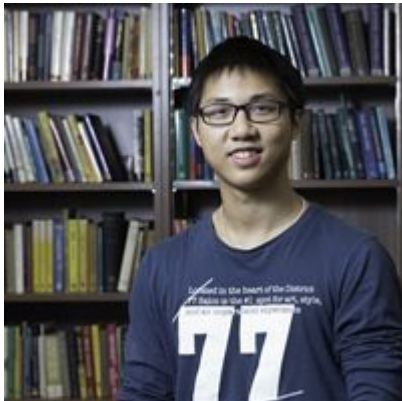


Department of Statistics Archive of Actuarial Science Seminars - Michaelmas
Term 2021

Wednesday 10 November 2021, 4-5pm - Zezhun Chen (LSE)



[Website](#)

Biography: Zezhun Chen is a PhD student in Probability in Finance and Insurance, statistics department. His research mainly focuses on Point processes, which includes Hawkes Process, shot-noise Cox process and dynamic contagion process, and Integer-valued autoregressive model.

Title: EM Estimation for Bivariate Mixed Poisson INAR(1) Claim Count Regression Models with Correlated Random Effects

Abstract: This work considers bivariate mixed Poisson INAR(1) regression models with correlated random effects for modelling correlations of different signs and magnitude among time series of different types of claim counts. This is the first time that the proposed family of INAR(1) models is used in a statistical or actuarial context. For expository purposes, the bivariate mixed Poisson INAR(1) claim count regression models with correlated Lognormal and Gamma random effects paired via a Gaussian copula are presented as competitive alternatives to the classical bivariate Negative Binomial INAR(1) claim count regression model which only allows for positive dependence between the time series of claim count responses. Our main achievement is that we develop novel alternative Expectation-Maximization type algorithms for maximum likelihood estimation of the parameters of the models which are demonstrated to perform satisfactorily when the models are fitted to Local Government Property Insurance Fund data from the state of Wisconsin.

Wednesday 24 November 2021, 4-5pm - Mary Hardy (University of Waterloo)



[Website](#)

Biography: Prof. Hardy's research focuses on risk management strategies for long term contingent risks. The work is problem-driven, using theory and methodology from financial engineering, statistics and actuarial science. Much of her current research seeks to measure and promote fairness, efficiency and transparency in the design and implementation of insurance and pension risk solutions.

Title: Target benefit pension design

Abstract: In this talk, we will explore a form of target benefit plan that allows for structured, transparent intergenerational risk sharing. The plan design draws significantly from earlier analysis of much more stylized TB plans, as seen in, for example, Cui et al (2011), Wang et al (2018) and Zhu et al (2021). We compare the target benefit (TB) plan design with the traditional defined benefit (DB) design, based on five broad areas of comparison: affordability (average cost), sustainability (volatility of costs), efficiency, adequacy, and fairness. We assume that, implicitly, contributions to the plan come from workers' salaries, so the problem is to balance the interests of workers and retirees. We find that if we take into consideration the possibility of default, the TB design can offer a better balance of costs and benefits

than the traditional DB plan, with respect to affordability, efficiency, sustainability, adequacy, and intergenerational fairness.

This is joint work with David Saunders (University of Waterloo) and Xiaobai (Mike) Zhu (SWUFE).

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Wednesday 8 December 2021, 4-5pm Lei Fang (Bayes Business School)



[Website](#)

Biography: Lei started her PhD programme in Actuarial Science at Bayes Business School (formerly Cass) in 2018. Prior to joining Bayes, she obtained a First Honor PhD degree of Economics in Actuarial Science from Shanghai University of Finance and Economics. She was also a Joint PhD student in London School of Economics.

Title: Contextual antecedents of industry convergence: text analysis of risk disclosures

Abstract: In this paper, we construct a new measure of firm-level inter-industry convergence of risk managers' attention, calculated from text data of insurers' and banks' risk disclosures (10-K report). This convergence measure is based on the silhouette values of vector representations of individual insurers' and banks' risk disclosure documents. Documents are represented as vectors by Doc2Vec embeddings. Hence, the measure represents the extent to which a given company's report (e.g. an insurer) is semantically close to those in the industry it does not

belong to (e.g. banking). Furthermore, we aim to disentangle the strategic antecedents of such convergence in risk managers' attention. Specifically, we consider the potential for substitution and new industry entries, and the shared challenges and opportunities in the firm's environment. Text-based measures of those two antecedents are constructed, using topic modelling via Latent Dirichlet Analysis of the Business sections of 10-K reports. Furthermore, we consider the prevalence of generic practices and narratives in risk disclosures, which we measure by the convergence of reports to those in a third industry (in this case, Pharma). The impact of those variables on inter-industry convergence of risk managers' attention is quantified via random forest regression. Sensitivity analysis allows us to evaluate the differential impact of the different antecedents of convergence, showing that generic practices and narratives have dominant explanatory power. Through this analysis, the notion of systemic risk is expanded and re-conceptualised, to consider the confluence of business and institutional risks.

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