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SOCIAL SECURITY PRIVATIZATION AND
THE ANNUITIES MARKET

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PREFACE

In anticipation of the retirement of the baby-boom generation, policymakers have been analyzing the financial pressures on Social Security and devising new ways Americans could prepare for retirement. Those proposals—loosely called "privatization"—would prefund retirement income in personal accounts that workers could invest in the financial market and then spend down during retirement.

This Congressional Budget Office (CBO) paper discusses the importance of private annuities markets for the payout phase of personal retirement accounts, focusing on the interaction between regulatory design and market performance. It also describes current annuities markets and the reasons for market inefficiencies and contrasts annuities with Social Security's protection against longevity risk.

Jan Walliser of CBO's Macroeconomic Analysis Division wrote the paper under the supervision of Robert Dennis and Douglas Hamilton. Among colleagues at CBO, Robert Arnold, Arlene Holen, Tim Lasocki, Joyce Manchester, Paul Menchik, Benjamin Page, Kent Smetters, John Sturrock, and David Torregrosa all made important comments. Outside CBO, Moshe Arye Milevsky of York University, Canada, and Mark J. Warshawsky of TIAA-CREF made valuable comments and suggestions. The views expressed in this paper do not necessarily reflect those of the reviewers or their affiliations.

Melissa Burman edited the paper, and Leah Mazade provided editorial assistance. Verlinda Lewis Harris prepared the manuscript for publication. Laurie Brown prepared the electronic version for CBO's World Wide Web site (http://www.cbo.gov/).

June E. O'Neill
Director

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SUMMARY AND INTRODUCTION

Social Security's long-term financing problem has fueled a debate about fundamentally changing the current system. Under the rubric of "privatization," advocates have devised many plans to divert a portion of the payroll tax into private retirement accounts. Within the regulatory framework of the new system, the owners of those accounts could then decide how to invest their funds.[1] Proponents of privatization have devoted most of their efforts to deciding how much should be accumulated in those accounts and how transition costs should be divided among current and future generations, while virtually ignoring how retirees will draw down the accumulated funds for use in old age.

Currently, most retirees receive an inflation-indexed life annuity from Social Security. If the beneficiary is married or has dependent children, Social Security also pays benefits to survivors. Many people also receive annuity payments from private pensions.[2]

Annuities like Social Security provide insurance against longevity risk—that is, the risk of outliving personal resources. An annuity provides a stream of payments for an agreed-upon period of time; a life annuity provides payments for as long as the annuitant is alive and protects against longevity risk. The insurer (an insurance company or the government) absorbs the uncertainty about longevity and pools many annuitants. Since some annuitants live longer and others die earlier than expected, the annuity provider can protect each individual against life span uncertainty and be subject only to the uncertainty about the average life span of the population.

Without access to annuities, consumers must divide their resources according to their expectations about longevity after retirement. They may find themselves without sufficient resources if their actual life span exceeds what they had expected. For example, an individual who retires at age 65 with assets of $100,000 expecting to live 10 more years may decide to spend down savings in 10 equal installments. If the retiree lives to age 76, he or she would end up without any assets.

Proposals to change the existing system need to deal with whether private markets will be able to offer protection against longevity risk during retirement similar to what Social Security offers. In particular, will retirees be able to convert

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1. Such plans include the "Personal Security Account Plan" of the last Advisory Council on Social Security, S. 821, introduced to the 104th Congress by Senator Kerrey and former Senator Simpson, as well as H.R. 3758, sponsored by Representative Nick Smith.

2. Alan L. Gustman, Olivia S. Mitchell, Andrew A. Samwick, and Thomas L. Steinmeier, *Pension and Social Security Wealth in the Health and Retirement Study*, Working Paper No. 5912 (Cambridge, Mass.: National Bureau of Economic Research, February 1997). The authors find that about half of the population between ages 51 and 61 receive private pensions or have accrued claims on private pensions. About two-thirds of total pension assets of the average household are promised future retirement payments from defined benefit plans.

their private account balances into annuities at fair prices? If not, some of the long-run gains attributed to prefunding retirement consumption may be diminished.

Currently, private insurance companies offer annuities, but the market is small because of the existence of Social Security and private pensions, the unfavorable pricing of private annuities as a result of market imperfections, and the desire to leave assets to heirs. This paper addresses the implications of those issues and comes to the following conclusions:

- Private annuities are currently 15 percent to 25 percent more expensive than average mortality would suggest. That range reflects a combination of overhead costs and the longer-than-average life span of people who purchase annuities. Overhead costs and longer-than-average life spans each account for roughly half of the additional costs.

- Annuity prices would fall if reducing the value of Social Security's annuity put more people into the annuities market. That outcome could lower both overhead costs and the share of annuitants with longer-than-average life expectancy. Furthermore, a growing annuities market could increase the variety of annuity products and better adjust those products to consumers' demand.

- However, some factors could hinder the functioning of the private annuities market: adverse selection, high marketing costs, myopic behavior by consumers, and the existence of a social safety net. Although government oversight of annuities markets and personal retirement accounts could address those problems and reduce the cost of annuities for society, policymakers would face trade-offs between balancing the gains from reducing social costs against the losses that arise from restricting individual choices.

THE CURRENT STATE OF THE MARKET FOR PRIVATE ANNUITIES

Financial markets provide a variety of annuities to groups and individuals. Group annuities cover a large number of people, often members of a defined benefit pension plan; individual annuities are purchased by individual customers who want to convert their assets into a stream of income payments. Over the past four decades, sales of reflects the decline of defined benefit pensions as well as the expansion of the market

for individual annuities, especially in the 1980s and 1990s.[3] This paper concentrates on the cost of individual annuities.

A Classification of Individual Annuities

Individual annuities can be classified by five characteristics:[4]

- The method of payment. Some annuities can be purchased with a single premium (single-premium annuities); others require a series of annual payments (fixed-annual-premium annuities, flexible-premium annuities).

- The number of people covered. Annuities can be purchased for an individual (individual annuity) or several people—for example, the annuitant and spouse or several family members (joint life annuities, joint and survivor annuities).

- The waiting period for benefits to begin. Annuity payments can begin immediately after the purchase of the annuity (immediate annuity), or the annuity can be deferred until a certain age is reached (deferred annuity).

- The nature of payouts. Life annuities provide income until the death of the annuitant. A fixed-payments-certain life annuity provides payments until the death of the annuitant and also guarantees a certain number of payments even if the annuitant dies early. Refund annuities return a portion of the premium should the annuitant die before a certain date. Finally, some annuities provide payments for an agreed-upon fixed period of time so that payments may end before the death of the annuitant.

- The variability of payouts.[5] Annuity payouts can be fixed or variable. A fixed annuity guarantees a minimum payment. The market offers two types of fixed annuities: the "nonparticipating" fixed annuity disburses a constant stream of annuity payments; the "participating" fixed annuity provides a guaranteed minimum payment and additional dividend payments that depend on the performance of the insurance company's investment portfolio. Variable annuities also rise and fall with the performance of the annuity insurer's investment portfolio, but they do not guarantee a minimum payment.

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3. See James M. Poterba, *The History of Annuities in the United States,* Working Paper No. 6001 (Cambridge, Mass.: National Bureau of Economic Research, April 1997).

4. Ibid.

5. For a discussion of available options see Mark J. Warshawsky, "The Market for Individual Annuities and the Reform of Social Security," *Benefits Quarterly* (Third Quarter 1997), pp. 66-76.

Some purchasers consider annuities more as an investment than as insurance. Sales of variable annuities surged from roughly $12 billion in 1990 to approximately $75 billion in 1996.[6] Usually, those annuity contracts combine investment in a mutual fund with several payout options: before retirement, an investor puts money away in the mutual fund; on or after retirement, the assets are converted into an annuity or withdrawn in a lump sum.[7] Since sales of deferred variable annuities largely reflect the tax preferences those annuities receive during their accumulation, they are less useful in understanding the market for insuring against longevity risk. Indeed, most people who buy variable annuities do not value that insurance against longevity risk and instead withdraw their money in a lump sum or in a series of periodic payments.[8]

This paper concentrates mostly on single-premium immediate annuities (SPIAs). In contrast to variable deferred annuity products, the market for SPIAs, which are generally fixed and nonparticipating annuities, remains small. In 1995, premium payments for SPIAs amounted to $6.2 billion, about 12 percent of the market for single-premium annuities.[9]

According to data of the Life Insurance Marketing Research Association International (LIMRA), most people who purchased a SPIA from any of 26 companies included in a survey chose an annuity for life (single-premium immediate life annuities, or SPILAs).[10] SPILAs closely parallel current Social Security annuity payments in all respects but one: they are not indexed for inflation. Therefore, prices for SPILAs most accurately reflect the cost of insurance against longevity risk at retirement, and the empirical evidence referred to in this paper largely focuses on that payout option.

SPILAs offer several provisions for survivor benefits. Simple life annuities protect only the annuitant against life span uncertainty, and payments end at death. Joint life annuities protect the annuitant and a coannuitant (such as a spouse) against

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6. "Owner's Guide to the Variable-Annuity Rush," *The Wall Street Journal,* June 2, 1997, p. C1.

7. The annuity payout of deferred variable annuity products can be either variable or fixed. Hence, the common use of the term "variable annuity" often reflects only the accumulation of funds in risky assets and not the variability of payouts after retirement. In this paper variable annuity generally addresses the variability of payments after retirement.

8. "The Money Keeps Rolling In for Variable Annuities—But Tax Law Has Removed Some Luster," *New York Times*, January 11, 1998, p. 62.

9. Olivia S. Mitchell, James M. Poterba, and Mark J. Warshawsky, *New Evidence on the Money's Worth of Individual Annuities*, Working Paper No. 6002 (Cambridge, Mass.: National Bureau of Economic Research, April 1997).

10. Warshawsky, "The Market for Individual Annuities and the Reform of Social Security."

outliving their resources. Other annuities with survivor options continue to pay a percentage of the previous benefit after the death of the primary annuitant. A fixed-payments-certain life annuity provides lifetime payments for the annuitant and guarantees periodic payments to beneficiaries if the annuitant dies before a certain date. Similarly, a refund annuity returns some of the premium to the annuitant's beneficiaries should he or she die before a certain date.

Among people covered by the Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF)—the retirement saving system for employees of colleges and universities and largest private pension fund in the United States—74 percent of male annuitants chose a joint (two-life) annuity and 68 percent of women chose a single-life annuity. In 1994, 62 percent of all TIAA-CREF life annuitants decided to take a fixed and participating TIAA annuity that provides a minimum guaranteed benefit and also participates in the returns of TIAA's investment portfolio. (TIAA does not offer a fixed and nonparticipating annuity.) A large minority of 38 percent, however, preferred the variable CREF annuity, in which monthly payouts fluctuate with the performance of underlying securities and the mortality of CREF's annuitants.[11]

Why Is the Market for Single-Premium Immediate Life Annuities Small?

Analysts give a number of reasons for the small size of the market for single-premium immediate life annuities.

Unfavorable Prices. Prices for private annuities are high. As discussed in the next section, the behavior of annuitants increases premiums beyond what an average household may be willing to pay. In addition, the smaller the market, the larger the administrative costs per customer tend to be, and that overhead is tacked on to every annuity.

Much Wealth Is Already in Annuities. Many households already receive annuities from Social Security and private pensions. Recent calculations based on the data collected under the University of Michigan's Health and Retirement Study show that Social Security wealth—expected future Social Security benefits expressed in today's dollars—accounts for 27 percent of household net worth on average.[12] That estimate of household net worth includes the value of housing, pensions, and health insurance, but it excludes taxes paid on Social Security benefits. The percentage varies

11. Francis P. King, "Trends in the Selection of TIAA-CREF Life-Annuity Income Options, 1978-1994," *TIAA-CREF Research Dialogues*, Issue No. 48 (July 1996). The paper is available on the Internet at http://www.tiaa-cref.org/set-lib.html.

12. Gustman and others, *Pension and Social Security Wealth in the Health and Retirement Study,* Table 3.

significantly among income groups, however: for low-income households, almost all wealth derives from expected Social Security benefits; for households with median income, Social Security accounts for 40 percent to 50 percent of wealth; and for high-income households, it accounts for only 10 percent to 15 percent of wealth.[13]

In addition, private pension wealth accounts for 23 percent of the average household's assets, although the percentage also varies by income. Households at the top of the income distribution hold about 20 percent to 30 percent of their wealth in private pensions, median earners hold about 20 percent, and low earners hold 13 percent or less of their wealth in private pensions.[14] On average, at least two-thirds of pension wealth is provided in the form of life annuities through defined benefit plans.[15] Thus, the combined pension and Social Security wealth of low and median earners is largely annuitized. Clearly, such a large annuitization of resources reduces the incentive for people to convert their remaining assets into annuities, especially if they have other reasons for holding nonannuitized wealth.

Housing Wealth. According to the Health and Retirement Study, a household with median income holds about 20 percent of its assets in housing.[16] Although a household could annuitize its housing wealth by selling the home and using the proceeds to purchase an annuity contract, many retirees are reluctant to do so. Owning a house provides both financial security (no need to pay rent out of current income) and the security of living in a familiar neighborhood.

As an alternative to selling and renting, households can take out a reverse mortgage. A reverse mortgage with tenure option provides monthly income to the homeowner as long as he or she stays in the home.[17] Once the home is sold, the proceeds are used to repay the loan; if the proceeds exceed the value of the loan, the remainder goes to the homeowner or the estate. The market for reverse mortgages with tenure option is currently small, possibly for the same reasons that keep the private annuities market small.

Unanticipated Expenditures After Retirement. Expenditures may vary unexpectedly after retirement. For example, retirees may experience health problems that require high expenditures for medication or long-term care that are not covered by insurance. They may also want to be able to support their children in case of an adverse shock

13. Ibid., Table 15.

14. Ibid., Table 14.

15. Ibid., Table 20.

16. Ibid., Table 3.

17. Other reverse mortgages simply provide a line of credit and therefore serve mostly as a buffer for unexpected expenditures.

to the children's income. But because an annuity converts assets into a constant stream of income, the annuitants do not have a buffer stock for unexpectedly high expenditures once wealth is annuitized. To the extent that borrowing against future annuity income is impossible, the retiree may wish to keep a portion of assets in liquid funds as a safeguard against adverse health and income shocks.[18]

Bequest Motive and Intrafamily Risk Sharing. Retirees may wish to bequeath some of their savings at death. A bequest can be altruistically motivated, reflect the giver's pleasure in giving, or be used as a disciplining device with the threat of disinheritance.[19] Despite considerable disagreement about the nature of bequest motives, scholars agree that the desire to leave some assets to others reduces the incentive to annuitize and increases the incentive to hold wealth in a form of financial assets and tangibles.

Moreover, the family itself may provide implicit annuity income. Through implicit or explicit agreements concerning consumption and intrafamily transfers, families can self-insure against uncertain death. For example, spouses may name each other as beneficiaries of their wills and decide together how much to spend each year. Such a joint decision reduces the risk of outliving resources for both spouses because it pools the resources of two individuals with different mortality prospects. If the spouse with higher expected mortality receives higher income, the couple may decide to save some of that income so that the surviving spouse can draw on those savings and is not forced to reduce spending. According to research by Laurence Kotlikoff and Avia Spivak, risk sharing between spouses may already provide around 50 percent of the risk reduction that a perfect annuities market could provide.[20] Moreover, the larger the number of family members in a risk-sharing arrangement, the closer the family comes to performing the function of a perfect annuities market. However, empirical evidence does not support full risk sharing within families.[21]

Inflation Risk. Unlike Social Security, annuities that are currently available in the private market may not protect against inflation risk. Private annuities pay a fixed

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18. Wolfram F. Richter and Klaus Ritzberger, "Optimal Provision Against the Risk of Old Age," *Finanzarchiv*, vol. 52, no. 3 (1995), pp. 339-356.

19. The different strands of the literature are represented by Robert J. Barro, "Are Government Bonds Net Wealth?" *Journal of Political Economy*, vol. 82, no. 6 (1974), pp. 1095-1117; Andrew B. Abel and Mark J. Warshawsky, "Specification of the Joy of Giving: Insights from Altruism," *Review of Economics and Statistics*, vol. 70, no. 1 (1988), pp. 145-149; and B. Douglas Bernheim, Andrei Shleifer, and Lawrence H. Summers, "The Strategic Bequest Motive," *Journal of Political Economy*, vol. 93, no. 6 (1985), pp. 1045-1076.

20. Laurence J. Kotlikoff and Avia Spivak, "The Family as an Incomplete Annuities Market," *Journal of Political Economy*, vol. 89, no. 2 (1981), pp. 372-391.

21. See Fumio Hayashi, Joseph Altonji, and Laurence J. Kotlikoff, "Risk-Sharing Between and Within Families," *Econometrica*, vol. 64, no. 2 (1996), pp. 261-294.

nominal income (fixed and nonparticipating annuity), a variable income based on the performance of investments (variable annuity), or both (fixed and participating annuity). A fixed and nonparticipating nominal annuity clearly cannot protect against inflation, and its real value falls at a rate equal to the rate of inflation since the payout stays constant in nominal terms. TIAA offers a graded fixed and participating annuity that rises each year if the return on TIAA's portfolio exceeds 4 percent, thus protecting against inflation as long as the rate of inflation remains smaller than the annual benefit increase.[22] However, the graded annuity does not eliminate the risk from unexpectedly high inflation. A variable annuity protects against inflation only to the extent that investment returns move in step with inflation. Inflation risk may become a smaller problem in the future, however: the Treasury recently began to issue five-year and 10-year inflation-indexed bonds that insurers can use to back inflation-indexed annuities.[23] In response, CREF has added an inflation-indexed annuity to its portfolio.

THE DETERMINANTS OF ANNUITY PRICES

Prices for single-premium immediate annuities are affected by several factors: the rate of return the annuity company receives on its investment portfolio, its overhead costs, and the expected mortality of its annuitants. Prices also depend on the insurer's profits, which are determined by the structure and performance of the annuities market.

The Rate of Return

Annuity companies invest the premiums they receive from annuitants. The future flow of income from the investment combined with the principal is the source of income for the annuity payments. Depending on the insurer's expectations about the return on its investment portfolios, the company converts the premium into future payments. The annuity insurer can charge a lower premium for an annuity if it expects higher future returns on the investment portfolio.

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22. The graded and participating fixed annuity was originally suggested by John H. Biggs, "Alternatives in Variable Annuity Benefit Design," *Transactions of the Society of Actuaries,* vol. 21 (1969), pp. 495-528. A discussion of the inflation protection of graded annuities can be found in Francis P. King, "The TIAA Graded Payment Method and the CPI," *TIAA-CREF Research Dialogues*, Issue No. 46 (December 1995). The paper is available on the Internet at (http://www.tiaa-cref.org/set-lib.html).

23. If the Treasury offered indexed bonds with additional maturities, insurers would be more willing to offer inflation-indexed annuities.

The rate of return an insurance company receives on its investment portfolio is uncertain. Like any investor, an insurance company faces the trade-off between higher returns and higher risk. The annuity insurer can pass that risk on to the annuitant only with a variable annuity. However, most single-premium immediate life annuities sold are fixed annuities. Because the insurance company bears the risk of that investment, it may choose to invest conservatively to make sure it can always meet its obligations. Indeed, fixed annuities are backed by general accounts of life insurance companies, which are mostly invested in corporate bonds, commercial mortgages, and real estate.[24] Those conservative investment strategies also reflect regulatory requirements concerning the liquidity of life insurance and annuity companies.

Overhead Costs

The insurance company also incurs overhead costs: it sets up accounts for the individual annuitants and keeps track of the amounts paid out; it also manages the assets of the company, hires people with the appropriate experience (or pays an outside firm), and pays taxes on profits. Furthermore, the annuity insurer provides customer service and markets its products. Marketing costs can be substantial since annuities constitute a relatively complicated product with a large number of options, generally requiring contracting with commissioned agents to explain and sell annuity products. An insurance agent's advice may be valuable for the customer's retirement planning, and the customer may therefore perceive a portion of the commission as compensation for the agent's services rather than as a cost of the annuity. The state of New York mandates that marketing costs including commissions not exceed 7 percent of the annuity premium for licensed insurance companies.[25]

Mortality

In order to assess its expected future liabilities, the annuity company must evaluate how many annuitants will be alive at each future year. Over the life of an annuity contract, the chance that the annuitant will die increases, which decreases the expected liability for the insurance company. In calculating the expected future obligations from an annuity contract, the insurer puts a higher weight on payments in the near future than on those in the distant future. Those weights are determined by the estimated probability that the annuitant survives to that particular point in time.

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24. Warshawsky, "The Market for Individual Annuities and the Reform of Social Security."

25. Ibid.

The insurance company can offer a higher rate of return on annuities than it expects to receive on its investment portfolio, net of overhead costs, because some annuitants die early. Since the obligation of the insurer ends at death (unless the annuity provides a fixed-payments-certain payoff or has a refund provision), the insurance company can redistribute the premiums from those annuitants who die to those who survive. For example, if the average overall mortality rate of annuitants over a 30-year horizon is 25 percent, and the rate of return is 5 percent per year, the annuity company can offer a rate of return of 6 percent per year (see Box 1).

Although annuity companies do not face a longevity risk from any particular annuitant, they still face the uncertainty of a future decline in overall mortality. The losses of annuity insurers in the late 1930s stemmed largely from errors in forecasting future trends in mortality.[26] In projecting future mortality rates, an annuity company faces considerable uncertainty.[27] It may therefore choose to be cautious and assume that mortality rates may decline somewhat faster than they have in the past. A faster decline in mortality implies that annuitants will live longer on average and the insurer will face higher costs.

Only one particular annuity, the variable CREF annuity, passes on the aggregate mortality risk to annuitants by varying the annuity payouts with the mortality experience of the annuitant pool. CREF annuities can currently be purchased only by CREF members since most state laws prohibit or limit the sale of an annuity that passes the aggregate demographic risk to non-CREF members.[28]

Adverse Selection and Moral Hazard. People who buy individual annuities tend to live longer than average, and that affects the annuity market. Consider what would happen if an annuity company promised annuity payments based on the average mortality of the entire population. Such an annuity contract would be very attractive to potential annuitants who expect to live longer than average. But people who expect to have shorter lives than average would find an annuity based on average mortality to be unfavorably priced. As a consequence, longer-lived individuals would probably annuitize more of their wealth than shorter-lived individuals, and some individuals with short life expectancy might decide not to buy annuities at all. As a result, the insurance company would raise its premiums per dollar of annuity payout to avoid losses. In turn, higher premiums would increase the incentive

26. Poterba, *The History of Annuities in the United States.*

27. For a discussion of the uncertainty involved in projecting future mortality rates, see the *Report of the 1994-1995 Advisory Council on Social Security*, vol. 2 (Washington, D.C., 1997), pp. 148-153.

28. See Salvador Valdés-Prieto, "Design of Pensions and the Mandate to Annuitize" (draft, World Bank, October 1997).

BOX 1.
MORTALITY, THE RATE OF RETURN, AND ADVERSE SELECTION

A numerical example can illustrate how mortality, the rate of return of an annuity, and the effect of adverse selection are related.

Rate of Return

Suppose the annuity pool consists of 200 people. For simplicity, assume that they live in two periods (representing 30 years each). During the first period, they work and save $100,000; during the second period, they retire and consume their savings and interest. Everyone has a 25 percent chance of dying at the beginning of retirement. Assume the interest rate in this economy is 5 percent per year, or 330 percent (1.05^{30}-1) for a 30-year period. Thus, everyone will retire with $430,000 in savings, and if a particular individual survives, he or she can consume $430,000. However, if he or she dies at the beginning of retirement, savings are transferred to the heirs.

If people do not wish to leave bequests, they could purchase an annuity with their savings. If they purchase an annuity for $100,000, the annuity company could offer a payment of $573,333 to annuitants should they survive. That payment reflects a rate of return of 6 percent per year (or 470 percent for 30 years) and exceeds the interest rate of 5 percent.

Why $573,333? The annuity company collects a total of $20 million from annuitants and receives interest of $66 million. The annuity company knows that, on average, only 75 percent of annuitants will survive. Thus, it can offer $573,333 to each of the 200 annuitants, figuring only 150 of them will actually collect the money.

Expressed differently, the resources of the annuitants who die are distributed to the surviving annuitants rather than to the heirs. The advantage for the annuitants is clear: they can achieve a higher retirement income with the same savings (or the same retirement income with lower savings) if they decide to purchase an annuity and pool their longevity risk.

Adverse Selection

Suppose that the pool of annuitants contains 100 people with a survival probability of 90 percent and 100 people with a survival probability of 60 percent instead of 200 people with a survival probability of 75 percent. The annuity company cannot distinguish the different types. If both types of people purchase an annuity of $100,000, the outcome is the same as above since *on average* 150 out of 200 annuitants survive.

However, those with a survival probability of 60 percent may feel that buying an annuity is a bad deal since they have a 40 percent chance of never receiving any payments. Therefore, they reduce their annuity demand from $100,000 to $50,000, say, and the annuity company collects $15 million. Since two-thirds of annuity payments out of the $15 million plus interest go to those with high-survival probabilities, the annuity company cannot afford to offer a payout of $573,333 for a $100,000 premium anymore. Instead, it will offer $537,500 for a $100,000 premium and $268,750 for a $50,000 premium, because the average dollar received now has an 80 percent chance [(100*0.9+50*0.6)/150] of coming from a survivor rather than a 75 percent chance as in the example above. As a result, adverse selection reduces the annuity payment per premium dollar.

for people with short life expectancy to reduce their demand for annuities or drop out of the annuities market altogether. In the extreme, the market could shut down entirely. The effect of having high-risk types (people with long lives) drive out low-risk types (people with short lives) from insurance markets has been called adverse selection (see Box 1).

Adverse selection can arise only if the potential annuitant has more information about his or her survival prospects than the insurance company does. If the insurance company knew how long a prospective customer expected to live, it could issue an annuity based on the annuitant's specific survival prospects. Someone with short life expectancy would be offered a low price; someone with long life expectancy would be offered a high price. In reality, the insurance company has limited means to assess the specific survival prospects of its customers.

The difficulty of separating the annuity market by risk types stems from two sources: the lack of observable characteristics that are tied to longevity, and government regulation that prevents insurers from gathering and using such information. Personal characteristics, like health habits and family disposition for diseases, may be difficult to assess or verify. An annuity insurer may conduct health screenings, as is commonly done by life insurance companies, but may be restricted by law from using observable characteristics to assess survival prospects. For example, insurers are not allowed to differentiate subscribers to group annuities by sex, although, with the exception of TIAA-CREF, they do differentiate individual annuity holders by sex.

Separating the annuities market into risk classes may be more difficult than in the life insurance market because the incentives of the insurer and the insured work in opposite directions. In the life insurance market, both the insurance company and the insured individual want the insured to live a long and healthy life. By contrast, an annuity insurer would like the insured to die early. To the extent that changes in lifestyle can affect longevity in the short-to-medium run, the annuitant might change his or her habits and live longer than previously expected by the insurer. Such a change in behavior after the sale is called moral hazard. Healthy annuity applicants seeking lower rates could also cheat by claiming they had unhealthful habits, such as smoking, to receive a better rate.

Annuity insurers also cannot entice people to reveal their longevity prospects by simply offering annuities of different sizes. According to economic theory, insurers with imperfect information about potential customers can entice both good-risk and bad-risk customers to reveal their type and choose contracts of different sizes if they can successfully restrict the overall insurance coverage.[29] In that case, both risk types

29. Michael Rothschild and Joseph Stiglitz, "Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information," *Quarterly Journal of Economics*, vol. 90, no. 3 (1976), pp. 629-649.

receive insurance at an actuarially fair price, but the bad-risk customer cannot buy as much insurance as desired. However, annuity insurers cannot easily limit the size of the overall annuity insurance (potentially from different insurers) sold to a specific person. The insurer could offer both a small monthly annuity payment with a low premium per dollar of payout and a large annuity payment with a high premium per dollar of payout, but nothing would force people with long life expectancy to buy the large and expensive annuity. Instead, those people could buy several of the cheaper annuities.[30]

Annuity companies may still be able to segment the annuities market somewhat by offering annuity contracts that differ in reversibility. For example, if people want to leave money to their heirs, those with shorter life expectancy may find annuities with refund options or fixed-payments-certain more appealing. People with longer life expectancy are less willing to accept a lower annuity payment in exchange for the refund and as a result may choose life annuities without refunds. Currently, almost all life annuitants choose a refund option, thereby limiting effective market segmentation.

Annuity insurers also cannot provide any incentives that entice people to behave in the insurers' favor. Other insurance contracts, like health or fire insurance, require copayments of the insured to avoid moral hazard. If a catastrophe occurs, the insurance company does not finance the full cost of the damage; instead, the insured are required to bear a certain percentage of the cost. Also, if the terms of the contract are violated, the insurer may withhold compensation altogether. Such arrangements increase the incentive of the insured to reduce the risk of damage. However, those kinds of incentives do not work for annuity insurance because the insurer cannot entice the insured to die early or live recklessly.

Annuity Costs and the Correlation Between Longevity and Income. Annuity insurance costs increase as people with higher incomes and higher life expectancy buy larger annuities than households with lower income. If longevity also rises with income, the average annuity payment is made to people with above-average longevity prospects. As a consequence, premiums for annuities must be higher than they would otherwise be, or the insurer will not be able to earn a competitive return. To some extent, that effect may be offset by smaller administrative costs for the larger annuities that higher-income people demand.

30. In other insurance markets, most prominently the health insurance market, companies offer a menu of different contracts that differ by the extent of insurance coverage and copayments. Health insurers can thus limit the extent of insurance coverage and devise insurance schemes that split the market into separate risk pools.

Market Structure

Observable annuity prices also depend on the structure of the annuities market. If the annuities market is highly competitive, annuity companies do not have the market power to extract higher-than-normal profits from selling annuities. However, if the annuities market is dominated by a relatively small number of firms, profits and prices tend to be higher. The exact effect depends on the cost to new firms of entering the market and on the pricing strategies of existing firms.

According to the A.M. Best survey of more than 100 companies, annuity companies charged markedly different prices for the same annuity payment in 1996.[31] A $100,000 premium buys a monthly annuity for a 65-year-old male that can range from $653 to $856. However, the survey shows larger disparities in annuity premiums than real-time quotes do. CANNEX Financial Exchanges, a company that provides online real-time quotes for annuities sold in Canada, reports only a roughly 4 percent difference between the best and worst monthly payout per C$50,000.[32] Even that difference could be considered large for identical products. Analysts still do not know whether those price differences exist because of limited competition, lack of information among customers, differences in risk-taking behavior of annuity companies, or because the market is still very small.

EMPIRICAL EVIDENCE ON ANNUITY PRICES AND ADVERSE SELECTION

The previous discussion about the determinants of annuity prices raises a number of empirical questions. First, do individuals have a better idea about their own survival prospects than an insurance company does? As described above, adverse selection arises when potential annuitants have private information about their survival prospects. Second, what portion of today's annuity prices can be explained by differences between the mortality of annuitants and that of the general population? That is, how important is adverse selection? Third, do people with higher income live longer than those with lower income? If longer-lived people were also wealthier, annuities would be more expensive than average mortality suggests, even in the absence of adverse selection.

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31. A.M. Best Company, *Best's Policy Reports, Single Premium Immediate Annuities, Special Edition: 1997* (Oldwick, N.J.: 1997).

32. See Moshe Arye Milevsky, "Optimal Asset Allocation Towards the End of the Life Cycle: To Annuitize or Not to Annuitize" (working paper, York University, July 1997). Some of the CANNEX data are accessible on the Internet at (http://www.cannex.com/ canada/ rates/ anty.html).

Private Information About Mortality Rates

The empirical evidence from two studies suggests that individuals can predict their own survival prospects with some accuracy. Daniel Hamermesh conducted a survey of 410 economists and 363 residents of a metropolitan area in the Midwest.[33] His survey asked respondents to assess their own survival probability. Hamermesh found that self-assessed survival probabilities are correlated with forebears' longevity as well as with smoking habits and illness. Agents' responses are also roughly consistent with life tables.

Recent results from the first wave of the Health and Retirement Study (HRS) support Hamermesh's findings. A study by Michael Hurd and Kathleen McGarry uses a question in the HRS that asked respondents to evaluate their chances to live to age 75 and age 85.[34] The authors conclude that the implicit subjective probabilities are generally internally consistent and vary systematically with socioeconomic and behavioral variables such as education, income, and smoking. Those variables are good predictors for actual outcomes.[35] Overall, the studies have two important implications: people are able to form consistent expectations about their life span, and their expectations are based on relevant information available to them but not necessarily to insurance companies.

Evidence for Adverse Selection in the Annuities Market

Three studies provide direct evidence for adverse selection in the annuities market for fixed and nonparticipating single-premium immediate life annuities. Those studies measure adverse selection by deriving the expected present value of annuity payments based on the average mortality of the overall population and comparing

33. See Daniel S. Hamermesh, "Expectations, Life Expectancy, and Economic Behavior," *Quarterly Journal of Economics*, vol. 99, no. 2 (1985), pp. 389-408.

34. See Michael D. Hurd and Kathleen McGarry, "Evaluation of the Subjective Probabilities of Survival in the Health and Retirement Survey," *Journal of Human Resources*, vol. 30, suppl. (1995), pp. S268-S292.

35. Evidence from the second wave of the Health and Retirement Study also indicates that individuals who did not expect to live long had a higher probability of dying between the first two waves of the survey. See Michael D. Hurd and Kathleen McGarry, *The Predictive Validity of Subjective Probabilities of Survival*, Working Paper No. 6193 (Cambridge, Mass.: National Bureau of Economic Research, September 1997).

that estimate to the actual prices observed in the annuities market.[36] The present value is a single number that expresses a flow of current and future income in terms of an equivalent lump sum received today. Because future payments are made only if the annuitant survives, the present value is expressed in expectations: each annual payment in the future must be discounted with a factor that reflects a combination of the interest rate and the probability that the annuitant will have died in that future year.

The studies separate the effect of overhead and other costs from the impact of adverse selection by calculating the expected present value of an annuity using the mortality experience of people who actually buy them. Comparing that value with the expected present value calculated for the overall population indicates the extent to which the particular mortality characteristics of annuitants increase the price of annuities. As a result, the cost of adverse selection and other costs (including the profits of the insurer) can be identified.

A convenient way to make those comparisons is to construct a money's worth ratio, the ratio of the expected present value of annuity payments to the premium paid in the market for that annuity. A money's worth ratio indicates how much each premium dollar paid to the insurer generates in expected present value of annuity payments. The money's worth ratios are always less than unity (1) because the insurer faces overhead costs in providing the insurance. Money's worth ratios below 1 should not be taken as an indication that the insurance is not worth buying.

This method of identifying the effect of adverse selection was first applied to data from the 1980s. Recently, Olivia Mitchell, James Poterba, and Mark Warshawsky improved the methodology to measure the effect of adverse selection on 1995 annuity prices.[37] Their calculations take the average premium reported by A.M. Best as the market price. The new study also captures the effect of taxation and accounts for the fact that interest rates differ for different maturities.

In calculating money's worth ratios for the general population and the subpopulation of annuitants, different assumptions about interest rates are employed. Since annuity premiums depend on an expected future rate of return on investments, the table uses interest rates on Treasury notes and Baa corporate bond rates to discount future annuity income. The corporate bond rate reflects the price of

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36. Benjamin M. Friedman and Mark J. Warshawsky, "The Cost of Annuities: Implications for Saving Behavior and Bequests," *Quarterly Journal of Economics*, vol. 104, no. 1 (1990), pp. 135-154; Mark J. Warshawsky, "Private Annuity Markets in the United States: 1919-1984," *Journal of Risk and Insurance*, vol. 55, no. 3 (1988), pp. 518-528; and Mitchell, Poterba, and Warshawsky, *New Evidence on the Money's Worth of Individual Annuities.*

37. Mitchell, Poterba, and Warshawsky, *New Evidence on the Money's Worth of Individual Annuities.*

borrowing for private companies; the Treasury rate reflects the lower rate of borrowing accorded to the government. Since the risk properties of the average annuity insurer are unknown, the two rates provide reasonable benchmarks. The rates used in the calculations are derived from the prices of Treasury notes with different maturities: payments made one year in the future are discounted with the Treasury bond yield of one-year maturity, while payments made 20 years in the future are discounted with the Treasury bond yield of 20-year maturity.[38]

The estimates in Table 1 depend on specific assumptions about future mortality rates and the size of the annuity. Of course, mortality rates are uncertain. If mortality rates were to decline more rapidly than assumed, the money's worth would be higher. The estimates also focus exclusively on annuities purchased for a $100,000 premium. To the extent that larger premium payments are connected with lower overhead costs, larger annuities could be more favorably priced.

Annuitants whose mortality expectations coincide with those of the average population receive annuities that are worth between 75 cents and 85 cents per dollar of annuity premium paid (see Table 1). Take, for example, the annuity for a 65-year-old male. Discounting with the Treasury bond rate results in a money's worth ratio of 0.814. Hence, the price of the annuity would be 18.6 percent less than the actual price charged in the absence of overhead costs and adverse selection. The money's worth ratio is smaller when future annuity payments are discounted at the corporate bond rate.

A similar picture arises for women and people who hold joint annuities. The money's worth ratio is higher for women than for men, and in most cases the money's worth ratio is highest for people with joint annuities, reflecting the differences in both mortality rates and the incentive to purchase annuities for different groups of the population.

As described above, some portion of the reduction in money's worth ratios occurs because annuitants live longer than the average population. The money's worth ratio for a 65-year-old male annuitant is 0.927, compared with 0.814 for the average 65-year-old male. The difference between the mortality of annuitants and the general population explains about 10 percentage points of the drop in the money's worth ratio. Analysts refer to that difference as the cost of adverse selection.

38. The adjustment assumes a constant risk premium for corporate bonds.

TABLE 1. MONEY'S WORTH RATIOS FOR SINGLE-PREMIUM IMMEDIATE LIFE ANNUITIES IN 1995

Sex and Age of Annuitant	Money's Worth Ratio for the General Population Discounted with		Money's Worth Ratio for Annuitants Discounted with		Difference in Money's Worth Ratio (Cost of adverse selection) Discounted with	
	Treasury Rate	Corporate Rate	Treasury Rate	Corporate Rate	Treasury Rate	Corporate Rate
Men						
55	0.852	0.773	0.934	0.840	0.082	0.067
65	0.814	0.756	0.927	0.853	0.113	0.097
75	0.783	0.743	0.913	0.860	0.130	0.117
Women						
55	0.880	0.791	0.937	0.838	0.057	0.047
65	0.854	0.785	0.927	0.847	0.074	0.062
75	0.846	0.796	0.919	0.861	0.073	0.065
Joint and Survivor[a]						
55	0.889	0.792	0.930	0.824	0.041	0.032
65	0.868	0.792	0.929	0.841	0.061	0.049
75	0.846	0.791	0.922	0.857	0.076	0.066

SOURCE: Congressional Budget Office using data from Olivia S. Mitchell, James M. Poterba, and Mark J. Warshawsky, *New Evidence on the Money's Worth of Individual Annuities*, Working Paper No. 6002 (Cambridge, Mass.: National Bureau of Economic Research, April 1997), Tables 3 and 4.

NOTE: All numbers refer to the average annuity payment for a $100,000 premium and reflect the tax treatment of annuities. The money's worth ratio is defined as the ratio of the expected present value of future annuity payments divided by the average premium paid for the annuity as reported by A.M. Best.

a. Joint annuities assume a couple of the same age.

The cost of adverse selection rises with age and is smaller for females than for males. One explanation is that people who have survived to age 75 and then decide to buy an annuity are healthier than the general population. People who buy annuities at older ages may have even more private information about their survival prospects than people who buy annuities at younger ages.[39] The lower cost of adverse selection for females and joint annuitants may reflect a smaller variability in female mortality rates: with lower variance in mortality rates, there is less opportunity to exploit private information about one's own longevity prospects. The possibility that households may insure within the family may make the market for joint annuities less vulnerable to adverse selection. Joint annuities may be an

39. A similar argument is made in Agar Brugiavini, "Uncertainty Resolution and the Timing of Annuity Purchases," *Journal of Public Economics*, vol. 50, no. 1 (1993), pp. 31-62.

attractive way to ensure a stream of income for a healthy spouse even though the other spouse may be frail or ill.

Calculations that discount future payments at the corporate bond rate show a lower cost of adverse selection. The reason for that finding is that the corporate bond rate is higher than the Treasury bond rate and therefore discounts future payments more heavily, implying that the money's worth ratio depends less on the differences in mortality rates.

The cost of adverse selection seems to be smaller in the Canadian than in the U.S. market. According to findings by Moshe Arye Milevsky, adverse selection in Canada for 65-year-old male annuitants reduced money's worth ratios by 3.6 to 4.6 percentage points between 1984 and 1996, depending on the discount rate used. For 65-year-old females, adverse selection reduced money's worth ratios by 2.2 to 2.9 percentage points.[40]

To conclude, the latest empirical evidence for the United States suggests that the "money's worth" of today's annuities is about 75 cents to 85 cents per dollar of premium paid. If future annuity payments are discounted at the Treasury bond rate, adverse selection accounts for about half of the shortfall, and overhead costs and profits of the insurer account for the rest. If future payments are discounted at the corporate bond rate, then adverse selection accounts for about one-third of the shortfall. The cost of adverse selection rises with age and is smaller for women than for men.

Evidence for the Correlation Between Income and Mortality

Some of the difference in money's worth ratios between annuitants and the general population may simply indicate that households with more wealth are both more inclined to purchase annuities and more likely to live longer, especially because Social Security's annuity rises less than proportionally with income and replaces less than 20 percent of income for the richest people.

The literature provides ample evidence that poorer people have shorter life expectancy. Jonathan Feinstein recently surveyed the medical and economics literature and found that lower income is correlated with shorter lives.[41] Although no single channel for this connection has been identified, a multiplicity of factors including lifestyle, habits, and access to health care probably influence longevity. However, the relationship between income and mortality may be overstated because

40. Milevsky, "Optimal Asset Allocation Towards the End of the Life Cycle."

41. See Jonathan S. Feinstein, "The Relationship Between Socioeconomic Status and Health: A Review of the Literature," *The Milbank Quarterly*, vol. 71, no. 2 (1993), pp. 279-309.

empirical estimates also indicate that someone who is not healthy may not be able to work and so has a lower income.

Recent studies using longitudinal data try to control for the effect of health on income by relying on wealth or lifetime income measures rather than annual income measures. One such study by Paul Menchik employs 20 years of data from the National Longitudinal Study (NLS) and finds that both wealth and permanent income—measured as the constant income one would receive over the entire 20-year period, dividing the actual income equally over all periods—lower mortality significantly.[42] Properly controlling for income and wealth also reduces the effect of race on mortality to marginal significance. Menchik finds that income affects mortality even within groups of people who had the same health characteristics when the survey started. Overall, the evidence suggests a strong link between income and mortality in the United States.[43]

PRIVATE ANNUITIES MARKETS IN A SOCIAL SECURITY SYSTEM WITH PERSONAL RETIREMENT ACCOUNTS

Some proposals for changing the Social Security system currently being discussed would alter how Americans save for retirement and receive retirement income. Those proposals require that workers accumulate retirement savings in personal retirement accounts. In order to achieve the same level of protection against life span uncertainty that is offered by Social Security, accumulated funds would have to be converted into a real fixed annuity. If markets for private annuities are imperfect, however, those annuities may be costly or unavailable, and long-run gains from prefunding a privatized social security system may be smaller than suggested in some recent papers. This section addresses how the annuities markets may be affected by creating personal retirement accounts and then discusses the underlying policy issues in more detail.

Effects of Personal Retirement Accounts on Annuities Markets

If the current system reflects the preferences of retirees for annuities, the annuities markets could expand substantially under proposals that create personal retirement accounts. Currently, lower-income households hold almost all of their wealth in expected future Social Security benefits. The share of Social Security wealth is 40

42. Paul L. Menchik, "Economic Status as a Determinant of Mortality Among Black and White Older Men: Does Poverty Kill?" *Population Studies*, vol. 47 (1993), pp. 427-436.

43. Lee A. Lillard and Constantijn W. A. Panis of RAND draw a very similar conclusion in a recent study that assesses the mortality of participants in the Panel Study of Income Dynamics. See Lillard and Panis, "Income and Mortality" (draft, RAND, December 1996).

percent to 50 percent for median earners and less than 15 percent for high earners.[44] Thus, if policymakers reduced Social Security benefits, the demand for annuities would probably increase, especially for low- and median-income households.

By combining annuity products, a retiree could tailor the payout much more closely to his or her preference and circumstance than the rules of Social Security currently allow. Many annuity products already exist: fixed-payments-certain or refund annuities that allow people to bequeath the remaining annuity principal; annuities with a variety of survivor options to protect several people against longevity risk; and fixed annuities or variable annuities that can match individual risk preferences. Other annuity products could be developed: annuities could be indexed for inflation or offer a reduced monthly payment in exchange for providing health and long-term care insurance.

Reduced Adverse Selection. Theoretical models of annuity demand predict that the cost of adverse selection would fall if Social Security's annuity was reduced.[45] Social Security currently satisfies most of the demand for annuities by people with shorter-than-expected life spans. If private retirement accounts replaced some or all of Social Security, those people might purchase private annuities. Moreover, because income and mortality are correlated, the increased demand for annuities by low and median earners could lower the life expectancy of annuitants on average, which in turn would allow insurance companies to lower annuity prices. A model that takes those complexities into account shows that under certain assumptions, the cost of adverse selection could fall by 1 to 2 percentage points if Social Security benefits were entirely replaced with personal retirement accounts.[46]

However, historical evidence only partially supports those theoretical arguments. Mark Warshawsky collected historical annuity prices and analyzed adverse selection for the two decades before Social Security was created, when the annuities market was small and most annuitants were women.[47] After the introduction of Social Security, the cost of adverse selection in the annuities market rose by 5 percentage

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44. See Gustman and others, *Pension and Social Security Wealth in the Health and Retirement Study*.

45. Andrew B. Abel, "Capital Accumulation with Adverse Selection and Uncertain Lifetimes," *Econometrica*, vol. 54, no. 5 (1986), pp. 1079-1098.

46. See Jan Walliser, "Understanding Adverse Selection in the Annuities Market and the Impact of Privatizing Social Security," Technical Paper No. 1997-4 (August 1997), available from CBO's Macroeconomic Analysis Division.

47. Warshawsky, "Private Annuity Markets in the United States: 1919-1984."

points for 65-year-old males but remained approximately the same for 65-year-old females.[48]

According to theory, the cost of adverse selection should have gone up for females as well. That indicates that the introduction of Social Security may not have increased adverse selection for all market segments. The current U.S. economy differs substantially from its counterpart in the 1930s, which may also call into question the applicability of comparative historical evidence. Back then, more families lived in rural areas, risk sharing within the family was more widespread, life expectancy beyond 65 was shorter, and the financial markets were much less developed.[49]

Overhead Costs. Overhead costs would fall as retirees demanded larger annuities and the annuity pool expanded. Moreover, a growing annuities market would attract more companies and therefore increase competition, putting additional downward pressure on annuity prices. However, competition for largely similar annuity products could lead to a substantial increase in marketing costs for insurers and thus raise overhead costs.

Challenges for Annuities Markets and Policymakers

If private annuities markets continued to experience substantial adverse selection and overhead costs even under a privatized Social Security system, some people might decide not to annuitize their wealth. People with either small account balances or shorter-than-average life expectancy might view annuitization as too expensive and choose to live off their savings. In the event those savings turned out to be insufficient, they would have to rely on government assistance.

Moreover, if the government guarantees a generous retirement income to people with insufficient means, some may deliberately spend down their savings. Such

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48. Warshawsky also finds that the cost of adverse selection has declined for females when comparing the period from 1963 to 1984 with the period from 1919 to 1940. By contrast, the cost of adverse selection stayed constant for males.

49. Life annuities markets have existed for a very long time, which points to a substantial demand for insurance against longevity risk. For example, Hans-Peter Baum, "Annuities in Late Medieval Hanse Towns," *Business History Review*, vol. 51, no. 1 (1985), pp. 24-48, states that in European medieval Hanse towns, "life annuities were payable only for the lifetime of the buyer; they could not be redeemed or sold to another person. In a way, they resembled modern old-age pension plans. Life annuities were often bought from hospitals or churches, which were unlikely to default on payments and which presumably did not speculate on an early death of the buyer." Baum also reports that life annuities bore significantly higher interest than usual credit contracts. Unfortunately, none of the historical prices have been analyzed for the cost of adverse selection because of a lack of mortality tables for annuitants.

behavior is called gaming because people exploit the insurance offered by the government (they "game the system").

Others may fail to annuitize their wealth because they do not understand the consequences or lack the information to make rational, forward-looking choices ("myopic" behavior).[50] Among other things, they may have difficulty comprehending the complicated interaction between the assumptions about mortality and rate of return that determines annuity premiums.

Regulatory Issues for Annuities Markets and Retirement Accounts

In thinking about a regulatory framework for personal retirement accounts and annuities markets, policymakers will confront the following questions:

- How should retirement savings be withdrawn?
- At what age and over what period should funds be available for withdrawal?
- How much information should annuity companies be able to use in pricing annuities?
- What types of annuities should be available to retirees and how much should annuity companies be regulated?
- How should annuities be taxed?
- How generous should the guaranteed minimum benefit be and how should it be provided?

How Should Retirement Savings Be Withdrawn? In a Social Security system with mandatory personal retirement accounts, people could accumulate a substantial amount of wealth. Rules on how that money is withdrawn at retirement are therefore as important as the provisions concerning contributions to and investment of those accounts.

Policymakers must first decide whether they want to restrict the withdrawal of funds. Should they mandate that the entire account be annuitized? Mandatory annuitization of retirement savings could reduce adverse selection and lower the price of annuities. Forcing all retirees to buy annuities would reduce the price of annuities,

50. See Peter A. Diamond, "A Framework for Social Security Analysis," *Journal of Public Economics*, vol. 8, no. 3 (1977), pp. 275-298.

since the mortality characteristics of annuitants would then tend to reflect the mortality characteristics of the average population.[51]

Mandatory annuitization might also keep overhead costs in check. If everyone born in a certain year was forced to annuitize at, say, age 65, that entire birth cohort would enter the annuities market simultaneously. If that cohort (or large subgroups of that cohort) purchased group annuities, they would face lower marketing costs and commissions compared with those in the individual annuities market. The government could facilitate the purchase of group annuities by establishing a specific bidding process.

Forcing people to annuitize their account balances could also address the problem of myopia and gaming. If retirees were forced to purchase a life annuity with their account balances, they would receive income until the end of their life, regardless of their ability to plan ahead. By the same token, people who had account balances that provided a sufficient retirement benefit but who were locked into an annuity would not be able to spend down their assets and then rely on government assistance.

However, mandatory annuitization may encourage participation in the underground economy and thus still leave some room for gaming. Because people in a system with mandatory accounts and forced annuitization cannot access their savings before retirement or spend that money freely after retirement, those with lower income and shorter life expectancy may choose to earn some of their income in the underground economy and rely on government assistance after retirement. That behavior largely depends on the size of the underground economy, which is small in the United States. Indeed, under the current Social Security system, payroll tax evasion is largely limited to the self-employed.[52]

Other problems may arise. If everyone was forced to annuitize their wealth without the possibility of bequests, people with shorter life expectancies would be hurt. Of course, those people also fare poorly in the current Social Security system. Allowing withdrawal options other than full annuitization may reduce those concerns, but those options would allow adverse selection and thus raise the cost of annuities for people remaining in the market.

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51. Note, however, that insurers could not use simple population mortality tables to assess the mortality of the average annuitant. Because of the correlation between income and mortality, the longer-lived richer people hold a larger share of the annuities market than would be predicted by their share of the population. Therefore, insurers would have to use income-weighted mortality tables, which would raise the cost of annuities.

52. Joyce Manchester, "Compliance in Social Security Systems Around the World," in Olivia Mitchell, Robert Myers, and Howard Young, eds., *Prospects for Social Security Reform* (Philadelphia: University of Pennsylvania Press, forthcoming).

Some analysts are also concerned that the government could use mandatory annuitization to redistribute income by regulating annuity prices and mortality tables. For example, if policymakers used unrealistically pessimistic mortality tables for a certain group of the population, that group would receive higher incomes in retirement than would be actuarially fair.[53] Of course, alternative options for withdrawing funds could allow disadvantaged groups to opt out of the market, which would serve as a check on such governmental intervention.

If policymakers decide against mandatory annuitization, should retirees' withdrawals still be regulated or should they have complete freedom in deciding how fast to spend their assets? Could retirees withdraw their funds in a lump sum or should their withdrawals be restricted? One possible restriction, for example, would be to prohibit people from withdrawing more than a given amount each month. In the case of such "programmed withdrawals," a limit would be set by the size of the account and the accountholder's expected remaining life span. Restricting withdrawals only partly addresses the problem of myopia and gaming after retirement. Prohibiting people from withdrawing more than a certain amount (programmed withdrawals) in any given period, for example, does not insure against longevity risk since the stock of remaining resources falls each year. If retirees live unexpectedly long, they may qualify for government assistance programs because their resources are depleted. Moreover, people who perceive annuities as a bad deal may choose programmed withdrawals, creating another adverse selection problem.

Giving people complete freedom in using their retirement accounts would create the largest risk to the government. If lump-sum withdrawals were permitted, retirees could use their resources as they see fit but could increase the government's costs. Some people might recklessly spend down their savings; others might rationally choose to qualify for government assistance by spending their money or transferring it to their children. That behavior becomes more likely as the government's minimum pension becomes more generous (see below).

Despite those potentially detrimental effects, it may be reasonable to allow people to withdraw some of their funds in a lump sum, because the mandatory saving in personal retirement accounts may substantially exceed what is necessary to maintain a retiree's previous standard of living. For that reason, policymakers may want to allow withdrawal of those funds that exceed a minimum threshold in a lump sum and mandate the annuitization of the rest (as they do in Chile—see below).

At What Age and Over Which Time Period Should Funds Be Available for Withdrawal? Since funds in personal retirement accounts would be accumulated specifically to provide retirement income, people would have access to their funds only after they reached a "normal" retirement age. Both the Individual Account Plan

53. Valdés-Prieto, "Design of Pensions and the Mandate to Annuitize."

and the Personal Security Account Plan of the last Advisory Council on Social Security give access to savings at age 62.

One potential problem is that retirees could face the risk of unexpectedly low asset values at the time their savings must be annuitized. If the stock market fell just before retirement or if interest rates were low, those retirees would have less wealth and their life annuity would be smaller than they had expected.

Additional risks arise if retirees are forced to switch their investment portfolios upon retirement—for example, by converting stocks into a fixed annuity. That risk could be eliminated if retirees were allowed to purchase variable annuities that reflect their investment portfolio before retirement.[54] In that case, no adjustment of investments would be necessary at retirement.

Alternatively, rules could allow people to annuitize their wealth over a certain period. For example, retirees could annuitize one-tenth of their retirement account each year between ages 65 and 75. Because market prices vary less over a long horizon than over a shorter period, such a provision would reduce the volatility of retirement income.

Yet if the entire retirement account must be annuitized within a certain time frame, the risk of switching investment portfolios cannot be eliminated.[55] In the United Kingdom, for example, an annuity must be purchased with the entire account balance sometime before age 75. Thus U.K. retirees face a decision similar to that of an investment manager: they must bet whether the market will go up or down in the future, a task at which many professionals fail.

Offering a substantial window of time for converting all savings into an annuity has a further disadvantage: it exacerbates adverse selection. Those who expect a shorter life span could postpone their annuitization and—if they happen to die before annuitization—could leave the remaining account balance to their estate. Such behavior would lead to a healthier-than-average pool of annuitants with longer-than-average life expectancy, defeating the purpose of the mandate.

How Much Information Should Annuity Companies Be Allowed to Use in Pricing Annuities? Insurers could attempt to separate annuitants into risk classes based on sex, marital status, forebears' longevity, income, and health habits. However, severe conflicts might arise between the protection of individual privacy and the informational demands of annuity insurers. For example, would insurers have access to the results of genetic tests, or would that information remain private? Equally difficult is the distinction between market separation and the perception of

54. Valdés-Prieto, "Design of Pensions and the Mandate to Annuitize."

55. Ibid.

discrimination. For example, would insurers be allowed to sell differently priced annuities to men and women, or would unisex policies be required? (Pension plans covered by group annuity insurance are already required to offer the same pensions to men and women.)

If annuitization is not mandatory, pooling different risk classes may make annuities unattractive to people with shorter life expectancy, exacerbating adverse selection. Specifically, if programmed withdrawals or lump-sum withdrawals are possible, those with shorter life expectancy (low-income male smokers, for example) might simply stay out of the annuities market, raising the price of annuities for other market participants.

If annuitization is mandatory, prohibiting the segmentation of annuitants into risk classes implies redistribution of resources among different people. If low-income retirees with shorter life expectancy pay the same price for an annuity as high-income people with above-average life expectancy, wealth is redistributed from the low-income person to the high-income one. If unisex annuities are required, resources will be implicitly redistributed from men to women since women live longer on average than men. Both types of redistribution could have substantial effects on the welfare of certain groups.[56]

What Type of Annuities Would Be Available? Should retirees be able to use their personal retirement accounts to purchase both fixed and variable annuities? Variable annuities tend to offer higher payouts on average since the risk is shifted from the insurer to the annuitant. But variable annuity payments can also be volatile, and the annuitant would have to rely on other assets or borrowing to smooth consumption over time, especially during periods of sharp asset devaluation. The government's safety net may even entice people to buy more or riskier variable annuities than they otherwise would, creating moral hazard. Policymakers could restrict the riskiness of the asset portfolio of variable annuities, but to the extent that the risk and return properties may not coincide with annuitants' preferences, doing so may lower annuitants' well-being. Alternatively, policymakers could allow only annuities that pay a guaranteed minimum income exceeding the level of government assistance. However, such annuities could increase moral hazard problems among annuity insurers (as discussed below).

Should all annuities be indexed to inflation? Indexing would protect annuitants from changes in the price level and reduce the chance that they would require government assistance even with rising prices. However, annuitants might pay a price for not being exposed to inflation risk: their real returns would tend to be somewhat lower than the difference between nominal returns and expected inflation.

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56. See Jan Walliser, "Privatizing Social Security While Limiting Adverse Selection in Annuities Markets," Technical Paper No. 1997-5 (August 1997), available from CBO's Macroeconomic Analysis Division.

Economic theory suggests that full indexation may not be desirable, because people weigh the benefit of small inflation risk against the cost of reducing that risk.[57]

Should refund and fixed-payments-certain annuities be permitted? Annuities that offer a refund if the annuitant dies before a certain age or that guarantee a minimum number of payments pay a lower annuity income. However, they also increase the flexibility of the annuities market to serve annuitants who do not expect to live long.[58] Moreover, such options may assist annuity companies in separating risk classes and could therefore lead to fairer pricing of annuities than in a pooled market.

Should policymakers mandate the purchase of survivor insurance? Unlike Social Security, a system with individual retirement accounts may not provide benefits to survivors and dependents. Many women work in low-wage jobs and have a less stable earnings history than men because of employment interruptions. As a consequence, some women may not accumulate enough savings to purchase an annuity that provides sufficient retirement income. In that case, they may have to rely on their husband's annuity or the government. Policymakers could require that annuities cover the annuitant and spouse either through a joint life annuity or a survivor annuity that pays some proportion of its value to a surviving spouse. Such a provision would prevent the survivor from being pushed into poverty and therefore would reduce gaming and the attendant costs to the government. Alternatively, spousal consent could be required if an annuitant wanted to purchase an annuity for his or her life only. Similar rules might be necessary if lump-sum withdrawals from retirement accounts were permitted. (Programmed withdrawals do not create a similar problem since the remaining account balance would be part of the retiree's estate.)

How Tightly Should Annuity Insurers Be Regulated? If policymakers implicitly or explicitly guarantee the annuity contracts offered by private insurers, regulation of annuity insurers' funds may be necessary to reduce the risk to the government. Fixed annuities expose insurers to a rate-of-return risk and the risk that mortality rates might improve unexpectedly in the future. If an insurer's assets underperform, the company may be unable to meet its obligations, and policymakers may feel obliged to help retirees who purchased annuities from that company. Policymakers could create some formal insurance—similar to that provided to pension plans by the Pension Benefit Guaranty Corporation—for annuity companies. However, such insurance may lead to overly risky investment strategies of annuity insurers unless

57. Martin S. Feldstein, "Should Private Pensions Be Indexed?," in Zvi Bodie and John Shoven, eds., *Financial Aspects of the U.S. Pension System* (Chicago: University of Chicago Press, 1983), pp. 211-230.

58. The Individual Account Plan of the last Advisory Council on Social Security mandates the purchase of annuities but explicitly permits annuities with minimum guaranteed payment periods.

it is properly priced or policymakers develop regulations to limit risk taking. The savings and loan crisis during the 1980s is an example of how government guarantees can lead to overly risky investment behavior. Further, regulating the insurer's investment choices (for fixed annuities) or the annuitant's investment choices (for variable annuities) are just two manifestations of the same issue: the entity that bears the risk may take on too much risk if the government offers guarantees.

Should companies that offer investment services during the accumulation period of retirement savings be prohibited from offering annuities? On the one hand, prohibiting investment companies that handle the accumulation of accounts from also offering annuities may hinder the sale of deferred annuities.[59] On the other hand, allowing one company to handle the accumulation and annuitization of funds would give that firm market power since it may be difficult to switch companies once the account balance is committed to annuitization. Increased market power tends to lower competition among insurers and raise prices.

How Should Annuities Be Taxed? The tax treatment of annuities may affect the incentive to purchase an annuity. The current tax code makes special provisions to capture the complexities of annuities. An annuity payment combines the principal (the premium paid to the insurer) and the rate of return the insurer receives on his or her investment. The tax code attempts to tax the portion of an annuity that reflects a return on investment, measuring the taxable return as the difference between the actual annuity payment and the premium paid to the insurer (net of federal, state, and local premium taxes) divided evenly over the annuitant's expected life span according to the Treasury's life tables.[60]

In a Social Security system with personal retirement accounts, the tax treatment of annuities would probably be linked to the tax treatment of accounts. Most existing plans to change Social Security would accumulate retirement savings from after-tax income, but the return on those savings would remain untaxed. Exempting annuities from taxation would therefore be consistent with the tax treatment of the accounts.

Minimum Benefit Guarantee. Policymakers have to weigh the advantage of a minimum benefit guarantee on annuities against the disincentives: spending down retirement savings and incentives to work in the underground economy. As

59. Economic theory predicts that adverse selection is less important if annuitants can commit to an annuity purchase early in life (deferred annuity). Younger investors should therefore find variable annuities valuable because the reduced adverse selection an insurer faces at younger ages is not offset by a higher rate-of-return or demographic risk for the insurer.

60. The tax treatment of annuities introduces distortions because the mortality tables used to assess the taxable portion of an annuity payment rarely reflect the true expected mortality experience of an annuitant.

discussed earlier, a generous minimum benefit guarantee combined with unregulated lump-sum withdrawals would provide large incentives to spend down retirement funds and then rely on the minimum benefit, but the incentives for such behavior are substantially smaller if only programmed withdrawals are permitted. People with shorter life expectancy may prefer to risk outliving their resources, creating an adverse selection problem in the annuities market if the government provides a generous minimum benefit. Finally, if annuitization is mandatory, a minimum benefit may also increase the incentive to work in the underground economy to avoid the mandatory saving.

Two ways of providing minimum benefits would have different repercussions on the annuities market and government spending. A minimum pension that depended on the account balance and only supplements insufficient retirement savings may not significantly affect annuities markets if the account balance can only be used to purchase an annuity. However, a flat benefit paid to everyone regardless of need would create a basic insurance against longevity risk and therefore alter the incentives to purchase annuities, disproportionately reducing annuity demand by the shorter-lived households.[61]

Regulatory Choices in Chile and the Chilean Annuities Markets

Chile privatized its social security system in 1981. The Chilean experience can therefore provide some unique insights into the challenges for annuities markets and the effects of a specific set of regulatory choices.[62] However, little research has thus far been devoted to the Chilean annuities markets, and the information on the functioning of those markets is still limited. Box 2 provides a brief description of the Chilean regulatory framework.

In Chile, a majority of retirees choose to annuitize despite the alternative of programmed withdrawals from a personal retirement account. Recent figures on participation in the Chilean annuities market cited by Valdés-Prieto indicate that among people who became eligible to withdraw funds at the normal retirement ages(65 for men and 60 for women), 37 percent purchased an annuity and another 6.5

61. See Walliser, "Privatizing Social Security While Limiting Adverse Selection in Annuities Markets."

62. For a detailed discussion of the Chilean system, see Peter Diamond and Salvador Valdés-Prieto, "Social Security Reforms," in Barry P. Bosworth, Rudiger Dornbusch, and Raúl Labán, eds., *The Chilean Economy: Policy Lessons and Challenges* (Washington, D.C.: Brookings Institution, 1994). See also Valdés-Prieto, "Design of Pensions and the Mandate to Annuitize," for some recent data.

BOX 2.
THE REGULATION OF ANNUITIES MARKETS
AND RETIREMENT ACCOUNTS IN CHILE

Chile privatized its social security system in 1981. Every covered worker opting out of the old system or entering the labor force must contribute 10 percent of monthly earnings to a savings account with one of the investment companies called Administradora de Fondos de Pensiones (AFP). AFPs invest the funds in heavily regulated portfolios with a minimum performance guarantee. The Chilean system has the following provisions:

Timing. Workers become eligible for a retirement pension at normal retirement age (65 for men and 60 for women) or when their funds are sufficient to finance a pension that exceeds both 50 percent of the individual's average taxable earning over the last 10 years and 110 percent of the minimum pension. Disability and death of a covered relative are also qualifying reasons to withdraw funds. No eligible person is forced to make withdrawals.

Lump-Sum Withdrawals. Lump-sum withdrawals are permitted from retirement savings as long as the remaining funds finance an annuity exceeding both 70 percent of the individual's average taxable earnings over the last 10 years and 120 percent of the minimum pension.

Programmed Withdrawals. An individual can choose a programmed withdrawal that divides the remaining fund balance over the expected remaining life span using official life tables and a constructed interest rate. The retiree can also switch to an annuity later.

Annuities. A retiree can purchase an annuity with his or her retirement account. The annuity must be indexed for inflation and must cover spouses and children. However, the annuity may be deferred (start at a later date); fixed-payments-certain annuities and refund annuities are also permissible. Insurance companies are free to segment the annuities market into different risk classes. Insurance reserves are highly regulated, however, and the government guarantees up to 75 percent of the pension payments above the minimum pension in case of the default of an annuity insurer. Annuity insurers cannot simultaneously act as AFPs; therefore the accumulation phase and paydown phase must be handled by separate companies.

Disability and Survivor Benefits. The Chilean system requires workers to purchase disability and survivor insurance. Upon disability or death, the insurance pays a lump sum into the disabled or deceased worker's retirement account to finance an annuity equal to 70 percent of the worker's inflation-adjusted earnings over the 10 previous years (the disabled worker or survivor can choose programmed withdrawals instead).

Welfare and Minimum Benefit Guarantee. Chile has two government assistance programs. Retirees can qualify for either of the two but not for both. The first, called Assistance Pension, pays a benefit to those who have no other pension income and are deemed needy. The second (much more generous) program, called Minimum Pension, pays a pension to covered workers who have contributed for more than 20 years and satisfy a means test. Disabled workers with 10 years of contributions or a continuous history of contributions up to the time of disability also qualify. The Minimum Pension supplements payments from AFP accounts to achieve 25 percent of the average income after contributions to social security. All supplemented accounts must be drawn down with programmed withdrawals.

percent chose a programmed withdrawal combined with a deferred annuity.[63] Among those who qualified for an early pension because their fund balance was sufficiently large, 94 percent chose an annuity and only very few people chose the combination of programmed withdrawal and deferred annuity. Out of both groups, 75 percent chose an immediate annuity.[64] Disabled workers and dependent survivors were less likely to purchase annuities.

Many of those who qualified for withdrawals at regular retirement ages had low account balances close to the minimum pension level and were forced to take the programmed-withdrawal option. The low number of annuitants among retirees at the regular retirement age may therefore be caused by that regulation. However, adverse selection could also be part of the explanation because those with little incentive to annuitize may wait until normal retirement age to tap their fund balances in the first place. A second analytical difficulty arises because some insurance agents hand back a lump-sum payment to annuitants, financed with increased commissions. If annuitizing is the only means for some retirees to receive a lump-sum payment out of their account, that may increase the attractiveness of annuities even if the cost of adverse selection is substantial. Moreover, the observable overhead costs from commissions may be overstated since some of the money is returned to the retiree. A third problem in interpreting the outcomes is that the Chilean private system has not matured yet. Therefore, those who currently retire under the new system decided to opt out of the old system in the first place.

Despite those caveats, the fact that three out of four Chilean retirees choose to annuitize suggests that neither adverse selection nor relatively high transaction costs have caused the annuities market to collapse in Chile. The ability to differentiate risk types in Chile may contribute to that outcome. However, policy options other than the Chilean regulation may reduce adverse selection and overhead costs.

CONCLUSION

Annuities are an important financial instrument that provide insurance against life span uncertainty. Thinking about the availability and cost of annuities is therefore essential for considering changes to Social Security. Private annuities are currently costly because of adverse selection and overhead. Some of those costs might fall if Social Security was altered and the market for private annuities grew. However, because of adverse selection, myopic behavior, and the existence of a safety net, some people might be less inclined to buy annuities than would be desirable from society's perspective, and annuities may remain costly.

63. Valdés-Prieto, "Design of Pensions and the Mandate to Annuitize," Table 1.

64. A total of 5,093 people qualified for the regular pension, and 9,938 people qualified for the early pension.

A variety of policy options might be considered to avoid the high costs of annuities in a privatized system. Those policy options would monitor the regulation of withdrawals from personal retirement accounts, the timing of annuity purchases, the regulation of annuities markets, and the generosity of government minimum benefit guarantees. In considering the withdrawal of funds from personal accounts, policymakers need to evaluate the benefit of reducing costs for society against the cost of limiting individual choices.