

# Forecasting Mortality in Related Populations Using Lee-Carter Type Models: A Comparison

Pietro Millossovich<sup>1</sup>, Ivan Luciano Danesi<sup>2</sup>, Steven Haberman<sup>3</sup>

<sup>1</sup>*Faculty of Actuarial Science, Cass Business School, City University London*

<sup>2</sup>*Department of Statistics, University of Padova*

<sup>3</sup>*Faculty of Actuarial Science, Cass Business School, City University London*

---

## Abstract

We test and compare several mortality forecasting models for related populations. More precisely, we consider extensions of the standard Lee-Carter approach, where either the central death rates or the corresponding improvement rates are modelled. The models include common and population specific time indices and/or combinations of them. We apply this range of models to the Italian regions and perform a thorough analysis. Finally, some actuarial application is presented.

**Keywords.** Lee-Carter, Longevity, Mortality Forecast, Multipopulation

## REFERENCES

- [1] S. HABERMAN AND A. RENSHAW (2012) Parametric mortality improvement rate modelling and projecting. *Insurance: Mathematics and Economics* **50**, 3, 309-333.
- [2] J. S. LI AND M. R. HARDY (2011) Measuring basis risk in longevity hedges. *North American Actuarial Journal* **15**, 2, 177-200.
- [3] N. LI AND R. D. LEE (2005) Coherent mortality forecasts for a group of populations: an extension of the Lee Carter method. *Demography* **42**, 3, 575-594.