Incorporating behavioural change & dynamic considerations in tax policy modelling

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Models, models, models

- Speaking from the perspective of HMRC (and Treasury)
- But Department of Work and Pensions also have models – with distinct benefits and pensions focus – and issues are similar
- My focus today is on ‘policy models’
  - Testing the effects of tax and benefit policy scenarios
  - Estimating distributional and microeconomic effects of those scenarios
- Greater focus on distributional/behavioural modelling in last 20 years or so
  - Increasing use of these tools in IFS and wider academia
  - Ministers expect to know the effects of policy (IFS/academia raised expectations)
  - Technology and improved applied techniques
  - Greater transparency in Government
The key trade offs in modelling

**Precision**
To how fine a level of detail do you want to be able to explore?

**Completeness**
Can we model the whole tax and benefit system / whole population?

**Cost**
What resources – time, human and financial – can we commit?
Some terminology

**Static**
Characteristics and composition of agents (e.g. age) do not change.

**Dynamic**
Characteristics and composition of agents can change as time passes.

**Non-Behavioural**
Agents behaviours (e.g. labour market participation) unchanged.

**Behavioural**
Agent behaviours change in response to changes in tax and benefit system.
Current and planned models

- **Personal Tax Model** (individual)
- **IGOTM (tax & benefits)** (household) + public services
- **Employment Choice Model** (participation/hours)
- **NIBAX**
IGOTM

- IGOTM: Intra-Governmental Tax and Benefit Model
- Non-behavioural micro-simulation model, similar to IFS’s TaxBen: estimates tax and benefits and effect of policy changes
- Commonly run from FRS and LCF survey datasets
- Works at individual and household level to capture different rules
- Covers most personal and indirect taxes, tax credits and benefits
- But sample sizes and nature of surveys used means some detail cannot be modelled (e.g. indirect taxes at individual level)
- Used to produce decile gains/losses charts included in Budgets
- Also provides underlying advice to Ministers to support decision making
IGOTM: the benefit of public services

- Since SR10, provide distributional analysis of public spending by income quintile using a spreadsheet model
- Intended to refine and update the approach: 18 month project to improve quality and flexibility of distributional analysis of spending on public services
- Developing IGOTM to estimate public service usage by individuals and households and allocate benefits in kind from frontline public services
- Using LCF data and, where necessary, a regression-based approach to predict usage of public services. Value based on unit cost of provision
- Treasury-led, working closely with colleagues across Whitehall, ONS, IFS and other experts in the field
- Aim to complete in summer/autumn 2013
Employment Choice Model

• IGOTM can model changes in work-incentives, but the measures often imperfect – real issue is whether people change work status or hours
• ECM is a behavioural add on to IGOTM to model effect of changes in the budget constraint on labour supply decisions
• Discrete choice model: evaluates budget constraint at 0 hours and selected positive hours
• Modelled wages for non-workers and five categories of work/leisure preferences all estimated from LFS data
• Produces labour supply estimates at extensive and intensive margins, relative to a baseline
• Primarily a tool for advising ministers, but is time consuming to run and quality assure outputs
NIBAX

- NIBAX: National Institute Benefit and Tax Model – behavioural, dynamic model
- Assumes households plan their consumption, savings and labour supply decisions considering the future and the uncertainties of their environment
- Starting point is simulated cross section of the current population based on data from the Wealth and Assets Survey
- Covers most personal taxes, tax credits and benefits; indirect tax to a limited extent.
- Expected to produce gains/losses charts by lifetime income decile and analysis of behavioural impacts of policy
- Based on a broader population – a full cross-section – than the IFS model, which focuses on a female cohort; but only has household level analysis
- NIBAX treats human capital (qualifications) as exogenous while IFS model has education and human capital investment as endogenous
Dynamic, behavioural models – an *ex ante* view

**Opportunities**

- Can overcome limitations with some snapshot surveys of income
  - Best example being the ‘bottom 10 per cent’ issue
  - Ways round it using expenditure, but better to look directly at lifetime income
- Labour supply effects can appear small in snapshot
  - Over life cycle, different income trajectories could have large effects

**Challenges**

- Inevitably some loss of ‘precision’ and ‘completeness’
- Complexity
  - Diagnostics and explanation
  - Presenting results
  - Behavioural parameter judgements
  - A potential source of tension and disagreement even in static behavioural modelling
  - Effects amplified in lifecycle models, as optimise behaviour each period
Concluding thoughts – the modelling

- Strong demand for good modelling
- Dynamic & behavioural models can add real value to policy making – important additions to our capability
- But inevitable trade offs compared to static/non-behavioural models
- Challenge is to make (all) modelling accessible – avoid the ‘black box’
- And microsimulation and micro-data are not the only approaches
  - Some approaches need to be modelled in a different way – evaluation of the 50p rate principally used aggregate data
  - With business taxes, we have to use more bespoke modelling approaches and judgements on investment decisions
  - Specimen or ‘case study’ approaches are simple and easily communicated
Concluding thoughts - presentation

- Presentation of microsimulation models often focuses on changes compared to a baseline tax and benefit system (‘winners’ and ‘losers’)
- But the baseline creates an interesting reference point issues
  - Baseline changes results: what is the right counterfactual to measure against?
  - Often compared to an indexed base
    - Correct economically, but not necessarily how people perceive the world
    - In life-cycle models, not necessarily sustainable
  - Tax and benefit system only one determinant of living standards
  - Focus on change misses underlying effects of tax and benefit system
  - Often does not include ‘benefits in kind’ (health, education, etc.)