The Pension Challenge. Risk Transfers and Retirement Income Security, edited by Olivia S. Mitchell and Kent Smetters, 2003, New York/Oxford: Oxford Univ. Press, 328 pages.

Reviewer: Roland Eisen, Department of Economics, Goethe University of Frankfurt, Germany eisen@wiwi.uni-frankfurt.de.

I.

This is a very interesting collection of essays mainly concerned with new developments enhancing old-age income security and its costs. Issues such as increasing volatility in capital markets combined with massive global demographic change force academics, financial practitioners, pension participants young and old, and policymakers "to search for innovative and creative responses" (p. 1).

After an informative "Overview" by the two editors, there follow thirteen papers organized under two headings: Plan Sponsors and Retirement Income Risk covers six papers by Bodie, Mitchell, and Utkus; Ramaswamy, Doyle, and Piggott; Gold, and Palacios. Global Developments in Retirement Risk Transfers contains seven papers by Lachance and Mitchell, Maurer and Schlag; Forsyth, Vetzal, and Windcliff; Walliser, Turner, and Rajnes, Cummins and Lewis; and Fliegelman, Milevsky, and Robinson.

II.

In the following review, I shall comment on only a few of these papers, according to my personal interest in evaluating the costs of the implied risk transfer.

Increasingly, the traditional defined benefit (DB) model has been substituted with defined contribution (DC) plans. Yet, many of the challenges for DB plans, either centralized public funds or private sector plans, apply also for DC plans (whether public or private). Only a public entity can supervise the funds, and this task requires competence and transparency. Furthermore, government in its role as regulator and supervisor can produce the same distortionary consequences as might have existed in the old public managed system. Additionally, decentralization and competition imply costs that reduce the net investment returns. And these costs result either as pure administration (and selling) costs, or as costs of the risks the plan sponsors transfer to participants.

A prominent place here is taken by the investment risk and the hypothesis, that investment risk becomes less important over the long run. As put by Zvi Bodie (in chapter 2), "The apparent reduction in risk is a statistical illusion arising from the fact that the measure of return used is an average compound rate" (p. 21). However, this is not the relevant parameter but "the dispersion of the value of the portfolio in 30 years. The dispersion of long-term holdings does not fall with time" (p. 21). The same is true also with another argument, related to the probability of a shortfall (pos), where this "occurs if the value of a stock portfolio at the horizon date is less than the value an investor would have received by investing in safe bonds (e.g., Treasury bonds) maturing on that same date" (ibid). Now, if the expected average compound return on stocks exceeds the risk-free rate of interest, "it is indeed true that the probability of a shortfall declines with the length of the investment time horizon" (ibid). However, this pos is again "a flawed measure of risk because it completely ignores the severity of the financial loss should a shortfall occur" (ibid). The "right" measure, according to

Bodie, is the cost of insurance of the wealth position at the maturity date, and this is a put option: "According to theory, and in actual practice, the put price representing the cost of insuring against a shortfall increases as the investment horizon lengthens" (p. 22).

This result is confirmed by Marie-Eve Lachance and Olivia Mitchell (in chapter 8) for Individual Account Guarantees (as part of a social security reform). Without going into details of calculating these IA guarantee costs, the results are astonishing. For an investor with a 40-year investment horizon and a 50/50 stock/bond portfolio, "the cost of guaranteeing the 10-year Treasury bond returns would be 0.65 percent of assets annually," or equivalently $3,406 in present value dollars or 16 percent of total contributions (p. 172). Although, Lachance and Mitchell ignored administrative costs associated with the guarantee, "it is interesting to note that such fees could even exceed the guarantee payments themselves" (ibid).

For Germany, Raimond Maurer and Christian Schlag (chapter 9) calculate the costs of a "money-back" guarantee. They show that the conditional mean expected loss[1] against a (nominal) zero percent target rate of return in a stock saving plan increases with the time horizon (up to 20 years) from 8.62 percent to 16.55 percent of the sum of the contributions paid (see Figure 9-3, p. 194).

III.

In chapter 3, Olivia Mitchell and Stephen Utkus discuss several arguments for and against employer stocks in DC plans. Krishna Ramaswamy calculates (in chapter 4) an efficiency measure "showing the difference between an efficient portfolio and the one chosen by the DC plan." Furthermore, he calculates the cost of "insurance against the decline in his wealth attributable to his undiversified position within the DC plan" (p. 72). He shows that this insurance policy (also seen as an option contract) "becomes very expensive for longer terms" (p. 84). This is why Maurer and Schlag suggest alternative hedging strategies which might be cheaper (see pp. 198 sqq.).

In chapter 5, Suzanne Doyle and John Piggott focus on the design of annuities and similar retirement income instruments when public and private pension systems may interact with each other. Jeremy Gold (chapter 6) discusses the error normally made by public actuaries about the value of the pension obligations. This valuation favors today's generations, therefore, "even those who do perceive the problem are poorly motivated to correct it" (p. 44).

Robert Palacios (in chapter 7) presents an interesting description of five countries' public pension funds investments. It seems clear that it is a crucial question whether public plans will be managed effectively in the future. Globally, as mentioned here, "pension assets under public management are estimated at more than one-quarter of world GDP, although this impressive figure is driven primarily by United States and Japanese reserves" (p. 140).[2]

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[1] This MEL indicates the expected loss with respect to the benchmark, under the condition that a shortfall occurs! Given a loss, MEL shows "how bad on average" the loss will be (see pp. 190-191).

[2] Only a short remark: I cannot understand why everybody compares a stock variable (assets) with a flow variable ($ per period). This never gives percentages.

In chapter 10, Peter Forsyth, Kenneth Vetzal, and Heath Windcliff discuss so called segregated funds in Canada which provide a guarantee on the initial principal invested after a specified time horizon, therefore offering investors the upside potential of the equity market, while providing a protective floor should the market fall (see p. 214).

Also, Jan Walliser (chapter 11) looks at the costs and benefits of risk protection for retirees in mandatory DC plans. And while Walliser is concerned with state programs, John Turner and David Rajnes (chapter 12) analyze retirement guarantees for voluntary DC plans "that workers must participate in if they work for a particular employer, in a particular industry, or belong to a particular union" (p. 251). Both papers survey different countries.

David Cummins and Christopher Lewis (chapter 13) give a thorough description of new ways to manage risk of institutional investors via asset-backed securities (ABS) and non-traditional ABS such as "Act-of-God bonds," Tobacco bonds or Kelvin Weather Derivatives. Furthermore, they analyze the advantages and disadvantages of holding such complex securities.

In the last chapter, Arthur Fliegelman, Moshe Aye Milevsky, and Scott Robinson focus "on the risks and opportunities for insurers when they convert qualified retirement or other saving into guaranteed payout streams" (p. 309). In particular, they develop a pricing model to quantify the risks to profitability (and solvency) from unexpected increases in longevity (ibid).

IV.

These papers show that the interested groups can develop innovative and creative responses to the challenges posed by the economic and demographic trends leading to a more risky global retirement environment. However, this collection also shows that there is still a lot to do—in educating people while they decide on their retirement products; and in maintaining insurers' financial sustainability, including protection for the long-tailed nature of payout annuity contracts. With respect to the question raised about retirement income security, it is a pity that all papers only use the assumption of "i.i. and n.d." (i.e., the easy-to-handle normal distribution), when we all know that capital markets behave differently.

Modern Actuarial Theory and Practice, 2nd edition, by Philip Booth, Robert Chadburn, Steven Haberman, Dewi James, Zaki Khorasanee, Robert H. Plumb, and Ben Rickayzen, 2005, Chapman & Hall/CRC

Reviewer: Ping Wang, St John's University, wangp1@stjohns.edu.

What is an actuary? Answers abound. However one thing is fundamental to all answers—actuaries deal with risks. On the Web site of "Be an Actuary," actuaries are defined as experts in (1) evaluating the likelihood of future events; (2) finding creative ways to reduce the likelihood of undesirable events; and (3) decreasing the impact of undesirable events that do occur.

To execute the mission, those who want to become career actuaries must acquire the fundamental mathematics of actuarial science and its associated disciplines, which is covered in *Loss Models: from Data to Decision* by Klugman et al. (2004); *Actuarial*

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