Monthly mortality estimates for Aotearoa New Zealand

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The project

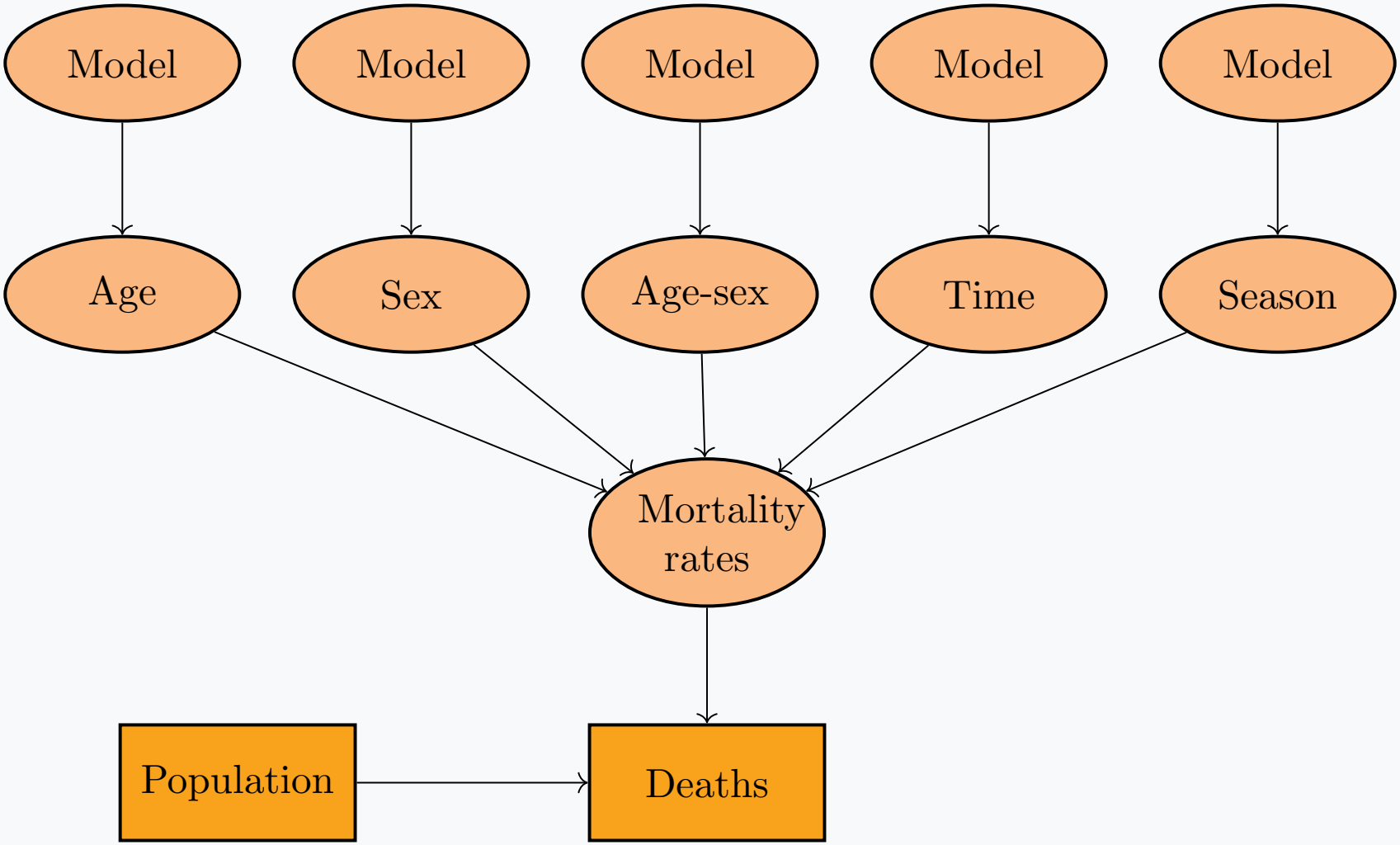
- Estimate mortality by age, sex, month
  - Current official is three-year rolling average
- Challenges
  - Small numbers
  - Complicated patterns
- Why
  - Effect of events, eg COVID
  - Seasonal mortality
  - Generic methodology
- Exploratory, work in progress

The model

Data

- Deaths by age, sex, month
  - Date of occurrence (not registration)
- Population at risk
  - Interpolated from quarterly ERP

Specification

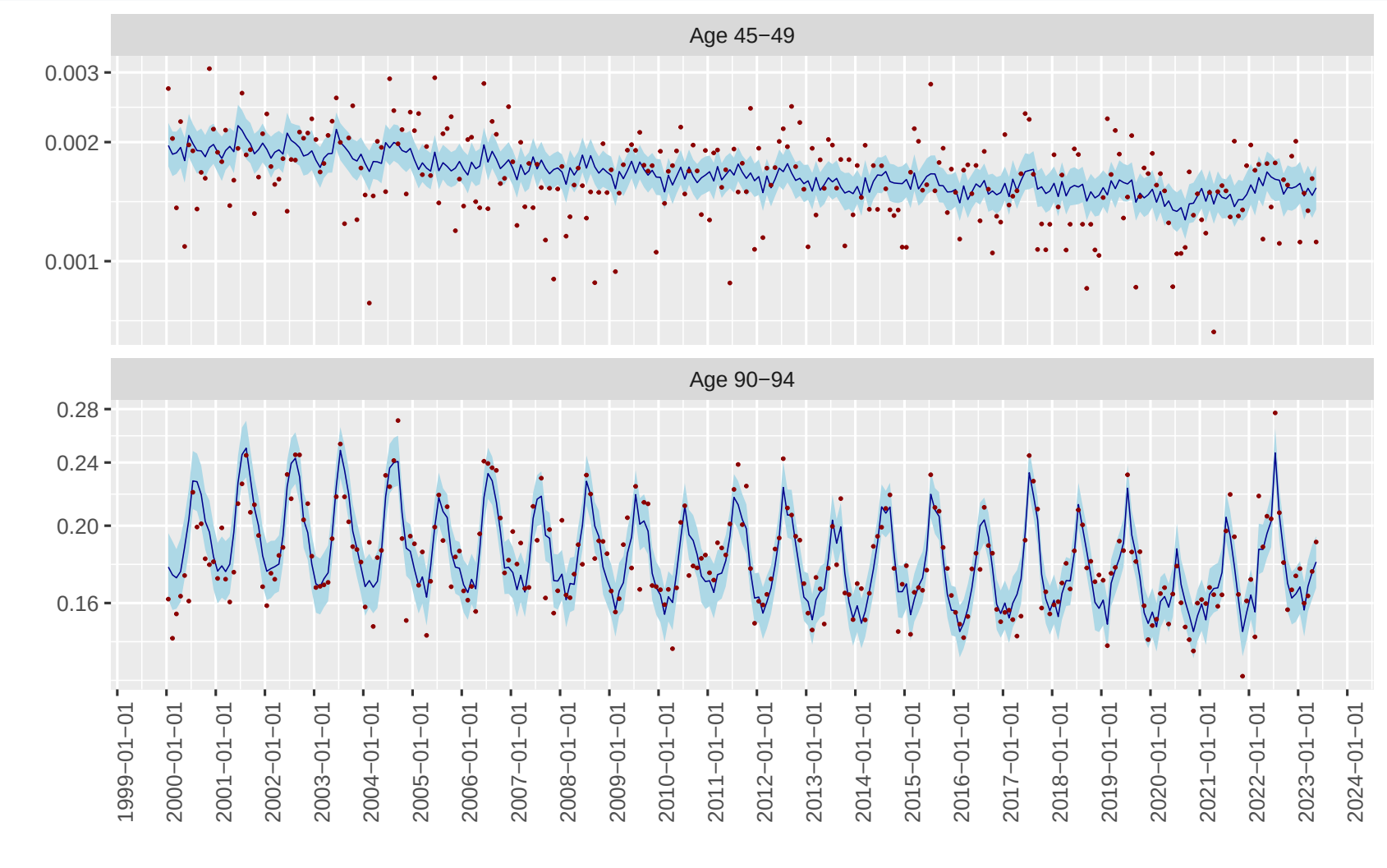


Computation

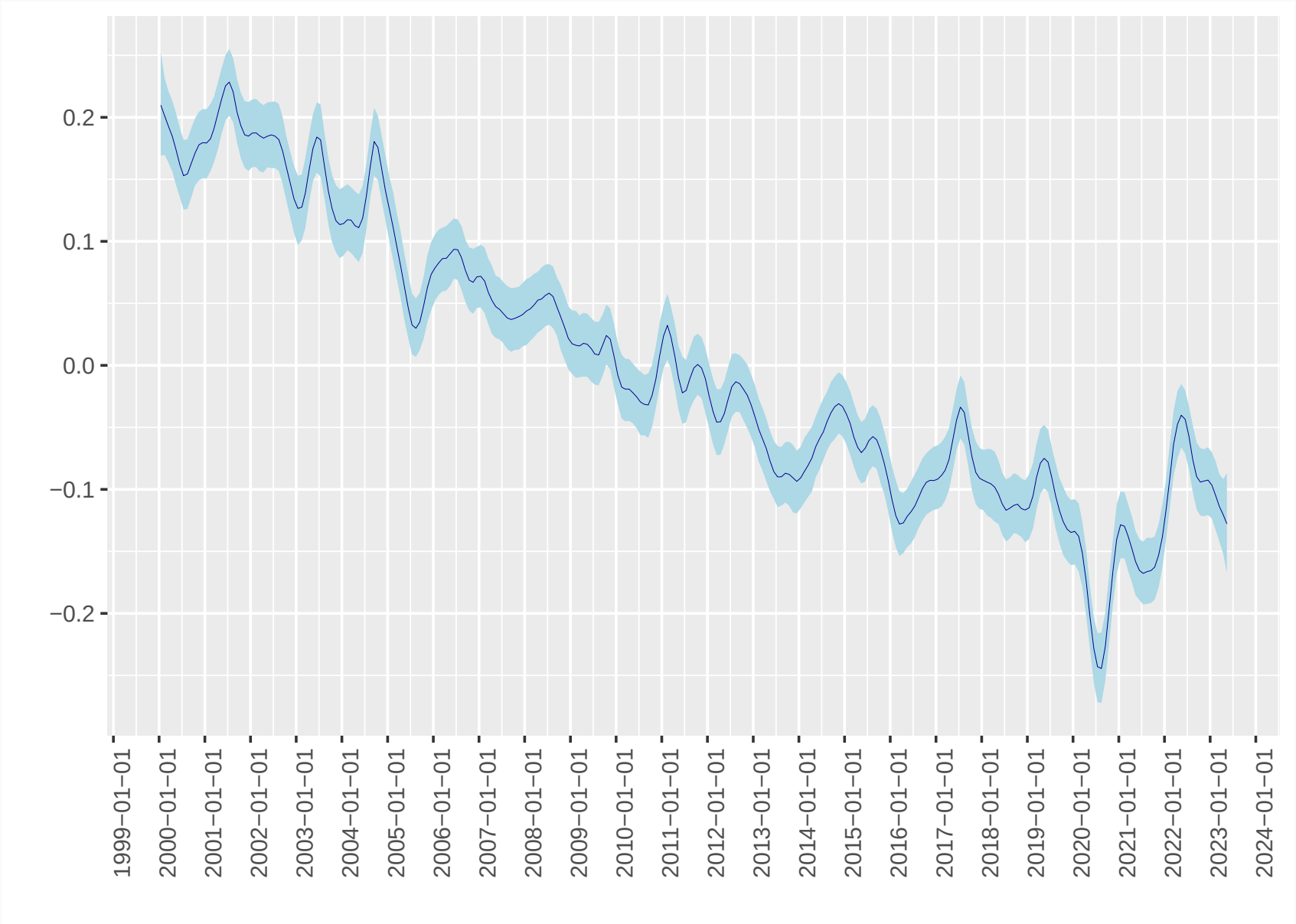
- Bayesian
- Open source R package
  - github.com/bayesiandemography/bage
- Fast approximation
  - Template Model Builder (TMB)

Preliminary results

Mortality rates, females aged 45-49 and 90-94



Time effect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−0.1
−0.2
1999−01−01
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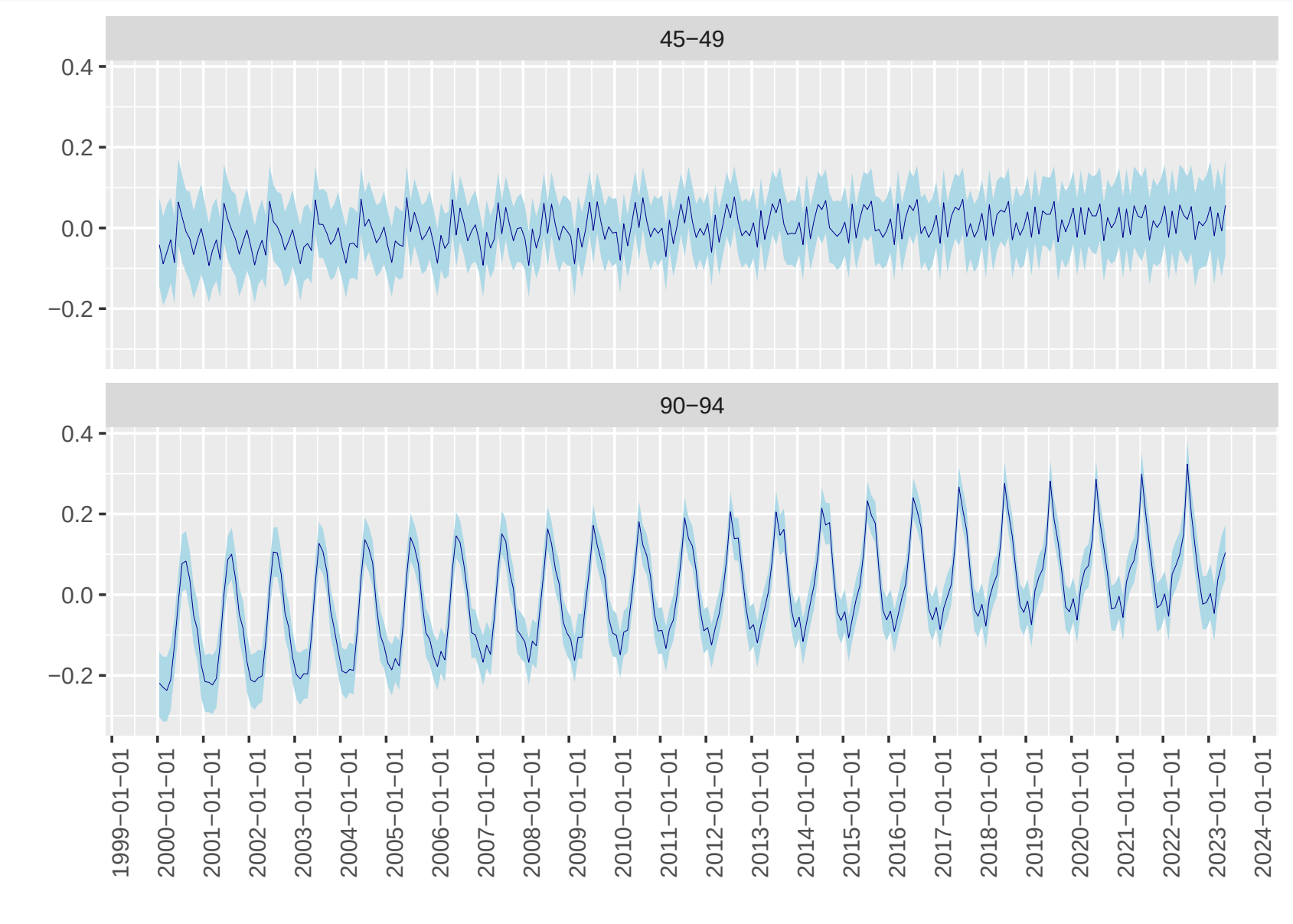
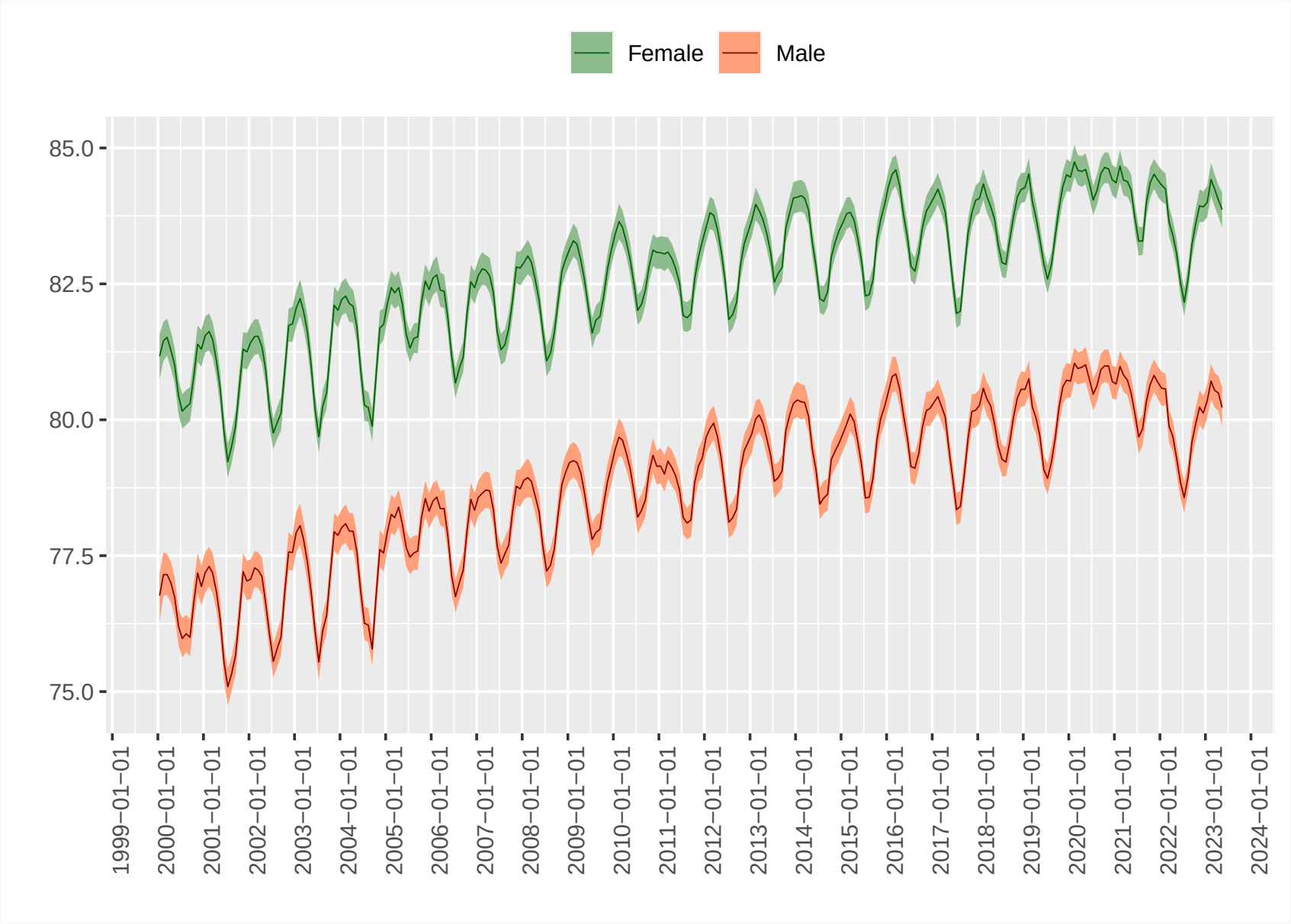
Seasonal effect



Life expectancy



Future work

Monthly mortality

- Model testing
- Refine decomposition
- Isolate effects of COVID

General methodology

- Extend theory and software
- Other topics
  - Fertility
  - Migration
  - Labour force
  - etc
- Detailed estimation becomes routine