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The Public Policy Preference Calculator (TriplePC)

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What's novel about TriplePC?

TriplePC is a conventional tax-benefit model, written in Julia and using Family Resources Survey (FRS) data, but with two novel features:

1. as well as modelling the outcomes of a policy in the conventional way, our model uses Conjoint Analysis to give an indication of the policy's popularity;
2. we integrate health outcomes into the model. There is strong evidence that welfare policies can have a substantial effect on population health.



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Conjoint Analysis

- a survey-based technique originally developed as a market research tool, to examine how consumers value characteristics (sweetness, colour, alcohol content, etc.) of goods;
- has become popular as a method for discovering the public's valuations of economic or social policies;
- conjoint results are good predictors of voting.

Our Survey

- 800 UK resident adults recruited through the Prolific online platform;
- Participants were asked repeatedly to choose their preferred welfare policy from sets of two.
- The two policies contained randomised levels of inputs (tax rates, benefit amounts, etc.) and outcomes (health levels, inequality, etc.)
 - e.g. payment sizes of £63 per child, £145 per adult and £190 per pensioner; poverty decreased by 25% etc.).

Conjoint Analysis: Findings

- preference for more generous payments than less generous ones.
- strong preference for decreases in poverty
- Increasing personal income tax rates were popular if the package they were part of also decreased poverty, and unpopular otherwise.
- preference for a wealth tax, carbon taxes, and increased corporation tax, as opposed to increased government borrowing.
- significant positive effect of a large reduction in inequality, and a significant negative effect of a large increase in inequality. However, the effects for inequality were weaker than for poverty.
- An increase in life expectancy of five years was significantly preferred to the status quo, and a decrease in life expectancy of five years significantly dis-preferred.
- dis-preference for increased rates of anxiety and depression relative to the status quo, and there was a slight preference for policies that decreased them sharply.
- no strong preference for or against means-testing or other restrictions on eligibility.
- Mild differences between left- and right- supporting participants, in the expected directions.
- no significant variation by gender or between rich and poor.
- older people were significantly less keen on high income tax schemes and, curiously, less concerned with health consequences.

Health Modelling

- We model mental health and life expectancy.
- We build a model relating SF-12 scores to income and demographic characteristics. SF-12 is a widely used measure of an individual's health-related quality of life
- Estimated over 12 waves (2009/11-2020/22) of Understanding Society panel data., using the 'between' individual coefficient from a fixed effects 'within-between' model, which combines the effect on physical and mental health of both an individual's income in one wave vs their average across waves, and their average across waves compared with the sample average.
- The model is a reformulation of the standard Mundlak model. The within-between model, conceptually, captures several key income-based drivers of health, including:
 - Temporary income shocks (within component), which see individuals' income increase or decrease in one wave compared to their average.
 - permanent income shocks (between component), which see an individual's average income either be closer to or further away from the population average.
 - objective inequality (between component), which see differences between individuals' average income, which is calculated over a longer, enduring, period.
 - subjective social status inequality (between component), which is the psychological phenomenon driven, in part, by income inequality.

Model Implementation

- Uses a heavily adapted version of ScotBen, a conventional static tax-benefit model
- Written in Julia, open source, in the family of IFS Taxben (Stark and Reed TaxBen co-authors)
- Publicly available with a Web front end (<https://triplepc.northumbria.ac.uk>)
- Problems:
 - tricky question about the basis of comparison (25% less poverty compared to what?)
 - Some conjoint questions are hard to model e.g. incidence of corporation tax, 'Green Deal' policies, taxes on wealth, VAT.
 - modelled with a combination of data matching (VAT), imputations from regressions (wealth) and very strong assumptions (Corporation Tax)



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The Model in Action

<https://triplepc.northumbria.ac.uk>

Lessons Learned

- Need for good coordination between conjoint analysis and microsimulation modelling.
- The model could present only a very limited set of options for taxes and benefits compared to the model's underlying capabilities. The survey system used for the survey – Qualtrics – had a hard limit on the number of attributes that could be
- The meaning of options such as 'Tax on wealth' should, where possible, be made clearer in order to provide a clear direction for modelling.
- Co-development of a conjoint survey and microsimulation might have enabled respondents to see accurate consequences of their preferred policies for incomes and health.
- Some of the options in the survey, such as VAT increases, were quite burdensome to model in the time available
- Careful thought must be given to the definition of the base case the model is comparing against.
- There are also interesting questions about how best to present results of a model with such diverse outputs. For instance, can we count payments by a household from a wealth tax in the same way as payments for income tax? And should we be imputing a monetary value to any health improvements?



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Thanks!

- This work is part of the Health Case for UBI project, funded by NIHR.
- Source code is written in Julia and available on GitHub:
 - Tax-Benefit Model;
 - Web Front-End Code.
- Conjoint analysis used the R Conjoint Package.