



## Book Review

### Book Review: Actuarial and Financial Risks in Life Insurance, Pensions, and Household Finance - Edited by Luca Regis

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## 1. INTRODUCTION

Numerous empirical studies have conclusively demonstrated that nations of any socioeconomic level that expand their insurance industries are more successful in fostering stronger long-term economic growth and development, in a quicker and less volatile manner (Outreville, 1990; Han et al., 2010; Pradhan et al., 2015). Income, life, and equity protection are among the benefits of insurance, which is viewed as a crucial component in today's globalized economic systems. Insurance also benefits gross capital formation, total productivity, public spending, foreign direct investment, trade opening, and financial development (Apergis & Poufinas, 2020). Recent legislative reforms and heightened awareness of the various sources of uncertainty that affect the operations of insurance and pension funds have increased interest in insurance risk management theory and practice. In light of this, this Special Issue compiles pertinent essays on a range of topics including longevity risk modeling, solvency requirements, risk management, and risk sharing. To help readers manage financial and actuarial risks when making an investment or business-related decisions, this book aims to address some of the most common problems that people and businesses encounter. Only nine excellent submissions were chosen from a huge number to make up this edition.

The majority of the chapters take the form of research papers, and the topics covered in these papers range from risk management to mortality modeling, which is an essential topic. The management of financial and actuarial risks is covered in-depth in each chapter of this book, which also provides readers with a wide understanding of risk management and risk sharing. As a result, whether discussing the investment or business-related decisions of individuals or corporations, this book acknowledges the significance of financial and actuarial risks. Instead, this book is a collection of essays that address a wide range of research issues with a special emphasis on longevity risk modeling, solvency requirements, risk management, and risk sharing. In addition, this book contains fresh factual data on the quickly changing business dynamics associated with the insurance industry as well as a variety of relevant opinions on the topic of financial management. The chapters in this book are the result of a team of international experts working together, and they present unique research on financial management from a variety of theoretical vantage points, various epistemological frameworks, and mixed research approaches. It is meant for a large audience, which includes academics and professionals who are interested in learning about insurance and finance. The majority of the chapters in this book can be utilized as additional readings in financial management courses to provide real-world examples of tourism from around the globe. This work can be seen as an opportune effort that critically analyses different perspectives on the difficulties that people and businesses encounter when managing financial and actuarial risks. Insights into the modeling and management of actuarial and financial risks for institutions and households are provided by this collection of publications, both from a theoretical and a practical standpoint. It has nine chapters and was edited by eminent academic Luca Regis. The chapters of this book are all organized in a formal manner, which is also important to emphasize for the audience's ease of comprehension. The reviewers evaluated this edited book using the academic review methodology used by Peiris et al. (2020), Gamage (2021), Dewasiri and Iddagoda (2020), Iddagoda and Dewasiri (2021), and Peiris et al. (2021).

## 2. OVERVIEW

The first chapter of "The Myth of Methuselah and the Uncertainty of Death: The Mortality Fan Charts," written by Kevin Dowd, David Blake, and Andrew Cairns study's chapter on future male mortality includes mortality fan charts as a novel tool for visualizing the most probable forecasts and their uncertainty. According to the fan charts, longevity has distinct upper and lower bounds, and future mortality rates are very unpredictable. The projections on the fan chart point to three key conclusions. First, no one will survive to very old ages notwithstanding recent advances in death rates. Second, death rates in the future are highly unknown and continue to remain so. They also demonstrate that, if other factors remain constant, future mortality rates for older cohorts are less certain than those for younger cohorts. Last but not least, taking parameter uncertainty into account significantly widens

the range of calculated fan charts. For those who provide services to the elderly, such as health and long-term care or pensions, these findings have obvious and troubling consequences. The fan charts also imply that because future mortality is so unpredictable, the healthcare system, pension plans, life insurance firms, and even the state itself are all highly exposed to longevity risk and need to have their exposure to this risk handled.

The second chapter, "Applying Spectral Biclustering to Mortality Data," by Gabriella Piscopo and Marina Resta, focuses on applying spectral biclustering to mortality datasets to capture three relevant aspects: the period, the age, and the cohort effects, as their knowledge is a key factor in comprehending actuarial liabilities of private life insurance companies, pension funds, as well as national pension systems. After conducting an exploratory examination of Italy's mortality data, this is done. The chapter highlights that, even though conventional techniques typically fall short of capturing the cohort impact, biclustering methods appear to be especially well suited to accomplish this goal. According to scientists, spectral biclustering provides more insightful results when compared to traditional hierarchical clustering.

The study by Carlo Maccheroni and Samuel Nocito, "Backtesting the Lee-Carter and the Cairns-Blake-Dowd Stochastic Mortality Models on Italian Death Rates," is presented in the third chapter. It compares backtesting analyses of the Lee-Carter and the Cairns-Blake-Dowd mortality models using Italian data. To compare the accuracy of short-run forecasts to those for the medium term, the chapter suggests three possible backtest methodologies. We discover that neither model could adequately explain the decreasing shock in mortality seen in the male population during the study period. Furthermore, the findings imply that CBD forecasts are generally trustworthy for ages above 75 and that LC projections are essentially more accurate for this data. The study's findings suggest that they are pertinent to Italian annuity providers, both public and private, which base their product offerings on LC projections. From this angle, selecting between the two models may depend on how the model will be used (e.g., the age and the sex of the insured). Although this analysis was restricted to the study of the forecast, it can be assumed that a backtesting analysis of annuity prices based on the forecast obtained by the original model formulations would reveal evidence of a distortion caused by the forecast error on the money's worth of an annuity and reserves.

The authors of this study, Pierre Devolder and Sébastien de Valeriola, examine the two options that a new Belgian law gives employers regarding the kinds of guarantees that the pension plans they provide to their employees should embed in the fourth chapter, "Minimum Protection in DC Funding Pension Plans and Margrabe Options," which is titled "Minimum Protection in DC Funding Pension Plans and Margrabe Options." As a case study in this paper, Belgian occupational pension plans are considered. Recent changes have been made to the regulation governing the occupational pension plans in Belgium. The new law gives businesses the option to offer one of two alternative guarantees to their affiliates. In this essay, the alternatives are compared using two different techniques. To compare the

approaches, stochastic models and financial pricing techniques have been applied. According to the research, the reform will probably have the impact of altering the investment options available to pension plan funding vehicles.

The research by Academic Editor Luca Regis, "A Discussion of a Risk-Sharing Pension Plan," analyzes the Risk-Sharing Pension Plan by modifying the benefits and investment strategy in response to a fluctuating funding level, which is inspired by the with-profits contract suggested by Goecke (2013). Between defined benefit (DB) and defined contribution (DC) pension plans' extremes, risk-sharing pension plans provide a middle ground. The author introduces a measure of disappointment that may be used to assess how resilient a plan is to human variables. Disappointment is high when benefit payments have declined for a long period in a row. Devastation is a new measure that is activated when there are no benefit payments. The reasoning for this is that members of pension plans who are susceptible to disappointment or are expected to receive no benefit are more likely to leave the plan. This study found that risk-sharing plans give more disappointment than defined contribution plans, but they also avoid the destruction that could result from plans that try to amass contributions at a continually growing pace. Contrary to a defined contribution plan, the suggested risk-sharing plan may offer a more limited set of benefits. As a result, it may provide a steady benefit to members without taking a financial risk. The conclusions seem to hold up when the financial model is changed, according to a preliminary analysis by the author utilizing the membership profiles examined in the research. Even though a subset of the plan's parameters is examined in this study, any implementation in practice would necessitate additional research to determine the right values for the anticipated plan membership.

Chapter six essay by Thomas G. Koch, "Shifting Shape of Risk: Endogenous Market Failure for Insurance," discusses risk-sharing pension systems that change their benefits and investing strategy to maintain their funding ratio. The theoretical performance of this type of plan is compared to defined contribution plans in the article, along with the stability of the benefits offered to plan participants. According to the study's findings, the amount of insurance that just right depends on both the level and the form of the risk distribution. The authors of the article "Compositions of Conditional Risk Measures and Solvency Capital" Pierre Devolder and Adrien Lebègue take into account conditional risk measure compositions to produce time-consistent dynamic risk measures and ascertain the solvency capital of a life insurer selling pension liabilities or a pension fund with a single cash-flow at maturity. In the beginning, this chapter will review the idea of conditional, dynamic, and time-consistent risk measurements. Linking the latter to its iterated attribute allows us to create time-consistent dynamic risk measures from a backward iteration scheme with the composition of conditional risk measures. The following section of the study examines specific scenarios using the conditional versions of the value at risk, tail value at risk, and conditional expectation measures. The study concludes with an application of these metrics in determining a pension liability's solvency capital, which gives a fixed guaranteed rate

without any intermediate cash flow under the assumption that the corporation is completely hedging against the mortality and underwriting risks.

The study conducted by Yuguang Fan, Philip S. Griffin, Ross Maller, Alexander Szimayer, and Tiandong Wang yielded valuable results, which were presented in the eighth chapter of this book, titled "The Effects of Largest Claim and Excess of Loss Reinsurance on a Company's Ruin Time and Valuation." Excess of loss reinsurance (EOL) and largest claim reinsurance (LCR), both of which shift payment of a portion or the entirety of one or more sizable claims from the primary insurance company to a reinsurer, are being contrasted in this study. According to the article, in situations with similar short time horizons, LCR is at least as successful as EOL at preventing ruin. The dividend discount model demonstrates that, when the LCR reinsurance ruin probability is lower than the EOL ruin probability, the cedant can pay a higher share of the dividend for LCR reinsurance than for EOL while still maintaining firm value. According to the standard deviation of the company value, both techniques significantly reduce risk when compared to no reinsurance in a variety of scenarios. Another intriguing result is that the potential demise of a corporation is not always determined just by the weight of the tails; small and moderate-sized claims can also have a big impact on this.

Jan Natolski and Ralf Werner's "Mathematical Analysis of Replication by Cash Flow Matching," the book's concluding chapter, shows how the (possible) non-smoothness can be avoided by reformulating the procedure in a manner that makes it a linear second-order cone program (SOCP). This enables the use of effective second-order methods, such as interior point methods or comparable techniques, for a numerical solution. According to the results, it is possible to guarantee the existence and uniqueness of the optimal solution even under unreliable assumptions. The study also establishes that the replicating portfolio's fair value is equal to its liabilities' fair value under a second, analogously weak condition. The authors contend that this understanding supports their claim that the replication problem family's unloved stepmother child does represent a formulation that is as suitable for use in practice.

### 3. CONCLUSION

Anyone interested in wealth accumulation is worth to read Luca Regis' book "Actuarial and Financial Risks in Life Insurance, Pensions, and Household Finance," which is equally motivating and educational. In this 2018 publication, Assistant Professor Luca Regis of the University of Siena's Department of Economics and Statistics deftly combines years of in-depth statistical studies with captivating success stories. It is certain to be a personal finance book with broad appeal for years to come due to the page-turning narrative style, author's financial expertise, and general life wisdom. Luca Regis demonstrates to readers how they may use affluent strategies to assist themselves attain financial success reducing financial risk associated throughout the entire book. This book is for anyone interested in learning more about the world of investment as well as anyone searching for a reliable financial

resource they may refer to on occasion. The information disseminated through this book is equally relevant to people with high and low incomes. In contrast to many books on behavioral economics and popular psychology, "Actuarial and Financial Risks in Life Insurance, Pensions, and Household Finance" not only describes the flawed way that people naturally handle money, but also offers practical guidance to help us all change our irrational spending patterns. This book stands out from other works of a similar nature because of the guidance provided in its nine chapters, which not only explain how to manage money but also how to interact to and think about priorities and money. The readers of this book will find a well-written, from-soup-to-nuts introduction to investment and financial management that can be inferred from the information included within its covers.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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