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## Understanding the Uncertainties of Retirement

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## Understanding the Uncertainties of Retirement

### Disciplines

Economics

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The published version of this Working Paper may be found in the 2006 publication: *Restructuring Retirement Risks*.

## **Part I**

# **Perspectives on Pension Risks and Rewards**



## Chapter 1

# **Understanding the Uncertainties of Retirement**

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*David Blitzstein, Olivia S. Mitchell, and Stephen Utkus*

An aging-population tsunami is sweeping the world, and capital markets have buffeted pension plans while retiree health care costs rise without letup. This coincidence of shocks marks a crucial moment for global retirement security, since public and private retirement systems everywhere have fared poorly just as the massive Baby Boom generation moves into retirement. Clearly urgent efforts are needed to enhance risk management for public and private pension systems around the world. This book explores three aspects of the evolution of risk and reward sharing in retirement, to offer guidance to pension fiduciaries, plan participants, and policymakers. First, we focus on new perspectives for assessing retirement risks and rewards. Second, we evaluate efforts to insure retirement plans. Last, we provide several new strategies for managing retirement system risk. This chapter briefly previews the remarkable findings by contributors to this rich and interesting volume.

### **Perspectives on Retirement Risks and Rewards**

Many long-held beliefs about the pension system have been undermined in the last few years. Traditionally, pension stakeholders believed that firms which offered a defined benefit (DB) plan would bear the bulk of the pension plan risk. But recent corporate bankruptcies involving massively underfunded DB plans have clearly demonstrated that workers and retirees are also exposed to capital market risk in such pensions. And even though DB plans are seriously underfunded in many developed nations, many have not yet come to grips with this new reality. Instead, sponsors and participants often elect to simply wait for rising markets to bail out the system—a leap of faith that we contend represents poor policy and wishful thinking on stakeholders' part.

Indeed, there are several sources of uncertainty in the retirement mix. In his chapter, Henning Bohn explores the role of technological change and productivity, future fertility and longevity patterns, and health shocks. Bohn argues that productivity represents the greatest source of long-term uncertainty. If productivity increased 1 percent annually over a generation, today's children would earn 35 percent more than today's workers, and

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their children in turn would be 80 percent wealthier. If productivity grew at 3 percent, today's youths would earn 140 percent more than their parents and their children would earn 500 times more. Nevertheless, the retirement security debate tends to focus mainly on asset valuation rather than productivity risk which is often overlooked. Using an overlapping-generations (OG) model, Bohn shows that some groups—namely active workers—are more exposed to even more productivity risk than others—namely retirees. He also demonstrates that demographic risks must be taken into account since large cohorts, such as the baby boomers, have a disadvantage compared to smaller cohorts in demanding wages; further, its flood of retirement saving tends to depress asset returns. Another demographic risk is uncertain longevity: the good fortune of living longer is bad news financially. As a result, increasing retirement age along with longevity improvements make sense and annuitized pensions help share longevity risk.

Taking the perspective of participants, Phyllis Borzi notes that only a decade ago, some 40 percent of US families had at least one member enrolled in a DB plan, but the figure has now dropped to 20 percent. Defined contribution (DC) plan coverage rose from one-third to over one-half over the same period, but she worries that the average 401(k) balance is not large, amounting to only about \$77,000 in 2003. This highlights 'accumulation risk' or the possibility that workers will not build up enough saving or underestimate the amount of money they will need in retirement. Another obstacle to accumulating retirement saving arises from 'breaks in coverage', due to unemployment or disability, reducing contributions, and employer matching. Furthermore, she points out that employees often lack the knowledge to invest wisely: in a corporate DB plan, the costs of hiring professional investment advice are spread across the entire group, but if workers invest on their own, they often invest too conservatively and tend to hold too much undiversified employer stock.

Due to the relatively recent arrival of DC pensions on the scene, today's retirees have not had an entire career to invest in this sort of plan. To assess their likely future role, Sarah Holden and Jack VanDerhei describe their model that estimates projected future saving patterns in the 401(k) context. Their model tracks amounts contributed, asset allocation, and whether loans are taken; they also consider whether participants change jobs and whether they roll their accruals into individual retirement accounts (IRA). The research indicates that workers who remain in a 401(k) plan for their entire careers will replace about half of their pre-retirement salary in the lowest income quartile if they reach age 65 between the years 2030–9; replacement rates of two-thirds would be anticipated for the highest income quartile. Combined with social security, retired low-paid workers could receive over 100 percent of their preretirement income, while higher earning retirees would expect over 80 percent. But they also

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show that replacement rates would be much lower, around 25 percent, if workers experience long breaks in service unless they have the self-control to contribute to an IRA.

Discussions of retirement income risk should also acknowledge the huge problem of retiree medical care, addressed in the chapter by Brian Fuller, Anna Rappaport, George Wagoner, and Frank Yeager. In the USA, larger employers traditionally offered early retirees continuation of medical coverage until age 65, and most also offered supplemental coverage once the retiree attained age 65 and was eligible for government-provided Medicare. (Most small- and mid-sized firms offer no supplemental coverage.) Yet there retiree health insurance provision has dropped steadily: a decade ago, almost half of all large employers offered retirees health care insurance if they were below the Medicare age, and some 40 percent offered coverage to the Medicare eligible. These figures are now down to 26 and 20 percent, respectively, and continue to fall. This is the result of concern over rising retiree medical costs that have risen at double digit rates for a decade; health insurance premiums for pre-Medicare retirees are now 25 percent higher than active workers. It is also worth noting that 5 percent of claimants account for more than half of the medical care costs, leading to the problem of adverse selection in the health insurance risk pool. If employers try to recoup costs by increasing the employee share of premiums or other costs, healthier participants will tend to drop out, leaving only the sickest, most expensive beneficiaries—a phenomenon sometimes called the ‘health plan death spiral’. More generally, aging workforces and continued double-digit increases in health care costs are leading employers to boost retiree health premiums, drop coverage, or move to a defined-dollar approach where retirees must bear the brunt of future premium increases.

### **Pooling Pension Risks and Rewards**

The recent wave of DB pension fund terminations has prompted many to review the role of pension insurance, offered by the US government for the last thirty years and recently adopted in the UK. In their chapter, Julia Coronado and Nellie Liang investigate whether this pension insurance has influenced financial practices in firms offering DB pensions. The authors note that the insurance premiums charged were not properly risk based, thus distorting funding and possibly asset allocation decisions. In fact, they conclude that the inefficient premium structure creates moral hazard and exacerbates underfunding, mainly through inadequate contributions. They find little evidence that pension funds offered by firms close to bankruptcy got into trouble by holding riskier assets in their portfolios.

The flaws in the US DB guarantee program have produced a \$450 billion shortfall in the insurer’s reserves, in part because the rules are overly complicated and offer few incentives for sponsors to prudently fund their

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plans. Authors Neal McCall, Mark Warshawsky, and John D. Worth outline several key principles that they contend should guide reform proposals, placing great emphasis on the view that DB plans should be seen as financial intermediaries providing workers with a promise of deferred compensation. They also propose that DB plan sponsors and participants are economic actors who respond to incentives in a predictable way. Finally, they note that no DB plan will live forever, so provisions should be made for termination. These principles imply that an insurer cannot provide an open-ended guarantee without exposing itself to extraordinary risk. Their reform proposals stem from the observation that pension assets and liabilities must be measured in a transparent and timely manner. Whereas under current law, plan sponsors may compute an 'almost infinite number' of liability calculations, they argue for a single liability measure. They also argue again discounting expected future benefit payments using a single discount rate, and they favor a seven-year amortization period for annual increases in funding shortfalls. Finally, they additionally propose restrictions on the extension of new benefit promises by sponsors that fall below minimum funding levels. Their proposals address the incentives for plan sponsors in financial trouble to promise generous pension benefits rather than raise wages, putting more participants and the government insurer at risk. Under their proposal, bankrupt companies would not be allowed to raise benefits if they were 20 percentage points below their required funding level. Investment-grade sponsors would be unable to increase benefits if they were below 40 percentage points of their targeted funding level.

Plan sponsors hoping for reform of the US guarantee system should take to heart aspects of the newly created Pension Protection Fund (PPF) in the UK, as described by Anthony Neuberger and David McCarthy. This chapter projects a set of likely scenarios for the recently established PPF and concludes that the UK insurer will likely have many years of low claims, interspersed with troubled periods of high demand. As a result, the UK fund would require huge reserves, which the authors conclude will be politically difficult to maintain. Since the PPF will face lumpy and irregular claims, relatively small in normal times but huge after a market downturn, the authors argue that the UK reserve fund design is economically nonviable. These same lessons apply not just to the UK design but to any reserve fund attempting to guarantee private DB pension claims.

### **New Strategies for Managing Retirement Risk**

Traditional DB plans are moving quickly to extinction, driven by systemic risk, economic and accounting issues, and administrative problems. Brett Hammond and Douglas Fore assert that the biggest problem is that traditional plans did not keep up with dramatic changes in the labor market. Consequently, these plans are now concentrated in troubled industries

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such as steel and airlines. Additionally, accounting rules permitted sponsors to smooth asset values and underfund their plans. To counteract these trends and enhance DB benefit systems, the authors favor the recently adopted European accounting standards that require market-based accounting and curb smoothing of asset values. They also propose a new framework for DB plans that would emphasize portability. Once common actuarial standards and plan designs are adopted, workers could purchase service credits and carry them along when they change jobs.

In view of the growing popularity of company-sponsored DC plans around the world, it is worth knowing how they are designed and what they accomplish. In the USA, plan sponsors have a great deal of leeway regarding employee contributions, employer matches, investment menus, the availability of loans, and various other plan features. The chapter by Olivia Mitchell, Stephen Utkus, and Stella Yang demonstrates that a wide range of US 401(k) plan design features are a function of the average wages of a workforce—better-paid employees are more likely to have more generous matching contributions, as well as ‘better’ noncash features such as greater access to loans. Drawing on data for more than 500 401(k) plans covering more than 740,000 participants, the authors show that corporate match rates *offered* range from 0 to 18 percent; the median match offered was 3 percent of pay. They also note that *actual* employer match rates fell below 2 percent of pay, since not all employees opted to contribute the full amount. For lower-paid employees, employer matching elicits a positive impact on contributions up to 3 percent of salary, but there is little response above that level. Because of the impact of average workforce earnings on plan design, the analysis shows that a low-paid clerical worker employed at a high-wage firm would be likely to have a richer plan with a more generous match and other appealing attributes; the same worker employed at a low-wage firm would have far less rich opportunities to save.

A different approach to pensions in Europe, described by Peter Albrecht, Joachim Coche, Raimond Maurer, and Ralph Rogalla, explores a hybrid plan which combines elements of both DB and DC plans. Their chapter traces how a traditional DC pension can be adapted to include, for instance, minimum and maximum benefits, and minimum as well as maximum return guarantees in the individual investment accounts. The authors also show that capping investment returns is the best way to share investment risk and returns more equally between plan sponsors and participants. Further, the analysis explores optimal asset allocation-given benefit and return features. For instance, if the plan caps investment returns, the optimal investment strategy would rely on a high exposure to bonds and low exposure to equities. Additional costs of these guarantees will vary according to their structure, with estimates ranging from 0 to 250 percent of contributions depending on the plan design.

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Turning to public pensions, the chapter by Salvador Valdés-Prieto asks how to mitigate political risk in unfunded social security systems which arise when demographic and economic shocks require action but politicians cannot take urgently needed action. He proposes developing contracts and rules that remove discretion from politicians by securitizing the revenue stream dedicated to social security. This would be facilitated by having the system issue Covered Wage Bill bonds, representing the future revenue from payroll taxes dedicated to social security. Participants could trade these assets with their prices set similarly to mutual fund net asset values. This scheme would offer a means to restructure pay-as-you-go social security systems while internalizing transition costs, as the payoff to the new bonds would depend on system financing and economic performance.

## **Conclusions**

While private and public retirement systems face deep stresses, made worse by volatile capital markets, uncooperative interest rates, poor corporate earnings streams, anemic macroeconomic underperformance, and international turmoil, progress is possible. Those charged with protecting the pension institution understand that there is a deep-seated need for restructuring of these valued and long-standing retirement institutions, to restore the promise of future retirement security. This volume informs the debate by bringing to the fore lessons from research and practice on these topics so critically important for the future of retirement security.

Three lessons can be drawn from the current DB pension crisis. First, DB plan funding is extraordinarily sensitive to investment returns and volatile swings in asset prices, much more so than previously believed. Second, mature DB plans have become highly leveraged, with assets rarely well-matched to liabilities. Third, while DB pensions should be long-term investments, in practice they confront lethal short-term market risks that have undermined their survival. Experience shows that pension-funding ratios can drop 30 percent in a single year. These problems arise from several sources, including outmoded pension actuarial and accounting practices which assume incorrectly that assets always earn an equity risk premium. This has produced confusion over smoothing assets and liability value, allowing corporations to convey plan assumptions to generate profit and create incentives to undertake an asset–liability mismatch.

Going forward, the ‘pension deal’ between employers and participants must be seen as a contractual relationship requiring transparent and accurate information so that both sides know what risks they are sharing (see Frijns 2003). If stakeholders are required to finance shortfalls, they must also be included in the sharing of surplus. The contract should also include clearly stated, targeted, pension formulas that describe the risk-bearing agreement between various stakeholders in the pension plan. Both

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the reform of traditional DB pensions, as well as the continued growth of hybrid and DC pension designs, will be central to this transformation of risk-sharing among the affected parties. Indeed, retirement security is the central policy issue of our time: it can no longer be shunted off to the side.

### **Reference**

Frijns, Jean (2003). 'Redesigning DB Pension Plans: The Case for Risk-Sharing Cooperatives', *The Ambachtsheer Letter*#209. Toronto: K.P.A. Advisory Services, Ltd.