Modelling migration: Review and assessment
Outline

1. Migration modelling: State of the art

2. Evaluation of forecasting methods and models: Example of UK migration

3. Towards a bespoke model of asylum flows
Part 1

Migration modelling: State of the art
Methodological State of the Art

- Migration is volatile and barely predictable; too precise forecasts are doomed to fail
- Short horizons, with increasing uncertainty
- The variability itself may be random
- Migration uncertainty compounded by data problems
Current practice in migration modelling

• Deterministic scenarios
  – Dominant in official statistics

• Surveys and expert studies
  – ‘Migration potential’, drivers, Delphi

• Econometric and gravity models
  – Theory-based covariates, spatial interactions

• Probabilistic models, including hierarchical models
  – Stochastic processes, time series

• Micro-simulations and agent-based models
Current practice in migration modelling

• Net migration vs individual flows
  – Individual countries, or a migration systems?
  – Data availability?

• Covariate information
  – Scenarios often used for predictors
  – Conditional forecasts with underestimated errors
  – Politics and policies usually absent

• Disconnected flows and stocks
  – Population variables often exogenous
Pitfalls

- Net migration
  - Conflates processes & structures
  - Problem with global constraints

- Use of predictors
  - Some less predictable than migration
  - Time-invariant ones not very helpful

- Too “orderly” forecasts
  - Overfit and unlikely to come true
  - Uncertainty not calibrated
Uncertainty everywhere

• Measurement
  – Different concepts and definitions
  – Different data collection mechanisms

• Theories
  – Fragmented explanations
  – Very strong assumptions

• Forecasts
  – Model specification, parameters, covariates, and experts
  – Irreducible uncertainty about the future
Part 2

Evaluation of forecasting methods and models: Example of UK migration


All the views and interpretations presented in this part are those of the authors, and do not reflect the views of the Home Office or the Migration Advisory Committee.
Background

• Project “Evaluation of existing migration forecasting methods and models”

• Commissioned by the Migration Advisory Committee, Home Office

• Aims:
  (1) to evaluate the existing approaches to forecasting UK international migration;
  (2) to assess the uncertainty of different forecasting methods
Insight into forecast uncertainty offers decision makers additional information beyond single (deterministic) variants.

Empirical assessment by comparing the results of various models for different migration flows against the past trends.

Two crucial challenges:
- Synthesis of this information
- Communication to the users
Methods and Models

• Several methods looked at, chiefly time series and extrapolation of past errors

• A range of data sources with different features: (non)stationarity, series length

• Analysis of errors and calibration
  – Mean Percentage Error (bias)
  – Empirical coverage of 50% and 80% intervals
  – Exercise on series truncated in 2003 and 2008
• Problems with theory-based forecasting
  – Migration theories are too weak and too fragmented to be useful
  – The future of migration determinants themselves can be very uncertain
  – Estimation of relationships between covariates and migration: another source of error
  – Result: If all these problems are combined, the forecast is almost pure uncertainty
Selected results
Selected results

• No single model is conclusively superior

• Results are not surprising: better forecasts for the more stable data series (e.g. flows of the UK nationals), less susceptible to shocks or policy changes

• Models assuming stationarity not to be used for non-stationary data series (and vice versa)

• Additional information – expert judgement, for example in Bayesian models – can help
## Migration – Risk Management Matrix

<table>
<thead>
<tr>
<th>Uncertainty (risk)</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Long-term migration of UK nationals</td>
<td>Short-term non-EU migration*</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>Long-term migration: old EU nationals (Western Europe)</td>
<td>Long-term migration: new EU nationals (Central and Eastern Europe)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long-term migration of non-EU nationals*</td>
<td>Short-term EU migration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Student migration*</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>Visas issued, by type*</td>
<td>Refugees and asylum seekers*</td>
</tr>
</tbody>
</table>

* Existing policy controls
Part 3

Towards a bespoke model of asylum flows
Survey of the existing methods

• Literature on the processes and drivers
• Available data series at a national and EU levels
• Existing models and predictions for asylum-related migration flows
Framework for the analysis

Synergy

Method n–1

... 

Method n

Data

Method n+1

... 

Assessment

Variable of interest

Push and pull factors

Intervening variables

Specification

Validation & performance

Evaluation Criteria
Final outcome: Feasibility study

- Synthesis of the modelling framework
- Design of bespoke model structure(s)
- Identifying data gaps and limitations
- Recommendations
Thank you!

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