Time Series of Internal Migration in the United Kingdom by Age, Sex and Ethnic Group: Estimation and Analysis

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Outline

1. Ethnic diversity in the UK
2. Ethnic group population projections – ETHPOP
3. Internal migration component methodology
4. Interaction patterns
Rather than “Diversity Explosion” as seen in the USA (Frey 2015), are we seeing “Diversity Diffusion”?

Note: Index of Diversity = 1 - $\sum e r_e^2$ where $r_e =$ proportion of the population in ethnic group $e$
Evaluation, Revision and Extension of Ethnic Population Projections - ETHPOP

- Our overall aim is to understand and to forecast the ethnic transition of the United Kingdom’s population.
- This is important for monitoring ethnic advantage / disadvantage & segregation.
- The team are Phil Rees (PI), Paul Norman, Pia Wohland, Nik Lomax & Stephen Clark.
Evaluation, Revision and Extension of Ethnic Population Projections - ETHPOP

- The migration component requires input time-series data of migration of ethnic group populations
- Moving to a multi-regional model over a bi-regional model
- Experimenting with probabilistic estimates which require good time-series estimates
# ETHPOP specification

<table>
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<tr>
<th>Features</th>
<th>Old ETHPOP (2007-2010)</th>
<th>New ETHPOP</th>
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<tbody>
<tr>
<td>Zones</td>
<td>LADs in England + WA, SC, NI (355 zones)</td>
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Previous ETHPOP project: 2007-10

Broad ethnic groups
- White
- Mixed
- Asian
- Black
- Others

Other Ethnic
- White & Black African, Other Mixed
- White Other
- White & Asian

Chinese
- Black African
- White & Black Caribbean, Other Asian
- Pakistani
- Other Black
- Indian, Bangladeshi

Black Caribbean
- White Irish
- White British
Levels of migration
(Migrants aged over 1)

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There is a negative correlation between immigration and net out-migration of the 404 Local Authority Districts for each year of the time series: $r = -0.67$ in 2001/02, $r = -0.74$ in 2006/07 and $r = -0.66$ in 2010/11, all $p<0.01$. 
Model Input: Origin-Destination-Age-Sex-Ethnicity

Migration per 1,000 people

Source: 2011 Census
Chinese and Pakistani migration at age 16 to 24
Model Input: Origin-Destination-Age-Sex-Ethnicity
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Adapted from Rees and Willekens 1986
Model Input: Origin-Destination-Age-Sex-Ethnicity
Combining data and estimating gaps

• Iterative Proportional Fitting
Urban – Rural Patterns

WBI
Dense to Sparse
Dense to Dense
Sparse to Sparse
Sparse to Dense

WHO

CHI

BLA

BLC

IND
Urban – Rural Patterns

16 to 24

65 Plus

Dense to Sparse

Dense to Dense

Sparse to Sparse

Sparse to Dense

X1 X2 X3 X4 X5

X6 X7 X8 X9 X10

X1 X2 X3 X4 X5

X6 X7 X8 X9 X10

X1 X2 X3 X4 X5

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Age 65+ in 2011

See Abel and Sander (2014)
Conclusions

• Ethnic diversity in the UK has increased between 2001 and 2011 and is projected to increase further

• Internal migration patterns by ethnic group an important component of population change
  – Age structure and migration rates vary by group

• Need to get this right for our projection models

• Further estimation required for the full Origin-Destination-Age-Sex-Ethnicity array

• Full ODAS array allows us to experiment with multi-regional projection model
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Poster Session tomorrow: Ethnic population projections for the UK and local areas, 2011-2101: a second chance to get them right
References