Modelling Labour Supply Responses in Australia and New Zealand

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Introduction

- Brief from organisers:
  - To present some Australian results for labour supply elasticities for different types of labour
  - Comment on relevance for New Zealand
- Important in the context of tax and social security reforms: reforms can be expected to affect financial incentives to work, which affect labour supply
  - Both in hours and participation decision
- We can use labour supply models in tax policy microsimulation models to allow analysis of tax reforms w.r.t. effect on labour supply as well as other aspects (eg income distribution, govt expenditure)

Introduction

- It is not straightforward to compare elasticities:
  - Elasticities are w.r.t. gross wage but it's net wage which affects labour supply so tax regime affects elasticity
- Labour supply story only, no labour demand
- (emigration is not an option in the model)

Microsimulation modelling

- **Static**: replicate tax and social security system and apply all relevant rules to a sample of households.

- Needs detailed individual/household information.

- Calculates effects of tax policy changes on income distribution, government expenditure/ revenue, average net income of a range of subgroups or specific individuals

Microsimulation modelling

- **Behavioural**: allows individuals to respond to policy changes with labour supply changes
- Labour supply is predicted using discrete choice structural labour supply models
- Generates probabilistic outcomes: P(not working), P(working h1 hours), P(working h2 hours), etc.
- The above are used to calculate effects of tax policy changes on income distribution, government expenditure/ revenue, average net income of a range of subgroups or specific individuals, while allowing for labour supply changes.

Labour supply models

- Advantage of discrete choice labour supply models:
  - Allows incorporation of detailed tax and social security rules (precise reflection of actual transition from gross to net income)
  - More realistic representation of actual labour supply distribution
  - Relatively easy to incorporate in microsimulation models.

Labour supply models

- We have estimated similar specifications based on quadratic utility and heterogenous preferences for Australia and New Zealand
  - Australia using Survey of Income and Housing Costs data from 1994-1998 and from 1999-2004 (incorporated in the Melbourne Institute Tax and Transfer Simulator, MITTS)
  - New Zealand using Household Economic Survey data from 1991-2001 (was linked to TaxMod, previous version of NZ Treasury microsimulation model)
- Basic assumption: households optimise utility over leisure and consumption (net income)

Labour supply model

$$U\left(x, h_1, h_2\right) = \beta_x\left(x - \gamma_1 - \gamma_2\right) + \beta_1 h_1 + \beta_2 h_2 + \alpha_{xx}\left(x - \gamma_1 - \gamma_2\right)^2 + \alpha_{11}\left(h_1\right)^2$$

$$+ \alpha_{22}\left(h_2\right)^2 + \alpha_{x1}\left(x - \gamma_1 - \gamma_2\right)h_1 + \alpha_{x2}\left(x - \gamma_1 - \gamma_2\right)h_2 + \alpha_{12}h_1 h_2$$

Implied elasticities

- The model does not estimate the effect of wages explicitly
- We use approximations to the wage elasticities:
  - For Australia these are derived by increasing everyone's wages with 1% and computing the percentage change in predicted labour supply
  - For New Zealand we needed to use what we had done a few years earlier, which was based on a 10% increase in everyone's wage
  - For Australia we increase wages of partners in a couple separately, but for New Zealand they are increased at the same time (generates a mix of own and cross wage elasticity).
  - For Australia, average elasticities are computed, while for New Zealand elasticities over average predicted hours are computed

Comparison New Zealand - Australia

Table a Implied average uncompensated wage elasticities by demographic group based on 1991-2001 labour supply estimates for New Zealand

	Based on expected labour supply	
	Average wage elasticity	Change in participation (per % of wage increase)
Demographic group	Own wage	Percentage points
Single male	0.63	0.39
Single female	0.82	0.45
Sole parent	0.34	0.08
Married male	0.23	0.17
Married female	0.38	0.19

Comparison New Zealand - Australia

Table b Implied average uncompensated wage elasticities by demographic group based on 1994-1998 labour supply estimates for Australia (1999-2004 in parentheses)

Demographic group	*Based on expected labour supply*			
	Average wage elasticity		Change in participation	
			Percentage points	
	Own wage	Cross wage	Own	cross
Single male	0.22 (0.33)		0.16 (0.20)	
Single female	0.38 (0.28)		0.19 (0.17)	
Sole parent	1.48 (0.90)		0.41 (0.29)	
Married male without children	0.33 (0.49)	0.06 (0.07)	0.20 (0.24)	0.05 (0.06)
Married female without children	0.42 (0.70)	0.08 (0.07)	0.18 (0.25)	0.05 (0.05)
Married male with children	0.17 (0.27)	0.02 (0.03)	0.11 (0.15)	0.03 (0.04)
Married female with children	0.66 (0.86)	0.12 (0.12)	0.22 (0.32)	0.04 (0.06)

Comparison New Zealand – Australia

- Order of magnitude is similar
- In New Zealand: single men, single women highest elasticities (partnered women's (and men's) elasticities mix cross and own wage elasticities).
- In Australia: single parents and partnered women highest elasticities
- Participation rate of single parents in New Zealand is relatively low, which would usually lead to higher elasticities.
- Something about the tax system?
  - Elasticities are based on gross wages, so a 1% gross wage increase could be a much lower net wage increase

Comparison New Zealand - Australia

- For New Zealand only breakdown by age is possible:
  - Not much difference for those <30 and 30-51, but increase in elasticity for those >50 and >60
- For Australia:
  - No clear pattern by age
- Our labour supply model does not take into account retirement decisions (health, assets are not included in the model)
- However, 1991-2001 was the period over which the age of eligibility for NZ superannuation was increased.

Comparison New Zealand - Australia

- Another disaggregation for Australia was by education level:
  - Generally:
  - higher levels have lower elasticities and often negative cross wage elasticities (are already working relatively long hours)
  - lowest skill level have the highest elasticity, except for single parents who have high elasticities up to the level of a diploma

Comparison with other countries

- Wide range of estimates
- Generally speaking, Australia and New Zealand are well within this range.
- Single parents' elasticities are often found to be relatively high
  - Australia's estimate is at the high end (relatively low participation, although it's even lower for New Zealand)
  - New Zealand's estimate is lower than for singles, which is unusual

Comparison with actual changes

- Although difficult to do, it is valuable to validate predicted elasticities against observed changes in labour supply after policy changes affecting the financial return to work

- Little work done so far, but reasonably encouraging. For Australia, estimates appear relatively conservative.

Conclusion

- Australia and New Zealand are not totally different, but there are a number of important differences which need further investigation

- New Zealand needs its own updated labour supply model
    - should be tested in a range of policy changes to check whether predictions seem sensible
    - can also be used to find out whether the differences are persistent
    - can investigate the cause of differences: different characteristics of the population, different tax and transfer policies or different behaviour