

Tower 42, Old Broad Street, London

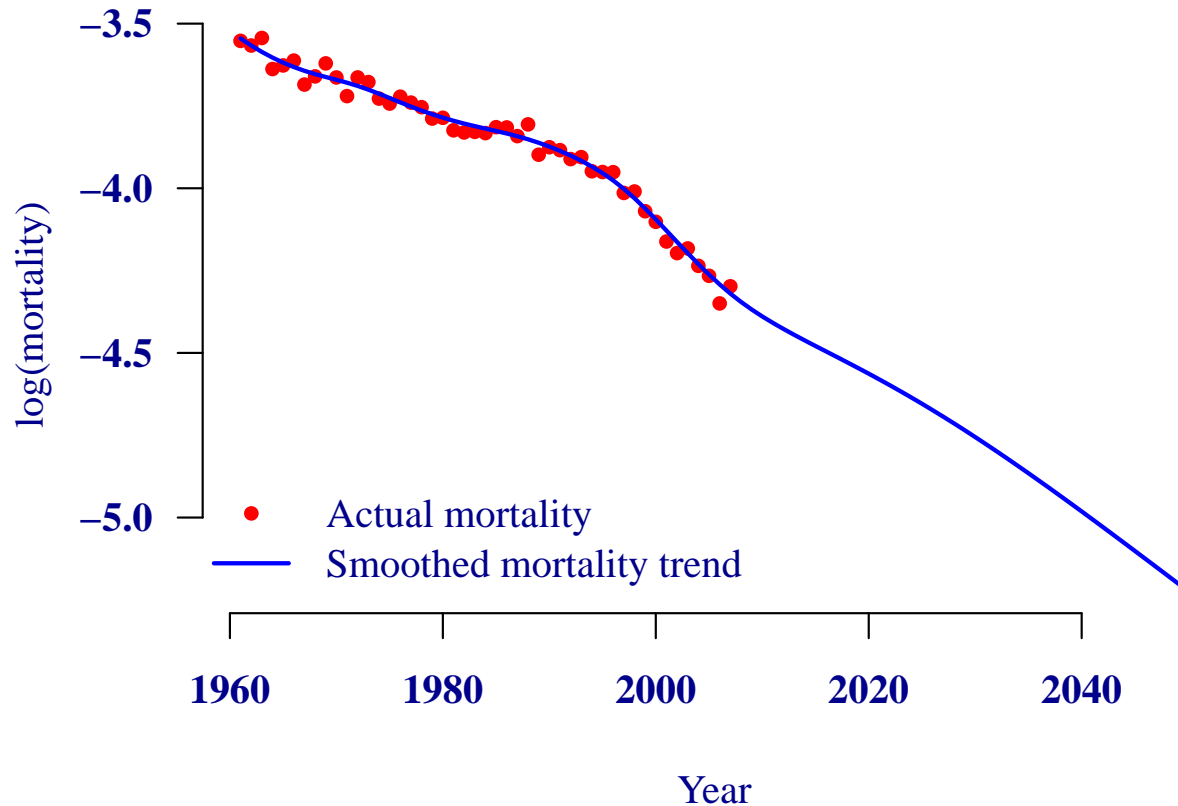
# Sample paths

Stephen Richards

18<sup>th</sup> May 2010

# Smooth trend and projection

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Source: ONS data for females aged 70 in England and Wales, 2D age-period P-spline smoother and projection.

# Penalty projections

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- Penalty projections are smooth
- Actual experience data is not smooth
- How can we add more realism to penalty projections?

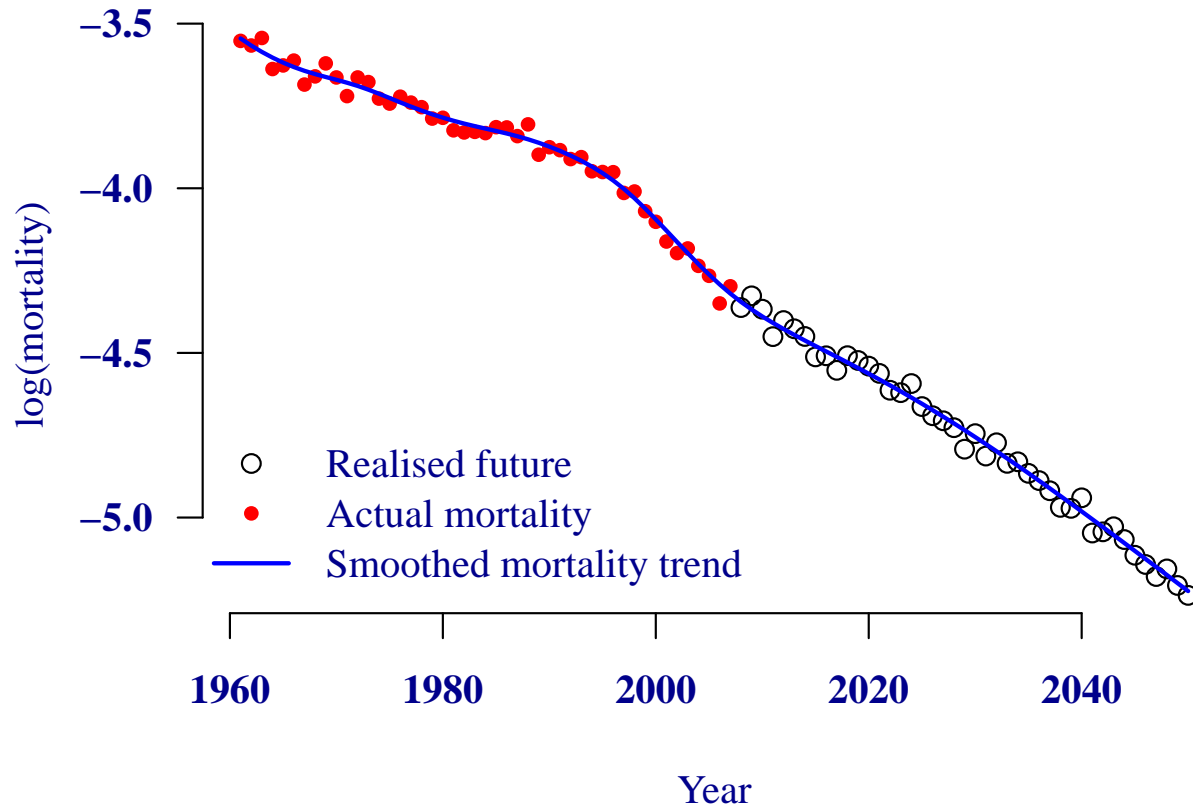
# Resampling

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- Resample the unstandardized residuals by year (column)
- This preserves age-related structure ...
- ... and also reproduces any mortality shocks
- Approach works with all penalty-based projections

# Projection with added volatility

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Source: ONS data for females aged 70 in England and Wales, 2D age-period P-spline smoother and projection with resampled residuals added.

# Conclusions and questions

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- Use resampled residuals to add realism to penalty projections

