


PENSION SECTION NEWS

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A VIEW FROM THE SOA'S STAFF FELLOW FOR RETIREMENT

By Andrew Peterson

Creating lifetime income in retirement plans is a hot topic right now. It seems that the broad retirement industry and policy-makers are waking up to the fact that with ever-increasing amounts of retirement assets being held in defined contribution (DC) plans (at least for those working in the private sector), participants need tools to manage the "pots of money" they will have in retirement. As I write this column, the U.S. Department of Labor (DOL) is seeking comments on an outstanding "advance notice of proposed rulemaking" (ANPRM) on the topic of providing equivalent lifetime income benefit illustrations for current and projected account balances in DC plans. In addition, the DOL's ERISA Advisory Council also focused on income in DC plans as one of their three study topics in 2012. That report is available on the ERISA Advisory Council website.

Those of us actuaries who work primarily with defined benefit (DB) plans might be tempted to take an "I told you so" attitude as we have observed the trend from DB to DC plans. After all, we have seen the income-for-life feature of DB plans as one the primary positive attributes of these plans, and one that has been sorely missing from (most) DC plans. While pension actuaries might fret about the decline in the DB system, the fact is that retirees still need to be able to make money last for their lifetime in retirement, so it is up to us to find new ways to provide our skills to help in this area. Along that line, I'd like to highlight two projects that I'm aware of within the actuarial profession on this topic.

First, the SOA's Committee on Post-Retirement Needs and Risks commissioned a paper on this topic that will soon be released. The name of the paper is, *The Next Evolution in Defined Contribution*

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PENSION SECTION NEWS

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2013 SECTION LEADERSHIP

This newsletter is free to section members. Current issues are available on the SOA website (www.soa.org).

To join the section, SOA members and non-members can locate a membership form on the Social Insurance & Public Finance Section Web page at *http://www.soa.org/sipf/*.

CHAIRPERSON'S CORNER

By Faisal Siddiqi

Being the chairperson of the SOA Pension Section goes by very quickly! It seems not that long ago in Atlanta last October that I started my term and by the time our section members read this article, my term will be almost complete. Thank you very much to my fellow council members for a fun year organizing meetings and webcasts, producing podcasts, brainstorming on future activities to support our section membership, and continuing to work on leading edge pension-research. To our section membership, I would like you to know that your council members are very thoughtful people who work very hard on your behalf and we are always striving to improve the services you need to help you succeed in your professional actuarial careers through continuing education and research.

In this article, I would like to discuss the Pension Section Council elections and highlight the initiatives we are pursuing that my successor, Azita Bassiji, will lead going forward. As usual, you will also find very informative articles in this edition of the *Pension Section News* from Anna Rappaport (celebrating 50 years as an FSA…amazing!), Martin McCaulay, Andy Peterson, Thomas Lowman, Jeremy Burke, Robert Brown, Bruce Schobel, and Steven Siegel.

RUNNING FOR PENSION SECTION COUNCIL

This year's Pension Section Council candidates are (in alphabetical order by last name): Carol Bogosian, Julie Curtis, Grace Lattyak, and Larry Pollack. All four are highly-accomplished pension-professionals who have many years of experience working with defined benefit plans, defined contribution plans, dealing with funding, accounting, administration, and new developments in the pension arena. They all come from varied areas of pension work: large consulting firms, corporate work, investment work, and individual consulting firms. I'm sure that regardless who wins this year, they will also make important contributions to our council going forward and I thank them in advance.

What is unique about these individuals is that they stepped forward and have decided to help lead our section. If you have thought about running for the council, I encourage you to take the next step and let the Society of Actuaries know. Most of us who are on the council started by joining one of the three teams that do the lion's share of the work: Continuing Education, Communication, and Research. After getting a taste for this level of volunteering, we moved on to run for the council. I think it is a very rewarding feeling and the time you invest in volunteering will pay off in spades afterwards in making new friends and contacts in actuarial and non-actuarial disciplines; increasing your knowledge on various pension topics by writing articles, giving a webcast, or contributing to a research paper; and from participating and leading teams. Finally, "just giving back" feels good too.

Faisal Siddiqi, FSA, FCIA, is principal and consulting actuary at Buck Consultants in Toronto, ON. He can be reached at *Faisal.Siddiqi@buckconsultants.com*.

I wish much success to our candidates this year and remind our section members that if they feel like volunteering in the future, there will be many opportunities to do so.

FUTURE INITIATIVES

As mentioned in my previous chair articles, the Pension Section Council has been busy developing new ideas for future projects and bringing to life ideas that were put forth during 2011/2012. Some of the ideas we continue to work on are as follows:

- *Investment for Pension Actuaries:* there is a small sub-group of council members who are working to create a reference guide so that current pension actuaries who are interested to pursue an investment line of work in the future or improve their investment knowledge will know what topics to study and which references support these topics. We hope to open up new job opportunities for pension actuaries and, at the same time, raise the knowledge level of interested pension actuaries. Additionally, another group is organizing the "Investment Boot Camp" at the 2013 SOA Annual meeting. It will be a four-session embedded seminar to educate pension actuaries on fixed income products, equities, and how to use these asset classes to better manage pension risks. Take a look at the annual meeting web page for more details.

- *Mortality and Longevity Education:* there is a group of actuaries also putting together a "toolkit" for pension actuaries: information in a PowerPoint format you need to know. Also being built is a "longevity calculator" which will help individuals and couples understand how long they will live or both live and help to plan their finances accordingly. Finally, we have put out an RFP to build a reference for pension actuaries which involves consolidating and presenting in cohesive manner the current thinking on mortality. This will help actuaries set mortality assumptions going forward.

- *Socializing Research:* there has been a lot of of research conducted by the Pension Section but I suspect most members in the SOA do not know about it. I certainly did not know much of it when I joined the council and many existing research topics can be used in our regular day to day consulting work. To address this problem, we have organized a group whose sole task is to raise the awareness of this research and make it accessible to our section membership. Look for more information this fall.

- *Benefit Adequacy:* there has been much talk about what the right retirement age should be and what individuals will need in retirement. There has also been much talk about the sustainability, efficiency, and governance of public and private sector pension plans. As a council, we feel there are a lot of

inter-relationships amongst these topics. You may have seen some our webcasts on benefit adequacy or replacement ratios. You may have also read the research we have already prepared on these topics. Going forward, we will be pursuing a detailed review of these topics and providing further research and continuing education.

- *Improving Retirement Plan Design:* many of you will remember the excellent work prepared as part of the *Retirement 20/20* initiative a couple of years back. Four award winning papers providing new designs for pension plans. There have been a number of changes since then: interest rates have continued to drop, there is renewed interest in the advantages of defined benefit pension plans, defined contribution investment choices have expanded and become more user-friendly, investment markets have gone up and down a number of times causing many of the strengths and weaknesses of defined benefit and defined contribution plans to become apparent, and the pension risk management approaches of both companies and consultants have become more refined as we looks for ways to provide pension benefits to plan members. As a result of all these upheavals, we feel it is time to take another look at retirement plan design and consider what will be the features of the tomorrow's retirement plans. Look for research and continuing education on this topic as well.

This is actually a very exciting and interesting time to be in the pension field, where the work we do today will shape the pension landscape for years to come. I hope you will consider participating and putting forth your ideas. Thank you.

NOTES FROM THE EDITOR

By Raymond Berry

Raymond Berry, ASA, EA, MAAA, MSPA, can be reached at *raymonddberry@yahoo.com.*

Notice anything different about this issue? We are now publishing in a digital flip book format to make the *Pension Section News* more convenient to read on all of your devices.

Topics in this issue include behavioral research and why this is important to pension actuaries, self adjusting pension plan designs, longevity risks, middle market retirees and near retirees, as well as duration/convexity of liabilities.

In addition, we included an article on retirement security for defined contribution plans.

The Society of Actuaries annual meeting is October 20–23 in San Diego. Sessions qualify for SOA Continuing Professional Development credits. In addition, some sessions qualify for Enrolled Actuary continuing education credits. Pension topics include ethical dilemmas, mortality, frozen plans and managing retirement and disability risks. See the event calendar for details.

Thanks to the authors for their contributions to this issue. ■

Have an article you think will be of interest to others in the Pension Section?
You can email them to the newsletter editor at *raymonddberry@yahoo.com.*

Retirement Plan Design: The paper was written by Steve Vernon, FSA, in his role as a Research Scholar at the Stanford Center on Longevity (SCL). The target audience for the paper is plan sponsors and their advisors, and it is intended to help plan sponsors carry out their due diligence when implementing a retirement income program.

The paper advocates that DC plan sponsors implement a retirement income program in their plans, consisting of retirement income options, educational material to help plan participants make informed decisions and administrative support to implement participants' decisions.

The paper includes the following:

- Summary of the business case for implementing a retirement income option
- Stochastic forecasts that illustrate how various retirement income options perform under different economic scenarios
- Estimates of possible increases in retirement income due to institutional pricing over retail pricing
- Discussion of the fiduciary risk that concerns many employers
- Summary of various retirement income solutions that exist in the marketplace today
- Guide and checklist for implementing such a program

Second, the American Academy of Actuaries has a *Lifetime Income Initiative* and related task force that released a paper in June 2013, titled, *Risky Business: Living Longer without Income for Life.* The Academy's focus is a long-term initiative meant to:

- Promote meaningful discussions both within and outside the profession
- Actively engage with the public policy community
- Host discussion symposia on longevity, longevity risk, and lifetime income
- Develop actuarial policy statements.

The *Risky Business* paper seeks to identify some of the challenges with securing lifetime retirement income and suggest specific steps or approaches that can be taken to make improvements in this area. The approaches are categorized broadly as:

- Emphasize financial literacy and education for prospective retirees
- Refocus plan design on lifetime income needs
- Implement federal retirement policies to support lifetime income needs

These two projects represent significant steps that the actuarial profession is taking to address the challenge of securing lifetime income in retirement. I'm sure there are many other areas that I could highlight—whether other research projects/papers, or actuaries working on product developments on the industry side, or those who may be consulting with plan sponsors in this arena. Likewise, many actuaries are writing regularly about this in blogs and other venues trying to raise awareness of these issues.

Actuaries who feel strongly about this may also wish to advocate for or design new solutions that they think can better meet lifetime income needs. Often actuaries see an important issue but feel that advocating for a solution is best left to others. I encourage more actuaries to participate actively in this area to build a culture in DC plans focused on income replacement. If you have thoughts or comments on how the actuarial profession can further contribute to this important topic area, feel free to contact me at the SOA.

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PERSPECTIVES FROM ANNA: INTERESTING IDEAS ON RETIREMENT RISK MANAGEMENT

By Anna M. Rappaport

Anna Rappaport, FSA, MAAA is an actuary, consultant, author, and speaker, and is a nationally and internationally recognized expert on the impact of change on retirement systems and workforce issues. She can be reached at *anna@annarappaport.com*.

The topic for the 2013 Pension Research Council Symposium was *Recreating Sustainable Retirement: Resilience, Solvency and Tail Risk.* The conference provided interesting papers and ideas. The Pension Research Council has posted the draft papers on its website and will be posting video selections from the meeting on its *YouTube channel.*

I have chosen to focus on a few of the ideas that I believe offer a way forward. I hope this perspective will encourage dialogue.

The program started with discussions of capital market risk. It seems clear that there are a variety of approaches to modeling and a variety of investment vehicles and that plan sponsors' willingness to take on these risks is significantly declining, particularly in the private sector. Low interest rates make the job of investment management more challenging. The big issue for pension investments is to coordinate the investment of assets with the pattern of liabilities and expected cash flows. The big change of the last few years seems to be improving the coordination between investment management and liabilities structures. For another view on alternative investments, I recommend the *2011 ERISA Advisory Council report: Hedge Funds and Private Equity Investments.*

The program then moved on to a focus on longevity risk. What was missing for me was the tie between longevity risk and retirement ages. Where retirement ages are fixed and longevity is increasing, costs will grow over time. This can be funded for by including mortality improvement in the assumptions, but benefits will still be getting more generous. The discussion focused on mortality rates during retirement ages, but did not stress this issue. As indicated in a recent American Academy of Actuaries Issue Brief, within the United States, ERISA and the structure of Social Security are barriers to increasing private plan normal retirement age. The shift to DC avoids the problems. A significant part of the discussion focused on the use of financial instruments to manage longevity risk.

Longevity risk was a major focus of the discussion. My summary of the big picture for longevity risk is that there are a number of different ways to focus on liability risk management:

- Use actuarial assumptions that properly bring in projected mortality and reflect mortality improvements.
- Use liability driven investments (LDI) or structure the assets to fit the liabilities. This can include financial market instruments such as liability swaps that are designed to hedge longevity risk.
- Adjust the plan structure or plan design.
- Manage the risk through specialized financial market transactions. These transactions include selling the income stream to an insurance company, or buying an annuity in the plan. They also include use of hedging instruments.
- Buyout the benefits by offering lump sums, although this transfers risks to participants who may be even less well able to bear them than are pension plans.

The conference papers offered relatively little focus on the issue of actuarial assumptions and adjustment of plan design, although some of the discussion focused on plan design. My personal view is that the failure to regularly adjust retirement ages with increasing life spans has meant that total benefits got larger and larger, and they are now viewed as being unsustainable by some plan sponsors. One way to address this issue is to avoid dealing with it directly by terminating (or freezing) the DB plan and moving to DC. Unlike DB plans that offer powerful incentives about timing of retirement, and can help manage the risk of inability to continue working due to disability,

DC plans usually do not include such incentives. I feel sad that the retirement system has not addressed the retirement age directly rather than terminating plans.

A number of different approaches to modeling were discussed during the conference. One paper provided an analysis of Monte Carlo modeling. The author found that the model was satisfactory to explain variation, but that the initial assumptions made a huge difference in the outcome. Jim Moore compared a number of asset modeling approaches. I was most interested in a paper by Tim Hodgson which looked at extreme risks and how they might interact. This paper takes an entirely different approach and focuses on the world as a complex adaptive model. Hodgson defines several categories of extreme risks, and provides a framework for thinking about them. His categories are political, environmental, social, and technological. He reminded me that there are many moving parts, and that we need to think of them interacting and moving together. The issues Hodgson raised link directly to the cover story of the April/May 2013 *Actuary*, titled "Are Black Swans Real?" That article focuses on the projection of large-scale, large-impact rare events. The Society of Actuaries engaged Guntram Fritz Alein Werther to do a research paper on this topic, and it is now available.

In another setting, I have been reminded of the impact of the interaction of different risks. I have been working with Vickie Bajtelsmit on the Society of Actuaries research project *Measures of Benefit Adequacy.* That project models retirement adequacy considering a number of different risks and makes it clear that it is important to consider the interaction between risks and take a holistic view. The project focuses on individuals, not plan sponsors.

I moderated the wrap-up panel. The panelists were Kenneth Winston, from Western Asset Management, Rob Wylie, from the South Dakota Retirement System, and Peter Shena, from the Ontario Pension Board. The panel applauded the focus on sustainability, but commented that the discussion overall was pessimistic and hoped for a more positive approach to sustainability. We focused on the plan structure and the importance of risk sharing between participants and plan sponsors. Traditional DB often means all risk is assumed by the employer and traditional DC means all risk is assumed by the employees. Various options for risk sharing allow continued risk pooling but without so much risk on employers. Examples of risk sharing strategies include making plans contributory with cost increases shared, adjusting retirement ages with longevity changes, offering cost-of-living increases contingent on plan results, adjusting the formula if funded status falls below a certain level, etc. The participating group annuity contracts of the past included an approach to risk sharing. Risk sharing is not a new topic

"THE BIG ISSUE FOR PENSION INVESTMENTS IS TO COORDINATE THE INVESTMENT OF ASSETS WITH THE PATTERN OF LIABILITIES AND EXPECTED CASH FLOWS."

and it has been discussed in various forums. There is a lot of discussion of this topic in the Society of Actuaries *Retirement 20/20* project. *The Retirement 20/20 papers* offer different ideas about risk sharing. What was particularly interesting to me was the longevity pooling ideas in the *Retirement 20/20* papers. Those papers focused on the issue of individual mortality risk and separated it form systemic mortality risk. One of the ideas was to adjust benefits down if mortality increases exceeded a threshold. To me, indexing retirement ages is a very important idea and topic.

A second area for future focus is collective or pooled arrangements. Globally there is a range of different multi-entity arrangements and some work better than others. Two of the panelists described multi-entity arrangements that have focused on strong risk management and funding together with some risk sharing. Both entities cover a group of public employees, one in Canada and one in the United States. Private sector multi-employer plans in the United States do not offer a successful model. Collective arrangements can be based on a traditional DB model, a traditional DC model or something in between. They can include risk pooling but with more risk sharing. One idea for pooled arrangements starts with a DC approach, but provides a minimum investment return and annuity payout. Arrangements in Europe may offer a range of ideas and should be reviewed. At the same time the future may call for new ideas. One thing that was not discussed at the Pension Research Council Symposium was what would be feasible for smaller and mid-sized employers. As risk management gets more complex, it seems to me that the only approaches that will be feasible are approaches that use collective arrangements or shift all risk to employees, but this gives up an important tool—the ability to manage risks by pooling them. Even managing arrangements that shift all risk to employees may become too complex if fiduciary requirements are too great.

A third area of focus in thinking about solutions for the future is retirement ages and how we retire. Some observers question the feasibility of retirement. Many public systems have increased retirement ages, but much less than life spans have increased. For me, focus on this area is a critical part of the sustainability discussion.

As indicated above, sustainability was an idea discussed at various points during the session. This is an area of great importance going forward. There are different ideas about sustainability. I would throw into the mix an affordable benefit structure, appropriate risk sharing, and asset management that fits with the liability structure. DB plans with all of the risk on the employer are not viewed as sustainable by some people, particularly when they have fixed retirement ages. DC plans offer an approach to sustain-

ability from the employer perspective but they place a huge amount of responsibility on the employee. Unless there are adequate funds, this is not a long-term satisfactory approach from the individual perspective. Another approach to sustainability is to provide for risk pooling but with more risk sharing. Amy Kessler's paper provided an approach to sustainability by using the following components:

- Sustainable risk budgeting
- Sustainable asset management, possibly including LDI, alternative fixed income investments, and absolute return strategies
- Longvity insurance.

Each of the authors who contributed to the *Retirement 20/20* papers had their own ideas about sustainability.

There were many more ideas. I have only shared a few of them. As I listened to this discussion, it made me ask how a plan sponsor is supposed to be able to evaluate all of these tools and choose which ones make sense for them. There were many interesting ideas, but it was not clear to me how to use them in practice. It seemed clear that many plan sponsors will need to rely on consultants for help, but that offers no help in evaluating which ideas are best. The big question for me is how actuaries and those we serve can use some of these new tools to manage risk effectively. At the same time, too much complexity is a recipe for disaster, and we need to figure out how to keep things manageable.

I am very pleased to have been a part of the 2013 Pension Research Council Symposium. I have attended a number of these annual events, and they often make me think about things I would not usually focus on. This year was no exception. I encourage the readers to look at the Pension Research Council website for many interesting ideas. ■

ACTUARIES NEED TO PAY ATTENTION TO BEHAVIORAL RESEARCH AND FINANCE

By Anna M. Rappaport and Jeremy Burke

Early in 2012, the Society of Actuaries Committee on Post-Retirement Needs and Risks learned about the Rand Behavioral Finance Forum (BeFi). BeFi hosts an annual conference in Washington bringing together academics, policy makers, think tanks, the business community and others to discuss how behavioral finance helps us learn how people make decisions and improve the design of financial products and arrangements, and the communication linked to them. Anna is very proud to have moderated a panel on retirement issues in both the 2012 and the 2013 BeFi conferences. Don Fuerst, Senior Pension Fellow from the American Academy of Actuaries was the discussant in the retirement session at the 2013 conference. Both BeFi and the actuaries who have been involved are hoping for further collaboration.

As an actuary, Anna says that she really likes attending these conferences because the presentations are almost all of interest to her, and many of them include information that is new to her (and probably many actuaries), and that attendees would not hear in most of the settings retirement experts and actuaries participate in. We have come to feel that all actuaries who are involved with arrangements for the security of individuals should take an interest in behavioral finance because it provides insights that they should consider in their work. However, for those who missed the conference, the good news is that it was videotaped, and the videos will be available on the BeFi website. Prior conferences are available as well.

We would like to share with you some comments about the 2013 conference.

Panels included a session on retirement, a session on communicating financial concepts, examples of how industry is putting behavioral finance to work, examples of how government is putting behavioral finance to work, a session on investments, and a session on short-term issues including debt and short-term savings.

Several of the papers were based on experiments. These experiments usually involve using a panel (often through the online survey system, the American Life Panel), and asking them a series of questions to see how they respond to alternative framing of a financial decision or product.

It was reinforced several times during the session that asking consumers to do complex financial calculations will not work for many of them. Many consumers do not have the math literacy or the will to do the calculations. So, you need to find a way to reach them that works. One example by Anya Samak from the University of Wisconsin was

Some perspective on BeFi: The RAND Behavioral Finance (BeFi) Forum is a collective of academic, financial and government leaders fostering cutting edge behavioral research for practical application. Behavioral research deals with the science and study of how people make decisions, and with understanding how changing the way decisions are presented can impact choices. The BeFi website is one of a number of sources that offer a wealth of resources on this topic.

Some perspective on the actuarial knowledge base: Actuaries have drawn their knowledge and training from a variety of disciplines including specialized mathematics and risk analysis, law, investments, accounting, finance, business practice, etc. They have traditionally focused more on the business enterprises that produced financial products and offered employee benefits than on the individuals who were users of these programs. Individual decision making and behavioral finance are not part of the traditional knowledge base of actuaries.

to present decisions using short video clips that told a story based on people making a decision. She showed an approach to explaining investment diversification. In their research they tested a variety of ways of presenting the same ideas. Two more examples were presented by Doug Lebda of Lending Tree. He showed how Lending Tree makes it easy for people to shop for and manage mortgages online. We know that people have been very accustomed to shopping for airline tickets and hotels online. It seems to us that if you make it easy and available, there is a good chance to improve outcomes and potentially save a lot of money. He also talked about Tykoon, a system using social media techniques to help children manage their own money and in so doing, learn to manage money in a way that would help them for all of their lives. Tykoon is a financial services platform for families that empowers children to develop strong financial practices and values, and it is focused on children age 8 to 12. Children (and even adults) who are comfortable with Facebook would probably quickly adapt to Tykoon.

The ideas presented at the conference were a mix of ideas that are focused on the population at large, but particularly the middle class, and ideas that are more focused on those without much in the way of financial resources. It is particularly gratifying to see work focused on the middle class and on those without much financial resources. So often, when financial issues are discussed, the focus is on engaging those with more money.

Several of the presenters focused on helping people solve problems and on responding at the point in time when help is needed. Lee Lundy from Experian focused on a program they offer which helps people with poor credit scores improve them. He presented research suggesting that the program may work for those who participate in it. The Lending Tree program helps people get a better result when they shop for mortgages. Jonathan Zinman focused on household debt, the size of the problem and the potential to help people. In Anna's experience, actuaries are very focused on risk management, but not very often on the problems of managing debt. Yet, debt is a huge problem for resource constrained households, and for many, managing that debt is the first step to being able to secure a good future.

Jonathan Zinman of Dartmouth provided an example of a typical household that might be able to save $2,700 a year by managing its debt more effectively. He indicated that there is $13 trillion in debt on household balance sheets. He provided examples of a number of opportunities to improve debt management including better shopping, using other vehicles, and wiser refinancing. He is involved in research on how to help people use debt more wisely. The advantage of such an approach, particularly if automated, would be that potentially millions of people could benefit from it. We encourage actuaries to watch the tape of his talk. Anna suggests that this is an area that is often neglected in our thinking. (One of the reasons that this seemed so important to Anna is that in prior focus groups on the middle market, financial advisors pointed out that an important place to start is cash flow and debt management. The report on these focus groups: Approaching the Underserved Middle Market: Insights from Planners will increase the reader's interest in debt management.)

A comment was made during the conference that products look different to buyers and sellers. This makes a lot of sense to us, and our response is that sellers need to do more to understand buyers. In the government panel, there was a discussion about using behavioral finance to help individuals who are in prison and owe child support. Many such individuals fail to get their support orders modified and leave prison owing substantial back payments, creating more prob-

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lems for them. The discussion focused on using a different approach to these prisoners to encourage them to get support orders modified with the hope that they would be better positioned to make a good start when they leave prison. While this discussion was very far away from anything most actuaries do, it brought home to Anna the idea that the potential applications of behavioral finance are everywhere, and that we should be aware of what it offers as we analyze problems so as not to forget about these opportunities.

PS: There will be another Behavioral Finance Forum in 2014, and you might want to watch to see when it is scheduled. It is an interesting day for all who participate. ■

About the authors:

Jeremy Burke *is an Associate Economist at RAND, Director of RAND's Behavioral Finance Forum, Associate Director of RAND's Center for Financial and Economic Decision Making, and a professor in the Pardee RAND Graduate School. His main fields of research are information and behavioral economics, with a particular focus on how people gather and use information to make economic and financial decisions. His recent research has examined the impact of financial literacy and social acceptance on the decision to strategically default on one's mortgage; whether financial literacy and financial decision-making can be improved by providing information sequentially rather than all at once; and how reliance on financial advice (particularly biased advice) is influenced by financial literacy. Currently, he is examining how individuals make investment decisions in defined contribution plans, developing and evaluating novel programs designed to improve financial capability amongst the economically vulnerable, and designing soft-commitment savings products to try to promote healthy savings behavior.*

Anna Rappaport, *FSA, MAAA is an actuary, consultant, author, and speaker, and is a nationally and internationally recognized expert on the impact of change on retirement systems and workforce issues. She is passionate about women's retirement security and about improving employment opportunities for older Americans. Anna is a past- President of the Society of Actuaries and chairs its Committee on Post-Retirement Needs and Risks. Anna served on the ERISA Advisory Council, and currently serves on the GAO Retirement Security Advisory Panel, the Women's Institute for a Secure Retirement Board, and the Advisory Board of the Pension Research Council. Anna will be a 50 year FSA in 2013, and has an MBA from the University of Chicago. Anna is an abstract painter and a member of the original seven artists participating in "Artuaries."*

SOA 2013

SOCIETY OF ACTUARIES
Annual Meeting & Exhibit

Oct. 20-23, 2013
San Diego Convention Center
San Diego

Influence. Inspire. Impact.

Join with 2,000 actuarial pros to take part in the SOA Annual Meeting—created with input, insight and guidance, by actuaries, for actuaries. More than 100 sessions, on over 100 topics, presented by nearly 300 experts. Hot issues you told us are important to you and your career—and 25+ networking ops.

Plan to take part in these sessions, sponsored by the Pension Section:

Investment Boot Camp for Pension Actuaries

Sessions 112, 127, 151, 165

Tuesday, Oct. 22 (Parts 1-2)

Wednesday, Oct. 23 (Parts 3-4)

This four-session boot camp will cover key investment issues for pension actuaries including: The Fixed Income and Derivatives Market; Fixed Income Securities and Derivatives Applied to a Pension Plan Liability; Beyond Fixed Income: Other Important Asset Classes for Pensions and Pension Investing Strategies Today.

Increasing Longevity … Or Not: A Look at Current Research and the Implications for Actuaries

Session 42 Interactive Forum

Monday, Oct. 21

1:45 – 3:00 p.m.

What are the key factors that impact mortality improvement, and are the factors that have driven past improvement likely to continue? This session will provide an update on current research in longevity and discuss the implications for actuaries in the areas of pension and insurance.

SOAAnnualMeeting.org

SELF ADJUSTING PENSION DESIGNS

By Thomas Lowman

Thomas Lowman, FSA, EA, MAAA, is vice president & chief actuary at Bolton Partners, Inc. in Baltimore, Md. He can be reached at tlowman@boltonpartners.com.

I like guaranteed traditional pensions. Someone once said people with DB plans are the luckiest people in the world. My parents were two of those people. However, as we watched the single employer ERISA DB world decline, the SOA's *Retirement 20/20* project looked for more sustainable options than traditional DB or DC plans. *Retirement 20/20* defined the needs/risks/roles for the four key stakeholders and expanded on the concept of self adjusting systems. If you want to read one paper on self adjusting plans from the project I would recommend the Don Fuerst paper in the 2012 *Pension Forum* (you could also read my 2004 SOA article on a Group Variable Annuity Pension design, but start with Don's). Yet at the end of the last *Retirement 20/20* meeting a few years ago I was a bit depressed as it seemed that nothing could be done politically until the system burned down some more. We may now be at the edge of seeing more self adjusting systems being created. However, there are barriers:

1. I was hoping to see these plans emerge in the ERISA single employer space where they may be needed most. I don't see this group as being a leader and the sponsors enjoy the more employer-friendly DC plan options.

2. In the ERISA multiemployer space we see some recent movement in this direction, but most plans are largely focused on the issue of legacy cost and need the support of future contributions.

3. In the public sector space, I see even less movement than in the private sector in part due to competitive pressures, special needs for public safety employees and the better ability to take risks compared to the private sector (there are always limits).

4. Congress/IRS may have to provide rules.

5. Employee expectations of what benefits cost (or are worth) do not align well with true cost in a low interest rate world.

However, at some point we will see more of these designs being implemented. Mercer's 2008 Retirement Shares design (December 2008 *Pension Forum*), Senator Harkin's USA Retirement Funds proposal and the 2013 NCCMP variable annuity proposal give me hope. Possibly the NCPERS Secure Choice Pension (2011) for those without a traditional plan may also be in this category. We may need to have a period of time with a large variety of designs, some being more risky than others.

At one extreme, you can create a group variable annuity design that fully adjusts benefits annually and never has unfunded liabilities. As you try to protect retirees or assume a minimum guaranteed interest rate you need to look around for someone who will provide the guarantee. Maybe the

employer will provide the guarantee since the risk is likely much less than under a traditional plan. Maybe there is a market based solution that one day more people can accept. Under the *20/20* concepts, the employer might not be the plan sponsor. Maybe the participants will end up being the sole guarantors but if they are, when might the plan become a Ponzi scheme?

So my questions are:

1. How do we control these designs and set limits on the guarantees under different circumstances and should we as a profession even try?

2. How do we set standards on actuarial disclosures to be sure all of the stakeholders understand the risk?

Answering these questions is not the responsibility of a single person as we all have a voice in this debate. As with creating specific designs, the devil is in the details and the more specific you are the easier it is to criticize the details. Here are a few broad answers I would suggest.

1. Any plan that does not have a guarantor other than the participants should have no guarantees. What we have is what one actuary referred to as an uncapitalized mutual insurance company. A traditional variable annuity design could work if the plan were large enough. (The direct impact of liability valuations on benefits implies a need for better quality data than is often currently provided for pension valuations.)

2. Promises by the employer to cover guarantees go a long way to justifying guarantees. Even something as simple as a 5 percent minimum interest rate (common in more than one self adjusting design proposal) requires some support. The NCPERS proposal falls into this category.

3. A union fund with the ability to call on a portion of future contribution to support unfunded liabilities (that emerge in the future) could support some minimum contributions. However, communicating the type of support the plan might need (when the ratio of assets/contributions is projected to be mature) should be disclosed at the outset.

4. Plan design and investments may be more linked than with traditional plans. Some designs may let employees select their risk level.

5. Good governance is a must.

These are my thoughts. What are yours? ■

DURATION AND CONVEXITY FOR PENSION LIABILITIES

By Martin McCaulay

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Formulas for duration are good approximations for pension liabilities with small changes in interest rates. Considering the volatility in interest rates, it is more accurate to use duration with a convexity adjustment. In most cases, the convexity adjustment results in a lower duration for rate increases and a greater duration for rate decreases.

ESTIMATING CHANGES IN LIABILITIES

Similar to bonds, pension liabilities have an inverse relationship to interest rates. An interest rate decrease will increase liabilities, and an interest rate increase will decrease liabilities. The amount of the increase or decrease can be estimated using the duration of the liabilities. To apply the formula for duration to pension liabilities, for every 100 basis point (bp) change in interest rates, the liability changes by duration divided by 100 in the opposite direction.

The typical pension plan has a duration of about 15. Considering convexity, the typical pension plan has a duration that is less than 15 for interest rate increases and greater than 15 for interest rate decreases. The duration for active participants is typically longer than the duration for retired participants. The duration for the Normal Cost (NC) is typically longer than the duration for the Actuarial Accrued Liability (AAL).

MACAULAY DURATION

The original formula for duration that was developed in the year 1938 by Frederick Robertson Macaulay is a measure of a bond's weighted average cash flows, using yield (y), the time period (t), the number of time periods (n), the annual coupon payment (C), the maturity value (M), and the purchase price (P).

$$\text{Macaulay Duration} = \frac{\sum_{t=1}^{n} \frac{tC}{(1+y)^t} + \frac{nM}{(1+y)^n}}{P}$$

MODIFIED DURATION

Modified Duration is a measure of the sensitivity of a bond's price to interest rate movements. Modified Duration is the first derivative of how the price of a bond changes in response to interest rate changes. Taking the derivative and adjusting for the number of payments per year simplifies to the following relationship between Macaulay Duration with annual coupons and Modified Duration.

$$\text{Modified Duration} = \frac{\textit{Macaulay Duration}}{\left(1+\frac{y}{\textit{Payments per Year}}\right)}$$

EFFECTIVE DURATION

Effective Duration is used to price bonds with options. Effective Duration approximates the slope of a bond's value as a function of interest rate movements taking the difference in the bond's value (V) for changes in the interest rate (i) by an equal amount ($x = \delta i$) in both directions, and dividing by twice the original value times the interest rate change in each direction.

$$\text{Effective Duration} = \frac{V_{i-x} - V_{i+x}}{(2)(V_i)(x)}$$

Pension liability duration is measured using the formula for Effective Duration, substituting the liabilities (L) for the bond's value (V).

$$\text{Duration} = \frac{L_{i-x} - L_{i+x}}{(2)(L_i)(x)}$$

Duration Example

Interest Rate	Liability
4%	$1,160,000
5%	$1,000,000
6%	$860,000

$$\text{Duration} = \frac{\$1{,}160{,}000 - \$860{,}000}{(2)(\$1{,}000{,}000)(0.01)} = 15$$

To apply the formula for duration to pension liabilities, for every 100 basis point (bp) change in interest rates, the liability changes by about 15% in the opposite direction. A 100 bp increase results in a new liability equal to 85% of the original liability. A 100 bp decrease results in a new liability equal to 115% of the original liability.

The liability change should be based on a compounded change rather than a simple change. Using compounding with a duration of 15, a 50 bp increase results in a new liability equal to 92.20% of the original liability, based on the square root of 85%. A 50 bp decrease results in a new liability equal to 107.24% of the original liability, based on the square root of 115%.

Estimates of duration also hold for yields outside of the corridor used to calculate the duration. Using the example above, a 200 bp increase results in a new liability equal to 72.25% of the original liability, based on the square of 85%. A 200 bp decrease results in a new liability equal to 132.25% of the original liability, based on the square of 115%.

CONVEXITY

The traditional formula for pension duration does not consider convexity. Convexity is equal to the second derivative of the change in liabilities for changes in cash flows. Interest rate decreases generally cause greater changes in liabilities than increases. Duration with a convexity adjustment can be used to provide a better estimate of the change in liability when there is significant volatility. Pension liability convexity can be approximated using a formula with the same variables as the formula for duration.

$$\text{Convexity} = \frac{L_{i-x} + L_{i+x} - (2)(L_i)}{(2)(L_i)(x^2)}$$

To include the convexity adjustment, the duration is adjusted by the convexity times the interest rate change.

Convexity Example

(using the liabilities above in millions)

$$\text{Convexity} = \frac{\$1.16 + \$0.86 - (2)\,(\$1.00)}{(2)(\$1.00)(0.01)^2} = 100$$

Illustrative Examples of Pension Duration with the Convexity Adjustment

The following formulas illustrate how making the convexity adjustment to duration results in a lower duration for rate increases and a greater duration for rate decreases.

$$\text{Duration} - \text{Convexity} = \frac{L_{i-x} - L_{i+x}}{(2)(L_i)(x)} - \left(\frac{L_{i-x} + L_{i+x} - 2(L_i)}{(2)(L_i)(x^2)}\right)(x)$$

$$= \frac{L_{i-x} - L_{i+x} - L_{i-x} - L_{i+x} + 2(L_i)}{(2)(L_i)(x)} = \frac{2(L_i) - 2(L_{i+x})}{(2)(L_i)(x)}$$

$$= \frac{(L_i) - (L_{i+x})}{(L_i)(x)} = \frac{1 - (\frac{L_{i+x}}{L_i})}{x}$$

$$\text{Duration} + \text{Convexity} = \frac{L_{i-x} - L_{i+x}}{(2)(L_i)(x)} + \left(\frac{L_{i-x} + L_{i+x} - 2(L_i)}{(2)(L_i)(x^2)}\right)(x)$$

$$= \frac{L_{i-x} - L_{i+x} + L_{i-x} + L_{i+x} - (2)(L_i)}{(2)(L_i)(x)} = \frac{(2)(L_{i-x}) - (2)(L_i)}{(2)(L_i)(x)}$$

$$= \frac{(L_{i-x}) - (L_i)}{(L_i)(x)} = \frac{(\frac{L_{i-x}}{L_i}) - 1}{x}$$

Duration with Convexity Adjustment Example

(using the liabilities above in millions)

To illustrate how the formula for duration with the convexity adjustment might be applied to pension liabilities, with a duration of 15 and a convexity of 100, the duration with the convexity adjustment would equal 15 plus or minus 100 times 1%. The adjusted durations are 16 and 14. In this illustrative example, for every 100 basis point (bp) decrease in interest rates, the AAL increases by 15% plus 100 times 1% squared, or a total of 16%. For every 100 basis point (bp) increase in interest rates, the AAL decreases by 15% minus 100 times 1% squared, or a total of 14%.

$$\text{Duration for Rate Decreases} = \frac{(\frac{L_{i-x}}{L_i}) - 1}{x}$$

$$\text{Duration for Rate Decreases} = \frac{(\frac{L_{4\%}}{L_{5\%}}) - 1}{1\%} = \frac{(\frac{\$1.16}{\$1.00}) - 1}{1\%} = 16$$

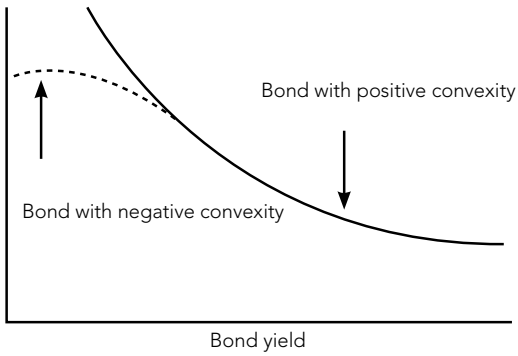
$$\text{Duration for Rate Increases} = \frac{1 - (\frac{L_{i+x}}{L_i})}{x}$$

$$\text{Duration for Rate Increases} = \frac{1 - (\frac{L_{6\%}}{L_{5\%}})}{1\%} = \frac{1 - (\frac{\$0.86}{\$1.00})}{1\%} = 14$$

In the example, the increase of 16% in liabilities for the interest rate decrease from 5% to 4% is consistent with the increase from $1 million to $1.16 million in liabilities, and the decrease of 14% in liabilities for the interest rate increase from 5% to 6% is consistent with the decrease in liabilities from $1 million to $0.86 million. Using different durations for increases and decreases in rates improves the accuracy of estimates compared to using the same duration for increases and decreases.

NEGATIVE CONVEXITY

Figure 1: Graph of Negative Convexity



Note: This fugure is an Illustration only and is not intended to represent a specific mathematical relationship.
Source: Vanguard.

The price/yield relationship for most bonds is convex. If the graph is concave, the relationship has negative convexity, as shown in Figure 2 above. Most callable bonds, mortgage backed securities (MBS), and asset backed securities have negative convexity at low rates due to the imbedded options. When rates decrease, the price will not increase as rapidly as non-callable bonds. At high interest rates, bonds with call options have positive convexity similar to bonds without call options.

KEY RATE DURATION

The duration calculations presented here are useful for parallel yield curve shifts and interest rate changes. Key rate dura-

tion considers the sensitivity of a liability's movement to different parts of the yield curve. When different rates move in different ways, key rate duration is more accurate. Key rate duration calculations require building a yield curve.

SUMMARY

Duration and convexity provide a risk metric for pension plan sponsors. The formula for Effective Duration can be used to estimate the value of pension liabilities at different interest rates. A convexity adjustment should be applied to reflect the fact that the pension liability increase for a decrease in interest rates is greater than the pension liability decrease for an increase in interest rates. There will be a lower duration for rate increases and a greater duration for rate decreases. ■

On the Research Front

NEW RESEARCH: EMBEDDED OPTIONS

Embedded options in pension plans play an increasing role in estimating pension liability values. With the credit interest rate floor of a cash balance plan as a model, this research, authored by Kailan Shang, Jen-Chieh Huang, and Hua Su, uses three valuation and risk analysis approaches to explore the existing techniques to value embedded options on an economic basis. In addition, several tools were built with comprehensive structures and documented implementation processes. The tools provide functions like economic assumption calibration, economic scenario generation (ESG), scenario validation and option value calculations using the three approaches.

RETIREMENT INCOME SECURITY: WHY INDIVIDUAL ACCOUNT DC PLANS ARE NOT THE ANSWER (BUT ALSO WHAT IS)

By Robert L. Brown

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Much of this article depends heavily on a paper recently written by the above author and a co-author, Tyler Meredith; namely: Brown, R. L. and T. Meredith (2012). Institute for Research on Public Policy. Study No. 27: Pooled Target-Benefit Pension Plans.

WHAT TO AVOID IN DESIGNING A RETIREMENT INCOME SECURITY SYSTEM?

A simple statement is that one must design a retirement income security system in a manner that absolutely minimizes the expense burden on the participants and the risks that the participants must assume. That being the case, it becomes rapidly apparent that the worst way to design a retirement income security system is as an "Individual Account Defined Contribution" system.

Such a system makes a number of assumptions that are just patently false.

1. Workers are capable of optimal investing and asset management.
2. If they are not capable themselves, then they can purchase asset management at a very low expense ratio.
3. Workers, if given investment fund options, will choose wisely and will also follow a life-cycle model of investing where they slowly move from a high equity portfolio to more fixed income as they near retirement (or, even better, they buy deferred annuities as they near retirement).
4. Workers can buy individual life annuities as a fair actuarial price.

Each of these assumptions is false.

1. Workers are capable of optimal investing and asset management.

How can an individual worker who has no training or education in business or economics be expected to invest wisely and manage their assets prudently?

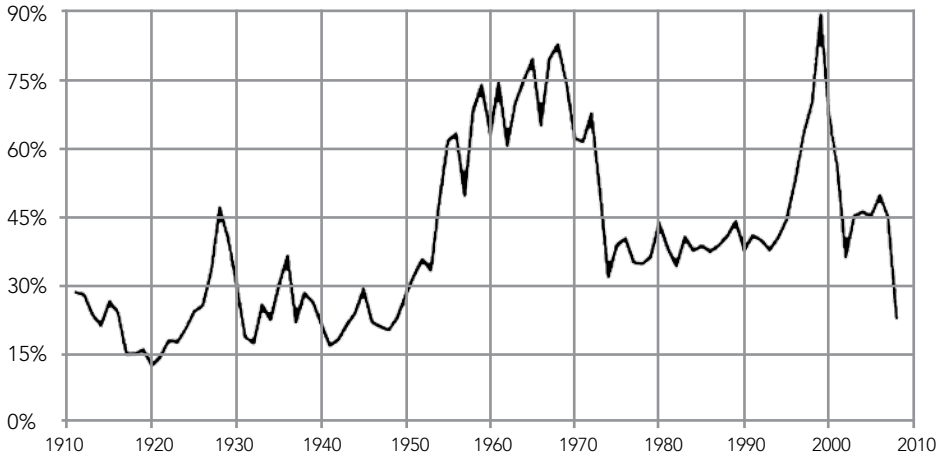
As the following graph shows the choice of one's investment portfolio and the timing of the cash flows can clearly have a huge impact on one's standard of living upon retirement.

In the graph above, we see replacement ratios as high as 90 percent and as low as 14 percent. And the only variable is the period over which one is working and saving.

Clearly, the worker can decrease the investment risk by choosing less volatile investments such as government bonds. While it is true that the volatility decreases markedly, so too do the Replacement Ratios as seen in Figure 2.

That is, the worker has two choices. Invest heavily in stocks and face a level of

FIGURE 1
Replacement Rate
(Annuity /Final wage)



Source: Burtless, (2009)

volatility that is probably unacceptable. Or, invest more heavily in bonds and fixed-income securities and mitigate the volatility risk but guarantee living at a much lower standard of living in retirement.

The replacement ratios in the above graphs also indicate the impact of the timing risk. This is the risk of being forced to liquidate your assets at depressed values while also buying an annuity when interest rates are low and annuity prices are, therefore, high (as in 2009).

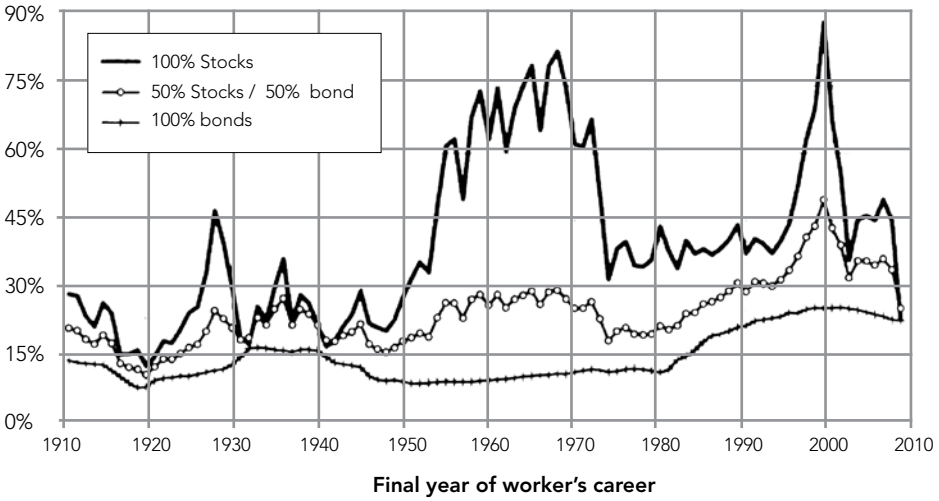
The responsibility of investing and liquidating one's assets is one for which the average worker has little capability. The literature indicates that if individuals are responsible for managing their own capital accumulation, they do so conservatively and achieve lower rates of return.

2. If they are not capable themselves, then they can purchase asset management at a very low expense ratio.

One can legitimately argue that there are professionals who can be paid to manage the funds even in the de-accumulation phase. While that is true, it comes at a high cost. It is not unreasonable to assume that a professional fund manager will charge 2 percent of assets each year as their management fee. A 2 percent per annum fee decreases the ultimate retirement fund (assuming a 35-year experience) by 31.7 percent (Ambachtsheer, 2008).

Looked at in a slightly different manner, Table 1 tracks the impact of investment expense ratios and shows how profoundly they can affect the aggregate pension benefits and working income replacement ratios of retired plan members. The data assume an annual contribution to a plan of $10,000 over 40 years for a worker making $50,000 per year.

FIGURE 1
Replacement Rate
(Annuity /Final wage)



Source: ibid.

Table 1: Impact of Investment Expense Ratios on Pension Adequacy

Expense Ratio	0%	0.4%	1.5%	3%	5%
Accumulated Value	$777,000	$707,000	$551,000	$400,000	$272,000
(after 40 years)					
Annual Pension	$45,000	$41,000	$32,000	$23,000	$16,000
Payout					
Replacement Ratio	90%	82%	64%	46%	32%

Ambachtsheer, 2008.

Munnell et al (2013) found that:

> "fees have a significant effect on how much an individual will have at retirement. An additional 100 basis points over a 40-year period reduces final assets by about one fifth. Many studies have also shown that actively-managed funds underperform index funds, even before accounting for the higher fees charged by the former. But broker-sold mutual funds

perform worst of all. One estimate is that broker-sold funds underperform average actively-managed stock funds by 23 to 255 basis points a year. The problem is big because the number of people rolling over into IRAs has increased dramatically.

…

The rollover of balances from 401(k)s to IRAs is extraordinary given that participants are typically passive in their interactions with their 401(k) plans. They rarely change their contribution rate or rebalance their portfolios in response to market fluctuations or as they age.

Some households may be attracted by the opportunity to obtain a wider menu of investment options or to consolidate their account holdings. But others may be seduced by advertisements from financial service firms urging participants to move their funds out of their "old," "tired" 401(k) plan into a new IRA."

Finally, if we are going to depend upon a DC system, at the least it should be run as a large, "collective" fund. This is because size matters.

Table 2: Investment Fees by Size of Pension Fund

Size of Pension Fund	Investment Fees for Large-Cap Equities
Individual Account	250-300 basis points
$10 million	60 basis points
$1 billion	42 basis points
$10 billion	28-35 basis points

Ambachtsheer, 2008.

Further, and importantly, a large collective fund can invest more widely than any Individual Account, in, for example, private equity or infrastructure. This effectively gives the worker a less risky portfolio.

3. Workers, if given investment fund options, will chose wisely and will also follow a life-cycle model of investing where they slowly move from a high equity portfolio to more fixed income as they near retirement (or, even better, they buy deferred annuities as they near retirement).

There is no support in the literature for this contention (see Munnell (2013) above). The more choice you give as to investment funds for Individual Accounts, the more likely it is that savings end up in the default option. In Australia, 80 percent of participants went to the default investment option. This does not have to be totally negative. For example, in Sweden, which offered 456 investment options, the majority of participants ended up in the default fund, but the default fund out-performed nearly all of the other funds, so the story ended well.

Nor is there any support in the literature for any evidence that workers use a life cycle approach to the management of their portfolio. (ibid)

Finally, buying fair market value life annuities may be very difficult.

4. Workers can buy individual life annuities at a fair actuarial price.

When we move into the de-accumulation phase, the worker can always manage the longevity risk by buying a life annuity. Simple enough, until we look at the cost, especially given today's very low interest rates. However, wherever interest rates happen to be at a given moment, a consistent cause of the high price of life annuities is the factor that the insurance company must include to cover anti-selection (James et al, 2008). Anti-selection occurs because the insurance company can never know as much about the annuitant's health and life expectancy as does the annuitant purchaser (the Principle of Information Asymmetry). Under this Principle, workers who know they are in good health are more likely to buy life

annuities or to buy larger amounts. Those who know they are in poor health will not buy life annuities at all. Thus, the insurance company must price the annuity assuming a five-star risk. That is, they price the annuity assuming the purchaser will have very high life expectancy.

In most countries, there is no risk classification for annuities (except in extreme cases where the seriously ill or injured can purchase a Settlement Annuity). Thus, the norm is that a coal miner who is over-weight and smokes pays the same price for an annuity as a non-smoking school teacher who jogs. Clearly they are not equivalent risks, but they are normally priced as if they are both five star applicants.

This has the further negative impact of being regressive. There is clear data (Brown and Prus, 2004, Whitehouse and Zaidi, 2008) that wealthier people live longer. And this is not because healthier people make more money. It is because of the stability, socialization and access to care that result from wealth and education (Brown and McDaid, 2003). Thus, if you charge the same rate for all life annuities, you are penalizing the poor who, it might be argued, are those in most need of being able to transfer the longevity risk. It is thus debatable as to whether a poorer worker should annuitize at retirement.

If the worker does not buy an annuity, effectively, they must self annuitize. That is, they must determine a program of income withdrawal that is optimal for them. Depending on their desire to leave a bequest (which we ignore here), they will want to take out the maximum income possible without creating the threat of outliving their assets. That is a lot to ask. Who knows their life expectancy? And covering your life expectancy is not enough. One would be wise to cover at least one's life expectancy plus one standard deviation. So, if workers want to be sure that they will not outlive their assets, they make conservative withdrawals. That means they live at a lower standard of living than is necessary. If they take more aggressive withdrawals, then they increase the probability of outliving their assets and thus becoming dependent on government programs for their continued consumption. (This should also be a concern to taxpayers who will pay those welfare benefits).

Individual Accounts also create a counter-cyclical macro-economic bias. For example, when a country's economy is hot, one would expect asset values to rise but also one would expect increased demand for labor. When the stock market is hot, holders of Individual Accounts will see an ability to retire and will then leave the labor force, exactly what the economy does not want. The reverse holds when the economy cools. Individual Account values go down and the account holders see that they must remain in the work force, just when you would like them to leave. (MacDonald and Cairns, 2007).

In short, in the case of a system based on individual accounts where the workers invest their funds, inadequate education of the public, lack of any smart default option and inadequate regulation and supervision of the investment managers may result in poor investment choices, high transaction costs, and thus lower than expected net returns. To

"THERE NOW APPEARS TO BE GENERAL ACCEPTANCE THAT NEITHER A PURE DB NOR DC PLAN IS OPTIMAL FOR THE FUTURE."

conclude, there appears to be little economic support for Individual Accounts retirement income security systems (see also de Mesa, 1997, Gill, Packard and Yermo, 2004, Sinha and Yanez, 2008, Diamond, 2004 and Diamond and Orzag, 2004).

FINDING A MIDDLE GROUND: POOLED TARGET BENEFIT PENSION PLANS

There now appears to be general acceptance that neither a pure DB nor DC plan is optimal for the future. Can an innovative pension plan design be found which would maximize the advantages of these two classical systems and still address the range of challenges we have outlined?

In this effort four government panels have reported in as many years with proposed changes to Canada's retirement income system. These include:

- Quebec: Regies des rentes, Member-funded Pension Plans (2007)
- Ontario: Ontario Expert Commission on Pensions, Jointly Governed Target Benefit Pension Plans (JGTBPPs) (2008)
- Alberta/British Columbia: ABC Joint Expert Panel on Pension Standards, A new ABC joint provincial pension plan (2008)[1]
- Nova Scotia Pension Review Panel, a new Province-wide plan that would be a DC Target Benefit plan administered by an independent agency (2009).

While these reports differ in their detailed recommendations, each suggests new mechanisms to expand coverage, improve pension incomes and achieve more effective savings and pension options for Canadians.

This paper draws from many parts of the body of ideas put forward by the expert reports mentioned above. It attempts to distill from these various models a practical application of the key principles for reform set out below that could conceivably be implemented in the current legislative and policy framework for pension reform. Many of the features put forward in this paper also build on the real-world examples of Ontario traditional MEPPs and JSPPs and the TIAA-CREF pension model in the United States.

THE CONCEPT

The paper's answer to these principles is the Pooled Target Benefit Pension Plan (PTBPP). In broad terms, it is a target benefit pension plan that blends the elements of pooled risk often found in traditional MEPPs with the cost predictability of a DC plan. This hybrid design yields a pension vehicle in which participants gain an expectation as to their retirement income (within a reasonable range), greater portability across the labor market and professional third-party investment management in a cost-efficient and effective saving alternative.

It is important to note, however, that the proposal entails gains and losses for both employers and workers. This is consistent with the intent of the PTBPP to more effectively balance the allocation of risks than current classic DB and DC pensions permit. But whatever gains and losses the proposal may create for the parties in moving to the PTBPP model, it is designed to balance them out overall and be acceptable to both sides. This section describes each of the elements and key assumptions central to the proposal. How the model can best be implemented

within current federal and provincial legislative frameworks is discussed in the next section.

POOLING

This model is premised on the pooling of assets and risk on a comprehensive basis. This means accounts would exist only notionally—assets would be booked by respective plan and participant, although no assets would be segregated per se. Assets would be invested and managed globally across the pool. By operating with such a high degree of comingling, the plan will be able to leverage relatively low management expense ratios and a collectivization of risk that should provide for smoother actuarial costs. Such pooling, while mitigating investment risk, will not eliminate it. For example, a market fall of the significance of 2008/09 would still have a measurable negative impact on these pooled funds.

Both employers and individual investors would be able to participate in the plan either by registering new pensions or transferring existing assets (including RRSP accounts) to the pool(s). This would include access for self-employed individuals. For current single-employer pension plans, particularly those of small and medium-sized enterprises where plan membership is small, participation in the PTBPP would provide the cost-efficiency of larger pension funds. In this context, it is important to emphasize that having a comingled asset portfolio does not mean that all participant plans need to be identical. The participant plans could, as necessary, operate with differing contribution rates and target benefit ranges. Larger participating plans would also have the discretion to define a portion of their investment portfolio within established parameters.

The plan itself is therefore a large umbrella under which a number of different plans and investments are comingled to realize size efficiencies. Provincial and federal regulators would also be able to make use of this vehicle by transferring in "orphaned" pensions in the event of wind-up or bankruptcy. While several provinces[2] already have the power to designate a particular agency to "receive or hold" the assets of a registered pension plan under extenuating circumstances, by virtue of its design as a pooled entity the PTBPP could be an ideal host. This would ease administrative burdens during the transition process and provide greater protection of pension benefits in provinces where such powers do not currently exist.

To ensure an efficient scale is reached, pool(s) operating under the plan would be required to maintain a minimum portfolio of, for example, $10 billion, a size generally considered large enough to generate significant cost-efficiency (see Table 2) and to allow for specialized investments (e.g., private placements). It should also be noted that, in contrast to other proposals for pension reform, the PTBPP would not require

mandatory enrolment of employers or workers—it is a voluntary pension. Many studies have shown that a system where participation is the default option and where workers (and employers) must take an action to opt out does produce higher participation levels. While we favor this design characteristic, we do not believe it is necessary for achieving the required economy of scale.

CONTRIBUTION RATES AND COST MINIMIZATION

Pooling provides a useful structure in which to mitigate some of the actuarial risks and management costs related to a pension fund, but it is not an end-point. The effectiveness of a pension plan depends on a number of factors, including: whether contributions are to come from both employers and employees, what rate of income replacement is provided, who is responsible for supplementing the under-performance of assets, and what policies exist with respect to management expenses.

For the plan's sponsor (employer), the PTBPP appears as a traditional DC plan. In this respect, contributions would be mandatory for both parties, but the employer's contribution would be known and fixed within certain limits. The minimum contribution rate would be tied to a level appropriate for the target benefit set out in the plan, with contributions being matched by the employer up to a set rate (which may vary by plan). Similar to most DC plans, employee contributions would be permitted above this level but within the limits of the Income Tax Act.[3] The employer would not be responsible for any additional funding of the plan should asset values fall below the target range of benefits. As described further on in the paper, this responsibility would fall either to employees or be reconciled through a corresponding reduction in benefits. For existing DB sponsors this framework releases them from significant liabilities inherent in a classic DB plan.

While the plan is pure DC to the employer in the short term, in an extended period of low investment returns, one would anticipate that workers would wish to renegotiate the level of the employer contribution. Similarly, in an extended period of high returns, it would be expected that employers might wish to lower their required contributions.

One should not expect PTGPP plans to exist with low employer/employee contributions. As Mintz (2011) has suggested, an important source of under-saving behavior is related to inadequate minimum contribution rates among DC plans. The aim of the PTBPP, therefore, is as much on improving income replacement as it is on cost-efficiency. The intent is not to reduce costs to allow lower rates of saving, but rather to achieve greater saving efficiency and generate higher rates of income replacement. What, then, is an appropriate contribution rate for participating plans?

Work by the Organization for Economic Co-operation and Development (OECD 2009) indicates that a contribution rate of 5 percent would provide an income replacement ratio of 25.3 percent, while a contribution rate of 10 percent would double that to 50.7 percent (a one percent rate increase therefore raises the replacement ratio 5 percentage points, ceteris paribus). These figures assume 40 years of contributions and a balanced growth portfolio split between 40 percent domestic government bonds and 60 percent domestic equities. Although plans will differ based on the needs of workers, combined contribution rates would ideally range between 10 percent and 18 percent of pay (i.e., within the existing Income Tax limits), thus providing between 50 to 90 percent income replacement in retirement. The 50 percent replacement rate would satisfy the needs of an average worker who also gets a 39 percent replacement from OAS plus CPP. The 90 percent would apply only to the very wealthy where OAS and CPP provide a very low replacement ratio.

According to the 2009 Capital Benchmark Report the average combined employer/employee contribution rate to Canadian DC plans was 8.7 percent last year, having grown steadily over the previous three years (Great West Life 2010). Compared to these figures participation in the PTBPP would represent at least a modest uptick in contributions for many sponsors.

While additional contributions would likely be required on the part of some participants the cost-efficiency of corresponding investments would be vastly superior to the current mutual fund type offerings in the financial services marketplace (Exchange Traded Funds, or ETFs, are more competitive, but not well understood). Much has been said already about the drain that management fees impose on capital accumulation. To address this concern, management fees would be capped at 40 basis points after a pool has reached critical mass and an established start-up period has been completed. The MER cap ensures that a plan's assets grow efficiently over the course of a member's working life. This would represent a material advancement for many investors.

In suggesting a 40 basis points cap, it is worthwhile noting that the BC public sector pension plans (Public Service, Colleges, Teachers and Municipal) run at a total expense ratio (investment management and pension administration) of 25 basis points (i.e., 0.25 percent) (Kennedy 2011). Thus, we believe that the 40 basis point limit is fair and achievable as it allows a 15 basis point profit margin.

TARGET BENEFITS

The PTBPP entails a target benefit structure in which, as described earlier in the paper, participants make contributions over the course of their career with the purpose of receiving a retirement benefit within a pre-set range. The initial "target benefit" or its required contribution rate will, of course, depend on the age of the entering participant. A 45-year-old entrant cannot hope to achieve as high a potential benefit as a 25-year-old entrant making the same contribution. For workers who contribute to their retirement solely through personal investments or as part of a traditional DC plan, this moves retirement income beyond mere hope to expectation, but it does not provide the guarantee of a traditional defined benefit. In this respect, the model reflects a more equal sharing of risks than is the case with either traditional DB or DC plans.

After a target benefit range has been established and the plan set up, members would receive an update at least once annually as to the performance of their "account". This would include an indication of the benefit, based on a recent snapshot of plan valuation, that can be expected upon normal retirement, expressed as projected monthly retirement income. For those familiar with traditional DC plans this would relieve the informational burden on members to extrapolate a notional retirement benefit from the present market value of their investment accounts. With this information, members can then establish what replacement ratio their plan would provide and determine what, if any, need exists for supplementary personal savings. There are moves in the United States as this paper is being written to make these projections mandatory for 401(k) plans.

Obviously asset values will go up and down based on market performance, but this need not have a full or immediate impact on the benefit schedule. This is now true with respect to Ontario traditional MEPPs thanks to changes in solvency funding requirements. One must be aware, however, that this flexibility can create conflicts-of-interest. Retirees or those close to retirement will push for solutions that do not decrease benefits (but push the problem onto future generations of participants). Younger workers will want solutions that will not increase contributions. In an environment of prolonged low investment returns, such as today, par-

ticipants must understand that their benefits are not guaranteed. If, over the medium term, asset values do not keep pace with the plan's target benefit range the plan's trustees would address deficiencies either through supplementary contributions on the part of employees or, as is the case with traditional MEPPs, a reduction in benefits. Conversely, any "excess" returns above the target benefit schedule would be used to improve benefits for those still paying into the plan and provide inflation-protection for the payouts to those in retirement.

To help mitigate potential funding shortfalls, the plan would use a more conservative method for calculating target benefits than is common in classical DB plans. One example is to set the target benefit based on Career Average Pay where income replacement is calculated on the basis of an employee's average salary throughout their career rather than over the highest earning period. This approach is arguably more consistent with a target benefit model as it spreads benefit costs across the working life more evenly and recognizes, implicitly, that the purpose of the pension plan is not to provide a maximum, fixed benefit upon retirement but rather a reasonable expectation of retirement income.

RISK MANAGEMENT

Having already described the contingency for shortfall in investment performance, any pension plan must also accommodate potential risks arising from extended longevity of retirees, and the sensitivity of benefits to changes in inflation over time. How would the PTBPP respond to these risks within the pension design set out above?

The longevity risk can be addressed in either of two ways. First, the plan could purchase deferred life annuities for plan participants as they near retirement. This would start at a relatively early stage in a member's working life (e.g., age 40), allowing sufficient preparation and vesting of assets. The proportion of an individual worker's plan assets allocated to purchasing deferred annuities would then increase gradually to 100 percent as they near retirement age (not purchasing annuities all at once mitigates the interest rate risk). The Group Annuity market in Canada today is highly competitive and provides good value for this need (personal memo from Dr. M. Milevsky using data from http://www.ifid.ca/payout.htm)

Alternatively, the plan could elect to manage the payout of benefits itself; under this scenario the plan would still benefit from having the investment risk collectivized in a manner vastly superior to a typical DC plan where investment funds are segregated across member selections. We view this as a parallel to the systems used in the United States by the TIAA-CREF. In either eventuality, worker/participants are freed from managing these risks themselves.

Inflation is a major threat to any pension plan in which benefits are fully indexed to changes in CPI. The model we propose would use slightly conservative actuarial assumptions (e.g., taking a financial economics view of the equity risk premium[4] to determine the "target benefit" for members). Again rather than a guarantee of full indexation of benefits, the plan proposes only a "target" in this regard. If actual rates of return exceed actuarial assumptions it would allow for benefit improvements. The approach could be similar to that recently introduced by the Ontario Teachers Pension Plan whereby future accruals (on or after January 1, 2010) are indexed at half the rate of CPI, with the other portion conditional on the funding viability of the plan (OTF 2009). This is also consistent with the approach used in Quebec's MFPP, with the BC public sector pension plans and the Nova Scotia Teachers pension plan.

INVESTMENT MANAGEMENT

A final, unique element of the PTBPP model relates to the plan's management and

oversight functions. As compared to self-directed DC plans, where the individual bears the responsibility for investing funds, the plan would rely exclusively on professional, arms-length investment managers. These managers would be responsible both for the day-to-day management of invested funds as well as any pay-out responsibilities undertaken by the plan. Taking over the onus from individual members will significantly improve the investment capabilities of the plan, and provide a significant advantage for participating workers and small businesses as they no longer would be expected to manage their own assets and the associated investment and actuarial risks.

CONCLUSION

The least desirable design for a retirement income security system is an Individual Account Defined Contribution system. A much better approach is the Pooled Target Benefit Pension Plan outlined in detail in this paper.

It is the expectation of the author that many of the points made in this paper will prove to be contentious. By debating our different viewpoints, it is hoped that we can all arrive at a more complete understanding of how to design a retirement income security system that truly provides retirement income security.

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ENDNOTES

1. The ABC Plan would have operated as DC supplement to pillar two workplace pensions. Although the program would have been based on auto-enrolment, both employers and employees would have been able to opt-out. Saskatchewan had shown some interest in participating, though for the moment Alberta has backed out until results of the PRPP initiative can be discerned (Baldwin 2010; Joint Expert Panel on Pension Standards 2008)
2. This includes: Manitoba, Newfoundland and Labrador, Nova Scotia, and Ontario
3. Currently 18% of income including both employer and employee contributions up to a maximum of $22,970 (for calendar year 2012).
4. Under the principles of Financial Economics, the required contribution to achieve the target benefit would be determined using a risk-free rate of return, such as that paid on Federal government bonds, rather than a portfolio average rate of return.

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MIDDLE MARKET RETIREMENT:
APPROACHES FOR RETIREES AND NEAR-RETIREES

By Steven Siegel

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The Committee on Post Retirement Needs and Risks recently released a paper that examined approaches for retirement for middle market consumers. This article presents excerpts from that paper and the surrounding issues.

BACKGROUND

The opinion of many retirement professionals is that the middle market is underserved when retirement planning is considered. This is even more the case for middle market consumers on the verge of retirement, or already there. Most retirement planning is focused on asset accumulation and growth, yet many middle market families and individuals have few financial assets, while they stand in great need of help with other financial challenges.

Different approaches are used by individuals, professionals, and other service providers to address this need, but they are far from uniform. The purpose of the paper was to shed light on the variety of approaches and consider how they fit the needs of the middle market.

The intent of the paper was to:

- encourage discussion about approaches to this market, their comparative advantages, and their suitability for specific audiences;
- move toward documenting, refining and getting acceptance on a cross-disciplinary basis for the intellectual framework for middle market planning;
- provide a framework for understanding the various planning models for this market, since no accepted system of classifying them currently exists;
- sketch out the pros and cons of various approaches, in terms of their ability to address the range of needs that exist in this market, and in terms of their suitability for different segments within this market; and
- open up a path that will eventually culminate in more and improved service to this important population group.

USES OF THE PAPER

Although the paper does not offer final answers, it provides useful information for financial planners who are considering different approaches to working with their middle market clients. In addition, the report should be useful as they evaluate the use of software for their own practices. Software and product developers and financial writers/reporters should also find the report helpful in their endeavors. Some organizations may be evaluating specific software and products for their clients' or employees' retirement planning, and the paper will raise important issues that are helpful as they think about their audiences, what questions to ask, and how to position various points of view. Researchers and policy makers may find the paper helpful in understanding the range of ideas and issues that apply when thinking about this important population segment. While the report is not intended for consumers directly, they also may find it helpful in better understanding the financial planning approaches being offered to them.

CHARACTERISTICS OF THE MIDDLE MARKET AS USERS OF FINANCIAL PLANNING

Research indicates that middle market families and individuals are different from their more affluent neighbors for purposes of planning, in that the middle market exhibits the following characteristics:

- They have significantly less (and maybe no) financial assets.
- They are likely to be resource-constrained in retirement; i.e., available income and assets will limit the choices they can make, and total risk management will not be feasible.
- They are less able and willing to pay fees for advice. They are also less trusting of financial institutions and advisors.

- Planning for this group is not primarily focused on investment management, but rather should focus on cash flow, debt, and/or solvency management.
- They need to make trade-offs in lifestyle and health care options to get the best result for themselves given their limited resources.
- Social Security is a significant part of their retirement resources.
- Efficiency is vital to a workable planning process. The cost of the process must be compatible with what users are willing to pay for its implementation. Assets Under Management planning models do not fit their needs.

A FRAMEWORK FOR UNDERSTANDING PLANNING APPROACHES FOR MIDDLE MARKET RETIREES

Middle market retirees face a broad range of financial risks and concerns. Yet the tools and methods available to address these issues often were designed for other audiences (especially high net worth families) and/or only for narrow purposes. Approaches that may work adequately for their intended use and audience are therefore not always suited to middle market retirees.

Although each particular software tool, analytical method, and advisory service needs to be evaluated on its own, this paper aims to facilitate this evaluation by categorizing approaches into four major groups, and thirteen sub-groups. Note that while there is a tendency to think of calculation software as the natural delivery mechanism for these approaches, in principal the same classification can apply to other alternatives: books on retirement, workbooks, informational websites, and a wide variety of advisor-based services that are not necessarily centered on software.

The balance of the paper presents the following:

- Definition of the proposed categories and subcategories of retirement analysis/advice models
- Characteristics of the proposed categories and subcategories, in terms of which retirement issues they address, their applicability to different audiences, and a few other points of concern
- Summary of key middle market segments, their needs, and which models tend to be most suitable for them
- Summary of the main categories and subcategories of models and which audiences they best serve
- Appendices identifying issues relating to employer plans, consumer issues, and software concerns.

CONCLUSION

This is an area that continues to demonstrate a need for further investigation and approach development. The Committee on Post Retirement Needs and Risks has plans to further explore this topic in future work. Thanks again to the working group that produced the full document. ■

LIVING TO 100: INSIGHT ON THE CHALLENGES AND OPPORTUNITIES OF LONGEVITY

By Jennifer Haid

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THE NEED FOR INSIGHT INTO INCREASING LONGEVITY

The thought leadership presented at the Living to 100 symposia by our academic and professional communities has highlighted the critical role actuaries have to play in identifying, quantifying, and helping to address the individual, economic and societal impacts of our longer lifespans

Our increasing longevity has far-reaching economic and medical implications for individuals and families, business and industry, and governmental organizations. Individuals will be challenged to achieve and maintain financial security over a longer time horizon, while pension plans, social programs and health care systems will face unprecedented stress. Long-held assumptions about how long human beings work, when they retire and the quality of life they can expect may undergo dramatic changes if longevity trends continue as seen in recent decades. Major re-allocations of individual, family and societal resources may be required to support growing lifespans.

As society comes to terms with the full range of changes and challenges associated with increasing longevity, actuaries are uniquely positioned to provide critical insights and analysis. The opportunities extend across the financial services, retirement planning and health care industries as well as into multiple areas of government and regulatory functions, as actuaries can help guide the design of profitable products to serve society's needs. In fact, many of us believe it is incumbent on us as professionals to actively engage with other stakeholders, promote understanding and provide leadership—both in the technical and societal realms.

The recent Society of Actuaries (SOA) research paper,"Living to 100: Insights on the Challenges and Opportunities of Longevity Literature Review: 2002 through 2011" highlights some of the core issues associated with increasing longevity, including some significant knowledge gaps that exist today. The SOA commissioned Ernst & Young to prepare this literature review based on The Living to 100 symposia, an international research program focused on understanding human longevity and aging. Sponsored by the SOA and others, Living to 100 brings together scientists, academics, policymakers and others to share knowledge and promote understanding of advanced-age longevity and its potential societal and individual consequences. There are many opportunities for the actuarial community to contribute their experience and ideas: in fact, the 2014 Living to 100 symposium is just around the corner.

This article outlines the key findings of the full paper, most notably the societal impact of increased longevity, the pressing need for more and better data on various longevity-related issues, the potential of advanced analytics and sophisticated modeling to enhance our ability to project future mortality, and the opportunity for actuaries to engage stakeholders and provide leadership on these important topics.

THE SOCIETAL IMPACT OF LONGER LIFE SPANS

While there is some variation in the longevity gains between men and women and among people of different races, geographies and socioeconomic status, overall trends are clear—people are living longer. In many societies, the leaps forward have been dramatic. This has put strain on the traditional "three-legged stool" model of retirement planning—wherein governments, employers and individual citizens each play a role.

As longevity expectations change, personal and social safety nets will be forced to adapt, as will medical support systems. Pay-as-you-go social insurance programs are becoming harder to maintain as more beneficiaries live longer; the age at which benefits from entitlement programs become available is a key issue. It is likely that workers and companies will need to innovate ways—for example, through the use of phased retirement strategies, or flexible work arrangements—to keep older workers in the workforce to a more advanced age. The terms on which workers exit the workforce will be refined, with significant inputs to come from governments and industry. These are important issues across many societies, and merit broader and more formal discussion, not just in the actuarial and academic communities, but also in political and commercial circles.

This is especially true given that the decline in defined-benefit plans, low savings rates in the United States, increased longevity, and the failure of many people to effectively plan for retirement means that many people now find themselves without adequate resources for retirement. Research on what the public knows about retirement and retirement planning shows significant gaps in knowledge and many misperceptions. Many employees would benefit from education, as well as improved access to financial security products to meet their needs

'AS LONGEVITY EXPECTATIONS CHANGE, PERSONAL AND SOCIAL SAFETY NETS WILL BE FORCED TO ADAPT, AS WILL MEDICAL SUPPORT SYSTEMS."

Looking at health care, major breakthroughs in the diagnosis and treatment of disease are a driving force behind increased longevity. However, both the increase in the share of disabled older adults receiving paid help and the intensity of the services they require present access, delivery and financing challenges. Important decisions will need to be made on both the individual and social levels as to who gets what and how it is paid for.

IMPROVING DATA COLLECTION AND ACCESS

While there is objective evidence and emerging consensus regarding increasing lifespans and broad agreement that the impacts might be profound, there is considerably less clarity about the key factors that materially affect life expectancy. Researchers have generated some important insights, but there are critical gaps in the data, especially at older ages. Specifically, significant questions remain about the rate of improvement and the ultimate age at which it is appropriate to assume a mortality table should end. A focused effort to collect credible data is necessary to develop our understanding of future mortality.

In many regions, there is no broad consensus on the appropriate base mortality rates and improvement factors that should be used to value life-contingent liabilities, let alone the models that should be used to forecast those rates into the future. Both of these issues—the gaps in data, particularly at older ages and the lack of consensus with respect to the techniques that should be used to forecast mortality—create challenges for practitioners. The use of different data, as-

sumptions and models lead to inconsistencies in these forecasts across disciplines and stakeholders (e.g., pension and insurance) as each develops its own independent view of future mortality.

One solution may lie with social insurance and census programs: through these programs governments have ample mortality and longevity data which may be used to develop base mortality rates and improvement factors. However, actuaries must consider how underlying populations map to the planned application of this data. Life insurance, annuity and pension practitioners will require additional sources of data that go beyond government programs.

The full paper highlights the data needs and associated challenges. Many of these issues relate to the need to understand potential variances within the data. Consider that:

- Researchers must segment data in various ways to understand correlations and establish appropriate subgroupings; this process is complex as the relevance of a subgrouping may be driven, in part, by the type of information that is included in a given database.
- Calibrating extrapolations to different time periods will lead to significantly different results.
- Companies should be explicitly or implicitly incorporating the effects of current and recent medical advancements, but major future developments (such as a cure for cancer) are difficult to predict and model.

In the near term, actuaries must be actively involved in determining the best estimate of current and future mortality rates. More broadly, actuaries must work together as a community to address these issues by educating stakeholders through common benchmarks, tools and materials and appropriate projection models.

There are a number of specific steps we can take:

- Consistency in techniques—such as stress testing, scenario testing, risk heat maps, screening systems—can be used to address the wide variances produced by projection models and better define base mortality rates and improvement factors. These techniques should be adopted and refined to research and modeling purposes.
- Because insured and annuitant populations are significantly different from the general population, insurers should be actively encouraged to participate in the voluntary data submissions for research being conducted by the SOA and American Academy of Actuaries (AAA). Additionally, we must find a way to collect high-quality and "clean" data on pensioner mortality to assist in setting assumptions for corporate plans.
- We need to look beyond our industries and global regions to find new insights and lessons learned. Potential sources include the United Kingdom's Continuous Mortality Investigation and similar efforts in Germany. Populations around the world will face different challenges given the variations among current practices and conventions in both private and pension plans. These differences may represent a rich source of comparative information.

A substantial amount of academic research is being conducted on a variety of longevity-related issues across a range of disciplines. New findings shift perspectives and continue to shape the conversation and understanding of longevity issues. It is important that we as actuarial practitioners continue to stay abreast of important research findings and the current literature. The full paper identifies a number of milestone studies and high-profile papers that merit the attention of actuaries.

ADVANCED ANALYTICS AND MODELING

As with many challenges, it is not just a matter of problem solvers and stakeholders having access to data; what they do with the data is just as important. That is where advanced analytics and modeling capabilities can be brought to bear.

While access to more and better data will empower all stakeholders interested in longevity issues, stronger capabilities in analytics and modeling will help clarify our understanding of issues and risks and, ultimately, help determine appropriate actions. Actuaries are likely to play a role in a number of specific areas: We can use our expertise to employ techniques—stress testing, scenario testing, risk heat maps, screening systems—that can be used to give us insight into what base mortality rates and improvement factors could be. We can help identify mechanisms for assessing the utility of finer subgroupings of the population which may give us insight into the drivers of mortality improvement at a more granular level. In addition, we can explore the use of more detailed techniques focused on correlations—for example, seasonal effects or birth characteristics—which may help develop our understanding of patterns in future mortality improvement. Here again, actuaries are in a good position to share lessons learned and provide guidance. Specifically, we can apply learnings from other industry sectors—like reinsurance, property and casualty carriers, and capital markets—that have more experience in using predictive modeling tools and techniques.

Actuaries are likely to contribute data to the modeling process and use the results and outputs. We will also partner with our colleagues in academia to answer some of the critical questions that are raised during the analytical and modeling phases. Those questions include:

- Which graduation methods are most appropriate for the oldest of ages?
- Can a wealth/longevity effect at the oldest ages, especially for disability income and long-term care business, be validated?
- How can companies model and mitigate risks associated with major technological advances in medicine?
- What are some mechanisms for assessing the utility and validity of more sophisticated, multivariate projections?

BOTTOM LINE

The significant increase in human longevity raises critical issues for governments, social institutions, pension plans, insurers, companies and individuals around the world. The impacts will be felt at every level of society and across many industries. For actuaries, there is real opportunity to shape the discussion, share insights and guide both product development and public policy. As demonstrated by the latest Living to 100 symposia—and certain to be confirmed by future events—there are significant knowledge gaps that the actuarial community is uniquely positioned to address. ■

The views expressed herein are those of the author and do not necessarily reflect the views of Ernst & Young LLP.

2013 SOCIAL SECURITY TRUSTEES REPORT

By Bruce Schobel

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On May 31, Social Security's Board of Trustees issued the *2013 Annual Report* on the financial status of the Social Security (Old-Age, Survivors and Disability Insurance, or OASDI) program. The 2013 report looks remarkably similar to the 2012 report. The long-range, 75-year actuarial deficit grew slightly from 2.67 percent of taxable payroll to 2.72 percent of taxable payroll. (The effect of moving the 75-year valuation period forward one year, by itself, would have been 0.06 percent of taxable payroll, so all of the other effects netted almost to zero.) The projected year of trust-fund exhaustion remained unchanged at 2033. After the trust fund is exhausted, annual income is projected to be sufficient to cover roughly three-fourths of projected annual outgo.

Social Security's Board of Trustees has six members: the Secretary of the Treasury (who chairs the Board), the Secretary of Labor, the Secretary of Health and Human Services, the Commissioner of Social Security, and two members of the public (one Republican and one Democrat) appointed to 4-year terms. Between 2012 and 2013, three of the six Trustees left and were replaced: The Secretary of the Treasury is newly appointed, and two officials are "acting" in the positions of Secretary of Labor and Commissioner of Social Security. The two acting officials have not been nominated to fill their positions and thus may themselves be replaced before too long. These changes in the make-up of the Board led to the late issuance of the 2013 report, which by law was due on or before April 1. But interestingly, the changes did *not* result in any significant changes to the long-range actuarial assumptions from 2012 to 2013. That's important to note.

There were, however, some changes to the actuarial assumptions. In the short range, starting values were updated to reflect the latest data, and transitions to the ultimate, long-range assumptions were necessarily adjusted. In both the short- and long-range, immigration assumptions were modified slightly. The legislation permanently lowering marginal tax rates for many taxpayers resulted in lower projected income from the taxation of Social Security benefits. (Much of that tax revenue is transferred into the Social Security trust funds.) All of these changes, taken together, increased the long-range actuarial deficit by 0.34 percent of taxable payroll. But they were slightly more than offset by methodological changes that reduced the long-range actuarial deficit by 0.35 percent of taxable payroll. The most significant methodological change (with an effect of +0.09 percent of taxable payroll) improved the projections of fully-insured population—those eligible for retired-worker benefits, in other words—as a percentage of total population. Other methodological changes are even more esoteric.

Other than the relatively minor changes noted above, the 2013 report and the financial projections contained therein look remarkably similar to the 2012 report. Social Security is a gigantic program that is critically important to the financial well-being of 57 million beneficiaries as of year-end 2012. About 163 million people (and their employers) are expected to pay Social Security payroll taxes in 2013, and all of them do so with a reasonable expectation of ultimately receiving benefits one day. The amount of those future benefits will depend on what Congress does to restore Social Security's long-range financial status. Under present law, the latest projections again show that timely benefits cannot be paid in full starting in 2033. As the 2013 report states so well:

"The Trustees recommend that lawmakers address the projected trust fund shortfalls in a timely way in order to phase in necessary changes and give workers and beneficiaries time to adjust to them. Implementing changes soon would allow more generations to share in the needed revenue increases or

reductions in scheduled benefits. Social Security will play a critical role in the lives of 58 million beneficiaries and 163 million covered workers and their families in 2013. With informed discussion, creative thinking, and timely legislative action, Social Security can continue to protect future generations."

Acting sooner rather than later is critically important to finding a responsible solution to these financial problems, which are not going to go away by themselves. We can only hope that Congress gets the message.

You can find the entire 2013 Social Security Trustees Report at the following link:

http://www.ssa.gov/OACT/TR/2013/tr2013.pdf

SOCIETY OF ACTUARIES Pension Section

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