

## Accepted Manuscript

Multivariate time series modeling, estimation and prediction of mortalities

Erland Ekheden, Ola Hössjer

PII: S0167-6687(15)00154-7

DOI: <http://dx.doi.org/10.1016/j.insmatheco.2015.09.013>

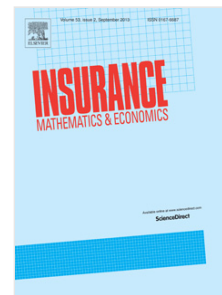
Reference: INSUMA 2139

To appear in: *Insurance: Mathematics and Economics*

Received date: March 2014

Revised date: September 2015

Accepted date: 24 September 2015



Please cite this article as: Ekheden, E., Hössjer, O., Multivariate time series modeling, estimation and prediction of mortalities. *Insurance: Mathematics and Economics* (2015), <http://dx.doi.org/10.1016/j.insmatheco.2015.09.013>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Multivariate Time Series Modeling, Estimation and Prediction of Mortalities

Erland Ekheden\*  
Ola Hössjer†

*Department of Mathematics, Div. of Mathematical Statistics,  
Stockholm University, Stockholm SE 106 91, Sweden.*

September 6, 2015

## Abstract

We introduce a mixed regression model for mortality data which can be decomposed into a deterministic trend component explained by the covariates age and calendar year, a multivariate Gaussian time series part not explained by the covariates, and binomial risk. Data can be analyzed by means of a simple logistic regression model when the multivariate Gaussian time series component is absent and there is no overdispersion. In this paper we rather allow for overdispersion and the mixed regression model is fitted to mortality data from the United States and Sweden, with the aim to provide prediction and intervals for future mortality and annuity premium, as well as smoothing historical data, using the best linear unbiased predictor. We find that the form of the Gaussian time series has a large impact on the width of the prediction intervals, and it poses some new questions on proper model selection.

**Key words:** Best linear unbiased predictor, generalized least squares, longevity, mortality prediction, multivariate time series, overdispersion

**Mathematics Subject Classification (2000):** 62M10, 62P05.

---

\*Corresponding author, tel +44-70-7704685; email address: e.ekheden@gmail.com;  
Present address: SPP, Stockholm, SE 105 39, Sweden

†Tel: +44-70-6721218; email address: ola@math.su.se.

Download English Version:

<https://daneshyari.com/en/article/5076499>

Download Persian Version:

<https://daneshyari.com/article/5076499>

[Daneshyari.com](https://daneshyari.com)