Vita

Candidate's name: Shi Zhang

Universities Attended:

Shanghai Lixin University (2017)
Bachelors of Business Administration

Guizhou University of Finance & Economics (2020)
Masters of Science

University of New Brunswick (2022)
Masters of Science

Conferences Presentations/Publications:

Duan, X., Wu, Z., Zhang, S., & Zhang, W. (2022). Modeling Heterogeneity in the Assessment of Treatment Effects on Tumor Development While Accounting for Monotone Dropout. Bulletin of the Malaysian Mathematical Sciences Society, 1-12.

Zhang, S., Ma, R., & Yan, G. (2022). Cox Survival Models with Partially Crossed Random Effects: an Application to Car Accident Data Cross-Classified by Location and Agent. 2022 Annual Meeting of the Statistical Society of Canada.

Zhang, S. (2020). Decision Tree Algorithms Predict the Audit Opinion. Sci-Tech and Development of Enterprise, 04, 98 -99.

Duan, X., Zhang, S., Zhang, W., & Miao, X. (2020). Bayesian Analysis for Multivariate Skew-Normal Simplex Mixed-Effects Models with Heterogeneous Dispersion. International Conference on Simulation Tools and Techniques, 313-326.

Duan, X., Zhang, S., Luo, L., & Zhang, W. (2020). Bayesian estimation and in-fluence analysis of Tweedie's Compound Poisson model. Applied Mathematics A Journal of Chinese University, 35(04), 393-404.

Cox Survival Models with Partially Crossed Random Effects: A Poisson Modelling Approach

UNIVERSITY OF NEW BRUNSWICK

THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment

of the Requirement for the Degree of
Master of Science

by

Shi Zhang

in the Department of Mathematics & Statistics

U.N.B., Fredericton, N.B.

Tuesday, September 20th, 2022
1:00 p.m.

Via MS TEAMS

Examining Committee

Dr. Guohua Yan	Co-Supervisor
Dr. Renjun Ma	Co-Supervisor
Dr. Nanwei Wang	Internal Examiner
Dr. Fan-Rui Meng	External Examiner
Dr. Jeffrey Picka	Chair of Oral Examination

Abstract

In automobile insurance studies, the time to settlement data are often partially cross-classified by location and agent. Our research question of great interest is to link time to settlement with various covariates since the analysis information help develop procedures to detect fraud and process claims. An appropriate analysis of such data needs to account for location and agent effects. In this thesis, we incorporate partially crossed random effects into Cox survival models for such data and propose a Poisson modelling approach to model estimation. We predict the random effects using the orthodox best linear unbiased predictor method, and obtain consistent estimators for the regression parameters. This estimating method relies on only the first and second moments of the random effects, and is thus robust against distributional assumptions of random effects. The usefulness of our approach is demonstrated by simulation and application to the time to settlement data.

UNB EST. 1785 UNIVERSITY of NEW BRUNSWICK FREDERICTON & SAINT JOHN