

CEPAR Summer Scholarship Application Form 2022/23

Project Code: CEPARSS2302

Project title

Provide a short descriptive title of no more than 20 words.

Stochastic affine models for systematic mortality risk

Supervisor

Name: Len Patrick Garces Michael Sherris	Location: UNSW Sydney	Email: l.garces@unsw.edu.au
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Project summary

To better understand systematic mortality and longevity risks, various stochastic mortality models have been proposed and are now widely used in practice in conjunction with product design and pricing. To this end, CEPAR researchers have developed or are developing multi-factor affine mortality models with cohort-specific factors, age-dependent trends and volatility, cross-cohort correlation, and jumps. Parameter estimation methods for these affine mortality models and estimation methods with regularization have also been developed. The models have application for the development of innovative product solutions using Long Term Care insurance, health, annuities and life insurance, the integration of these products with Australian aged pensions, health insurance and aged care support as well as demonstration of benefits of private market solutions on long term government budget costs. This project aims to extend current work by modelling and forecasting mortality rates using squared-Gaussian mortality models. In addition, the project involves a review of literature on stochastic affine mortality models, including ongoing work by CEPAR researchers and recent results published in the 2010s.

Role of the scholarship holder(s) in the project

The scholarship holder will:

1. Review and summarize existing literature on affine stochastic mortality models including current and recent work by CEPAR researchers.
2. Develop and test R codes for forecasting mortality rates using affine mortality models, with focus on squared Gaussian models in coordination with the project supervisors and collaborators.
3. Report on the performance of models implemented in (2) in terms of goodness of fit to historical data and forecasting ability.

Required knowledge, skills and/or training

- Completing actuarial studies
- Knowledge of quantitative finance and term structure models
- Knowledge of computing/coding with R

Preference

- Applicants pursuing a double degree in Actuarial Studies and Science, Advanced Mathematics, or Computing
- Applicants with an interest in pursuing an Honours program in Actuarial Studies

Work period

The work period may be broken into two parts as students will not be expected to work during the UNSW shutdown over Christmas/New Year.

Total work weeks:

The supervisor and the scholarship holder will discuss a mutually acceptable **6-week period** over the summer term.