

Multi-population mortality risk in Asia-Pacific: Outputs



In this article, **Dr Andreas Milidonis** from the **Insurance Risk and Finance Research Centre (IRFRC)**, **Nanyang Technological University** presents the final results of the “Multi-population mortality risk” project conducted at the IRFRC at Nanyang Business School. In its two research papers, Dr Milidonis and his colleagues discuss longevity risk predictability in Asia Pacific and the implications of longevity risk sharing.

Two datasets on APAC mortality freely available for research

First, we make available through our website, two comprehensive mortality datasets for several countries in Asia-Pacific (APAC).

Specifically, the first database presents aggregate population crude death rates representing 12 countries in Asia Pacific, with at least 31 years of data, while for some countries, data begin as early as the early 1900s and extend until today.

The second dataset presents age-specific and gender-specific death probabilities for eight countries, 15 age-groups, and at least 31 years of data.

A detailed report with descriptive statistics and data sources

Second, we present an extensive data collection report with descriptive statistics and trends by country and major geographical region for the two datasets.

Given the large variation in mortality time trends in the region, we also provide a detailed modelling exercise of changes not only in mortality trends but also in the volatility of those trends.

Specifically, we employ a regime-switching model with two regimes characterised by the same mean (for each country) but varying volatility.

Finally, we also provide a detailed account of the data collection exercise including the sources used.

Two research papers

Third, given that this project has resulted in several new data for some countries in APAC (eg South Korea, Malaysia etc), we also present the first two research papers that have used these two datasets to discuss longevity risk predictability and sharing implications.

“Mortality Lead-Lags”

The first paper is titled “Mortality Lead-Lags” (by Dr Andreas Milidonis (Nanyang Technological University and University of Cyprus and Maria Efthymiou (University of Cyprus)).

The analysis focuses on the APAC countries with available aggregate population crude death rates to identify short-term predictability relationships running from one country to the other. Their sample includes the following countries from year 1950 onwards: Australia, China, Hong



Kong, India, Japan, South Korea, Malaysia, Philippines, Singapore, Sri Lanka and Taiwan.

Their results show that several such predictability relationships exist over up to four years. Such predictability relationships seem to run from developed to developing countries in the region, thus lending support to the hypothesis that economic development, improves living conditions in developing countries, which in turn decreases mortality rates.

Hence mortality improvement arrives with a delay in developing countries. Such results are important for short-term predictability relationships that the industry, regulators but also government bodies working on social insurance and pension programmes, since they can provide some indications as to how mortality is expected to evolve and be managed in the next few years.

“The Cross-Section of Asia-Pacific Mortality Dynamics: Implications for Longevity Risk Sharing”

The second paper is titled “*The Cross-Section of Asia-Pacific Mortality Dynamics: Implications for Longevity Risk Sharing*”, co-authored by Dr Enrico Biffis (Imperial College Business School, UK), Dr Yijia Lin (University of Nebraska, US) and Dr Andreas Milidonis (Nanyang Technological University and University of Cyprus). The authors focus on APAC countries with available age-specific death probabilities.

The analysis is focused on the female population data from 1980 onwards in the following countries: Australia, Hong Kong, Japan, South Korea, New Zealand, Singapore and Taiwan.

It applies a widely accepted, multi-population mortality risk model across all age groups, in all countries in order

to separate APAC mortality risk into two broad categories: (a) a broad, annual, APAC mortality factor evolving from 1980-2010; (b) individual country specific factors, on an annual basis from 1980-2010.

As expected, the overall APAC common mortality risk factor is downward sloping. However, the results for the country-specific mortality trends are striking. This is because, even though for some countries which have been developing rapidly over the past years (eg South Korea) the country-specific factor is downward sloping, for some more developed countries (eg Japan) the country-specific factor is upward sloping.

This result implies that under some circumstances, these opposite trends in country-specific mortality risk, could provide opportunities for longevity risk sharing and trading. An example of how this outcome can be achieved is discussed by the authors.

Summary

In concluding the “Multi-population mortality risk” for APAC, the two datasets, the data collection report and the two research papers discussed can be downloaded from the IRFRC website (www.irfrc.com). Please direct any feedback or questions to amilidonis@ntu.edu.sg.

Dr Andreas Milidonis, is a Senior Research Fellow at the Insurance Risk and Finance Research Centre (IRFRC), Nanyang Business School, Nanyang Technological University. He can be contacted at amilidonis@ntu.edu.sg.

“The IRFRC was established in 2011 to produce research and extend the dialogue on insurance and insurance-related risk in the Asia-Pacific region. The ideas expressed in this article present the views of the named researchers. For more information, please visit irfrc.com.”

Insurance Risk & Finance Research Conference (IRFRC) 2015

Theme: “Risk in Emerging Markets”

Goodwood Park Hotel, Singapore

25 – 26 June 2015

Insurance Risk and Finance Research Centre

Nanyang Business School, Nanyang Technological University, Singapore.

General Information

The Insurance Risk and Finance Research Centre will hold its annual conference, sponsored by SCOR. The theme of this year’s conference is “**Risk in Emerging Markets**”. In addition to the conference’s theme on insurance risk in emerging markets, topics may include, but are not limited to: longevity risk financing, actuarial pricing of catastrophe risk and insurance economics.

Confirmed Keynote Speakers

- Paul Embrechts, Senior SFI Professor of Mathematics, ETH Zurich
- Christian Gollier, Professor of Economics, University of Toulouse I
- Lee Wai Yi, Director & Head of Supervisory Analytics Division, Insurance Department, Monetary Authority of Singapore

Publishing Opportunity: *Journal of Risk and Insurance (JRI)*

The Guest Editors will select from the Conference program a number of papers that will go through the normal refereeing process of the *JRI*. Those that have a successful outcome in the reviewing process will appear in a *JRI* symposium entitled “Risk in Emerging Markets”. Acceptance of the paper to the conference does not guarantee that it will appear in the *JRI*, as the ultimate decision on publication will be made by the Editor (Keith J. Crocker) in conjunction with the guest editors (David J. Cummins and Michael R. Powers) and the reviewers.

Visit www.irfrc.com for more information or send your queries to Andreas at amilidonis@ntu.edu.sg.