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Welfare-Improving Income Tax Reforms in NZ

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What constitutes a ‘good’ tax system?

- From ‘maxims’ to welfare economics (from Smith to Edgeworth): Implications of adopting value judgements
- Social Welfare Function – concept of optimal tax structure
- Structural approach: explicit preferences, govt budget constraint etc.
- Reduced form: use of first-order condition (marginal cost = marginal benefit)
- Valuable lessons – not least recognition of limits to redistribution
- Practical policy advice: need for microsimulation
- But cannot solve for optimal system, and cannot make such large policy change in practice
- Question: *What marginal reforms would move towards an optimal system*?

Part 1

THE METHOD

The method follows …

- Creedy, J. and Hérault, N. (2012) Welfare-improving income tax reforms: a microsimulation analysis. *Oxford Economic Papers*, 64, pp. 128-150.
- Creedy, J., Hérault, N. and Kalb, G. (2011) Measuring welfare changes in behavioural microsimulation modelling: accounting for the random utility component. *Journal of Applied Economics*, 14, pp. 5-34 (2011).
- Creedy, J., Kalb, G. and Scutella, R. (2006) Income distribution in discrete hours behavioural microsimulation models: an illustration. *Journal of Economic Inequality*, 4, pp. 57-76.

Central Concepts

- Full Income
- The net income which could be obtained if all the individual's endowment of time were devoted to work at the fixed wage rate
- Equivalent Variation (EV)
- The maximum an individual would be prepared to pay, after a 'price' change, to go back to the old prices (this is positive for welfare loss)
- Money Metric Utility
- The full income that, at a set of 'reference prices' gives the same utility as the actual prices

Useful Results

- If pre-reform prices are treated as reference prices …
- Pre-reform money metric utility is pre-reform full income
- Post-reform money metric utility is
- Pre-reform full income *minus* EV

Overall Evaluation of Policy Changes

- Explicit value judgements are required
- Use Social Welfare Function defined in terms of money metric utility per adult equivalent person
- Using SWF associated with Atkinson inequality measure, the abbreviated form is:
- W = mean*(1 - Inequality)

- With discrete hours approach, each individual has conditional distribution of hours, given actual pre-reform hours. The full post-reform conditional hours distribution for each individual can be used instead of expected values, using ‘pseudo distribution’ approach.

Atkinson's Inequality Measure

$$I = \frac{\bar{y} - y_\varepsilon}{\bar{y}} = 1 - \frac{y_\varepsilon}{\bar{y}}$$

$$W = \frac{1}{n}\sum_{i=1}^{n} \frac{1}{1-\varepsilon} y_i^{1-\varepsilon} \qquad \text{for } \varepsilon \neq 1,\ \varepsilon > 0$$

$$y_\varepsilon = \left(\frac{1}{n}\sum_{i=1}^{n} \frac{1}{1-\varepsilon} y_i^{1-\varepsilon} \right)^{1/(1-\varepsilon)}$$

Adult Equivalent Scales

Distinguish only children and adults

$$m_i = \left(n_{a,i} + \theta n_{c,i} \right)^{\alpha}$$

α reflects scale economies

Part 2

THE APPLICATION TO NZ

The model

- TaxWell-B (Treasury's Behavioural Model)
- Discrete hours structural approach to labour supply modelling; quadratic utility; joint maximisation for couples.
- Based on 2011/12 tax structure and Household Economic Survey.
- Could apply to wide range of benefit levels and taper/abatement rates, but analysis restricted to income tax structure

The NZ Income Tax Structure

Bracket	Threshold	Tax Rate
1	0	10.5
2	14,000	17.5
3	48,000	30
4	70,000	33

Thinking about Epsilon

- Transfer $1 from person in top bracket with $100k, to person in bottom bracket with $10k
- What is maximum ‘leak’ that would be tolerated?
- For ε of 0.1, max leak = 20 cents
- For ε of 0.2, max leak = 37 cents
- For ε of 0.8, max leak = 84 cents
- For ε of 1.4, max leak = 96 cents

Changes in Marginal Tax Rates: Absolute change in welfare per dollar of revenue

	Increase in tax rate			Reduction in tax rate		
Rate	ε=0.1	ε=0.2	ε=0.8	ε=0.1	ε=0.2	ε=0.8
(α=0.8)						
t1	1.369	1.379	1.371	1.333	1.342	1.332
t2	1.397	1.367	1.091	1.349	1.319	1.052
t3	1.356	1.290	0.855	1.276	1.214	0.805
t4	1.262	1.153	0.614	1.284	1.173	0.623
(α=0.4)						
t1	1.806	1.820	1.817	1.758	1.772	1.766
t2	1.877	1.837	1.458	1.812	1.773	1.406
t3	1.865	1.772	1.153	1.755	1.668	1.084
t4	1.745	1.594	0.829	1.776	1.621	0.841

W Change for Revenue-Neutral Rate Changes α=0.8 and ε=0.2

Lower tax rate

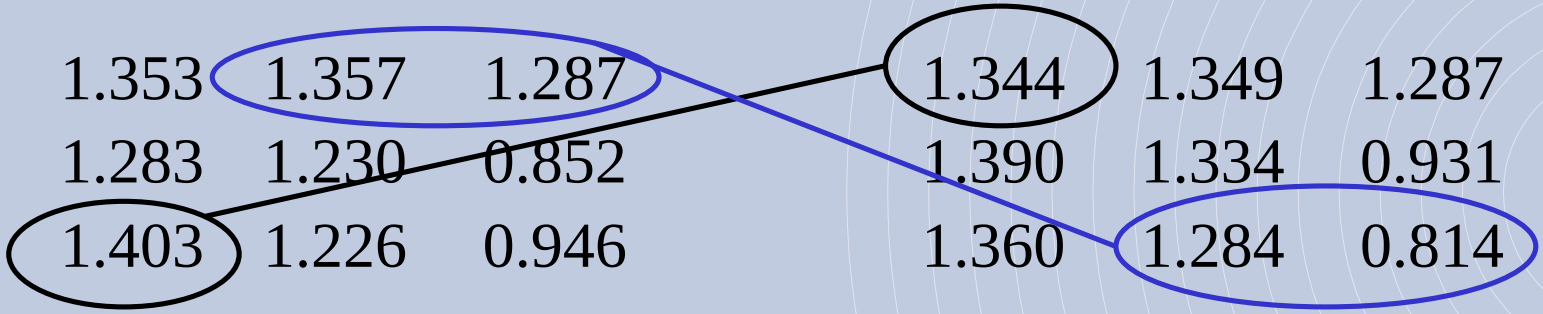
Raise tax rate	t1	t2	t3	T4
t1		-18.302	-50.985	-63.643
t2	-11.420		-69.700	-88.314
t3	6.539	3.729		-14.599
t4	30.391	26.774	9.767	

Additional responses …

- The revenue and welfare changes are associated *only* with labour supply responses
- Literature on Elasticity of Taxable Income suggests other larger responses, particularly in higher-income ranges
- Change in Revenue: Mechanical + Behavioural
- For top tax bracket, Behavioural equal to:
- -(Income s.t. top rate)(change in tax rate)(ETI)
- multiplied by t/(1-t).

Threshold Changes:
Absolute change in welfare per dollar of revenue

	Increase in threshold			Reduction in threshold		
Threshold	ε=0.1	ε=0.2	ε=0.8	ε=0.1	ε=0.2	ε=0.8
(α=0.8)						
a2	1.353	1.357	1.287	1.344	1.349	1.287
a3	1.283	1.230	0.852	1.390	1.334	0.931
a4	1.403	1.226	0.946	1.360	1.284	0.814
(α=0.4)						
a2	1.784	1.792	1.708	1.773	1.782	1.709
a3	1.762	1.687	1.147	1.908	1.829	1.254
a4	1.918	1.690	1.271	1.879	1.768	1.099



Some Caveats …

- Gives only the *direction* of *small* changes
- Use of welfare metric: MMU with heterogeneous preferences cannot guarantee concavity of Social Welfare Function


STOP