

Recreating Retirement Sustainability

Olivia S. Mitchell and Raimond Maurer

October 2013

PRC WP2013-18

Pension Research Council Working Paper

Pension Research Council

The Wharton School, University of Pennsylvania

3620 Locust Walk, 3000 SH-DH

Philadelphia, PA 19104-6302

Tel: 215.898.7620 Fax: 215.573.3418

Email: prc@wharton.upenn.edu

<http://www.pensionresearchcouncil.org>

Recreating Retirement Sustainability

Abstract

The financial crisis and the ensuing Great Recession have alerted those concerned with old-age security to the extreme risk confronting our retirement system. In this volume, we provide an in-depth analysis of the ‘black swans’ threatening pension plans around the world. Longevity risk, capital market shocks, regulatory and political risk, and model risk all have profound consequences for pension plan participants, plan sponsors, regulators, and consultants. This book also sketches various ways to manage and finance these risks, with a view to rebuilding a more resilient retirement system. In particular, the ensuing chapters take on longevity risk, capital market risk, model risk, and regulatory risk.

Olivia S. Mitchell

The Wharton School
University of Pennsylvania
3620 Locust Walk, 3000 SHDH
Philadelphia, PA 19104
mitchelo@wharton.upenn.edu

Raimond Maurer

Finance Department
Goethe University Frankfurt
Gruneburgplatz 1 (Uni-PF. H 23)
Frankfurt am Main
Germany
maurer@finance.uni-frankfurt.de

Chapter 1 Recreating Retirement Sustainability

Olivia S. Mitchell and Raimond Maurer

The financial crisis and the ensuing Great Recession have alerted those concerned with old-age security to the extreme risk confronting our retirement system. In this volume, we provide an in-depth analysis of the ‘black swans’ threatening pension plans around the world. Longevity risk, capital market shocks, regulatory and political risk, and model risk all have profound consequences for pension plan participants, plan sponsors, regulators, and consultants. This book also sketches various ways to manage and finance these risks, with a view to rebuilding a more resilient retirement system. In particular, the ensuing chapters take on longevity risk, capital market risk, model risk, and regulatory risk.

Measuring and Managing Longevity Risk

As the workforce ages and people live longer, analysts concerned with retirement security have focused increasingly on how financial markets can help model and manage longevity risk. Andrew Cairns (2014) notes that many statistical models of the human life extension are not very robust, though good models are critical if we are to properly forecast future mortality patterns and protect retirement plans against this risk. Defined benefit (DB) plans in particular need ways to hedge against large increases in human survival rates, including longevity swaps. Nevertheless, pension plan sponsor must also evaluate their appetite for and tolerance to risk, in order to determine how much to pay for such protection. This is not always an easy task.

Taking the argument a step further, Guy Coughlan (2014) proposes that DB pension plans should address longevity risk in the larger framework of corporate finance and financial economics. He points out that with the development of longevity swaps, this risk can now be hedged in a flexible and customized way. As a result, DB pension plans now have at their disposal a complete toolkit for ensuring they are managed in a sustainable fashion. In fact, because of the compounding effects between longevity and interest rate risks, he suggests that it is financially desirable to manage these two liability risks in concert. His proposed framework provides the basis for the addressing key pension risk management decisions, including whether to consider a buyout/termination, or pursue the hedging of longevity risk as part of the long-term management of the plan. He then shows how this approach helps understand the different ways in which Ford, General Motors, and Verizon handled risk management in their pensions.

The chapter by Michael Sherris and Qiming Zhou (2014) outlines several different actuarial approaches to modeling longevity risk. Both systematic mortality risk models and Markov aging models that can handle heterogeneity have been developed, but often analysts capture only one of these aspects of mortality risk. Their work, by contrast, embeds a mortality heterogeneity model along with a frailty model to show the impact of this risk on annuity fund values at older ages. In particular, when a mortality model includes systematic risk, this can increase the tail of the mortality distribution. They also allow for adverse selection to impact pension plan fund values.

Securitization of longevity risk is a topic that has generated much interest of late, as noted in the chapter by Richard MacMinn, Patrick Brockett, Jennifer Wang, Ruilin Tian, and Yijia Lin (2014). These authors explore several ways to manage longevity risk in both DB and defined contribution (DC) plans, noting that longevity risk is a \$2.2 trillion business in the U.S. and \$42 trillion business globally.

Modeling and Managing Capital Market Risk

One way that pension plans can better handle the capital market risk they face is to undertake Liability Driven Investment (LDI). Enrico Biffis and Robert Kosowski (2014) outline the main principles behind this variant of asset liability management (ALM), and they describe commonly used hedging tools. They also discuss emerging de-risking tools such as pension buy-outs/ins, longevity swaps, and tail risk hedges that have gained popularity in light of the rise in cross-asset correlation associated with quantitative easing. They go on to review some of the main challenges ahead, including changes in pension regulation, centralized clearing of derivatives, and risk-taking incentives in delegated asset management for pension plans. Recent innovations include risk on/off trading, stock-bond correlation longevity swaps, and Credit Support Annex (CSA) pricing. Non-cleared derivatives may also be part of the solution.

A different aspect of extreme longevity derives from the concern that deriving projections 30 years out is problematic, inasmuch as asset returns do not appear to be well behaved. James Moore and Niels Pederson (2014) contend that historical data suggest important deviations from normality in asset returns, so that fat tails and extreme events happen more often than we once anticipated. A different approach to simulation involves developing a macroeconomy-consistent structural model, which can be used to run simulations through real-world simulators. They devise a regime-switching model and compare results to more common approaches.

Marlena Lee (2014) also brings a measured perspective to the way in which many pension modelers use stochastic models to project the future. Monte Carlo simulation is commonly used in risk analysis and in financial planning, which generally assumes normal distributions of uncertainty. While such simulations will always be a useful financial planning tool, she also highlights their limitations. For instance, she notes that returns of 40 percent would be anticipated to occur only once

each 520 years if shocks were normally distributed, but these were seen in both 1931 and 2008. Moreover returns in excess of 70 percent would be expected to occur only every 4002 years, but this happened in 1933.

In sum, experts agree that all statistical models can provide useful guides, but model risk remains a crucial problem that cannot be taken too lightly. Financial models played a key role in the global financial crisis, and new ways to modeling financial risk are greatly needed.

Preparing for Regulatory and Political Risk

Another important topic in the retirement security arena pertains to what many in the field call regulatory and political risk. Philip Davis (2014) focuses on how pension regulation has become more focused on risk, transparency, and governance. In fact, he points out that some regulatory developments have been counterproductive, inducing pension funds to become increasingly short-term focused in their investments. Whereas banks have been subjected to new regulation under the Basel III international agreements in the wake of the financial crisis, Davis contends that pension funds do not compete across borders, a pension failure does not usually produce significant externalities across borders, and pension policy remains national in scope. Nevertheless, he also recognizes that some global similarity in regulation of company funds would likely be beneficial to multinationals. Some countries have turned to focus on risk-based supervision for DC pensions. Additionally, international accounting standards are also a form of regulation, in particular the mark-to-market movement.

The chapter by Stefan Lundbergh, Ruben Laros, and Laura Rebel (2014) examines how regulation can replicate what traditional DB pension schemes offered: they completed the market by offering real deferred annuities to their members. Although the traditional DB design proved to be

unsustainable due to the demographic developments, it still serves as a guide of what good pension solutions should provide, namely a lifelong stable inflation and linked cash flows at retirement. And in this context, they argue that risk should be defined as the probability of failing to provide stable retirement income. This approach to pension risk differs substantially from the wealth management portfolio approach. Against this backdrop, they see recent European Union (EU) regulatory changes as seeking to create a single market among member states for retirement provision and thus to remove an obstacle to labor mobility. In turn, this effort to bring coherence will increase transparency and create incentives for insurance companies and pension funds to manage the balance sheet risks in an economically meaningful way, while also providing regulators with an early warning system and tools for intervention. The authors also suggest that by applying the principles of market consistent valuation and pricing mechanisms to pension design, it will be possible to build a collective product that is fair to the members/customers and embodies an internally consistent risk based framework.

In his chapter, Tim Hodgson (2014) points that we cannot diversify our risk across time; hence he contends that analysts, regulators, and plan designers should give greater weight to the consequences of outcomes and less weight to their likelihoods. And in this context, extreme risks matter and deserve more attention than they have been given thus far. This is particularly worrisome since the global economic environment continues to be characterized by significant imbalances, and retirement for the masses is at serious risk, In fact he believes that retirement as currently configured was never affordable, but this reality was hidden by demographic and debt trends over many decades. He adds that a ranking system is a useful way to prioritize efforts to consider and manage potential risk exposures; as far as hedging is concerned the major conclusion is that political, environmental, social, and technological risks are generally difficult

to hedge. In view of this, a pragmatic solution is less about changing investment strategy and more about building a larger risk buffer.

Implications for Plan Sponsors

Amy Kessler (2014) notes that, while population aging continues unabated, the low growth/low interest rate environment is producing a deep funding gap for plan sponsors who have been taking on more risk to bridge the gap. In fact, finding path for pensions to be unsustainable, she questions whether there is a way to budget and moderate risk, provide for increasing longevity, manage the inter-generational risk in the pension plan, and create greater certainty that participant benefits can be met. One possible solution might be to increase the retirement age. Moreover, pension risk-transfer decisions made without taking longevity risk into account will consistently undervalue benefits of risk management. By contrast, she contends that a sustainability model departs from the conventional model, by building in a risk budget.

The study by Geoff Bauer, Gordon Fletcher, Julien Halfon, and Stacy Scapino (2014) argues that corporations have allocated a significant share of available cash originating from ongoing operations, as well as equity and debt, to finance pension obligations rather than to boost core productive activities or enhance shareholder value. And firms sponsoring under- or unfunded pension liabilities should assess whether they must provide additional voluntary funding, invest in alternative opportunities, or pursue other corporate activities. In their view, a holistic approach to pension risk and funding can prevent another decade of weak asset-liability management strategies, conflicts with trustees, investment boards and unions, and lost pension contributions. Pension deficits have ballooned after the 2008 crisis, and corporate finance decisions must be balanced in the face of pension risk and governance.

Conclusion

Many see the lengthening human life span as a welcome development, but longer horizons also expose us to a greater chance of tail risks and reduce our ability to predict long term capital market patterns. Moreover, our retirement system is grounded on the promise of Social Security and medical care benefit schemes, both of which confront important solvency challenges. For all these reasons, pensions will need to build in flexibility, if they are to be resilient to demographic, capital market, model, and regulatory risk. Moreover, in the United States and many other countries, pensions and other employee benefits were designed to be an employer responsibility. Yet as the healthcare system evolves and DB plans are frozen and terminated, there is a profound need to rethink oversight and quality control over the entire employee benefits system, including pensions.

References

- Bauer, G., G. Fletcher, J. Halfon, and S. Scapino (2013). 'The Funding Debate: Optimizing Pension Risk within a Corporate Risk Budget,' PRC Working Paper 2013-30. Philadelphia, PA: Pension Research Council.
- Biffis, E. and R. Kosowski (2013). 'Managing Capital Market Risk for Retirement,' PRC Working Paper 2013-23. Philadelphia, PA: Pension Research Council.
- Cairns, A. (2013). 'Modeling and Management of Longevity Risk,' PRC Working Paper 2013-19. Philadelphia, PA: Pension Research Council.
- Coughlan, G. (2013). 'Longevity Risk Management and Corporate Finance,' PRC Working Paper 2013-20. Philadelphia, PA: Pension Research Council.
- Davis, E. P. (2013). 'Evolving Roles for Regulators in the Pension Arena,' PRC Working Paper 2013-26. Philadelphia, PA: Pension Research Council.
- Hodgson, T. (2013). 'Extreme Risks, the Irreversibility of Time, and the Retirement Anomaly,' PRC Working Paper 2013-28. Philadelphia, PA: Pension Research Council.
- Kessler, A. R. (2013). 'Strategies for Sustainable Defined Benefit Pension Funds,' PRC Working Paper 2013-29. Philadelphia, PA: Pension Research Council.
- Lee, M. (2013). 'Stress Testing Monte Carlo Assumptions,' PRC Working Paper 2013-25. Philadelphia, PA: Pension Research Council.
- Lundberg, S., R. Cardano, R. Laros, and L. Rebel (2013). 'Developments in European Pension Regulation: Risks and Challenges,' PRC Working Paper 2013-27. Philadelphia, PA: Pension Research Council.

MacMinn, R., P. Brockett, J. Wang, Y. Lin, and R. Tian (2013). 'The Securitization of Longevity Risk and Its Implications for Retirement Security,' PRC Working Paper 2013-22. Philadelphia, PA: Pension Research Council.

Moore, J., and N. K. Pederson (2013). 'Implications for Long Term Investors of the Shifting Distribution of Capital Market Returns,' PRC Working Paper 2013-24. Philadelphia, PA: Pension Research Council.

Sherris, M. and Q. Zhou (2013). 'Model Risk, Mortality Heterogeneity and Implications for Solvency and Tail Risk,' PRC Working Paper 2013-21. Philadelphia, PA: Pension Research Council.