Applications of Computational Statistics Methods in Equity-linked Insurance Pricing

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Proposal

Group Members

Table 1: Group Members

Name	NetID
Peng Jin	pengjin2
Guanzhong Tao	gtao2
Haoen Cui	hcui10
Dayu Yao	dayuyao2
Yuan Zhong	yzhong19

Project Title

Applications of Computational Statistics Methods in Equity-linked Insurance Pricing

Basic Descriptions

STAT 428 Methods

- **(Group 1)** Random Number Generation, Monte Carlo Inference
- **(Group 2)** Bootstrap, MCMC

Application Areas and Project Scope

We aim to use simulation base methods to price equity-linked insurance products under percentile and equivalence principle. Risks involve mortality and uncertainty in investment returns. We will apply random number generation methods to an empirical life table to simulate projected remaining life time. Meanwhile, we will calibrate stock return data to infer future performance using MC and bootstrap methods. If time allows, we will delve into more complicated products including multiple decrements modeling using MCMC. Final products may also include interactive visualizations with R Shiny.

Data Involved

- **Mortality Table** for group life mortality estimation

1. Age
2. Remaining life in radix cohort

- **Stock Market Data** for investment performance projection

1. Date stamp
2. Index Value

Project Plan

Table 2: Tentative Project Plan

Task	Main Responsible Members	Internal Due Date
Data Collection	Peng Jin	Nov 19
Data Cleaning	Haoen Cui	Nov 20
Mortality Projection	Guanzhong Tao, Dayu Yao	Nov 25
Stock Return Projection	Yuan Zhong, Dayu Yao	Nov 28
Model Combination - Pricing	Peng Jin, Guanzhong Tao	Nov 30
Visualization (if time allows)	Haoen Cui, Yuan Zhong	Dec 2
Slides-Making	Dayu Yao, Yuan Zhong	Dec 5
Report Combination and Proofreading	Everyone	Dec 15