JOURNÉES ACTUARIELLES de STRASBOURG

Colloque pour fêter les 30 ans du D.U.A.S.

Jeudi 18 et Vendredi 19 Septembre 2014

à l'U.F.R. de Mathématiques et Informatique de l'Université de Strasbourg

avec les soutiens de l'UdS, de ses Facultés de Mathématiques et Informatique et de Sciences Économiques et de Gestion, et de l'Institut des Actuaires

Le colloque aura lieu dans le "*Grand Amphi Frenkel*", au rez de chaussée du bâtiment de mathématiques et informatique de l'UdS. Il est consacré à des thèmes et aspects parmi les plus actifs dans les préoccupations et recherches actuarielles actuelles. Entre autres, des actuaires professionnels, dans le cadre de leur instruction et formation permanente, pourront y bénéficier d'échanges avec des experts renommés de la théorie comme de la pratique actuarielle.

Programme détaillé

45 à 50 minutes sont prévues par exposé, plus 10 à 5 minutes pour les questions.

Jeudi, 8h45 : Accueil.

Jeudi, 9h : **Philippe Artzner** (UdS, DUAS) : "30 years of actuarial questions".

Jeudi, 10h : pause café.

Jeudi, 10h20 : **Hansjörg Albrecher** (Univ. Lausanne) :
"Insurance risk and the cost of capital".

Jeudi, 11h20 : **Nicole Bäuerle** (STOCH, Karlsruhe Univ.) :
"Dividend problems in insurance: from de Finetti to today".

Jeudi, 12h30 : interruption déjeuner.

Jeudi, 14h : **Damir Filipovic** (EPFL and Swiss Finance Institute) :
"Model uncertainty and scenario aggregation".

Jeudi, 15h : **Ermanno Pitacco** (DEAMS, Univ. Trieste) :
"Modelling life annuities: from Jan de Witt to risk-sharing solutions".

Jeudi, 16h : pause café.

Jeudi, 16h20 : **Griselda Deelstra** (ULB) :
"Some modelling issues about dependence coming from finance".

Jeudi, 17h20 : **Karl-Theodor Eisele** (UdS, DUAS) :
"Loss provisioning : a new approach for an old problem".

Vendredi, 9h : **David Fitouchi** (ACTUELIA) :
"ORSA : la créativité actuarielle au-delà des formules standard".

Vendredi, 10h : pause café.

Vendredi, 10h20 : **Michel Dacorogna** (SCOR) :
"Surviving the next crisis, a risk management perspective".

Vendredi, 11h20 : **Freddy Delbaen** (ETH) : "Some special law determined risk measures".

Vendredi, 12h30 : interruption déjeuner.

Vendredi, 14h : **Frédéric Planchet** (ISFA, Univ. Lyon 1) : "Best estimate and solvency capital in an economical framework : key points, best practices and pitfalls".

Vendredi, 15h : **Peter Boller** (Secquaero) :
"Actuaries beyond tradition : challenges of the future".

Vendredi, 16h : pause café.

Vendredi, 16h20 : **Pierre Devolder** (UCL) :
"Long term guarantees and longevity risk in the context of Solvency II".

Vendredi, 17h20 : **Michael Schmutz** (Univ. Bern & FINMA) :
"Risk based solvency frameworks and related modelling challenges".

Par ordre alphabétique, avec résumés

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1) Hansjörg Albrecher (Univ. Lausanne) Thursday, 10h20 - 11h05 + questions

"Insurance risk and the cost of capital".

The development of rules for the determination of premiums under solvency capital requirements is a classical topic in insurance. In recent years the cost-of-capital method for the determination of risk margins has been advocated, with a particular suggestion for the size of the cost-of-capital rate. In this talk a framework will be developed which considers the viewpoint of regulators, investors and policyholders at the same time, leading to a quantitative approach towards interpreting and justifying the size of such a rate. Some practical implications of this approach are discussed in the context of Solvency II.

2) Philippe Artzner (UdS, DUAS) : Thursday, 9h - 9h45 + questions

"30 years of actuarial questions".

We organise around the theme "What is Solvency?" questions raised and discussed with colleagues, visitors and students during their internships.

3) Nicole Bäuerle (STOCH, Karlsruhe Univ.) : Thursday, 11h20 - 12h05 + questions

"Dividend problems in insurance: from de Finetti to today".

In this talk we consider the famous dividend pay-out problem which has initially been formulated by de Finetti in 1957: Suppose an insurance company is characterized by its stochastic surplus process. What is the maximal expected discounted dividend pay-out for this process until ruin? This quantity is a measure for the value of the insurance company. De Finetti

himself solved this problem for a simple random walk. Over the years the surplus process and the dividend problem have been generalized considerably and thus created interesting and challenging mathematical problems. As an example we will investigate one recent development in greater detail which are so-called risk-sensitive dividend pay-out problems. These problems not only consider the expectation of the discounted dividend pay-out, but also take the variability into account. We show how these problems can be solved and characterize the optimal dividend pay-out strategy. The talk is based on joint work with Anna Jaskiewicz.

4) Peter Boller (Secquaero) : Friday, 15h - 15h45 + questions

"Actuaries beyond tradition : challenges of the future".

5) Michel Dacorogna (SCOR) : Friday, 10h20 - 11h05 + questions

"Surviving the next crisis, a risk management perspective".

With the economic and financial crisis, the question of solvency has become increasingly discussed and challenged. This presentation addresses the current financial crisis, analyses its specific nature, its impact on the financial system and its consequences on the solvency requirements. It takes a fresh look at crises and their characteristics to draw lessons for risk management. The pro-cyclicality of the current capital models for insurances is highlighted and its consequences on financial stability are discussed. It finally proposes to make the regulatory system more flexible to respond to future crises and suggests a way to do it without compromising the principles on which the whole valuation model is built.

6) Griselda Deelstra (ULB) : Thursday, 16h20 - 17h05 + questions

"Some modelling issues about dependence coming from finance".

Dependence modelling is of course very important when studying an insurance portfolio. Until recently, pricing multi-asset derivatives in finance and insurance are essentially based on multivariate Brownian motions. However this model is no longer appropriate for the pricing and hedging of derivatives in a market where interest rates and volatility are stochastic. The recent financial crisis has stressed even more the importance of capturing correctly market shocks. This talk focusses on some modelling issues coming from finance, in particular the study of multivariate Lévy processes and matrix-valued Wishart processes.

7) Freddy Delbaen (ETH) : Friday, 11h20 - 12h05 + questions

"Some special law determined risk measures".

Joint work with V.Bignozzi, F.Bellini and J.Ziegel.

Monetary utility functions are – except for the expected value – not of von Neumann-Morgenstern type. In case the utility function has convex level sets in the set of probability measures on the real line, we can give some characterisation that comes close to the vN-M form. For coherent utility functions this was solved by Ziegel. The general concave case under the extra assumptions of weak compactness was solved by Stephan Weber. In the general case the utility functions are only semi continuous. Using the fact that law determined utility functions are monotone with respect to convex ordering, we can overcome most of the technical problems. Having convex level sets can be seen as a weakened form of the independence axiom in the vN-M theorem.

8) Pierre Devolder (UCL) : Friday, 16h20 - 17h05 + questions

"Long term guarantees and longevity risk in the context of Solvency II".

Risk measurement as prescribed in the Solvency 2 regulation is essentially based on a one year horizon and based on market valuation. This short term view is not necessarily in line with the reality of the long term aspect of life insurance and pension liabilities; it can induce artificial volatility and sub optimal investment policies. Investment risks and longevity risks are the main drivers for these kinds of product and both are clearly affected by the time horizon of the liabilities. This long term character can have significant impact as well in the valuation process (through for instance the liquidity premium or the matching premium) as for the solvency requirement (choice of an appropriate risk measure). The purpose of this talk is to illustrate for the long term pension business the importance of the time horizon for a sound valuation and risk measurement of market and longevity risks.

9) Karl-Theodor Eisele (UdS, DUAS) : Thursday, 17h20 - 18h05 + questions

"Loss provisioning : a new approach for an old problem".

The provisioning of outstanding losses is one of the oldest problem in non-life insurance. For more than one century, actuaries attacked this challenge by quite a number of methods, of which the Chain-Ladder method is most widely known and applied one. In 1990, Thomas Mack gave a mathematical model supporting the calculations of the Chain-Ladder method.
Nevertheless, in the light of Solvency II, the answers of the somewhat crude Chain-ladder method are no longer sufficiently subtle and comprehensive.
We consider a new multivariate model for loss prediction with several contracts for each accident year. The main part of the model consists of a non-linear Hachemeister's credibility approach where the design matrix represents characteristic development patterns for cumulative quotas of the different contracts. These patterns can be found by methods of discriminative analysis. In a first step, the credibility estimator yields a mean development pattern. Comparing this mean development pattern with the given development of the data allows for a refined estimation of the final losses of the accident years.

10) Damir Filipovic (EPFL and Swiss Finance Institute) : Thursday, 14h - 14h45 + questions

"Model uncertainty and scenario aggregation".

The paper (papers.ssrn.com/sol3/papers.cfm?abstract_id=2441328 available on SSRN) provides a coherent method for scenario aggregation addressing model uncertainty. It is based on divergence minimization from a reference probability measure subject to scenario constraints. An example from regulatory practice motivates the definition of five fundamental criteria that serve as a basis for our method. Standard risk measures, such as value-at-risk and expected shortfall, are shown to be robust with respect to minimum divergence scenario aggregation. Various examples illustrate the tractability of our method.

11) David Fitouchi (ACTUELIA) : Friday, 9h - 9h45 + questions

"ORSA : la créativité actuarielle au-delà des formules standard".

Dans le cadre du projet "Solvency II", la Commission Européenne travaille sur la réforme des modalités de détermination des normes de solvabilité en assurance. De nombreux acteurs sont concernés par cette réforme (Entreprises d'assurance, Commissions de contrôle, Auditeurs, Agence de Rating et Analystes financiers), qui porte sur des aspects quantitatifs (type Formule standard), qualitatifs (Contrôle interne et Risk management) et de communication. En plus des

exigences financières imposées par Bruxelles, les organismes d'assurance devront produire leur propre évaluation de la solvabilité à court terme et à moyen terme. Non seulement cette vision interne pourra intégrer d'autres risques que ceux de la formule standard, d'autres mesures de risques et d'autres horizons de projection, mais elle devra être partagée par la Gouvernance de l'entreprise, qui devra s'en préoccuper pour toute décision stratégique. Si les années passées ont été consacrées aux réalisations des modèles internes et de la formule standard, 2014 est axée sur la mise en œuvre de l'ORSA.
Le sujet ORSA sera présenté de ses problématiques à ses ébauches de solution. L'objectif étant de voir comment l'actuaire pourra faire face à ce nouveau défi mêlant à la fois la technique, le pragmatisme, la créativité et la communication.

12) Ermanno Pitacco (DEAMS, Univ. Trieste) : Thursday, 15h - 15h45 + questions

"Modelling life annuities: from Jan de Witt to risk-sharing solutions".

Annuity and pension products can be interpreted as packages of guarantees and options, which determine risk transfers between the insurer or annuity provider on the one hand, and the annuitant on the other. Conversely, early actuarial models (to some extent still adopted in actuarial practice) do not explicitly account for the cost of guarantees and options.
When the assessment of these costs either implies too complex models or leads to very high premiums, possible sharing of risks between annuitant and annuity provider should be carefully analysed. Thus, the importance of the product design clearly emerges.
In this presentation we mainly focus on biometric risks, i.e. risks related to the annuitant's lifetime and health status. First, we address various arrangements which aim at building the post-retirement income, and involve either the accumulation phase, or the payout phase, or both. Various products are available on financial, insurance and pension markets, each product featuring its own guarantee structure (conventional life annuities either immediate or deferred, variable annuities, withdrawal plans, etc.).
We then shift to a range of specific annuity products, and stress the relevant characteristics: Advanced Life Delayed Annuity (ALDA), Ruin Contingent Life Annuity (RCLA), Variable Annuities (VA). Finally, we focus on some arrangements for the payout phase: the life annuity with a guarantee period, the value-protected life annuity (that is, with "capital protection"), the life care annuity, the long-term care (LTC) annuity combined with ALDA, progressive annuitization schemes, the longevity-linked life annuities.

13) Frédéric Planchet (ISFA, Univ. Lyon 1) : Friday, 14h -14h45 + questions

"Best estimate and solvency capital in an economical framework : key points, best practices and pitfalls".

Last ten years, we have observed a generalization of "economic valuations" use in different framework used by insurers : regulation (Solvency 2), accounting (IFRS) and financial reporting (MCEV). This led to the use by insurers of methods originally developed for pricing financial instruments to calculate their liabilities (best estimate calculation) and econmic capital. On this occasion, many challenges have emerged, particularly in life insurance :

- long duration of life insurance liabilities ;
- no market ;
- partially endogenous risk factors ;
- volatility of the value which does not reflect the risks carried.

The aim of this talk is to present the specific elements induce by the use of "economic valuations" in insurance business, with a special focus on the consequences for construction of Economic Scenarios generators (ESG).

14) Michael Schmutz (Univ. Bern & FINMA) : Friday, 17h20 - 18h05 + questions

"Risk based solvency frameworks and related modelling challenges".

Risk-based solvency frameworks such as Solvency II to be introduced in the EU or the Swiss Solvency Test (SST) in force since 2011 in Switzerland seek to assess the financial health of insurance companies by quantifying the capital adequacy through calculating the solvency capital requirement (SCR). Companies can use their own economic capital models (internal models) for this calculation, provided the internal model is approved by the insurance supervisor. The Swiss supervisor has recently completed the first round of internal model approvals. This has provided the supervisor and the industry with many insights into the challenges of designing, assessing, and supervising such models and has shown that there is a considerable number of modelling challenges that have not yet been solved in a completely satisfactory way. Some of the most important challenges and problems will be discussed along with some approaches to solutions.