

Introduction to the DWP Policy Simulation Model (PSM)

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What is the Policy Simulation Model?



The Policy Simulation Model (PSM) is DWP's premier policy analysis tool

Policy analysts across DWP access the PSM through an interface, on which they can tweak most of tax & benefit policy.



It's a static microsimulation underpinned by the FRS

We feed in lots of other data, benefit forecasts, economic assumptions, population projections to name a few ...



Maintaining and developing the PSM is a full-time endeavour

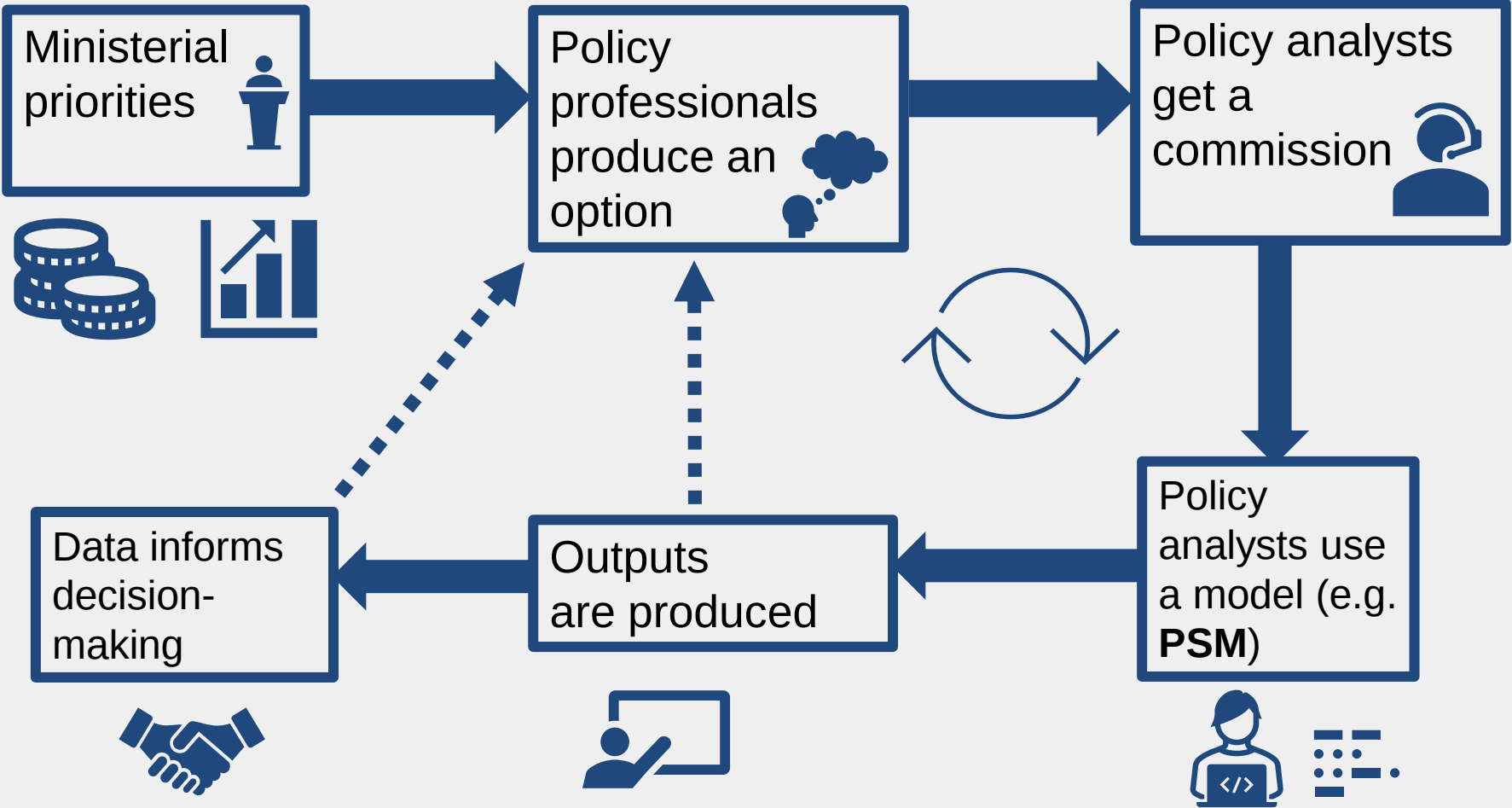
A dedicated team looks after the PSM. Our team sits within an analyst division whose remit is to forecast and model the entire working age benefit system.



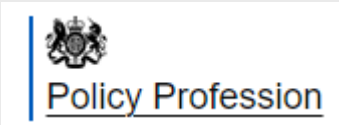
The PSM has been in active use for at least 20 years!

Over that time, the model has been continuously improved and it's scope has been expanded. It has been pivotal to Government policy over that period.

Policy Making Process



Our stakeholders and ultimate customers



Mel Stride
Conservative
Central Devon



Tom Pursglove
Conservative
Corby



Guy Opperman
Conservative
Hexham



Viscount Younger of Leckie
Conservative
Excepted Hereditary



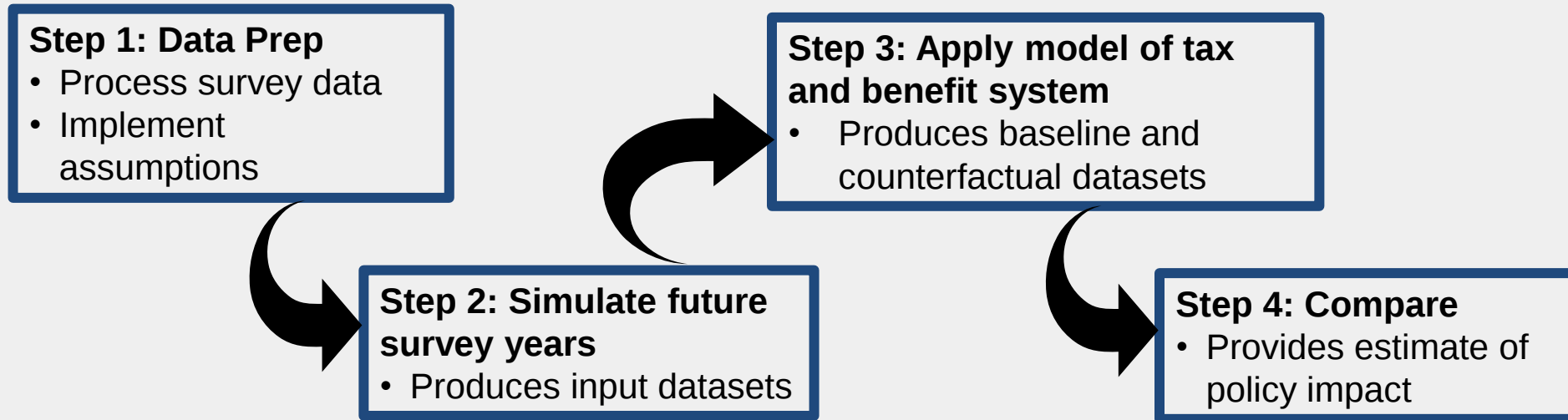
Mims Davies
Conservative
Mid Sussex



Laura Trott
Conservative
Sevenoaks

Methodology of the PSM

Estimating Policy Impacts



Terminology	Definition
Gainer/Loser	When someone gains or loses monetary income/entitlement.
Floater On/Off	When someone moves on/off benefit who was/wasn't previously entitled.
Average Amount	Average amount of benefit entitlement (or income) received per week.
AME (Annual Managed Expenditure)	Amount of money spent on benefit payments to claimants. DEL is the operational cost of doing this. The PSM looks at AME.

Similarities

- Both models are based on the FRS.
- Like UKMOD, we pool together three years of FRS data to improve on sample size when regional or other disaggregated analyses are performed. We project forward earlier FRS samples into the base year to create a total sample.
- We both account for statutory uprating so that the longer-term impacts of policies can be analysed.

Differences

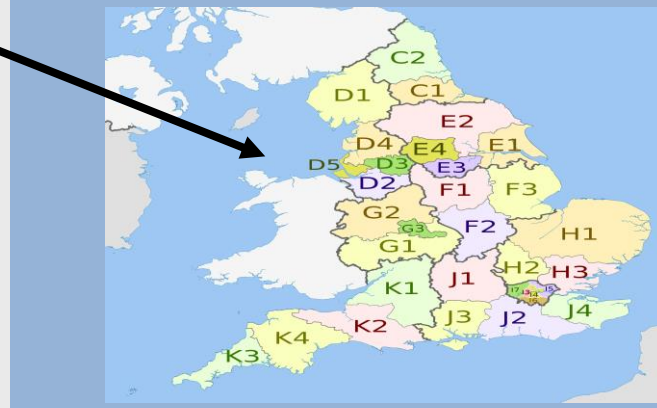
- Our model is owned by DWP meaning that only limited information is available on it outside of government. Since UKMOD is an academic project, it aims to be widely used and discussed, and puts accessibility as a top priority for achieving this.
- The latest edition of UKMOD is based on the FRS waves 17-18, 18-19, 19-20, whereas the PSM is based on 21-22, 19-20, and 18-19.
- We use a software called CALMAR to calibrate to a range of control totals, whereas there is an absence of calibration in UKMOD.

Population

- ONS population projections split by:
 - NUTS2 Region
 - Gender
 - Age range
 - Family type
- Household projections split by:
 - NUTS2 Region (ONS)
 - Tenure (various sources)

Employment

- OBR employment volumes split by:
 - Gender
 - Age range



Benefits

- Internally generated caseload forecasts of:
 - Contributory benefits e.g. ESA
 - Non-contributory, non-means-tested benefits e.g. PIP
 - Means-tested benefits e.g. UC
- Sub-group splits of these caseload forecasts.

Why do we calibrate?

- Any policy analysis needs to be consistent with the official baseline forecasts.
- The model needs to be agile – i.e. if the forecast for UC claimants massively changes.
- A more heavily calibrated model is what has been asked for by our stakeholders.
- We are interested in how representative each respondent of the FRS given changes in society that we measure.
- This means validation is tricky, but we look for uncalibrated quantities, i.e. small sub groups, expenditure, income, groups we don't calibrate for to assess the performance of the model. Stat Xplore + Administrative Data.

Grossing: A Closer Look

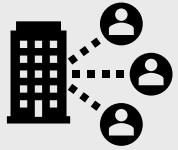
- We use software called CALMAR, developed by Olivier Sautory of INSEE.
- Suppose we have a survey of size n . Each sample unit S_j has an FRS sampling weight d_j .
- Additionally, suppose we have m control totals, X_i , representing a population of interest that we wish to calibrate to, then denote sample membership of that population by x_{ij} .
- Then to calibrate to the specified control totals, we need ω_j to satisfy for all $j \leq n$ and $i \leq m$.

$$\sum_{j=1}^n x_{ij} \omega_j = X_i, \mathbf{x} \boldsymbol{\omega} = \mathbf{X} \text{ \& minimise } \{\delta(\mathbf{d}, \boldsymbol{\omega})\}$$

- With the additional constraint that the weights $\boldsymbol{\omega}$ are as close as possible to FRS survey weights $\mathbf{d}$ (by minimising a distance metric).
- CALMAR then makes use of a host of numerical methods to derive the solution.
- We have hundreds of control totals without NUTS2 calibration, NUTS2 calibration takes this total to well beyond 1000 control totals.
- We only calibrate to caseload sizes, we don't calibrate to spend or average amounts.
- Our grossing weights will be different in each year of the projection.

Uses of the PSM

Capabilities



**Work
Incentives
Modelling**



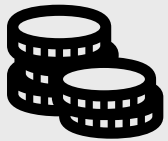
**Benefit
entitlement
vs Take-Up**



**Income
Impacts**



**Simple and
complex
policy
changes**



**Costs of
Policy
Options**



**Regional
Analysis**



**Impacting
Leg → UC
Migration**



**Equalities
Analysis**

Scope



**Health &
Disability
Benefits**



**UC &
Legacy IR
Benefits**



**Housing
Benefit &
Related
Policy**



**Cost of
Living**



Pensions



Child Care



Tax



**Free School
Meals – CTR
– Winter
Fuel**

Published Outputs

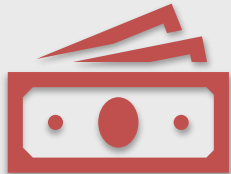
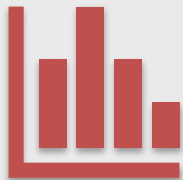
Equality Analysis for
The Size Criteria and
children with disabilities

Universal Credit: reduce taper rate from 63p to 55p and
£500 p.a. increase in work allowances from 1 December
2021

Official Statistics
**Income-related benefits: estimates of
take-up: financial year 2019 to 2020**
Published 24 February 2022

Analysis of Options
for the Income
Supplement

Disregarding compensation payments related
to the Post Office Horizon scandal from benefit
means tests



Official Statistics

Impact Evaluations

Policy Costings

**Evaluation of the Free
School Meals Pilot**

Benefit cap levels: uprate by CPI in 2023-24

Universal Credit: reintroduce Minimum Income Floor from
1 August 2021

DWP: pay Universal Credit childcare support
upfront for parents moving into work

Universal Credit: maintain the surplus earnings de
minimis threshold at £2,500 per month in 2022-23

Title: Universal Credit	Impact Assessment (IA)
	IA No:
Lead department or agency: Department for Work and Pensions	Date: October 2011
	Stage : Final Proposal
Other departments or agencies: Jobcentre Plus Local Authorities Her Majesty's Revenue and Customs	Source of intervention: Domestic
	Type of measure: Primary Legislation
	Contact for enquiries: