Key messages from the DPM MARP Subgroup meeting held on Wednesday, 9 July 2025

Attending:

Panel:
Jon Forster (University of Warwick)
Arkadiusz Wisniowski (University of Manchester)
Fred Piel (Imperial College London)
Ana Basiri (MARP representative - University of Glasgow)

ONS representatives:
Dominic Webber (ONS chair)
Duncan Elliott (ONS)
Ffion Lelii (ONS)
Petya Kozhuharova (ONS)
Pratibha Vellanki (ONS)
Salah Merad (ONS)
Greg Payne (ONS)
Beth Poole (ONS)

International Migration: A Comparative Look Before and After DPM Modelling - Presented by Dom Webber and Ffion Lelii

DE provided overview of how migration splitting works to separate internal and international migration, detailing the Iterative Proportional Fitting (IPF) method. FL then covered why we are looking at the differences between DPM inputs and outputs in terms of international migration, work done to date, and how we have found some discrepancies:

- A lag in the data post 2021 for 18-22-year-olds
- A divergence in the data for 2024 for 18-22-year-olds
- The DPM applying a “smoothing” effect for Gwynedd internal migration

This was then opened up for discussion.

GP suggested the lag could be due to the 2021 census, having a “strong” data point in the Dynamic Population Model that overrode the LTIM inputs. GP also suggested the 2024 divergence could be due to a change in data source (PDS vs SPD – this can be investigated further once the current production run is complete).

The panel highlighted that there was a divergence in 2015 and asked if we knew why this was. DE suggested it could again be due to PDS vs SPD. DE also suggested there may be a way to model the bias between the PDS and SPD to account for different data sources.

AW asked about what the results looked like pre-IPF, and if this issue was seen there too. DW and FL confirmed that this has been looked at previously and there is no obvious error being introduced by the IPF.

The panel queried overlap in uncertainty. ONS colleagues have looked at how inputs compare to the outputted Confidence Intervals but need to revisit this in more detail.

AW also asked about smoothing introduced in Generalised Additive Models. DE confirmed that the December dry run was using hierarchical models.

The panel suggested applying weights to the IPF to force the outputs to align more closely to the inputs. However, we do not know if that is the correct approach as the outputs may be capturing reality more accurately, and forcing the outputs to match the inputs may defeat the purpose of the model. Agreed this was a difficult question to answer.

Action DPMSG002: ONS to revisit how inputs compare to the outputted CIs.

Overview of Recent Changes to the DPM Model– Presented by Greg Payne and Duncan Elliott

DE and GP presented covered changes that have been implemented between the last publication (July 2024) and the upcoming publication (July 2025). This covered:

1. An overview of improvements to key input data sources, processes and additional methods that have been brought in to improve the quality of estimates, bring processes in line with current Mid-Year Estimates outputs and align with best practice.
2. An overview of the model tuning that has been required to run the July 2025 production run. This included some simplifications made to model specifications where processing issues were encountered.

No follow up actions were given.

Update on Aggregate Uncertainty and Coverage Adjustments - Presented by Salah Merad and Duncan Elliott

SM and DE presented results to questions and suggestions raised by members of the group at the previous meeting.

1. SM and DE presented results from a simulation study to evaluate the accuracy of uncertainty measures for cell-level estimates based on a single run, as opposed to the full multiple draws approach (draws from the distributions of mean demographic rates and coverage ratios from hierarchical models). This showed that the median coverage of the 95% credible intervals over all cells is 95% or higher - the median coverage was highest in 2021 (100%) and lowest in 2011 (95%). The multiple draws approach leads to much higher uncertainty in census years; therefore, we think that findings from the simulation study provide good evidence for using a single run at cell level. The ONS plans to do further investigations to understand the

differential between 2011 and 2021 since the uncertainty of stocks was set to be identical in both years in the simulation.

2. The ONS tested using approximately exact data models in 2011 and 2021 for aggregates estimation in the multiple draws approach - the estimation package does not accept exact data models for population. We found that this leads to the coefficients of variation of the posterior distribution of population to decrease as we move away from census years, which looks wrong as the uncertainty of stocks in the inputs is lowest in 2011 and 2021. More work is planned to understand why this counter-intuitive result appears.

Actions:

Action DPMSG002: ONS to revisit how inputs compare to the outputted CIs.

Action DPMSG003: ONS to investigate why the coefficients of variation of the posterior distribution of population decrease as we move away from census years.

Date and time of next meeting: Wednesday 10 September 2025, 13:00-15:00