

# Policy Simulation Model

Dawn McDonagh & Rafal Chomik  
Model Development Unit  
Department for Work and Pensions

# Policy Simulation Model (PSM)

- **Why** was the PSM created?
- **What** is the PSM?
- **How** does the PSM work?
- **How** does the PSM use the FRS dataset?
- **Comparison** of FRS0809 v.s. PSM0809
- **Applying** the PSM to poverty analysis

# Why was the PSM created?

Model impact of policy change on GB benefit units

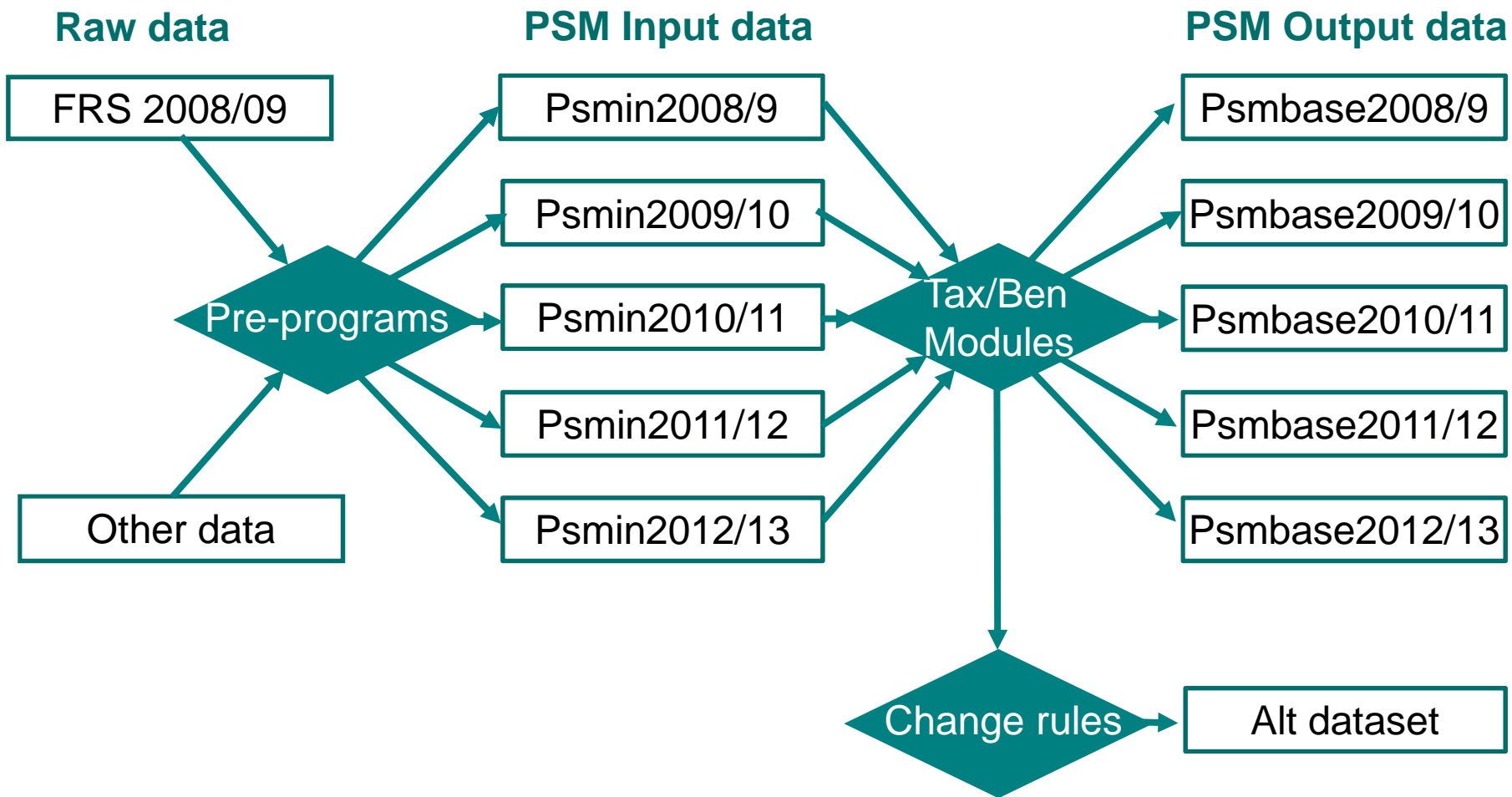
- Gainers/losers/floaters on/floaters off Income Related Benefits (IRBs)...recently Tax Credits (TCs)
- Changes to average weekly income/benefit receipt
- Government expenditure/savings
- Impact on Interactions between IRBs and TCs
- Impact on Income Distribution for GB population
- Impact on poverty

# What is the PSM?

## Static Microsimulation Model of GB Tax & Benefit System

- **Static** – uses 2008/09 FRS data and **doesn't change** personal or financial characteristics in simulated years.
- **Micro** – models **individuals** at ben unit & hh level
- **Simulation** – produces **results** of entitlement, from FRS year up to two years beyond current financial year.
- **Model** – **describes** the Great Britain population.

# How does the PSM work?



# How the PSM uses the FRS dataset

## Direct from FRS

- Attendance Allowance
- Carer's Allowance
- Disability Living Allowance
- Industrial Injuries Disablement Benefit
- Maternity Allowance
- Statutory Maternity, Paternity and Adoption Pay
- Statutory Sick Pay

## Eligibility from FRS, rates modelled in PSM

- Bereavement benefits
- Short-term incapacity benefit
- Long-term incapacity benefit
- Contribution-based jobseeker's allowance
- Retirement pension
- Severe disablement allowance

## Eligibility and rates modelled in PSM

- Income support/income-based jobseeker's allowance
- Housing benefit and council benefit
- Pension Credit
- Working tax credits
- Child tax credits
- Child Benefit
- Social fund payments (e.g. winter fuel payments)
- National insurance contributions

# Calculating Net Income...from gross income

## Taxable Income:

- Earnings
- Retirement Pension
- Contributory JSA
- Widow's Benefit
- Occupational Pension
- Gross personal pension and trust payments
- Total amount of taxable interest (before tax)
- Rental income from other property
- Carer's Allowance
- Statutory Sick Pay
- Statutory Maternity Pay
- Statutory Paternity Pay
- Statutory Adoption Pay

## Non-taxable Income:

- Non-taxable income of head and spouse
- War Disability Pension
- Income from external sources
- Maintenance Payments
- Attendance Allowance
- Severe Disability Allowance
- Govt. Training Scheme
- Maternity Allowance
- Any other NI/State benefits
- Industrial Injuries Disablement Benefit
- Trade Union/Friendly Soc Benefit
- Disability Living Allowance (care)
- Disability Living Allowance (mobility)
- Non-taxable interest income

## Benefits:

- Child Benefit
- Income Support
- Income-related ESA
- Pension Credit
- New Tax Credits (sum of WTC and CTC)
- Housing Benefit
- Council Tax Rebate (includes Second Adult Rebate)
- Winter Fuel Payments
- Value of Free TV licence to benefit units
- In Work Credits
- Return To Work Credits

# FRS0809 v.s. PSMBASE0809 datasets

|   | <b>FRS0809</b> | <b>PSMBASE0809</b>  |
|---|----------------|---|
| <b>Population</b>                                       | UK-based       | GB-based  |
| <b>Benefit unit characteristics</b>                     | Reported FRS   | Reported FRS  |
| <b>Non-income related benefits</b>                      | Reported FRS   | Some reported FRS (e.g. SMP, SSP)<br>Some modelled (e.g. IB, DLA) |
| <b>Income-related benefits:<br/>PC, IS/ESA, HB, CTB</b> | Reported FRS   | Modelled entitlement based on GB tax and benefit rules.           |
| <b>Tax Credits: CTC/WTC</b>                             | Reported FRS   | Modelled entitlement based on GB tax and benefit rules.           |
| <b>Grossing</b>   | FRS Grossing   | PSMGROSS based on age, sex, family and regional assumptions       |
| <b>Hourly wage</b>                                      | Reported FRS   | Set to at least the minimum wage                                  |



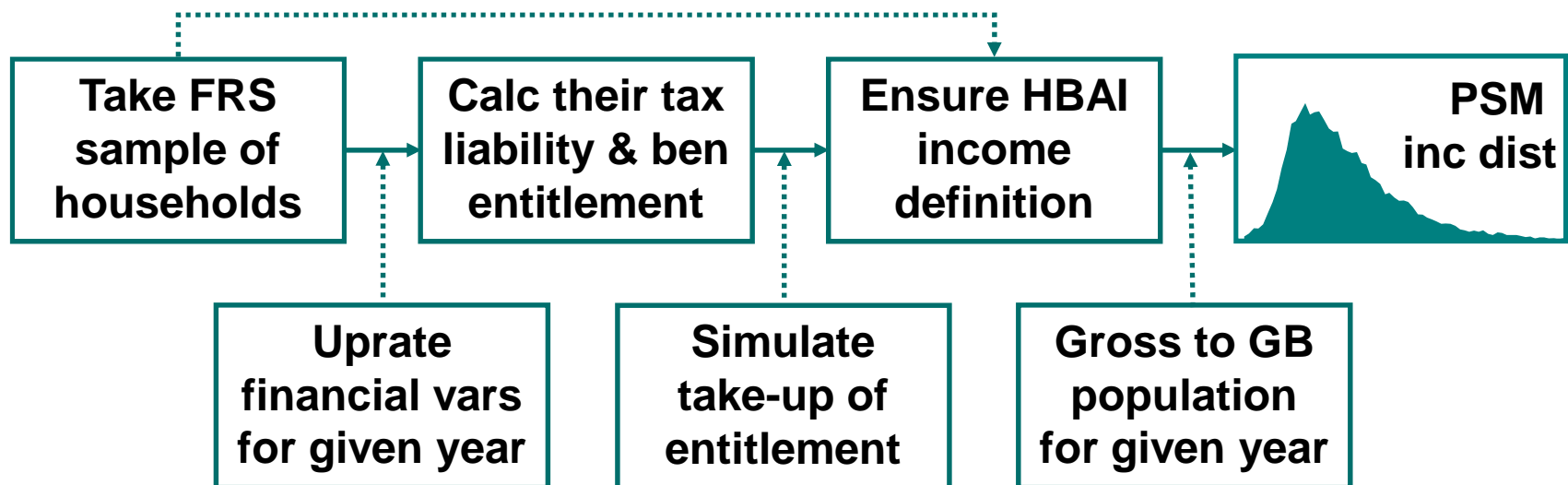
# Applying the PSM to poverty analysis

- Why we use PSM
- How we simulate income distribution & poverty
- Capabilities in projecting policy and scenarios
- Other output and uses

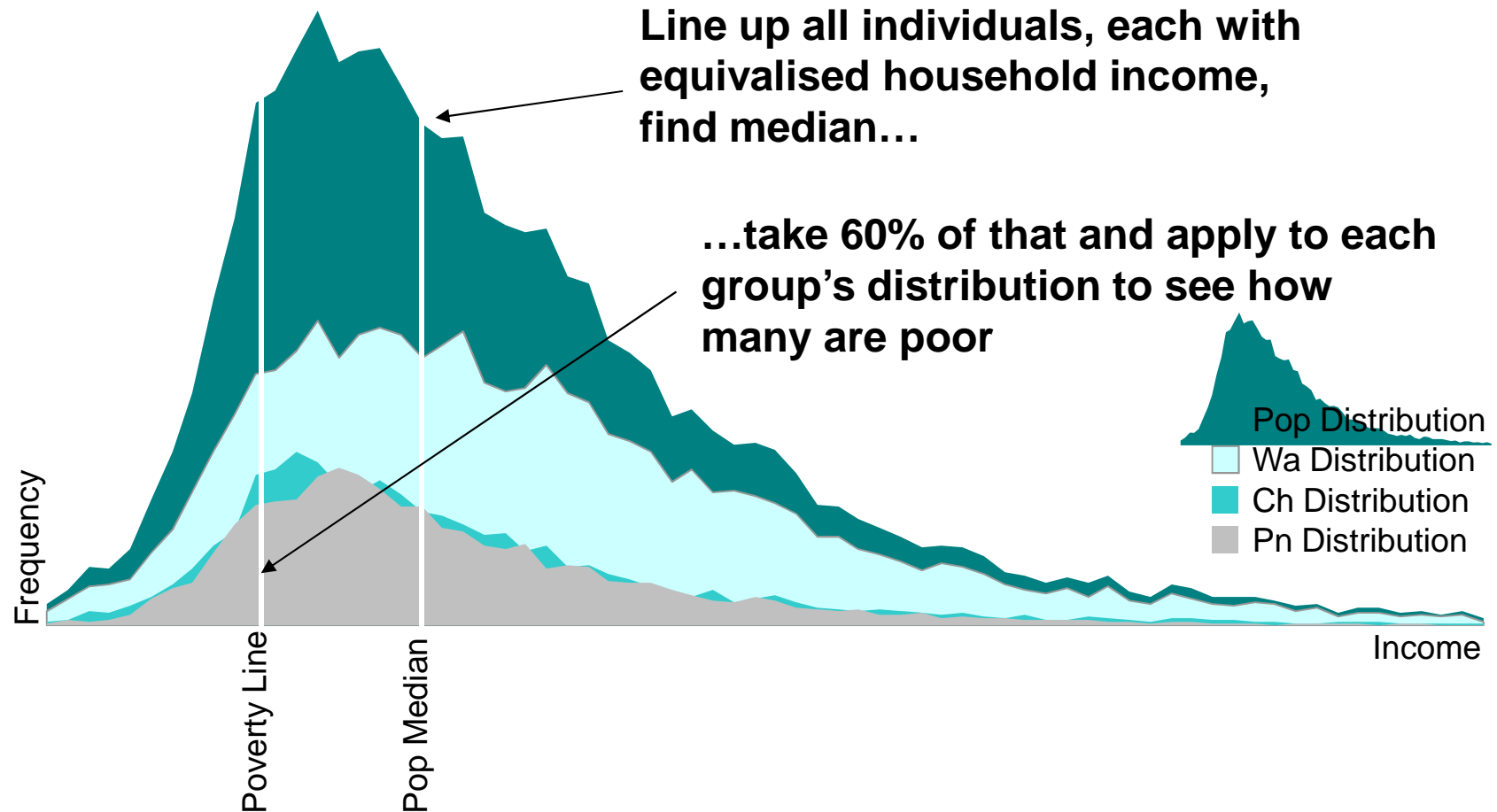
# Why we use PSM for poverty analysis?

- Simulation of entire income distribution
- Capturing tax & benefit rules interaction
- Income & relative poverty line interaction

# Simulating entire income distribution with PSM



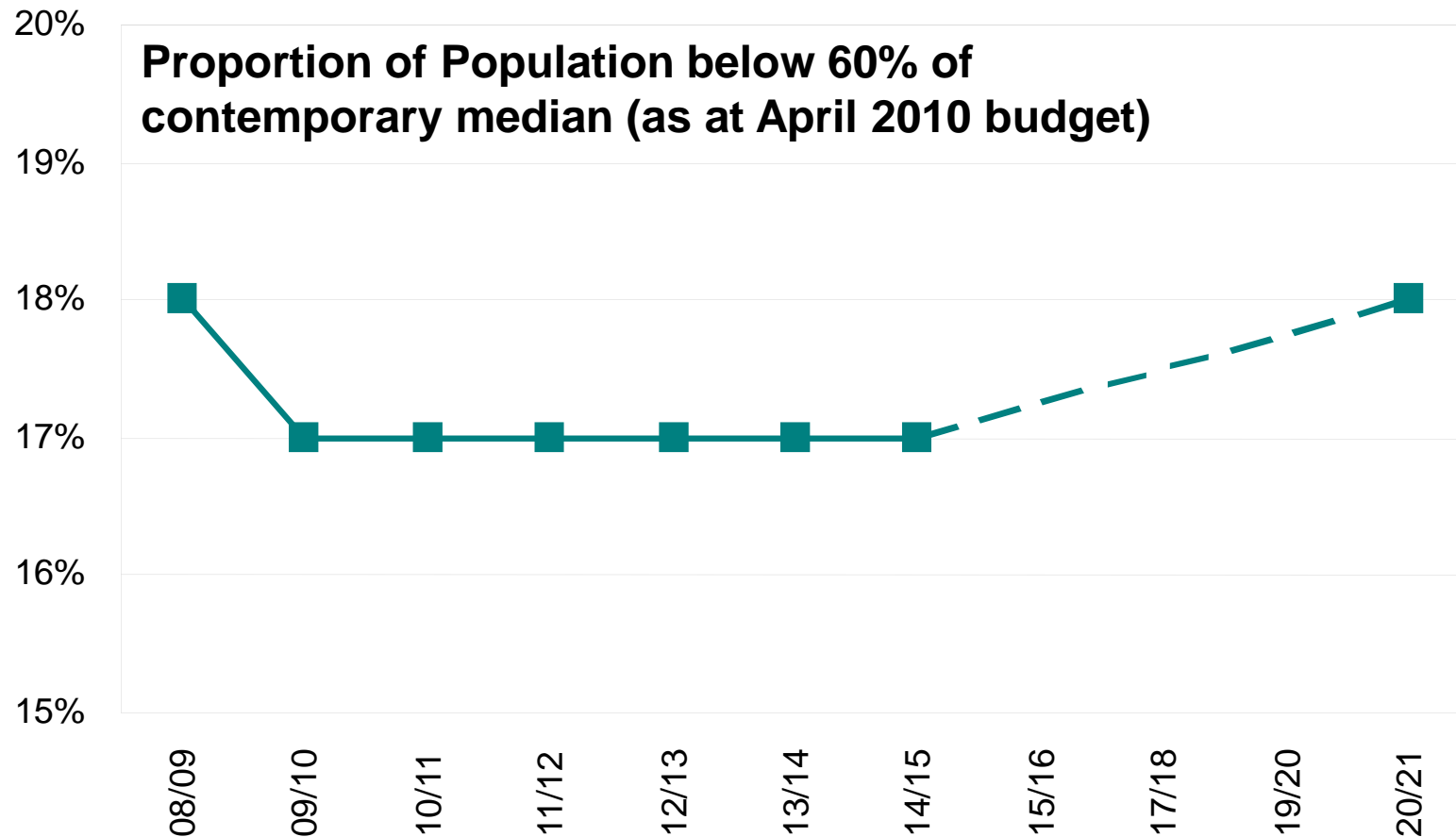
# From income distribution to poverty



## How do PSM and HBAI results compare?

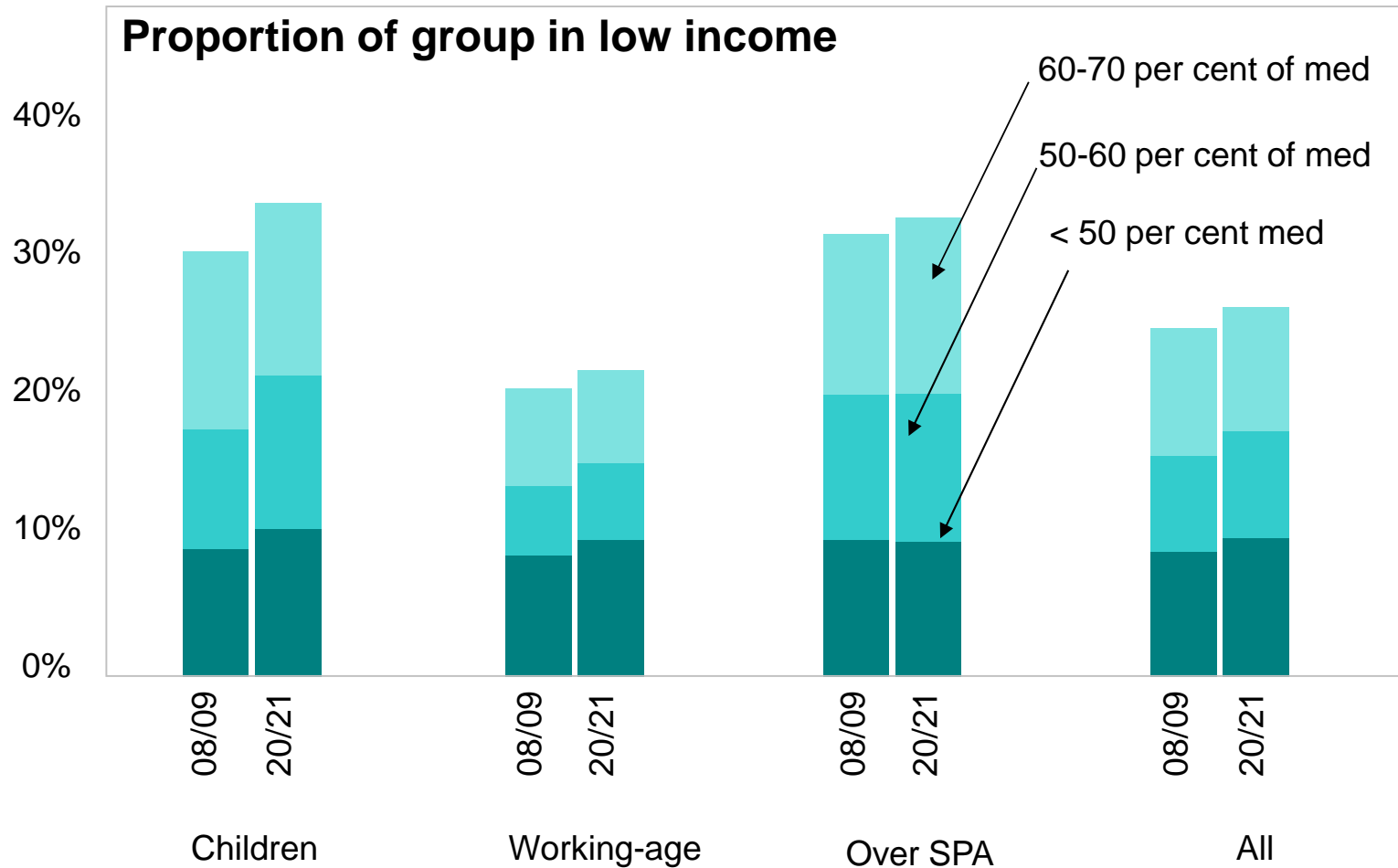
|                   | PSM<br>2008/09 | HBAI<br>2008/09 |
|-------------------|----------------|-----------------|
| All (BHC)         | 18%            | 18%             |
| All (AHC)         | 22%            | 22%             |
| Children (BHC)    | 21%            | 22%             |
| Working Age (BHC) | 16%            | 16%             |
| Pensioners (AHC)  | 15%            | 16%             |

# Projecting the path of poverty into the future



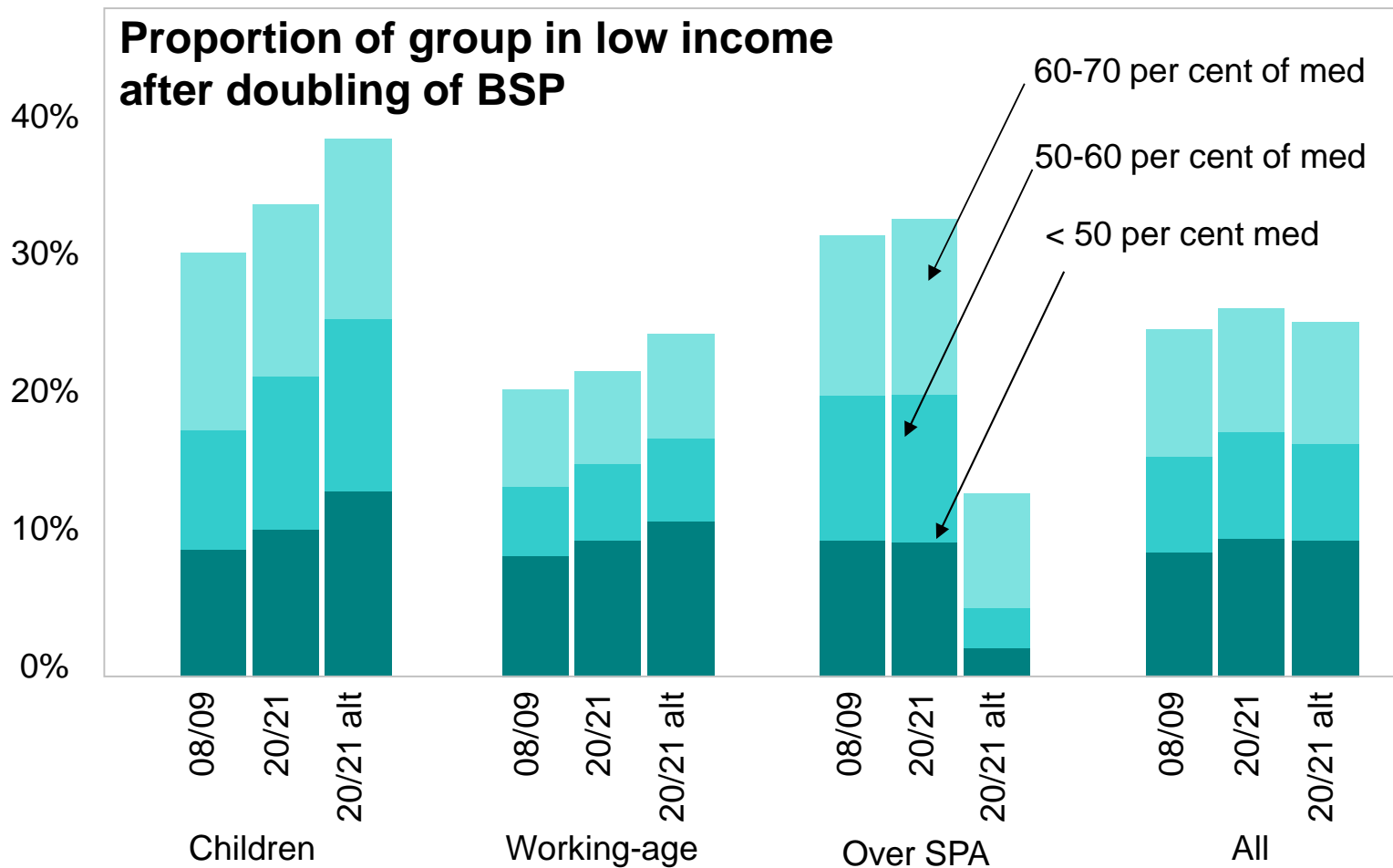
Note: Illustrative results only

# So, starting from base projections...



Note: Illustrative results only

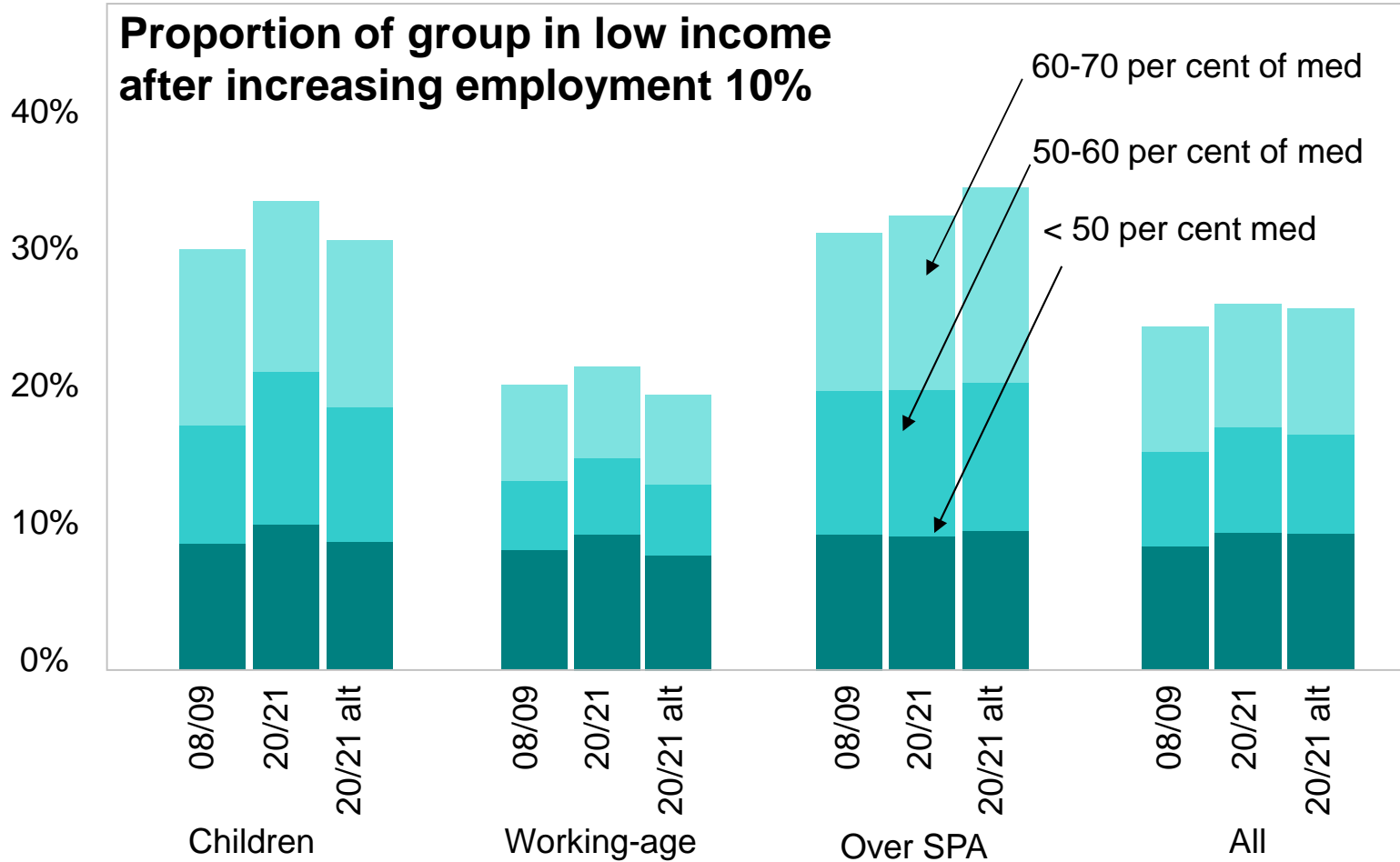
# We can simulate policy changes...



Note: Illustrative results only



# And conduct scenario analysis...



Note: Illustrative results only

## Other poverty analysis variants and output

- Stretching earnings distribution
- Alternative price/wage inflation
- Take-up regime
- Benefit uprating regime
- Housing tenure
- Alternative demographics
- Policy costing and caseloads

## Other recent uses

- Impacts of Universal Credit welfare reforms
- Distributional and cost analysis of SR10
- Experimental modelling of material deprivation
- Reforming HB in social sector

# Conclusion

- Dawn: What the PSM is and how it works
- Rafal: Examples of how it is applied