will live significantly beyond her expected life span and thus run out of money. One way to solve this problem is for her to consume very conservatively to ensure that she will not run out of money even if she lives to an extremely advanced age. For example, if she consumed only the interest on her wealth, and never consumed out of the principal, she would never run her wealth to zero.⁴ This approach, however, exposes the individual to the risk that she will die with a substantial amount of wealth left unconsumed. In what sense is this a risk? Because the unconsumed wealth is a lost consumption opportunity—were it not for the uncertainty about length of life, the individual could have consumed more in every period while alive, presumably making her better off.⁵

These risks arise from the fact that there is substantial variation in length of life. Table 1 shows that an average 65-year old man in the year 2000 can expect to live an additional 16.4 years to age 81, while a typical 65-year old woman has a life expectancy of an additional 19.6 years to nearly age 85. As the table illustrates, however, 12 percent of men and 7.7 percent of women will die prior to their 70th birthday, while 17.5 percent of men and 31.4 percent of women will live to age 90 or beyond. This highlights the significant uncertainty faced by individuals in allocating their retirement wealth across their remaining lifetime.

Table 1: Remaining Life Expectancy and Probabilities of Survival to Selected Ages for 65-Year Olds in the Year 2000

	Men	Women
Remaining Life Expectancy	16.4 years	19.6 years
Probability of Surviving to Age:		
70	.880	.923
75	.737	.821
80	.560	.685
85	.359	.513
90	.175	.314
95	.058	.135
100	.012	.036

Source: United States life table functions and actuarial functions at 3 percent interest for males and females born in 1935 based on the Alternative 2 mortality probabilities used in the 2000 Trustees Report of the Social Security Administration.

A life annuity solves the retiree’s wealth allocation problem. A life annuity allows her to exchange a stock of wealth for a guaranteed stream of income that will be paid as long as she is alive, and thus removes the risk of outliving her resources. In addition, an annuity solves the problem of the lost consumption opportunity by providing the annuitant with a higher level of income than she could receive in the absence of annuitization, in exchange for making the receipt of this income contingent upon living. In short, the provider of the annuity (i.e., the government, the employer, or the insurance company) uses the assets of those who die early to pay a higher rate of return to those who are still living.

⁴ In a model with finite-lived, egoistic consumers, the strategy of consuming interest only is never optimal. However, even more complex consumption rules that avoid running out of wealth provide a consumption stream that is strictly dominated by actuarially fair annuitization. Readers interested in a more formal treatment can consult Yaari (1965); Mitchell, Poterba, Warshawsky and Brown (1999) or Brown (1999).

⁵ For the time being, this *brief* ignores any desire to leave a bequest to one’s heirs. As will be discussed below, strong bequest motives will reduce the value of annuitization.

To illustrate the value of an annuity more clearly, consider two identical 65-year old men with \$100,000 of accumulated retirement wealth. The first of these men purchases an actuarially-fair life annuity, which, with a nominal interest rate of 7 percent, would pay the retiree \$929.38 per month for as long as he lives.⁶ The second of these men chooses not to annuitize, but tries to maintain the same living standard by consuming \$929.38 per month while alive, keeping the balance of his wealth earning 7 percent interest. The second man can do this for 13 years and 8 months, at which time he would run out of money with a 60 percent chance of still being alive. Without annuitizing, the 65-year old would have to consume only \$623.85 per month (33 percent less) in order to avoid running out of money by age 100, and even then there is a 1.2 percent chance of still being alive.⁷

For these insurance reasons, economists have long viewed annuities as an important component of any retirement portfolio. In fact, the earliest theoretical results suggested that life-cycle consumers with an uncertain date of death should annuitize *all* of their retirement wealth that they wish to use for financing future consumption, leaving un-annuitized only that wealth that they wish to leave behind as a bequest. Simulation results using this model suggest that such hypothetical consumers would find access to actuarially-fair annuities equivalent to a 50 percent to 100 percent increase in wealth. Naturally, this theoretical model omits a number of important factors that would rationally lead individuals to annuitize less than their full wealth, such as other sources of uncertainty, a desire for liquidity and control, and market imperfections, all of which will be discussed below. Nonetheless, economic theory suggests that a high level of annuitization, rather than a low level, ought to be the natural benchmark.

The Size of the Annuity Market in the United States

By far, the most important source of annuity income in the United States is the current Social Security system. Once an individual claims a Social Security benefit, this monthly income is paid in the form of a life annuity. Importantly, this benefit is indexed to the Consumer Price Index, so that the purchasing power of this annuity income remains constant. In 1999, the Social Security program paid out approximately \$391 billion in benefits to nearly 45 million recipients. While the majority of this amount was paid out to retired and disabled workers, a substantial fraction was paid to dependents and survivors.

Private pensions represent the second largest source of annuity income to U.S. households. Tabulations from the September 1994 Health and Pension Benefit Supplement to the Current Population Survey indicate that of the 17.4 million individuals over the age of 55 who were retired from private sector jobs, 7.2 million (41.3 percent) reported that they were receiving annuity income from a private pension plan. The mean annual annuity payment for this group was \$9,714, and the total amount of annuity income was \$70 billion.

The overwhelming trend among providers of private pension plans in the United States is the switch away from defined benefit plans to defined contribution plans, such as 401(k)s. One implication of this switch is a decline in the opportunities for annuitization within the pension plan. For example, in 1997, only 27 percent of 401(k) plan participants had an option to choose a life annuity as their method of distribution. Lump-sum withdrawal is the most common distribution option available, followed by some form of phased withdrawal. Figures for other DC plans appear to be similarly low. As a result, over 70 percent of the nearly 50 million defined contribution plan participants in the United States will be unable to withdraw their retirement account balances in a manner that directly protects them from longevity risk.

⁶ These calculations use mortality rates for the general U.S. population as used in the 2000 Trustees' Report of the Social Security Administration. For a 65-year old in the year 2000, the 1935 birth cohort life table is used. It is assumed, for purposes of this illustration, that the maximum possible age of life is 118 years.

⁷ Some might argue that this overstates the value of annuitization because the individual could simply invest his non-annuitized wealth in a higher-yielding portfolio, including corporate equities. This argument is somewhat misleading, for reasons that will be discussed later in this *brief*.

BOX: TYPES OF ANNUITIES AVAILABLE

The stylized examples used in this *issue in brief* are representative of a product known as a *single premium immediate life annuity*. There is, however, a much richer set of annuity products from which retirees can choose. It is useful to separately consider the accumulation phase and the payout phase of an annuity product. The accumulation phase is that period in which assets are being set aside for future conversion to an income stream. The payout phase is that period in which the individual receives income.

Design Features in the Accumulation Phase

- *Immediate versus deferred annuities:* Immediate annuities begin making payments immediately after the payment of the premium. In contrast, under deferred annuity contracts, payments do not begin until some date in the future. Deferred annuities often receive favorable tax treatment during the accumulation phase, and there is no requirement that these assets ever be converted into a lifelong income stream.
- *Rates of return on deferred annuities:* With deferred annuities, payments will not commence until some date in the future. Prior to the commencement of payouts, the premium dollars can be invested at a fixed rate, or in a portfolio of risky assets in which case it is known as a *variable annuity*.

Design Features in the Payout Phase

- *Number of lives covered:* Single life annuities pay until the insured individual dies. Joint-and-survivor annuities continue to make (possibly reduced) payments as long as at least one of the covered individuals is alive.
- *Bequest options:* Many private market annuities offer *period certain* guarantees or refund options that provide some additional payments to a beneficiary in the event that the insured individual dies shortly after annuitization.
- *Type of payout:* *Fixed* nominal annuities offer payments that are constant in nominal terms. *Graded* annuities increase at a pre-determined percentage rate. *Inflation-indexed* annuities rise with the rate of inflation, thus preserving the purchasing power of the income. *Variable* annuity payouts are linked to an underlying portfolio of assets, and will rise and fall according to a pre-determined relationship with that portfolio.

Outside of Social Security and private pensions, the market for individual life annuities is quite small. In 1998, the American Council of Life Insurance reported that there were 1.6 million individual annuity policies in a “payout phase,” meaning that the policyowners were currently receiving benefits. This figure actually overstates the extent of annuitization in the individual market, since some of these contracts are annuities

certain rather than life annuities and because some individuals may hold multiple policies. Thus, privately purchased individual annuities are trivial in importance when compared to Social Security and private pension plans.

The small size of the individual annuity market may come as a surprise to anyone who has heard about the dramatic growth in the market for deferred *variable annuities* over the past decade.⁸

⁸ A variable annuity that is still in deferred status is similar to a mutual fund in that an individual's contributions are invested in a portfolio of assets. From an individual investor's perspective, an attractive feature of variable annuities is that the returns on these investments are tax-deferred until withdrawal. In general,

what distinguishes deferred variable annuity products from mutual funds is that they generally offer some form of implicit or explicit insurance, such as a guaranteed return of principal in the event of the insured's death.

For instance, in the individual annuity market, variable annuities grew from only \$2 billion in annual premiums in 1988 to \$49 billion in 1998. An important distinction, however, is that nearly all of these variable annuities are *deferred annuities*, meaning that the contract owners are still in the process of accumulating assets (see Box for discussion of annuity types). This *issue in brief* is concerned primarily with annuities in the payout phase, known as *immediate annuities*, which are currently providing a source of longevity-insured retirement income. The growth in the deferred variable annuity market will be relevant for future annuitization trends if these funds are routinely converted into life annuities in the payout phase. However, there is no requirement that assets held in deferred annuities be converted to a life annuity at retirement, and existing evidence suggests that little of this conversion is taking place.⁹

Thus, to the extent that households are insured against longevity risk, it is done primarily through Social Security and defined benefit pension plans. Very few individuals appear to be purchasing annuities with non-pension savings or with the balances of their DC accounts. It is thus quite plausible that the continued shift in private pensions towards DC plans, as well as some Social Security reform outcomes, could result in a substantial reduction in the amount of retiree wealth that is insured against longevity risk. Whether or not this is a troublesome trend depends in large part on why retirees do not choose to annuitize more of their assets, an issue that is discussed in the next section.

Why Don't More People Buy Annuities?

While annuities feature prominently in economists' theoretical discussions of asset decumulation, most households are not choosing to buy annuities. Why is the individual annuity market so small?

Annuitization Through Pensions and Social Security

Social Security and pensions are the primary source of annuities in the United States, and represent nearly two-thirds of the wealth of households nearing retirement (Mitchell and Moore, 1998). Clearly, having a substantial fraction of wealth in this form reduces the marginal value of additional annuitization. The reason is that the benefits from Social Security and pension annuities already provide a minimum level of guaranteed income that cannot be outlived. With these benefits in place, an individual does not run the risk of running his or her resources to zero. Were the annuity benefits paid by Social Security to be substantially reduced or eliminated, one would expect to see an increase in the demand for annuities in the individual market. The increase in private demand, however, would likely offset the loss of Social Security by less than dollar for dollar, due to imperfections in the annuity market and decisions by some individuals not to annuitize.

The Pricing of Individual Annuities

The standard economic model that predicts high levels of annuitization assumes that individuals can purchase annuities that are actuarially fair. However, prices in the individual annuity market, like prices in many insurance markets, diverge from their actuarially-fair level for two primary reasons. First, insurance companies incur administrative and sales expenses to underwrite and market annuity products, and these costs, plus some level of profit, must be captured in the premiums that are charged. Second, individuals who voluntarily purchase annuities tend to live longer

⁹ For more discussion, see Brown and Warshawsky (2000).

than non-purchasers. As a result of this “adverse selection,” insurance premiums must be set high enough to compensate insurers for the fact that they will have to make annuity payments for a longer period of time. As the annuity prices are raised, some individuals with shorter life expectancies may find that these actuarially-unfair annuities are no longer attractive.

The extent to which adverse selection reduces the attractiveness of life annuities has been examined in a number of empirical studies of U.S. and international annuity markets. A common metric in these studies is the “Money’s Worth” calculation, which measures the expected discounted value of annuity payments per dollar of premium paid. A Money’s Worth of 1.00 corresponds to the case of an actuarially-fair annuity. Values less than 1.00 indicate that the present value of the annuity payments will, on average, be less than the premium paid. For example, if the Money’s Worth of an annuity is 0.90, this indicates that the individual can expect, on average, to receive 90 cents in annuity income for every \$1 paid in premium.¹⁰

To calculate the Money’s Worth, one needs information on annuity payouts, interest rates, and mortality rates. According to an industry trade publication,¹¹ the average payout available to a 65-year old male purchasing a life annuity in May 1999 with an initial investment of \$100,000 would have been \$734.77 per month for life. A 65-year old woman would have received \$667.36 per month, with the difference attributable to lower mortality rates among women.

To transform these payment streams into a present value requires selecting an interest rate. One option is to use the interest rates that are implied by the term structure of yields for U.S. Treasury bonds.¹² These are riskless interest rates, and using them to discount future annuity payouts implicitly assumes that no default risk is associated with these payouts. The argument for using such discount rates is that insurance regulation makes the default risk for annuity providers very low. In addition, annuity buyers in most states are protected against insurance company defaults through state insolvency funds. While these funds do not make all annuity purchases riskless, they do further reduce the chance that an annuity buyer will not receive the promised payouts. One can argue, however, that riskless interest rates generate discount rates that are too low, since life insurance firms generally invest their portfolios in risky corporate bonds. Thus, Table 2 also reports results using the term structure for Baa-rated corporate bonds.¹³

Due to the fact that mortality rates of annuitants differ from that of the general population, it is useful to calculate the Money’s Worth using two sets of mortality tables. The first set uses survival probabilities for the population at large, taken from the birth cohort mortality rates used in the Social Security Administration’s Trustees’ Report.¹⁴ The second set of results acknowledges that annuity purchasers tend to have longer life expectancies than the general population. As a result, insurance companies have developed a second set of mortality rates that describe the mortality experience of those who actually purchase annuities.¹⁵

¹⁰ Details of the Money’s Worth calculation are available in Mitchell, Poterba, Warshawsky and Brown (1999) and Brown, Mitchell and Poterba (2000).

¹¹ Annuity payout rates are from *The Annuity Shopper* magazine.

¹² The data on the U.S. Treasury yield curve were collected from *Bloomberg Financial Markets* for the same dates on which *The Annuity Shopper* data were collected.

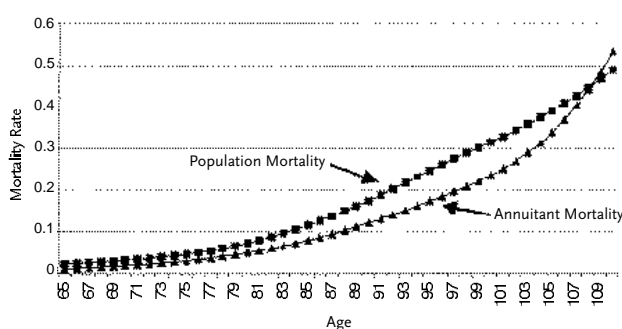
¹³ As defined by Moody’s Investors Service, bonds that are rated Baa “are considered as medium-grade obligations (i.e., they are neither highly protected nor poorly secured).” The bond rates in Table 2 were also taken from *Bloomberg* on the same dates as the annuity price quotes, and correspond to a Bloomberg bond rating of BBB-2.

¹⁴ This report is formally called The 2000 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds.

¹⁵ Mitchell, et al. (1999) develop an algorithm that combines information from the Annuity 2000 mortality table described in Johansen (1996), the 1983 Individual Annuitant Mortality table, and the projected rate of mortality improvement implicit in the difference between the Social Security Administration’s cohort and period mortality tables for the population. This algorithm generates projected mortality rates for the set of annuitants purchasing annuity contracts in a given year. These calculations use an updated version of that algorithm that incorporates the most recent Social Security data.

The population and annuitant mortality tables differ substantially. Figure 1 shows the projected mortality rates in 1999 for 65-year old male annuity buyers and 65-year old men in the population at large. Between the ages of 65 and 75, the mortality rate for annuitants is roughly half of that for the general population. The mortality differential is somewhat smaller at older ages. Because cash flows in the first few years after annuity purchase contribute importantly to determining the expected present discounted value of the annuity payout, the large mortality differential between ages 65 and 75 generates significant differences in Money's Worth calculations when switching from one mortality table to another.

Figure 1: Population and Annuitant Mortality Rates



Source: U.S. Population mortality rates from unpublished data used in the 2000 Trustees Report of the Social Security Administration and annuitant mortality rates from the Society of Actuaries (with some adjustments made by the author).

Table 2 reports results of the Money's Worth calculation. Using the population mortality table and discounting using the Treasury rate, the Money's Worth is 85 cents on the dollar for men and 87 cents on the dollar for women. This suggests that 65-year olds can expect to receive 13 to 15 cents less in annuity payments than they paid as an initial premium. If one instead discounts using the higher corporate bond rate, the Money's Worth is reduced considerably to 78 cents on the dollar for men and 79 cents on the dollar for women, suggesting a differential of over 20 cents on the dollar.

Table 2: Money's Worth of Single Premium Immediate Annuities Offered to 65-Year Olds, United States, 1999

	Men		Women	
	Population	Annuitant	Population	Annuitant
Treasury Rates	0.85	0.97	0.87	0.95
Corporate Rates	0.78	0.88	0.79	0.86

Source: Author's calculations.

If the Money's Worth is calculated using mortality rates of typical annuitants, however, the ratios are higher. Using a Treasury rate, the Money's Worth is 97 cents on the dollar for men and 95 cents on the dollar for women. Therefore, individuals with mortality expectations like those of typical annuitants appear to receive an actuarially-attractive price, with only 3 to 5 cents on the dollar being attributed to administrative costs of the insurance company. The 10 cents on the dollar difference between the Money's Worth using the population and the annuitant tables, however, is a measure of the cost of adverse selection. This number is important, because if all individuals were forced into the private annuity market with an annuity mandate, the adverse selection component would likely disappear. This suggests that an annuity mandate might raise payouts by as much as 10 percent.¹⁶

Bequest Motives and Self-Insurance Within Families

If retirees wish to leave an inheritance to their children or other relatives, then this desire would reduce the incentive to annuitize at retirement. With an ordinary life annuity, the value of the annuity contract is zero upon the death of the insured. While a number of "bequest" options are available, such as guarantee periods or refund options, generally the easiest method of providing for a bequest is to annuitize only partially, and leave some wealth in assets that can be inherited.

¹⁶ One would also need to consider whether administrative and selling expenses would be different in a large, mandated annuity market than in the currently small market dominated by high-income individuals.

The strength of bequest motives and their implication for financial behavior of elderly households are issues of continued debate in the economics literature. It is clear that many households do leave wealth behind to their children, but it is less clear whether these bequests are intentional, the result of poor financial planning on the part of the decedent, or due to limited market options for annuitization. Some researchers have argued that the large magnitude of bequests, the presence of life insurance in many household portfolios, and the choice of survivor options in pensions are suggestive of intentional bequest behavior.¹⁷ Still others have demonstrated that couples with children do not behave in a manner consistent with a bequest motive.¹⁸ Further research is needed to resolve this debate.

Risk pooling within families may be another reason that people do not fully annuitize in the formal insurance market. Researchers have looked at this effect in two ways. First, one can think of a family as a miniature annuity market. Annuity markets operate by transferring the resources of an early decedent to those who live for a longer period of time. Family members who share a common budget essentially do the same thing. For example, if the husband dies with unannuitized assets, his resources are not wasted, but rather are available to his wife or children for consumption. Obviously, the ability to pool risks in a couple or a small family cannot completely substitute for an efficient annuity market with many participants, but it can come surprisingly close. In fact, simulations suggest that a two-person household can achieve just under 50 percent of the utility gains that would accrue from an actuarially-fair annuity market (Kotlikoff and Spivak, 1981). A second view is that the risk of both members of a couple dying in any given year is obviously lower than the risk of any one of them dying in that year. Since annuity payments are inversely related to mortality risk (i.e., an insurance company can pay more each month when the risk of dying is higher), the extra return that a joint life annuity provides is lower, making annuities somewhat less attractive relative to alternative investments.

The Desire for Flexibility

With few exceptions, the decision to annuitize one's wealth is largely irreversible. The reason for this is quite simple—if individuals had the ability to cash out their annuity at any time, they would always try to do so right before death. This would be a severe form of adverse selection, and would make it financially impossible for an insurance company to offer attractive annuity rates.

As a result of this irreversibility, individuals who annuitize give up flexibility and essentially impose a liquidity constraint on themselves. In a recent survey, financial planning professionals were asked why so few individuals choose to annuitize. Of 321 financial planners surveyed, 31 percent cited the loss of control of principal or lost flexibility as the primary reason for low annuitization rates, as shown in Table 3. This response is far higher than any other response.

Table 3: Financial Planner Responses as to Why Few Retirees Take a Lifetime Income Option (percent)

Loss of control of principal/Locked in	31
Want money to go to heirs/Loss of assets	18
Low payout	15
No adjustment for inflation	12
Better ways to make money	11
Poor advice/Not well-informed	9
Bad idea/Don't need it	5

Source: American Council on Life Insurance, "Positioning and Promoting Annuities in a New Retirement Environment," 1999.

Presumably, one of the main reasons that individuals desire flexibility is that they are uncertain about future expenditure needs. This uncertainty is particularly true with regard to uninsured medical expenses, such as for prescription drugs or long-term care. For example, studies have estimated that 35 to 40 percent of 65-year olds will spend some time in a nursing home before they die. While Medicare will often pay for stays up to 100 days, many nursing home stays are of longer duration. Given the extremely limited coverage by private long-term care insurance in the United States, most expenses must be paid out of

¹⁷ Examples include Laitner and Juster (1996) and Bernheim (1991).

¹⁸ Examples include Hurd (1987, 1989) and Brown (1999a, 1999b).

pocket by the individual, or by Medicaid after the individual has spent down his or her resources. It is clear that older Americans recognize health care costs as an important source of financial risk. Venti and Wise (2000) report results from the Health and Retirement Survey question that asks “In thinking about your financial future, how concerned are you with health care costs?” Fifty-two percent of respondents indicated a high level of concern, significantly more than are concerned with other sources of uncertainty such as job loss or financial market collapse.

Inflation

Outside of Social Security and a limited number of DB plans, most annuities in the United States are fixed in nominal terms, meaning they do not include any provision to protect the individual against the risk of inflation. Inflation has two undesirable effects on fixed nominal annuity streams. First, even modest rates of inflation will erode the real value of the income stream over time. For instance, at a 3.2 percent annual rate (which is the average U.S. inflation rate over the 1926-97 period), the real value of a constant nominal annuity will be cut in half in 22 years. If inflation were constant and expected, however, this would easily be remedied by the use of a *graded* or *escalating* annuity product that increases the nominal payout by a fixed percentage each year. The second effect, however, arises from the inflation *uncertainty*. If inflation varies from year to year, it will induce variation in the real purchasing power available to retirees. This is true even if the product is escalating at a fixed percentage rate each year.

In the United States, inflation-indexed annuities are largely not available to consumers. Historically, this scarcity was due to the lack of inflation-indexed investments with which life insurance companies could underwrite policies. In 1997, however, the U.S. government introduced

Treasury Inflation Protected Securities (TIPS), which are inflation-indexed government bonds. Since the introduction of these securities, two companies have made inflation-indexed annuities available to consumers. TIAA-CREF, the principal and longstanding retirement system for the nation’s education and research sectors, offers a variable annuity linked to an “Inflation Linked Bond Account.” While this product does not guarantee a fixed real income stream due to several design features,¹⁹ it does offer a very high degree of inflation protection. However, this product is not available to individuals outside of the education and research sector. A second U.S. company, Irish Life of North America, offers a true CPI-indexed annuity, but as of this writing they had no sales of this product. It is unclear whether this lack of demand is due to unattractive prices, poor marketing, or a genuine lack of demand for inflation-adjusted products. If demand for inflation-indexed annuities were to increase in the future, such as through a Social Security or pension reform that mandated inflation-indexed annuities through the private sector, the availability of TIPS should enable life insurance companies to meet this demand.

Outside of the United States, other nations have more experience with inflation-indexed annuities. For example, index-linked bonds have been available in the United Kingdom for two decades, allowing insurance companies to offer inflation-indexed annuities. Even so, approximately 90 percent of individuals purchase level annuities and do not opt for any sort of inflation protection. Part of the lack of demand may be due to the high costs; the Money’s Worth of real annuities in the United Kingdom appears to be 8 to 10 percent lower than that of nominal annuities.²⁰ The experience of other nations, such as Israel and Australia, confirms that the private sector is able to offer real annuities, but at a significant additional cost relative to fixed nominal annuities.

¹⁹ These features include: 1) TIAA annuities are “participating” and thus change value based on the mortality experience of the contract owners; 2) the value of the underlying portfolio is marked to market daily, and thus the value will vary; and 3) the nominal portfolio return must exceed 4 percent plus the rate of inflation in order not to decline in real terms.

²⁰ See Murthi, Orszag and Orszag (1999) and Finkelstein and Poterba (1999).

Higher-Return Portfolio Choices

It is sometimes argued that individuals can do better than an annuity by investing the funds on their own in higher-return assets, such as a portfolio of equities. The logic of this argument is that fixed annuities are generally backed by bond portfolios, and over the long term, stocks have historically earned a higher rate of return than bonds.²¹

This argument is misleading for two reasons. First, even a well-diversified portfolio does not insure a retiree against longevity risk. Stock returns are higher than bond returns on average, but these returns come at the cost of increased risk. A recent study (Milevsky, 2000) found that even with an optimally-chosen, diversified portfolio, if a person tries to replicate the stream of annuity payments, the probability of running out of wealth is still significant.

Second, an individual who wishes to invest in a more diversified portfolio can do so without sacrificing longevity insurance by purchasing variable or equity-linked annuities. Variable annuities invest the premium in an underlying portfolio of assets, and the monthly payment from the annuity rises or falls depending on whether the asset returns are higher or lower than the *Assumed Interest Rate* that was used to determine the initial annuity payment. Equity-indexed annuities invest a fraction of the premium (e.g., 90 percent) in a fixed annuity, and use the remaining premium to purchase call options on a stock index, such as the Standard & Poor's 500. With this product, the individual is guaranteed never to receive less than the value of the fixed annuity portion, but can capture some of the "upside" potential of equities if returns are high enough. Importantly, both of these products preserve the longevity insurance feature that the individual will continue to receive payments for as long as he or she lives.

Lack of Understanding of the Benefits of Annuitization

A final reason that individuals may not choose to annuitize is that they fail to fully understand the benefits of annuitization. This could arise either

because they underestimate the probability of living to advanced ages, or because they fail to understand how annuities operate to insure against longevity risk.

The limited evidence available to assess subjective survival probabilities suggests that, on average, these subjective probabilities behave a lot like actual probabilities derived from life tables and mortality data.²² Thus, while any given individual may have an inaccurate assessment of his or her mortality risk, the data suggest that people are just as likely to overstate as to understate their survival probabilities. Based on these data, it is unlikely that the lack of annuity demand is due to people systematically underestimating their length of life.²³

A more likely scenario is that individuals simply do not understand how an annuity operates or why it is beneficial. A task force of the American Council on Life Insurance has concluded, based on qualitative consumer research, that consumer knowledge of annuities is low. Their report suggests that the least understood aspect of annuities is how risk sharing can allow insurers to offer lifelong income. Consumers tended to focus on the risk of dying early and therefore receiving less in return from the annuity than they paid in, while overlooking the fact that they may live longer than expected and receive much more than they paid. In fact, some consumers equated lifetime annuity payments with gambling on their lives and believed that the odds in the gamble favored the insurance company.

Unlike many of the other reasons that consumers may not annuitize, a lack of understanding of annuity products and their benefits is particularly troubling. While more research is needed to understand the extent to which this explanation is true, one possible implication is that the lack of annuitization outside of Social Security and defined benefit pensions should not be viewed as an optimal decision by all consumers. If true, it would lend further support to mandating a minimum level of annuitization.

²¹ For a detailed discussion of the equity premium, see Diamond (1999).

²² See Hammermesh (1985) and Hurd and McGarry (1995).

²³ Even if an individual correctly estimates his or her life expectancy, however, the degree of uncertainty about survival rates will still affect annuity demand. For example, a person who believes that they will die with certainty at age 85 may not desire an annuity because, according to their subjective probabilities, there is no longevity risk.

Spousal Considerations

While most of the discussion so far has focused on individual retirees, it is also important to consider the impact of retirement income policy on the spouses of retired workers. According to the Census Bureau, in 1997, 79 percent of men and 53 percent of women between the ages of 65 and 74 were married. Of those who were not married, most were widowed. These figures underscore the importance of considering both spouses when examining retirement income security.

The Social Security Act requires survivor insurance for spouses of workers covered by Social Security. Surviving spouses generally receive between half and two-thirds of the income that was being paid by Social Security when both spouses were alive. In contrast, there is no requirement that private pensions pay survivor benefits. ERISA, the federal law governing private pensions, only requires that pension plans that offer an annuity provide a joint and survivor option that pays the surviving spouse at least 50 percent, but not more than 100 percent, of the pension received during the joint lives of the husband and wife. Couples can waive the survivor option only if both spouses sign a notarized consent form.

Sponsors of defined contribution plans are not required to offer an annuity at all. However, if they choose to do so, they are also required to offer a joint and survivor annuity as the default option. Some practitioners have argued that this additional administrative burden is one reason that more DC plans do not offer annuities. These costs, however, must be netted against the significant social benefits of providing a guaranteed source of survivor income.

The major benefit of providing survivor income is a reduction in poverty among elderly widows. Between 1982 and 1991, for example, the median value of inflation-adjusted income from private pensions had fallen 23 percent for intact couples, primarily due to incomplete inflation indexing. For households in which the wife became widowed, the value of real pension income over this period fell 75 percent (Coile and Diamond, 1998). Becoming widowed has long been recognized as a key

determinant of poverty rates among the elderly, especially women. Higher levels of survivor benefits could help address this problem. A retirement system that wishes to provide meaningful income security, therefore, must be especially careful to provide for a surviving spouse.

Should We Mandate Annuitization?

One way to view the existing Social Security system is as a government-mandated annuitization system. Individuals are required to contribute to the system while working via Social Security payroll taxes and are then required to take the benefit as a life annuity. In the past, when defined benefit plans were far less likely to offer a lump-sum option than they are today, employees of firms with these plans had little choice but to take their pension benefit as an annuity. In short, mandatory annuitization has been the norm in the United States for many decades.

Advocates of DC plans and individual accounts applaud the broader degree of freedom that participants have to choose how to use their accumulated accounts in retirement. The absence of an annuity mandate is thus viewed positively as a loosening of constraints on individual choice.

As is often the case, however, the question of whether or not some annuitization of retirement resources should be mandated involves a complicated set of trade-offs. The two primary benefits of mandatory annuitization are: 1) the potential to improve annuity market efficiency through the elimination of adverse selection; and 2) the decreased risk that some retirees will fail to adequately provide for their own consumption at advanced ages. Mandatory annuitization also has two important costs: 1) some individuals will be forced to over-annuitize relative to what is optimal, due, for example, to poor health or strong bequest motives; and 2) mandatory annuitization can have undesirable distributional consequences. In the end, decisionmakers will no doubt differ on the answer to the mandatory annuitization question based on their different values about the importance of each of these costs and benefits.

Benefit 1: Enhanced Annuity Market Efficiency

As discussed earlier in the context of private market pricing of annuities, insurance markets often suffer from adverse selection. Because an annuity pays income for life, it will be more attractive to individuals who expect to live a long time and less attractive to those who suspect that they will not live a long time. As a result, in a voluntary annuity market, individuals who purchase annuities are likely to have longer life expectancies than those who do not. If an insurance company prices annuities based on the average mortality in the population as a whole, but only sells them to individuals who are longer-lived than average, then the company will lose money. To avoid this, insurance companies must charge more for an annuity, or stated differently, must lower the monthly payout they can provide for a given annuity premium. As they raise their price, they make annuities attractive to fewer and fewer individuals, thus “unraveling” the market.²⁴ As a result, annuity transactions that would be mutually beneficial to the insurance company and the individual in the presence of full and symmetric information and more detailed pricing do not take place.

Mandatory annuitization forces all risk classes into the market. As a result, insurance companies can price their annuities using average mortality characteristics. This outcome serves to lower prices and/or increase payouts for all individuals by overcoming the adverse selection problem. As noted above, evidence suggests that mandatory annuitization could increase payouts to individuals in the United States by up to 10 percent (Mitchell, et al., 1999).

Benefit 2: Decreased Risk of Individuals Having Inadequate Old Age Resources

If all individuals had near-perfect information and behaved rationally, they would all adequately provide for the contingency of living to advanced ages. Unfortunately, due to factors such as imperfect information about mortality risk, imperfect annuity markets, and even myopic behavior on the part of retirees, it is quite likely that some individuals will fail to adequately insure themselves against outliving their resources. In addition to the personal costs that running out of money imposes upon these individuals, there is also a potentially large public cost in the form of government assistance programs. Individuals or couples whose income falls very low become eligible for SSI, thus increasing the financial burden on the public sector. Mandating a minimum level of annuitization that provides an income stream greater than the eligibility level for SSI ensures that this will not occur.

Cost 1: Mandate May Over-Annuitize Some Individuals

A person may wish not to annuitize for a number of rational reasons. For example, he or she may have exceptionally strong bequest motives. Requiring these individuals to annuitize a substantial portion of their retirement wealth could make them worse off.

Some of these situations are more troubling than others. For example, two individuals with strong bequest motives but different health conditions could face different options. A very healthy individual can always “un-do” excessive annuitization and leave a bequest by using the annuity income to pay the premiums on a life insurance policy. However, this option may not be available to an individual in poor health, since he or she may be unable to qualify for life insurance. Thus, it is important that any annuity mandate not be excessive, or it will be of the most disadvantage to those individuals who are already “worse off” due to health considerations.

²⁴ Clearly, if the insurance company could accurately determine the expected mortality of each individual applicant, it could price each policy in a manner that was appropriate and profitable. In practice, life insurance companies estimate mortality for life

insurance contracts, using medical exams and health histories to separate individuals into risk classes. This estimation is almost never done for annuity products, however.

Cost 2: Redistribution from Poor to Rich

Distributional considerations of an annuity mandate arise due to heterogeneity in mortality risk across the population. Annuities that ignore individual or group characteristics will result in expected transfers from high-mortality risk groups to low-mortality risk groups. While the extent of redistribution is quite sensitive to the precise structure of the annuity, in some cases it can be substantial. Mandating the use of a single life, inflation-indexed annuity leads to very substantial transfers from men to women, from blacks to whites and Hispanics, and from lower education groups to higher ones. Research suggests that black males with less than a high school education would receive less than 80 cents in lifetime annuity income per dollar invested in the annuity, while white women with a college degree would receive \$1.10 per dollar invested (Brown, 2000). In general, within each gender these transfers tend to be from economically disadvantaged groups to groups that are better off financially.

The size of these expected transfers can be significantly reduced through the use of joint and survivor annuities, period certain or refund options, or by “front-loading” annuity payments. However, the mechanisms that lessen the extent of redistribution often do so at the cost of reducing the income that is available to retirees. One could also attempt to offset these distributional outcomes through the use of an income-based tax or subsidy system. For example, low earners, who have higher mortality rates, could receive a government match on contributions as a way of increasing their annuity payment, while higher earners could pay a tax. In order to offset the redistribution, these tax and subsidy rates would have to be set based on the correlation between income, or retirement wealth, and mortality. More research is needed to accurately quantify this relationship.

Implications for Pension Policy

Current policy towards pension plans in the United States discourages annuitization because defined contribution plans such as 401(k)s are not required to offer an annuity option. This fact,

combined with the other disincentives for doing so, has resulted in a mere 27 percent of 401(k) plan participants having access to annuitization within their pension plan. While retirees have the option of withdrawing their funds from the plan and purchasing an annuity directly from an insurance company, available evidence suggests this option is rarely chosen.

Given the importance of annuitization as a way of insuring longevity risk, this lack of opportunity to annuitize within the plan is troubling. Public policy could be changed in several ways to encourage annuitization, ranging from an annuity mandate to increased education of participants. The Department of Labor Advisory Council Working Group proposed to make annuities the default distribution option in defined contribution plans. Plan distributions other than in annuity form would require the active choice of the plan participant. Such a plan would probably be quite effective at increasing annuitization rates while still providing participants with the freedom to choose an alternative distribution method.

Some practitioners have argued that ERISA’s “joint and survivor” requirements are partially responsible for the scarcity of an annuity option within DC plans, due to the additional administrative complexity they bring. However, policymakers should be concerned about the income security for spouses of pensioners as much as for the pensioners themselves. Joint and survivor options, by insuring that surviving spouses also have a guaranteed lifelong income stream, are an important component of retirement portfolios. The ERISA requirement allows for couples to forgo the survivor option if both spouses agree, so choice is preserved. It does, however, provide a safeguard to spouses that may protect them in the case of widowhood.

In summary, policy towards annuitization has not kept up with the realities of the changing pension landscape in the United States. Looking to the future, defined contribution pension plans will be the dominant source of retirement wealth for many households. As such, if policymakers wish to encourage annuitization, it is critical that these households have opportunities to annuitize their assets within the DC plan.

Implications for Social Security Reform

The existing Social Security system provides an important source of inflation-indexed longevity insurance that is currently unavailable in the private sector. This insurance is of substantial value to retired households, but is often ignored in discussions of the financial returns available in the current system. This omission is unfortunate, since the benefits of annuitization are an important element of any retirement system that seeks to provide income security.

However, a desire to ensure adequate annuitization is not inconsistent with support for individual accounts proposals, since any individual accounts system can include a mandatory annuitization component.²⁵ Particularly if individual accounts are a partial replacement for the existing Social Security program, it is important that mandatory annuitization be part of the system. At a minimum, individuals should be required to annuitize enough of their resources so that they are above the poverty line. Retirees could then be free to take any remaining account balance as a lump sum.

Furthermore, these mandated annuities should be protected from inflation. This protection could be provided directly by the government, as is done with the current system, or through the private market. The availability of Treasury Inflation Protected Securities should make it possible for the private market to underwrite an inflation guarantee, assuming that the U.S. Treasury will continue to provide an adequate supply of these bonds in the future.

It is also quite important that any individual accounts plan provide adequate retirement income for surviving spouses. One simple way to achieve this goal is simply to require that the mandated annuities be joint and survivor annuities. Providing such annuities can easily be done by government or the private sector. It would be important, however, to ensure that the level of the survivor benefit chosen be sufficient for the surviving spouse to stay above the poverty line.

It should also be recognized, however, that mandatory annuitization has potentially severe distributional consequences. This is true in the existing Social Security system, and would be true in an individual accounts system as well. An important difference, however, is that the current Social Security system offsets this redistribution through the use of a progressive benefit structure. Taken together, the distributional impact of the existing system appears to be largely neutral.²⁶ Many individual accounts proposals, on the other hand, do not have an offsetting progressive benefit structure. As a result, the distributional effects can be quite substantial.

Conclusion

Annuities have an important role to play in retirement portfolios as a way of insuring that individuals do not outlive their resources. From a public policy perspective, ensuring access and utilization of annuity options by retirees is one way to limit dependence on social assistance programs. In the United States, the current Social Security system is the primary, and in many cases the only, source of annuitization for most households. If the private pension system continues to evolve in a manner that limits opportunities for annuitization, the inflation-indexed annuity offered by Social Security will become that much more important as a source of longevity insurance. Given this importance, proposals that seek to *supplement* the existing Social Security program with an individual accounts system need to ensure that individuals will have adequate opportunities to annuitize their wealth. Proposals that seek to partially *replace* the Social Security system should consider mandatory annuitization in order to overcome adverse selection and to guarantee a minimum level of retirement income for life. Mandatory annuitization, however, comes at a cost of redistributing resources away from economically disadvantaged groups towards groups that are better off financially. Fortunately, there are policy options that would help offset this redistribution, such as contribution matches based on income.

²⁵ For example, the members of The 1994-96 Advisory Council on Social Security ("the Gramlich Commission") who supported the "Individual Accounts" (IA) proposal recommended that account balances be paid out through inflation-indexed annuities.

²⁶ See Liebman (2000) and Coronado, Fullerton and Glass (2000).

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Contact Information

Center for Retirement Research
Boston College
Fulton Hall 550
Chestnut Hill, MA 02467-3808
Phone: (617) 552-1762
Fax: (617) 552-1750
E-mail: crr@bc.edu
Website: <http://www.bc.edu/crr>