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How Long Will We Live in Retirement, and Will We Have Enough Funds?

Track: Retirement Systems Practice Area, Nontraditional Marketing, Long-Term Care, Product Development

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Summary: The fundamental question of whether or not to annuitize will face us all one day. You have heard of the risks facing participants after retirement, such as investment risk and inflation, but have you given much thought to the following?

What do (and don't) people know about their mortality risk? What do (and don't) they know about the magnitude of retirement asset surpluses or shortfalls and how they change under various asset and longevity strategies? Some countries have adopted mandatory annuitization; does it make sense for the United States?

MR. WILLIAM H. LESLIE IV: For my piece of the presentation, I'll start out with an example that shows the development of the main form of output for this retirement income calculator. The example may not be true, but hopefully it will illustrate the form of the output from the retirement income calculator. A few months ago, I was at a family gathering. My Uncle Joe, who's 65 years old

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Note: All handout materials are available through the link on the table of contents.

How Long Will We Live in Retirement, and Will We Have Enough Funds?

2

and has been working for more than 40 years, pulled me to the side and said, "I think I'm ready to retire." He didn't want to tell his wife and children, though, until he first ran his calculations by me, the math guy of the family. Here's some of the information about my Uncle Joe. He's 65 and has saved \$500,000. He expects a \$22,000 Social Security benefit but will not be getting a pension benefit. He wants to have \$50,000 of income each year of retirement.

His calculation was fairly straightforward. He said, "If I need \$50,000, and I knock off the \$22,000 that I'll be getting from Social Security, all that's left is \$28,000, which is 5.6 percent of my \$500,000. I expect I can earn 7 percent, on average, on my assets, so my assets will continue to grow as I take out only 5.6 percent of the assets each year for income." I said, "I see what you're doing and hopefully you have enough money." But I brought up the notion of inflation, of course, because that was missing. He mentioned that inflation is pretty low right now, and they even talk about deflation, so why would he really need to worry about that? I pointed out that in some years, inflation is very high, especially with health-care costs and maybe fuel costs, and is something we ought to figure in.

We both decided to incorporate some measure of inflation—we went with 3 percent, a historical average—and then I stepped into the room that has a computer in it, and did a fairly straightforward calculation, basically drawing down his assets by the \$28,000 a year, growing with inflation. I said, "If we have enough money at the end of your life, then the answer will come out blue, and if you don't have enough money, it will come out red." By the way, he said that he expects to live to age 87, so that would be 22 years. I did the calculation, and this is what came out. It was blue, which meant he had enough money.

The next thing I asked him was, "Where do you think you'll get 7 percent?" He said, "From what I gather, that's a reasonable average over the next 22 years." I said, "That might be so, but we should consider that asset performances can be better or worse than 7 percent. Not only that, but if you're taking money out of a pile of assets, actually withdrawing that money, then the pattern of returns matters over the 22-year period."

I had done some stochastic analysis on asset performance before, so I said, "Go grab us another refreshment. I'll just do a little work, and I'll come up with 10 representative outcomes based on 22 years of retirement, but with different asset performances." Here's what I came up with by the time he had come back into the room. Of the 10 results, two are red, and eight are blue, which means that in eight of the 10 scenarios that I came up with, sure enough, Uncle Joe did have enough money to realize his \$50,000 of income each year. In the red ones, two out of 10, he did not. I was very happy when he asked the next question, which was, "In those two red scenarios, will I miss a dinner a week, or will I lose my house? What's the magnitude?" I said, "That's an excellent question. Let's look at what the dollars are." We both agreed that we have to figure out some way to measure how close or

How Long Will We Live in Retirement, and Will We Have Enough Funds?

3

far you are from reaching your target, and what we said was, "Let's look at what the final balance is at the end of 22 years. How much money do you have left over? If you have \$1 million, then you have plenty of money to spare. If you were short \$1 million, you weren't even close." That's what we did. We looked at the final balance at age 87.

One other thing we decided to do, though, was not to look at it in terms of the dollars of 22 years from now, but in today's dollars. If the result was \$300,000 that you had as a balance in terms of today's dollars, you know what that can buy. That can buy a nice house, for example. We changed those 10 numbers into 10 final balances in terms of today's dollars. We won't get into the individual numbers, but at least we've started to paint the picture.

Then I asked, "Why do you expect to live to age 87?" He mentioned family history and some articles that he read that led him to the idea that he'd live to about 87. That seemed pretty reasonable. I said, "Suppose you only live a few years, or you live many years? Should we take a look at that?" He agreed. We went back to the original calculation, and I came out with 10 representative ages at which he might die. The way I did that was to look at a mortality table of, for example, 1,000 65-year-olds, and I looked at what ages the first 100 would die. Then I took the median of those 100 people as the first representative age—so basically the 5th, 15th, 25th and 35th percentile ages at death—and then for each of those lengths of retirement, I used his 7 percent asset return and came up with these balances. Again I said, "Hey, this looks pretty good. There's only one out of 10 scenarios in which you run out of money."

We both at the same time said, "Can we put those two together?" We did. We put the asset performance going left to right from that center one, and then we put the ages at death going up and down. The ages at death are represented by ages of 69, 75, 78 and up to 101. We can see what happens if the assets perform poorly or better and if you live longer or shorter.

Then he asked another great question. "I can see what happens if assets perform poorly, and I can see what happens if I live a long time. What happens if both of those happen at the same time?" That would be the lower left part of this table. We went ahead and calculated it. You can see that there are some red numbers showing up, and they're of higher magnitude than we've seen before. At the same time, we said, "Suppose that you have good asset performance and that you live a long time." We filled out the bottom right of the graph, and you can see that you can accumulate quite a bit of money. If someone lives from age 65 to 101, that's 36 years, so asset performance can do quite a job over that time. Then we said, "If you only live a few years, what happens?" We filled in that part of the table, and you can see asset performance isn't as important if you only have a short horizon.

We both agreed to fill in the whole table and get the whole picture and see what

How Long Will We Live in Retirement, and Will We Have Enough Funds?

4

happens. We went down the sides and filled in the rest of the table. Not that any one of these numbers is particularly important, but hopefully somebody looking at this will get a feel for where the risks and potential rewards are of somebody entering retirement. If assets perform poorly, you look at the left side of the table. If you think you might live a long time, look toward the bottom of the table.

I want to make sure that you understand this because this is the main form of the output of the retirement income calculator. Again, the basic idea is to look at 10 representative ages at death and retirement by the 5th, 15th, 25th percentile, etcetera. Then for each of those ages, I ran 200 stochastic asset performances and picked off the 5th, 15th, 25th and 35th percentile, and you end up with a 10-by-10 grid of 100 representative outcomes.

Now, I'll go back to the regular presentation. I'll go through the calculator, and then I'll give a couple of examples at the end. The purpose of the calculator is education. The idea would be to see what happens to your potential retirement income results if you change your retirement income strategy. This is being developed for the Society of Actuaries. I am the developer, and I want to point out that this model is distinct from the recent Society of Actuaries release developed by Moshe Milevsky. This will be available when it is complete in the next few months, hopefully, on the SOA Web site. It incorporates the risks of longevity and real asset performance, so I do look at asset performance, net of inflation, and I have stochastic inflation in the model. Again, as a calculator, it's a good educational tool, but it's not a financial planner.

There are two keys to this calculator. The first is that strategy focuses on whether to retain or transfer financial risk. One way to look at strategy might be for retirement. What mix of products or what asset allocation should I choose going into retirement? I want to make a distinction and say that those are actually implementations of a strategy. The real strategy is whether or not to transfer risk. If you look at a product feature, such as a death benefit or maybe, on the investment side, equity participation, those are features of products that essentially are different ways or forms of transferring risk. The real strategy is actually whether or not to transfer financial risks. Why is this important? The main reason that it's important is that it helps emphasize that there are no free gains. If somebody has an optimal solution, for example, they should be aware that it's not necessarily any better than any other efficient strategy. It's more an issue of appeal as opposed to being optimal.

Let's consider a couple of examples of looking at this from a strategy point of view. A simple one and a common one would be to suppose that somebody has a 70 percent chance of success of realizing their target income in retirement. If they change their inputs—they're using a simple model, a simple calculator—so that their equity participation increases, they might find that they have an 80 percent chance of success. They need to know that they don't necessarily have a better overall

outlook at 80 percent than at 70 percent. That extra chance of success came at the cost of larger downside risk, so you need to realize that it's a trade-off. Another example would be a fixed annuity. If somebody purchases a 100 percent fixed annuity, they are transferring all of their longevity and asset performance risk and then, hopefully, they're locking in some secure retirement. They also need to be aware that if they're transferring the risks, they're also transferring the reward, so there may not be any money for their heirs.

The other key to this model is that it's very important that the magnitude of results is shown, as opposed to just the chance. Here's my logic. The retirement strategy is risk strategy. A risk strategy is a trade-off of risk for reward. To value a trade-off of risk for reward, you need to weigh the upside versus the downside, and if you weigh the upsides and the downsides, you need to know the magnitude.

Here are some of the features of this calculator. It gives the whole picture. That's what I aimed to show with my example at the beginning, when I talked about that whole grid, versus a simplifying statistic, which might capture only a piece of the picture. An example would be the chance of success, which is a simplifying statistic that can be very useful. For example, if you have a plan that has a 10 percent chance of success, that's a lot of information right there. If you have a plan that has, for instance, an 80 percent chance of success, you might need to have more information, such as what's going on in those 20 percent of failing scenarios.

This calculator aims to show that whole picture. It shows the success or failure over the range of asset performance in different ages of death. The user can judge which trade-off, or risk/reward profile, is most appealing. When it comes to certain strategies—for instance, investment strategies—there are often questionnaires. The person can fill out the question, and then the questionnaire essentially picks which strategy is appropriate. There's really an agent between the user and the strategy that's chosen, and that's not necessarily a bad thing. It's just that this particular model is trying to bypass the agent by having the user actually look at the results by himself or herself.

Let's talk about some other features. The calculator is relatively robust. It has stochastic asset performances and inflation, and "random" mortality. You can have a single or a joint retiree, or pre-retiree. You can incorporate Social Security and pension benefits, and you can change strategies at different ages. For example, users may want to look at one asset allocation at a young age and a different asset allocation at an older age, or they may want different target incomes at different ages in retirement. The model is Excel, so a lot of people will be familiar with that, and you can go in and look at the formulas, etcetera. You can also use Excel features, such as Goal Seek, or use formulas within the input cells. It's quick and simple. Simplicity is certainly in the eye of the beholder, so you can be the judge of that. But the intent is for it to be simple. It's a single page that has all the input and output right on it. There are no buttons to hit or macros to run. Simply change an

input and the output changes instantly.

As for the inputs, there's nothing crazy here, just ages and how much money you have. You can input the expected asset returns. I have four asset classes: equity, bonds, money market and then a pure fixed account with no variance. There are some default assumptions given, but you can change those if you'd like. It's the same with expected inflation and, again, with Social Security, pension benefits and target savings during your pre-retirement stage. You can also determine income in your retirement stage. You can determine different asset allocations and then whether you want to annuitize your income and get, for instance, longevity insurance.

As you see on Leslie slide 1, page 4, there's a note at the top of the model that says, "This model may change before it is released," and it will change before it's released. I will be taking out two of the outputs—that graph on the bottom right and also the table that's in black above it. Some of the labels will be changed, and the numbers will be changed. The stochastic numbers that are in here at the moment are really placeholders. This will be trued up before it's put out on the SOA Web site. The general nature of it will be this right here.

The way this model would work is that one section is for your inputs, and everything else is your output. The top part of the input would be your ages, the age at which you'll retire, your current nest egg, pension and Social Security benefits, and then your expected returns for each of the asset classes. The bottom section is your strategy input. There you can input how much you think you'll save each year during your pre-retirement, how much you expect to take out during your retirement, whether you want to annuitize some of your income, and your asset allocation. There are essentially five rows, which means that there are five different stages at which you can change your strategy if you're interested. The general flow of this would be to go ahead and input what you'd like, and then you'll see the output appear in the rest of the screen. If you want to change asset allocation, for example, to 100 percent equity, just type in "100," and then the results will show immediately.

Leslie slide 2, page 4 is a close-up view of the main outputs. We already went over the table of values, the 10-by-10 grid in the top left. Down at the bottom is a risk-reward profile. All it does is take those same 100 outcomes and then sort them from least to greatest. You then get a curve that may be familiar to you. It's generally a useful way of looking at potential results. The reason it's useful is that by looking at that curve, you can see how much upside you have on the top right that may be used to offset the downside at the bottom left.

Let's go back to the example I had with Uncle Joe. I'll just go through these examples to finish off my presentation. Again, he's age 65 with \$500,000, a \$22,000 Social Security benefit, no pension and a \$50,000 target retirement income

How Long Will We Live in Retirement, and Will We Have Enough Funds?

7

increasing with inflation. There are two examples. One is called a "discipline" example, and the other is a "bequest motive" example.

Leslie slide 2, page 5 is a situation in which Uncle Joe decides to purchase a 100 percent fixed annuity. In other words, he is transferring all of his longevity risk and all of his asset performance risk. If you can look down at the graph or the table at the bottom left, you'll see that almost all of the results are blue and generally they're all zero. In 96 percent of those 100 outcomes, Uncle Joe had enough money to realize his target income. This is a very safe retirement strategy. If instead he decided to retain most of the asset performance risk by putting 80 percent in equity and not getting an annuity, he is now only successful in 79 percent of the scenarios, and in some of those 21 failing scenarios, he is well short of having enough money. In this example, he has decided to bear the risk himself and has a lower chance of success.

Suppose, though, that Uncle Joe says, "For a median asset performance and living to age 87, I do have a blue number there. It's a couple of hundred thousand dollars. In other words, if everything comes in as expected, I'll have a couple of hundred thousand dollars extra, and I have \$500,000 at my disposal right now. Suppose I spend a little more than the \$50,000 each year. Instead I spend \$60,000." What happens is that by simply changing that income to \$60,000, the blue and red have shifted more to the red. This is called a "discipline" example because a fixed annuity does impart some discipline on your spending habits, whereas not having a fixed annuity may allow some undisciplined spending. If somebody spends more money early, for example, they may run out of money quicker.

The bequest motive example shown in Leslie, page 7 slides, uses the very same set of numbers, but I want to look at it from a different point of view. Again, Uncle Joe gets a 100 percent fixed annuity and, in 96 percent of the scenarios, he has enough money. However, in none of the scenarios does he have a lot of money to give to his heirs. He gave up the risk. He also gave up the potential for reward, whereas if you look at the situation where he decides to bear the risk himself, he does retain the reward. Only in 79 percent of the scenarios does he succeed. However, in most of those scenarios there is a lot of money left over for his heirs.

Which strategy is better? Again, I tried to show on Leslie slide 1, page 8, the fixed annuity up top and then the one where the individual bears the risk at the bottom. You could have two people who are in exactly the same situation—same money, health, family, target income, etcetera—and one may decide that the top scenario, transferring all the risk, is better, just for the fact that it is transferring all the risk, while a person who is exactly identical may look at that second strategy as better, just for the potential for reward, even keeping in mind the risk that the person might have to reduce his or her target income. There is no optimal solution. Neither of these is optimal. Rather, they are just different balances of risk and reward, and

different people may think different balances are more appealing.

That is the conclusion of my part of the presentation. I will leave you with a question to lead into the second part. Do you think that everybody should be required to take that first strategy, which is a fixed annuity, or do you think it should be left up to individual citizens whether or not they take the top strategy, the bottom strategy or something else?

MS. BEVERLY J. ORTH: I'm speaking on managing longevity risk in U.S. retirement plans through mandatory annuitization. I'm wondering how many of you in the audience were in the session yesterday that dealt with the 2003 retirement risk study or the one on public misperceptions regarding retirement security. My presentation today builds on many of the themes that we heard yesterday in those two sessions.

My presentation is based on the paper I wrote for the Managing Retirement Assets Symposium that was sponsored by the Society and other organizations this past April. The paper in its entirety appears on the SOA Web site if you'd like to read more about it. In that paper I present a proposal for mandatory annuitization of retirement assets in the United States.

In our current environment, U.S. pension law does not require annuitization of retirement assets. Defined benefit (DB) plans and money purchase pension plans have to offer life annuities for singles and joint and survivor annuities for married participants, but those can be waived by the participants. If they're married, they have to have their spouse's consent. Other defined contribution (DC) plan types, such as 401(k) plans, are exempt from these requirements entirely. There have been some recent legislative changes that have encouraged employers to eliminate their annuity payout options from their plans. In the past, it was much more common, even in DC plans, to have annuity options, and those have been going away. There was 2001 legislation that made some changes in the deductibility rules for DC plans, and that prompted many employers to replace their existing money purchase plans, which are subject to the annuitization offer, with profit sharing plans, which are not. Some IRS liberalization of the rules that allowed DC plan sponsors to eliminate optional forms from their plans occurred earlier than that.

Many or most DC plans now offer only lump sums, unless they're money purchase plans. Even DB plans have been moving in that direction. They don't make lump sums the only option, but more DB plans, especially cash balance and other hybrid plans, are offering lump sums. The rationale is that employees can take their lump sum and roll it over into their own IRAs, and then, from that IRA, they can take any form of distribution that they want. The reality is that something less than 1 percent of IRA assets are ever annuitized. For many workers in this country, that means that Social Security is their only annuitized asset when they get to actual retirement.

What are the risks under the current environment? There are a lot of risks related to managing retirement assets. Some of these cross over all types of plans, and some are peculiar to one type of plan or another. DB participants have the least amount of risk. They do have inflation risk unless their benefit is indexed, and few private plans index in this country. Primarily that's limited to public-sector plans. DB participants also face the risk of employer insolvency, but the PBGC guarantee does mitigate that. For DC plans or IRAs, participants bear investment risk.

The primary risk for retirees is longevity risk, the risk of outliving one's retirement assets. It's a largely hidden risk, so most of the public doesn't understand what that risk entails and how big it is. Individuals have a fuzzy idea of what life expectancy means. They don't realize that half the population will live longer than life expectancy, so they can't gauge the magnitude of that risk. Women have a bigger risk in this regard for two reasons. First, they have a longer life expectancy at every age, and they also typically start with a smaller pool of assets. Now alternatively, there are some retirees who might be too conservative in trying to gauge how to spend down their assets, and they might spend less than they could have if they had actually annuitized a portion of their assets.

Why haven't people been eager to purchase life annuities to hedge this risk? The market for individual life annuities in this country is very small. Variable annuities have a pretty big market, but they've been used mostly for asset accumulation and not de-accumulation. Less than 1 percent are actually annuitized in the withdrawal phase. Somehow that compares with the 1 percent IRA annuitization. I don't know if they're related.

I think the primary reason that people don't annuitize is that they fear losing control over their assets. The annuitization process is pretty much a one-way process, so you can't undo it. People fear lacking resources that they might need later for emergencies or unforeseen contingencies, such as increased costs for health care, nursing home care and things like that. People also lack knowledge about annuities—how they work and what they do. They underestimate their longevity risk. We heard yesterday that most people underestimate their life expectancy, so they undervalue the protection that annuities offer. The costs, I think, are difficult for most people to understand. It's hard to compare products. Maybe people who use Bill Leslie's software will gain a better understanding of the value of annuitization and the disciplined versus the undisciplined approach. Annuities do frustrate the bequest motive, as Bill's presentation pointed out. People fear dying before they receive their money's worth from their annuity contract purchase, so that leaves only the healthiest people to purchase annuities. That adverse selection then causes insurers to increase their prices, and you get a spiraling effect because the public then perceives annuities as even a poorer value.

Most of the annuities sold in this country are fixed annuities, so there's a lack of

protection from inflation risk. Inflation-indexed annuities are theoretically possible, but they're largely not available in the United States currently. Maybe that will change. They do exist in a few other countries. Tony Webb, my colleague, would also add another argument that is not in my paper, but I think it's a good one. He argues that the main reason people haven't annuitized up to now is that most retirees who already have retired are heavily annuitized through Social Security and DB traditional-type pensions, so individual annuities have really not been needed so far. I think they'll be needed in the future because our culture is changing from predominantly DB-based to DC-based. Should we consider mandating annuitizations through our pension laws? I'd like to at least explore it, so that's why I wrote the paper.

Currently, individuals receive very generous tax benefits for a variety of retirement savings types that we have in this country. We have qualified plans, IRAs and non-qualified plans. We have a whole slew of things.

What is the role of government in managing the retirement plan distributions from all these plans? First, I think it's to provide a guarantee of adequate income throughout one's retirement years. That's, of course, the function of Social Security as well. Another role of government in this regard is to reduce public reliance on government assistance. We don't want everybody going on welfare when they hit age 80 and run out of assets.

In exchange for the very favorable tax treatment that we receive, government could require some level of minimum annuitization, much as it now requires minimum distributions from plans at age 70.5. If legislated, how would a mandatory annuitization process work? I'm proposing a very simple approach. Not all retirement assets would have to be annuitized, because we already have Social Security, which at least currently is being paid as an annuity and, for the foreseeable future, would continue to be. I would suggest that we require annuitization of the lesser of a minimum percentage—for example, 30 percent—or a minimum dollar amount—for example, \$50,000—of DC plan and IRA assets by age 75. That \$50,000 amount would produce a monthly annuity of roughly \$500 to a 75-year-old.

For DB "assets" (I have that in quotes because the participant really doesn't own the assets, but is entitled to a benefit), I would require payment of assets exceeding a present value of \$15,000 as an annuity. That amount is three times the current limit for mandatory cash-outs, which is now \$5,000. That \$5,000 amount has not been increased with increasing longevity, so I would bump that up to \$15,000. Even at \$15,000, that only produces a monthly annuity of something under \$150 to a person who's under age 75.

Many other approaches are possible, and other approaches are used in other countries. I think that they might be very difficult to administer, though, under our

current array and variety of different types of plans. One approach that I don't think would work here is to require annuitized income from all sources to exceed a minimum annual dollar amount or replacement ratio. I think that would be very hard to coordinate.

For married individuals, the proposal would require use of a joint and survivor annuity with a 75 percent continuation to the survivor. I picked 75 percent. It's rather arbitrary, but studies that I've looked at show that the surviving spouse spends between 60 and 80 percent for living expenses, compared to the couple's expenses prior to the first death. So maybe 70 or 75 percent would be appropriate, but definitely it should be more than the 50 percent that we have under the current law. My thinking is that these rules would coordinate with or actually replace the current minimum required distribution rules.

What types of savings should be covered? Because of the tax benefits that we're offering as the carrot, I would extend it to all types of tax-favored savings. That would include qualified plans under 401(a), tax-sheltered annuities under 403(b) and deferred compensation plans under 457(b) and (f). I would extend it to nonqualified plans as well, because while they get tax benefits that are not quite as good as the other plans that are mentioned, they get some pretty good ones, although the American Jobs Creation Act of 2004 legislation would cut those back somewhat or make them more difficult to attain. There could be a possible exception for very short deferral periods—say less than two years. My proposal would extend to IRAs, both Roth and regular, and if the rules are directed at the individual rather than the employer, then non-ERISA plans could also be subject. That would be the governmental and church plans.

A very good question is, should there be hardship exceptions to the annuitization requirement? I think that if there are exceptions, they should be very limited. Otherwise, you'll introduce very severe adverse selection. It would be easiest to exempt someone from an annuitization requirement before it actually occurs. So if somebody gets to the age-75 trigger point and they have a terminal illness that gives them a life expectancy of less than 12 months and they can document that, they could be exempted. In addition, there could be a limited opportunity to convert remaining annuity payments to a lump sum. But I think that should be a very small portion—say less than 20 percent of the present value of the remaining expected payments—if somebody has a very serious emergency. I would limit that to uninsured medical expenses or to prevent foreclosure or eviction.

We should look at mandates outside the United States to see if there's anything we can learn from other countries' experiences. Most social security systems around the world do pay annuities only, just like our Social Security system. Most European countries also require annuitization for their private occupational plans. Some of the new, privatized social security systems offer some non-annuity forms—not necessarily lump sums—such as installments. Even when lump sums are prohibited,

they often are available through the "back door." The example I'll give is Chile. Lump sums are not permitted in Chile, but the commissions for their social security system are not regulated. What happens is that the insurer pays a lump sum to the agent as an extra commission, with the tacit understanding that the agent will pass it on to the retiree, who then in turn accepts a reduction in his annuity payment amount. So they have their lump sum, even though they weren't supposed to have it.

In the United Kingdom, annuitization of personal pension accounts can be delayed to age 75. There is evidence that delay to age 75 does contribute to adverse selection and does seem to cause annuities to be more expensive, especially at the older ages—those that are closest to 75. This seems to be because most of the individuals end up annuitizing much earlier than that age, so there's more price competition at the younger ages and less competition at the older ages. It seems to be mostly the wealthy who delay to age 75. Maybe their feeling is that the flexibility they get by the delay offsets the extra costs that they pay for the annuity.

Israel has a different approach. It requires annual purchases of a deferred annuity, so each year Israelis purchase another piece of annuity. That phased-purchase process does seem to reduce adverse selection, but it does increase aggregate demographic risks for the insurers.

Singapore requires deferring a portion of one's retirement savings from age 55 to age 62. It's only a seven-year delay, but because it's required, about 17 percent opt to buy a deferred annuity. They have other options. They can leave it in the plan. They can put it in a bank. But 17 percent buy a deferred annuity to achieve that deferral, which is much higher than the 3 percent voluntary annuitization rate that we have in this country. It does appear to reduce adverse selection because a large portion of the public is buying annuities at age 55, and the annuitants do receive better prices than in the United States for similar annuitants.

Many countries guarantee or actually mandate the annuity conversion interest rates. Some countries regulate only the mortality tables. Argentina and Switzerland actually do both. With mandated mortality tables, artificial tables can be created to benefit particular population groups by using mortality rates that are more pessimistic than the true rates. The evidence that I've seen—maybe I haven't done a lot of research—suggests that the pessimistic mortality tables are really designed to improve insurer solvency rather than to benefit particular population groups.

Tables can also be merged to enforce price equality, which is what happens in Switzerland and the United Kingdom. They require the use of sex-neutral tables, and the result is that there's wealth redistribution from the short-lived people to the long-lived people—so from men to women. While this may or may not be the result that the government intended, there are some other consequences. Agents have increased incentives to sell to men because they're more profitable to the insurer,

and they have decreased incentives to sell to women. So we do have market distortions, and I think women may end up receiving poorer service. These are just some things to think about.

What are the advantages of the proposal that I've outlined? Annuities do provide protection against longevity risk. They are really the only financial product that we currently have that provides that protection. They also provide income protection for surviving spouses or dependents. A joint-and-survivor annuity is a good way to provide protection for surviving spouses, provided the spouses are of similar ages. If they have a wide disparity in ages, they're not so good. It doesn't work well with children. Annuities do shift investment risk from the annuitant to the insurer. They support a higher sustainable consumption pattern. They postpone income taxes when compared to lump sums, but the downside is that the payments are taxed as ordinary income rather than as capital gain or dividends, which currently have lower tax rates.

There have been some bills introduced—there were some in 2001, there were a couple in 2003 and there was one introduced in July 2004—that would help level the tax rate playing field for annuities compared to other products. But the most recently introduced one would not apply to annuities paid out of a qualified plan. The American Society of Pension Actuaries is trying to get that changed so it would also apply to annuities paid from qualified plans. That only works really if the annuity is paid by the qualified plan or if an annuity contract is purchased by the qualified plan. If somebody takes the money out of the qualified plan as a lump sum, the person will have to pay tax on it and then go buy the annuity, unless he or she does it through a tax-free rollover. That can be kind of tricky if he or she doesn't do it right.

By annuitizing in layers, a person can maintain flexibility and get the advantage of averaging their purchases over different interest rate environments, and they still have most of their funds available. Up until that last annuity purchase, they maintain control over those assets, so maybe purchasing an annuity every three years or every five years is a good approach.

The proposal I've outlined does satisfy the minimum required distribution rules, as long as you're not using an increasing annuity, and I suggested that you maybe just scrap the minimum distribution rules and use this instead. With the proposal I've outlined, because everybody would have to annuitize something, there would be reduced adverse selection because you'll have a much larger annuity purchase pool and the average life expectancy of annuitants will go down. I've seen estimates that if we do something like this, annuity prices would reduce somewhere between 2 and 10 percent. People have different ideas of how far the reduction would go. There would be increased competition among insurers, and prices would go down in the long term through competition, plus insurers could market both life insurance and life annuities, which are natural hedges. I think that we'd see the development of

new annuity products that have a lot more flexibility because people would demand them. We'd have inflation-adjusted annuities, and maybe different types of partial indexation would come about. Long-term care insurance could be combined with a life annuity. We heard about that yesterday.

Let's look at some disadvantages. It's true that annuitization can be too costly at lower ages. Moshe Milevsky's article from, I think, four years ago about his study said that self-annuitizing up to about age 80 and then purchasing an annuity is much more cost-efficient than buying the annuity earlier. There is the risk of over-annuitization for certain population groups. I have identified three in the paper. People who have large DB pensions would be over-annuitized because they already have Social Security and their pensions as annuities. People who have a very strong bequest motive would be forced to over-annuitize, perhaps, relative to where they would prefer to be. People who are in poor health, of course, would not go out and buy an annuity, so they would be over-annuitized.

There could be and would be undesirable wealth redistribution because of the pooling of longevity risks. There would be redistribution from low income to high income because high-income individuals tend to live longer, from the less educated to the more educated and from men to women. This could be countered by using separate mortality tables. Another approach would be to provide a subsidy or some kind of a tax credit to the disadvantaged group.

Annuities probably often provide inadequate protection for children or other young dependents. In this case, term life insurance is probably a lot cheaper and is probably a better match for post-death protection. Annuitants do bear the risk of potential insurer insolvency, but we already have state guarantee funds that offer protection there. As part of this proposal, there could also be a creation of a federal guarantee fund or even have the federal government provide the annuities directly, much like Social Security. There would be increased administration because people would have to coordinate their DC and IRA assets, but we already have similar coordination issues under the minimum distribution rules, so that might not be too burdensome.

There are more disadvantages. There will be increased governmental costs. The IRS would have to come out with some new reporting forms for people to report the calculations of their annuitization requirement that they would file with their Form 1040, showing that they met the annuitization requirement some time before 75. IRS publications would have to be issued describing how the rules work. There would need to be IRS enforcement of all these rules, so there would be a new agency of the IRS or maybe some other government agency that would do this.

It possibly would require modification of insurer regulations. I've never worked in the insurance industry, so I don't know what kind of regulation might be needed there. There would be increased regulatory burdens on employers, perhaps. But for

some plans and plan sponsors, it might actually be easier to meet these requirements than to meet those that we currently have for the minimum distribution rules. There would be difficulty in enforcing indirect lump sums. I already mentioned the Chilean example. Another example would be if somebody used his or her annuity payment stream to apply for a consumer loan and then used the payments to repay the loan so he or she could still get a boat. There might be a potential reduction in retirement savings. If people realize that they can't get a lump sum on their entire savings, then they might be reluctant to save. We might have better protection against longevity risks but on a smaller pool of assets, which would not be a good result.

There could be adverse effects on the insurance and annuity markets. In the short term, prices might go up because there are few annuity providers now. But more would enter, and in the long term, I think prices would go down. There would be a need for information disseminated to the consumers and to the public, and tools to help them analyze and compare products. There'd be some transition costs in the short term. Providers would have to establish marketing, administrative staff and procedures and all that. I already mentioned that the government would need to communicate these new rules, so that workers and employers would know the requirements.

To conclude, if you were counting, you may have noticed that the list of disadvantages was only slightly longer than the list of advantages. In addition, the shift from DB annuities to DC lump sums in the future will put a lot more retirees in jeopardy. We have increasing life expectancies. If you were at the last session, you could see how mortality improvements were kind of frightening, at least in terms of people living longer and having more potential to outlive their assets.

I know a mandate like this definitely would not be popular. When I gave this presentation in Las Vegas in April, we had one very violently negative reaction from the audience, and she was very much opposed to the whole concept. If legislated, I'm sure that there would be a new industry dedicated to annuitization avoidance. We heard similar outcries in 1986 when the minimum distribution rules were expanded, and largely we've been able to adapt to those requirements. I think this proposal might be considered just an expansion of those rules, but with much larger benefits, I think, to individuals and society.

MR. ANTHONY WEBB: This paper is now a joint work with Glen Dorn at the University of Texas. I would also like to acknowledge the help that I've received from Irena Dushi at the International Longevity Center and from Jack Brown at the University of Illinois.

Bev has just given a detailed presentation of the advantages and disadvantages of mandatory annuitization. I want to focus on a single issue, namely the distributional consequences. All of us know that the life annuity markets suffer from adverse

selection, and mandatory annuitization is often proposed as an answer to adverse selection. As an aside, I would point out that it doesn't necessarily totally eliminate it. If the rich live longer and if the rich also have larger annuitizable balances than the poor, one may still have some adverse selection, though not as much as one might think because one long-lived group, namely women, tend to have a smaller annuitizable balances than men. The question I want to examine is whether the longevity insurance that life annuities offer is so great as to outweigh this.

First of all, how serious is the problem of adverse selection? The point I want to make is that comparing the money's worth of annuities to people who purchase annuities with the money's worth of an annuity to the average non-annuitant gives a misleading picture of the effective adverse selection. Many of the highest-mortality people have very little annuitizable wealth. In another paper, I make a calculation, an estimate of if you weight the money's worth by the amounts of annuitizable wealth, it probably about halves the effect of adverse selection, and the adverse selection probably increases the price of annuities by about 4 percent.

Let's discuss the starting point system work by Jeff Brown. He analyzes the national mortality study and constructs life tables for various subgroups in the population. He then does various actuarial math to construct life tables for each of these subgroups for the 1978 birth cohort. If you look at this table on Webb slide 1, page 3, we see the usual custom that we all know, that life expectancy is related to gender, to ethnicity and to education, and that women live longer than men, whites live longer than blacks and people who are better educated live longer than people who are less educated. If you then use those life tables to calculate the average money's worth of a life annuity for people in each group, we find that there are quite big differences, as shown on Webb slide 2, page 3. If you look at the group with the highest money's worth, white women with more than a college education, if they were purchasing a mandatory annuity with zero administrative costs, they would expect to get back roughly \$1.10 for each dollar annuitized. If you look at the group with the highest mortality, namely black men with less than a high school education, they would expect to get back only 80 cents on the dollar. That's quite a big difference and quite a big redistribution.

The point is that what people really care about is utility, namely expected utility. A risk-averse individual facing an uncertain life span will be willing to purchase a life annuity that has a money's worth of less than the premium paid if he is sufficiently risk-averse and if he values the longevity insurance sufficiently highly. Brown calculates how much each individual would be willing to pay to purchase a life annuity that is actuarially fair to a person with population-average mortality. I'd like to spend a few moments explaining how it's done.

First of all, he specifies a utility function, and he makes an assumption of constant relative risk aversion, which is standard in the literature. He then gives the individual some dollar amount and, as constant relative risk aversion is the scaling

variant, the dollar amount doesn't matter. He then assumes that the individual's wealth is annuitized on uniform terms, and he calculates the individual's expected utility, given his mortality risk. He then takes away the person's annuity and calculates how much unannuitized wealth would give the individual the same level of utility, assuming that the individual undertakes an optimal de-accumulation of his unannuitized wealth. If the person is risk-averse, the person will be willing to pay a large amount of money to circumvent the uncertainty over his life expectancy.

When Brown does this calculation, he finds that irrespective of whether the person is male or female, irrespective of his level of education and ethnicity and irrespective of his level of risk aversion, the individual is willing to pay more than the cost of his annuity to have access to mandatory annuitization. What is also interesting is that the between-group variations are quite trivial. The highest mortality group had a money's worth of roughly 30 percent less than the lowest mortality group. But when one looks at it in terms of willingness to pay, the differences in willingness to pay are absolutely trivial. If we look at constant relative risk aversion with a coefficient of five, those in the highest mortality group, namely the black men with less than a high school education, are willing to pay a 53 percent premium. Those in the lowest mortality group, namely the white women with a college education, are willing to pay a 58 percent premium. The difference in premium is absolutely trivial.

The key conclusions of Brown's paper are that all classes of individuals—but not necessarily all individuals within each class—are better off as a result of mandatory annuitization. Also, when one analyzes mandatory annuitization in expected utility terms, it's much more progressive than when one analyzes it in the money's worth terms, and the educational and ethnic differences in annuity-equivalent wealth are tiny.

Unfortunately, there are some serious problems with Brown's paper. I'm a great fan of his, but it nonetheless has to be said. The first problem is that his work only looks at single individuals. There have been a number of papers, including Brown and Poterba, that show that as a result of longevity risk pooling within marriage, married couples will be willing to pay a much lower risk premium for life annuities than the single individuals for any given level of risk aversion. The second problem is that he makes an assumption of zero pre-annuitized wealth. For plausible utility functions and more particularly for constant relative risk aversion, the value of further annuitization is a decreasing function of the percentage of the household's wealth that is already annuitized. The third problem is that he makes an assumption of actuarial fairness. If the rich live longer and have larger annuitizable balances than the poor, mandatory annuitization cannot deliver actuarial fairness.

We can be reasonably certain that Brown's calculations overstate the value of annuitization to all groups. The questions that I want to look at are, first of all, if we redo the calculations to take account of longevity risk pooling in the marriage, to take account of pre-annuitized wealth and to take account of the residual level of

How Long Will We Live in Retirement, and Will We Have Enough Funds?

18

actuarial unfairness, will we still get to the finding that everybody has an annuity-driven wealth of greater than one, that everybody is better off as a result of mandatory annuitization? What will the educational and ethnic differences look like?

The first step is that we redo Brown's calculations for married couples, again assuming no pre-annuitized wealth. What we observe is that there's now a sizable difference in households' willingness to pay, from the highest mortality household to the lowest mortality household. If we look at the black households with less than a high school education, they have a willingness to pay \$1.12 per dollar. The white households with a college education are willing to pay \$1.22. We're now seeing differences opening up, but we're still finding that all household types are better off as a result of mandatory annuitization.

The next thing we do is incorporate pre-annuitized wealth. We calculate this by having a look at the Health and Retirement Study, which is a panel of 7,000 households born from 1931 to 1941. We take a snapshot of each household as it passes age 65, and we calculate the present value of employer pensions and Social Security. We calculate the households' total wealth, including DB pension and Social Security, and the households' stocks, bonds, Treasury Bills, IRAs, checking accounts, money market accounts and housing wealth. We sort the households by total wealth, and then we calculate the mean wealth of households in each wealth decile.

This is a relatively familiar picture, I think. Webb slide 1, page 8, shows the mean asset balances for each asset class for households in each wealth decile. What we observe is that the present value of Social Security wealth is relatively equally distributed. The households' housing wealth is less equally distributed. The households' DB and DC pensions are less equally distributed, but non-retirement financial wealth is heavily concentrated in the top wealth decile. If we calculate the households' annuitized wealth as a percentage of the household financial wealth, we see it is really high, except in the top wealth deciles. That means that only the households in the top wealth deciles will value annuitization highly. If we look at single women, the picture is quite similar. But single women are less wealthy in every wealth decile and, more particularly, they have less financial wealth. In all but the very top wealth decile, they have high percentages of pre-annuitized wealth.

I then break it down by education and ethnicity. The kind of pattern emerges that one might expect. The only group that has sizable amounts of unannuitized wealth is white couples with a college education. Then I redo the calculations, incorporating pre-annuitized wealth. This is the willingness to pay of married couples after incorporating pre-annuitized wealth for various coefficients of risk aversion. What one observes is that willingness to pay has decreased again. It's highest among the white households with a college education, and it's lowest among the black households with less than a high school education. The latter group of households is now getting to the point that the value of mandatory annuitization is getting

marginal. The average household in that group might now be thinking it possibly wasn't beneficial.

I then redo the calculations again, assuming a higher rate of time preference. The previous calculations had all incorporated a 3 percent rate of time preference, and I redid the calculations assuming a 5 percent rate of time preference. As you'd expect, the value of annuitization decreases still further. The question is, why might one be interested in using a higher rate of time preference? One reason might be that households are impatient. If households are impatient, then the counterargument might be that households have to be saved from their own stupidity. It might also be capturing the idea that households might value consumption more highly in the early years of retirement, when they're better able to travel and what have you. There may be some rational reason for thinking that 5 percent is a better rate. I then upped the rate to 10 percent, and these are households that almost certainly need saving from themselves. Once again, the value of mandatory annuitization drops further, and one is seeing a larger number of households where mandatory annuitization is actually imposing costs.

The next step is to incorporate actuarial unfairness, and here I would like to acknowledge the help of Cory of the Urban Institute. The extent to which mandatory annuitization results in actuarial unfairness depends on the covariance between annuitizable wealth and the household's mortality risk. It depends on the scheme at which you're looking. If you are looking at mandatory annuitization as Social Security individual accounts, then the covariance probably isn't all that great because the contributions are capped at the upper earnings limit. If, on the other hand, one was having a look at mandatory annuitization of DC plan balances, where the rich contribute very much more than the poor, the covariance would be greater. There are two factors working in opposite directions. One of them is that rich people have lower mortality than the poor and also save more. The other, which works in the opposite direction, is that women have lower mortality than men, but women, on average, earn less and save less in individual accounts than men. These factors operate in opposite directions. It turns out that when you put them together, Cory finds that it's more or less a wash. She calculated about 1 or 2 percent. It's not something to worry about at all.

Let's look at the conclusions. First of all, mandatory annuitization, when one analyzes it in expected utility terms, does involve substantial redistribution. I think that the progressivity of the system has to be judged as a whole. If one is concerned that this particular aspect of the system has undesirable redistributive consequences, one can maybe correct it by working at other aspects of the system. As Bev Orth has also pointed out, there are many other factors that have to be taken into account.

I would like to tell you about where this research is heading. I have focused so far on the average individual in each ethnic and educational class, and obviously

nobody is average. What we are hoping to do is to use data from the Health and Retirement Study to construct subjective mortality tables for each of the 7,000 households in the Health and Retirement Study. We're making an assumption that each of these individuals is carrying around in his head an idea of his annual mortality risk, and we're asking how much would that individual be willing to pay for his life annuity, given what's in his head.

The other thing that we want to look at is the distributional consequences of the age at which annuitization is mandated. The talk here in the United States has been of having mandatory annuitization of Social Security—individual accounts at age 67—but other countries have quite radically different ideas about what is a sensible age. As an example, in the United Kingdom, personal pensions have to be annuitized at age 75. There are questions that we want to look at. What is special? What is good about age 67? What are the advantages of one age versus another, and what are the distributional consequences of choosing one age over another? That's where the research is heading, and I hope to be able to come back and tell you the answers to those questions at a future conference.

MR. PETER KREUTER: I have a question about the annuity calculator. It's hard for me to understand why there's almost no risk on the full annuitization if stochastic inflation is incorporated, because I would think that would be a very high risk from inflation in that case.

MR. LESLIE: If you remember, in that table there were some scenarios that did have some positive and negative \$100,000, so the inflation is being taken into account. There will be times when it won't work out perfectly because actual inflation differs from the expected inflation when purchasing an annuity. That's where trueing up of the numbers will show more of a pronounced effect. So you're correct. I think the effect, once I true up the inflation numbers in that model, will show more variance.

FROM THE FLOOR: I have another question on the calculator. I'm just trying to understand the example of your Uncle Joe showing a 7 percent return. Is that a constant year-by-year return, or is that stochastic? If it is stochastic, then what does the entry represent?

MR. LESLIE: That's a good question. In the original example, we did just use a simple 7 percent return every year. The stochastic analysis would have different annual returns year by year, and there would be 200 different scenarios. I think what you're asking is the heading of the table, for instance. Should there be a representative rate for each of the scenarios? There isn't that. Rather, it's the worst, median and best because it would be hard to come up with a single representative rate to represent a given scenario. In the 30-years horizon, for instance, the rates may be going up and down, so I just stayed away from that in the calculator.

Seven percent isn't necessarily the median scenario. When I just did the simple example at the beginning, we used 7 percent. I would guess that with the numbers that happened to be in the calculator at the moment, the median scenario probably is around 7 percent, but that was more coincidence.

MR. MITCHELL SEROTA: Have you been developing the retirement calculator in coordination with the task force on the personal actuary, or is this completely independent of them?

MR. LESLIE: This happens to be an independent project.

MR. SEROTA: The Society is putting together all kinds of resources toward the personal actuary, and it sounds like it's also putting resources to your calculator. It would be much more efficient to join forces, I would think.

MR. LESLIE: This is a result of the individual grant competition from 2003. I submitted a proposal for a research grant, and this is the result of that research grant. It is being reviewed by an oversight committee led by Steve Siegel, who is right here in the audience. I'm not sure if you can speak to any coordination.

MR. ROGER GAGNE: I'm from John Hancock, and I have a quick question on the annuitization scheme. This is wonderful research in terms of perhaps trying to keep people from outliving their assets. But it seems that, from a practical standpoint, if anything like this was ever to be put in, if I'm a politician, I'm thinking that these people will be saying, "You're going to take away my hard-earned income and force me to buy this thing. I'm from New Hampshire, and I live free or die. Don't tell me what to do." Has any work been done on quantifying the beneficial aspect of some form of annuitization, where people who would have blown through their assets and then become dependent on taxpayers for their incomes for the rest of their lives will see a benefit from this imposition of the government?

MR. WEBB: Yes, there actually has been. There's some work by a gentleman at the Rand Corporation. I can't remember his name offhand. He was having a look at how happy people were when they had a DB plan or a DC plan. He was finding that the people who had DB plans were more happy and more confident about their retirement situation.

FROM THE FLOOR: I had a question that wasn't clear in the beginning. Who provides these annuities? I think somebody said it was the government. Is it the government that will provide these annuities? That's the first question.

MS. ORTH: In my proposal, I was thinking that it would probably be insurance companies and that more insurance companies would get into the business of selling annuities. At one point in the proposal, I suggested that maybe you might

have the government do it. That's really not the gist of my proposal. It's an option, but it's not the major thinking.

FROM THE FLOOR: That was just a leading question. To me, it doesn't make a difference if it's the government or the private companies. I attended the multi-employer plans session. We just went through the years 2001 and 2002. So many people have problems of money losses because of that—businesses going out, and they can't pay their pensions. What will happen if you go through another series like this, where the annuity companies have such a large group of people getting annuities, and they lose 25 or 50 percent of their monies because their assets have dwindled? How will they pay? That's number one. Number two, how does one mandate that people have to buy these annuities? Can the government say that everyone has to buy an annuity?

MS. ORTH: The second question is actually easier, so I will answer that one first. It only applies to savings that are in tax-favored accounts. You don't have to put money in tax-favored accounts, but if you want the tax benefits, then you have this little stick that you have to annuitize a portion of it. It's not all of it. It's a portion, so it wouldn't apply to all of your tax-favored savings, but just to a portion. The first question is the harder one. I think that some countries that do have mandatory annuitization are having some problems. In the United Kingdom, I believe, insurance companies are saying, "We can't take this long-tail risk." They want to shift some of that to the government. That is a problem.

FROM THE FLOOR: That's precisely what I'm saying. The United States is a little bigger than England.

MS. ORTH: It's bigger. If we consider having the government pick up some of the risk, I think that's perfectly acceptable, because we already have that risk in Social Security. The risk might be smaller probably than the overall Social Security liability.

FROM THE FLOOR: Wait a minute. This is a giant and a dwarf that we're talking about. Social Security is one small thing, so to speak, when you compare that to what we're talking about here, the companies. I just don't see how it could work.

MS. ORTH: Well, thank you for your opinion.

MR. PAUL SCHOTT: This is from the viewpoint of the individual asking, "Will I outlive my money?" One gigantic storm cloud out there is the price of retirement homes in 10, 20 or 30 years. Are there any standard projections out there on just what that will cost and the kinds of things that long-term-care would cover? I don't want to turn this into a long-term-care session, but it's a relevant question. What are the projections on what will happen to that over the decades? I've seen some mighty heavy-duty costs.

How Long Will We Live in Retirement, and Will We Have Enough Funds?

23

MR. WEBB: I did a calculation, which I think is on the SOA Web site. I think a reasonable long-term guess is probably about 1 or 2 percent faster than the rate of inflation. At least that's what has happened in the past.