

---

**JOIM CONFERENCE SERIES**  
**OCTOBER 4–6, 2015**  
**CAMBRIDGE MARRIOTT HOTEL, CAMBRIDGE, MA**  
*Challenges and Opportunities in Retirement and Other Long-Horizon Investing*

**SUMMARIES**

---



**Robert C. Merton, MIT Sloan School of Management**

*Challenges and Solutions in Retirement Funding and Retirement Payout*

Robert Merton, winner of the 1997 Nobel Prize in Economics, School of Management Distinguished Professor of Finance at the MIT Sloan School of Management, and Resident Scientist at Dimensional Holdings, Inc., opened the JOIM Retirement Conference with a presentation entitled, “Challenges and Solutions in Retirement Funding and Retirement Payout.”

There are only four ways for people to improve their chances for achieving a good retirement, Merton said. They can consume less and save more during their working years; they can wait longer to retire and thereby shrink their liabilities;

they can reach for higher returns by taking more investment risk (and being prepared for the downside potential) or they can squeeze income more efficiently from the assets already available to them.

Squeezing more income from existing assets, he said, can be done in several ways: Through the use of income-for-life annuities (which exchanges the assets of the retiree when they are no longer needed for more income benefits during retirement and eliminate longevity “tail risk”); through the tapping of home equity through the use of reverse mortgages; through goal-based investment strategies which focuses on achieving a specific retirement income goal and stops taking risk when that goal is achieved. “We need to have annuities work well and we need to have reverse mortgages work well. It’s not a science problem. It’s an engineering problem.”

The current generation of DC plans is not well designed for providing core retirement, he

said. The next generation of DC plans should focus more on informing participants about their progress toward their retirement income funding goals, and less on investment selection, asset allocation and other technical information that isn't meaningful to the mass of disengaged DC participants.

At a time when ratio of the number of years spent saving to the number of years spent in retirement is falling to only about 2:1 (40 years of saving and 20 years of retirement), the task of financing retirement entirely from workplace savings programs is becoming impossible for most people. "Those are the real constraints," he said. "We've had too much discussion of easy ways to provide a good retirement that are simply not feasible."

**Andrew W. Lo, MIT Sloan School of Management**

*Can Financial Engineering Cure Cancer?*

In his presentation, "Can Financial Engineering Cure Cancer," Andrew W. Lo of the MIT Sloan School of Management, said biomedicine is at an "inflection point." Since the completion of the sequencing of the human genome in April 2003, biotech researchers have made important breakthroughs, with vast implications for the treatment of cancer and other serious diseases. But the amount of funding available to bring these breakthroughs to market as FDA-approved therapies has been falling.

Large pharmaceutical companies have reduced spending on basic research, preferring instead to distribute products that small firms develop—much as major motion picture studios have switched from making movies to distributing independently produced films. At the same time, the number of venture-capital firms backing biotech companies has been falling, thanks to the increasing risks and uncertainties involved in bringing new drugs to market.

To address this market failure, Lo and his co-authors propose the creation of a \$5–\$15 billion "biomedical megafund." Such a fund would invest in a diverse portfolio of 150 early-stage cancer research projects, for instance, and in doing so, the chances of two or more of those therapies of coming to market would rise to more than 99%. The diversity of projects within the portfolio is a key ingredient for success as it can help to reduce risk a level that would enable a megafund to issue debt in addition to equity; the investment risk could be divided into tranches, with senior debt, junior debt and equity liabilities ("research-based obligations"). The ability to issue debt is critical as it would open investment to a wider range of investors, including pension funds, which have greater investment capacity and longer time horizons.

According to the simulations Lo and his co-authors ran, such a fund's mean return on equity was 7.2% to 11.4%; debtholders could expect a return of 5% to 8%.

Software with an open-source license is freely available to encourage others to experiment with the parameter values, including costs, likelihood of success, the duration of clinical trials, the potential payouts if the project yields a marketable drug, and correlations between projects (please see <http://alo.mit.edu>). A shorter and less technical version of his talk is available at <http://www.youtube.com/watch?v=xu86bYKVMRE>

**Roger Stein, MIT Sloan School of Management**

*A Simple Hedge for Longevity Risk and Reimbursement Risk Using Research-Backed Obligations*

In what served as a complement to Professor Lo's presentation, his colleague Roger Stein of the MIT Sloan School of Management presented

research that demonstrated why healthcare insurance companies and annuity issuers might want to invest in research-backed obligations (RBOs) as a hedge. His presentation was called, “A Simple Hedge for Longevity Risk and Reimbursement Risk Using Research-Baked Obligations.”

If the therapies financed by the RBOs become marketable drugs, healthcare insurance companies face “reimbursement” risk: they would be liable for paying for the cost of the clinical use of those drugs, which are likely to be very expensive. Most of those therapies extend human lifespans, so life insurance companies and defined-benefits pension funds would similarly face rising “longevity tail risk”—the risk that annuity owners or pension plan participants might outlive actuarial projections and collect payments for longer than expected. Cash flows from investments in portfolios of those therapies would mitigate both of those risks.

While most people would consider life extension a boon, Stein said, longer life spans are expensive. A two percent reduction in cancer mortality would create about 1.7 million extra years of life worldwide, he said. A single added year of average lifespan among 350,000 pensioners with an average annual benefit of \$20,000 would cost their pension plan an extra \$7 billion in future value. For health benefits providers such developments are also costly. Specialty drugs tend to be expensive; 70% of drugs approved by the FDA in 2014 were specialty drugs, and according to one study, they represented only one percent all subscriptions, but accounted for 32% of all drug expenditures.

Stein presented analytic models demonstrating how to calculate the amount of RBO equity required to hedge specific longevity and reimbursement risks in simple cases. He went on to present detailed simulation results that accommodated much more realistic assumptions and

behavior. In the simulations, the RBO securities were highly effective at hedging reimbursement risk for health benefits providers and did so at relatively low cost.

### **Dan diBartolomeo, Northfield Information Systems**

*Seeing the Big Picture: How Conflict and Corruption Impact Financial Markets*

War is not only unhealthy for small children and other living things; it also causes return-robbing volatility in financial markets, according to Dan diBartolomeo, the president and CEO of Northfield Information Systems. So is official corruption. In his presentation, entitled, “Seeing the Big Picture: Financial Markets, Conflict and Corruption,” he argued that it would be “in the financial self-interest of large asset owners to proactively try to reduce market volatility by making targeted donations or ‘impact investments’ to international non-governmental organizations” such as UNICEF, the Red Crescent or Doctors without Borders.

Equity performance turns out to be negatively correlated (–30% to –38%) with deaths in military conflicts, and bond performance is even more negatively correlated (–63% to –71%), according to diBartolomeo’s analysis of data for the period from 1900 to 2010. “Wars are expensive, driving up yields; losers in war can’t pay and there is no ‘upside’ for lenders even if their borrower wins a war,” he said.

Official corruption has a similar depressive effect on markets, diBartolomeo found. He hypothesized that the ratio of equity market valuation divided by Gross Domestic Product would be lower in countries with a perceived high degree of corruption. Comparing World Bank data on equity market capitalization/GDP with the Transparency International Corruption Perceptions Index, he found a correlation of –45%

between the two for a sample of 100 countries in 2012 and a  $-48\%$  correlation within 82 countries with functional equity markets in 2002.

These findings pointed to the logic of contributing a small percentage of global assets to NGOs. Backed by “the arithmetic of enlightened self-interest,” he suggested that a contribution of \$33 billion to NGOs would pay for itself by reducing volatility and thereby reducing the drag on the rate of long-term compounding. The \$33 billion figure was arrived at by assuming investors would agree to “take market return minus 3% on 1% of their portfolios,” and multiple the three basis points times the current market value of all traded financial markets (\$110 trillion).

“For sovereign wealth funds and other large long term asset owners (DB pensions and endowments), the real risk of disaster comes from geopolitical conflicts that can disturb the functioning of markets,” diBartolomeo said. “We illustrate that it may be plausible that asset owners may be able to pro-actively reduce market risks sufficiently to offset related costs.”

**Jeffrey Bohn, State Street Global Exchange**  
*Improving a Pension Fund’s Asset-Liability Management with Latent-Factor Modeling*

Since the great financial crisis, asset managers have looked for new risk analysis tools that might protect pension funds and other large portfolios from extreme and unexpected “tail risk” losses. The crisis taught them that even when the metrics for directly observable “fundamental factors” like interest rates or volatility look normal, untracked “latent factors” can lurk in portfolios—especially in complex multi-asset portfolios—and pose rare catastrophic risks.

But how does a risk hunter make the invisible visible—without conjuring up images that aren’t really there. Jeffrey Bohn, Chief Science Officer and head of GX Labs at State Street Global

Exchange, presented his proposal for an “integrated simulation model that relies on extracting latent factors and factor loadings from market security prices” and showed “how equity, reserve-currency sovereign bonds (fixed income), corporate bonds and a simple liability profile can be linked to the same underlying latent-factor set.”

“This method is designed to give you tools to find the risk needle in the haystack and then decide what you’re going to do with the needle,” he said during a presentation based on his recent paper, “Improving a Pension Fund’s Asset-Liability Management with Latent-Factor Modeling.”

“A latent-factor model embedded in a forward-looking simulation of both assets and liabilities can facilitate better ALM as the profile of positions, sub-portfolios, asset classes and factor risks can be disentangled in terms of how each portfolio component contributes to both volatility, expected tail loss and expected funding gaps,” Bohn’s paper said. “These analyses can provide guidance with respect to new investments, re-allocation strategy and hedge overlays. Accordingly, systemic risks can be quantified and compared to prioritize scarce analyst resources to drill into what risks should be better managed. Moreover, these systemic risks can be identified and potentially mitigated.”

**Vineer Bhansali, PIMCO**  
*Downside Risk Management of Retirement Investments*

Does the use of “tail risk” hedging strategies make sense for people who are investing for retirement? Vineer Bhansali, managing director at PIMCO, the company best known for actively managed bond mutual funds, argued in his presentation that when pre-retirees know that they have a hedge in place that buffers their portfolios against severe declines in market value, they’ll be more

willing to take the risks that can enhance long-term returns, be less prone to panic-selling, and more likely to respond opportunistically to market drawdowns.

Pre-retirement investors should think of buying equity put options with at least 30 basis points (0.3%) of their portfolio value each year—and as much as 50 or 100 basis points—as “the cost of doing business” in saving for retirement, Bhansali said. Such hedges would limit downside risk, provide liquidity in distressed markets, and enable higher strategic risk-taking. “Tail risk hedging enables investors to keep playing offense in the face of large market shocks,” he noted.

Retirement plan participants and retirees need to think about retirement financing and retirement wealth differently, he said. The combination of the present value of Social Security benefits and the value of their homes constitutes by far the largest portion of the net worth most retirees, including many relative affluent ones. For most people, investments represent only 20% or 30% of their net worth. This means their overall wealth risk doesn’t go up very much when they increase their exposure to equities. “Incorporating [Social Security and housing] assets into the asset allocation process leads to a higher equity allocation and less long-duration fixed income,” Bhansali’s slides showed.

As for mitigating personal longevity risk—the risk that a person will outlive his savings and experience a significant decline in living standards—Bhansali recommended against immediate annuities, whose prices have risen by 50% in the past 20 years, but in favor of deferred income annuities. He recommended allocating 10% to 25% of wealth to the purchase of an annuity that begins paying income after age 80. According to the presentation, “A deferred annuity provides the retiree with a more targeted longevity ‘safety net.’ Without it, the retiree must substantially delay

spending in order to self-insure against...living substantially longer than one can expect.”

**Tom Reid, Sun Life, Peggy McDonald, Prudential, Robert Pozen (moderator), MIT Sloan School of Management**  
*Innovative Retirement Products: A Panel Discussion*

In an attempt to achieve something close to universal enrollment by Canadian workers in a retirement savings plan, Canada has introduced a new initiative called the Pooled Registered Pension Plan, according to a presentation by Tom Reid, senior vice president, Group Retirement Services, at Sun Life, one of Canada’s largest insurers.

The PRPP, which so far has been established only in Quebec, resembles the NEST (National Employment savings Trust) plan in the UK and the still unrealized “automatic IRA” program in the U.S. All three programs aim to establish low-cost retirement savings vehicles for workers in companies where no salary-deferral savings plan currently exists.

Canada’s pension landscape differs from that of the U.S. in a few important ways. “Defined contribution has had a slow adoption rate in Canada,” Reid said. Only 4% of Canada’s \$200 billion in pension assets are in DC plans; the rest are in defined benefit plans. But in Canada, as in the U.S., the trend is toward DC. The PRPP, whose pooled assets would be managed by a bank, insurance company or mutual fund company, would supplement the current national pension, financed with general revenues, which pays older Canadians between \$565 and \$1100 (Canadian dollars) per month. Employers would not be required to choose investments for PRPP participants or serve as plan fiduciaries, Reid said.

On the topic of pension buyouts, Peggy McDonald described Prudential’s activity in this area. She

described the actuarial and financial mechanics behind Prudential's recent transactions with pension plans at JCPenney and Royal Philips, where Prudential sold group annuities to those plans and the plans transferred a portion of their pension liabilities and assets to Prudential.

The pension buyout business in the U.S. traditionally involve mostly small pension plans and generated sales of only about \$1 billion to \$2 billion a year, McDonald said. But the trickle has turned into a flood. In recent years, as the funded ratio of multi-billion dollar plans has fallen, sponsors of those plans have become more interested in transferring at least some of their pension risk to insurers through the purchase of group annuities. (In the U.K., where pension liabilities tend to be indexed to inflation, plans have tended to de-risk through "longevity swaps" rather than purchasing group annuities.)

Prudential has been responsible for about \$40 billion worth of these "jumbo" deals, and is by far the leader in the U.S. pension buyout business. As McDonald explained, Prudential has found ways to execute these deals without exposing its shareholders to excessive longevity risk or financial risk.

To control its vulnerability to longevity risk, Prudential has only written group annuities for current retirees who are older than age 70 and whose longevity is less uncertain than younger plan participants. The company also has a "longevity team," McDonald said, that assesses the varying life expectancies of subsets of the retirees who will be covered by a group annuity. To control its financial risk, Prudential has required payment for the group annuities in carefully selected fixed income portfolios instead of cash. This financing method immunizes the deal against the effects of interest rate changes prior to closing, and avoids the risks and inefficiencies associated with re-investing billions of dollars in cash.

In moderating the panel, Pozen observed that, for several years after the 2008 financial crisis, many sponsors of large pension plans maintained hope that the Federal Reserve would raise interest rates, boost their funding levels and save their plans. Now they've given up. "Eventually they realized that it was like 'Waiting for Godot,'" he said, referring to Samuel Beckett's classic existential play. "The new reality is that rates won't go up or not by much. The sponsors are tired of all the liability and volatility."

In addition to serving as moderator to the panel, Pozen also presented information on deferred income annuities. Like Bhansali of PIMCO, Pozen believes that individuals can protect themselves from longevity tail risk—the mixed blessing of living to age 90 or 100—by purchasing these retail insurance products.

"People have a pretty good idea of how they'll deal with the first 15 years of retirement. But they have no idea what will happen after that," Pozen said. "Will they live to 90? What will the economy be like in 30 years? If we were back in 1985, would we have known what the economy would look like in 2015? I believe that an investment of 25% of assets in a DIA is realistic. It would act like a supplemental payment from Social Security."

**Andrew Biggs, American Enterprise Institute,  
Michael Kreps, Groom Law Group,  
Annamaria Lusardi, George Washington  
University School of Business, Deborah Lucas  
(moderator) MIT Center for Finance and  
Policy**

*Policy Issues for Retirement Investing: A Panel Discussion*

Andrew Biggs of the American Enterprise Institute, Michael Kreps of the Groom Law Group and Annamaria of the George Washington University School of Business each made short presentations during a panel discussion on "Policy Issues

for Retirement Investing.” Deborah Lucas, director of the MIT Center for Finance and Policy, moderated the panel.

In a presentation entitled, “Investment Risk and Contribution Volatility of Public Employee Pensions,” Biggs said that public pension sponsors tend to make assumptions about their ability to make annual contributions to their plans and about their future investment returns that are unrealistically optimistic.

The mismatch between assumptions and reality, he warned, can only lead to plan insolvency and/or large increases in the burden on taxpayers to meet the plan obligations. He recommends converting defined benefit public pensions to defined contribution plans. “If plan sponsors really want stable contributions, they need to get a DC plan,” he said.

But Annamaria Lusardi, who directs the Global Financial Literacy Excellence Center at the GWU School of Business, cited a mismatch between the complexities of DC plans and the low financial literacy levels of many DC participants. Many participants are unprepared to make the decisions—concerning contribution rates, investment selection, loans and hardship withdrawals, and whether to annuitize—that self-directed DC plans require of them, she said.

In addition to lacking financial literacy, Americans carry increasing amounts of debt. Baby-boomers (ages 56 to 61 in 2008) have an average debt-to-asset ratio of 22.9%, and an average home loan-to-home value ratio of 29.3%, according to Lusardi. By contrast, those ages 56 to 61 in 1992 had an average debt-to-asset ratio of just 9.6% and an average home loan-to-home value ratio of only 17%. According to the University of Michigan’s ongoing Health and Retirement Study, 24.3% of Boomers have saved less than \$25,000; only 18% of the 1992 generation had so little savings (in

constant 2012 dollars). Debt service acts as a drag on progress toward retirement savings goals. Lusardi recommended a variety of steps that could be taken to simplify those decisions and educate participants.

Michael P. Kreps, a principal at Groom Law Group who has also served as Pensions Counsel to the Senate Committee on Health, Labor & Pensions, offered his view on the chance that Congress will act on any of its members’ various proposals to expand access to workplace retirement savings plans. Legislation has been introduced in the House and Senate to enact President Obama’s proposal for automatic IRAs in companies that don’t offer retirement plans, but there’s been little progress.

Retirement security has traditionally been a safe, bipartisan issue, Kreps said. But there’s currently no “express support” for mandatory workplace plans in the Republican-controlled House, and some business groups oppose any government mandate to offer a plan. Given the gridlock in Washington, Kreps noted, the best near-term hope for expanding access to retirement plans (only about half of full-time U.S. workers are covered) lies at the state level, either with state-run DC plans, state-administered automatic IRAs or state-sponsored marketplaces for the purchase of retirement plan services.

### **Deborah Lucas, MIT Center for Finance and Policy**

#### *Hacking Reverse Mortgages*

In addition to moderating the public policy panel, Ms. Lucas gave a presentation entitled, “Hacking Reverse Mortgages.” Reverse mortgages, also known as HECMs (Home Equity Conversion Mortgages or “equity release” in the UK) allow people ages 62 or older to borrow against the equity in their homes, either in lump sums or through lines of credit. The Federal Housing

Administration (FHA) insures the loans and lines of credit. No interest or principal needs to be paid until the borrower dies and/or the house is sold.

At first glance, reverse mortgages would appear to solve the problem of many American retirees of being unable to tap into their home equity. An estimated 80% of Americans over age 62 own their own homes; many of them would prefer to “age in place” (i.e., live in those homes until death). Home equity accounts for about half of older household’s median net worth. Trillions of dollars in illiquid home equity appears waiting for older Americans to liquefy it. Reverse mortgages would appear to let them have their housing cake and eat it too.

But the FHA’s HECM program has failed to fill the need, Lucas said. Only about 2% of eligible seniors use it and only about \$16 billion in loans have been originated. In an academic paper, Lucas offered a reason for the lack of demand: “The loans are expensive for borrowers. There is a government subsidy, but the benefits are largely captured by the guaranteed private lenders.” Perversely, because the program is government-subsidized and the fees are fixed, market forces that might improve the product don’t work the way they could or should. “This is a very complicated product for a finance professor to understand,” Lucas told conference attendees. “It’s one of the most complex federal programs I’ve ever come across.”

BY KERRY PECHTER, EDITOR AND PUBLISHER  
RETIREMENT INCOME JOURNAL