Analysing regional policy initiatives
Showcasing our regional CGE on the Canterbury rebuild

20 March 2015
1. POLICY EVALUATION MEANS UNDERSTANDING REGIONAL TRADE-OFFS
Many policies have a regional angle

<table>
<thead>
<tr>
<th>Good for...</th>
<th>Could be bad for...?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wellington Convention Centre</td>
<td>Wellington</td>
</tr>
<tr>
<td>Christchurch re-build</td>
<td>Christchurch</td>
</tr>
<tr>
<td>Urban drift</td>
<td>Main centres</td>
</tr>
<tr>
<td>Zero Fees</td>
<td>Southland</td>
</tr>
</tbody>
</table>

Regulatory Impact Analysis needs to consider:

- Opportunity costs
- Distributional effects
- Winners and losers
We need to be careful about robbing Peter to pay Paul...

- Labour, capital and ideas are mobile in the long run, but usually sticky/fixed in the short term.
...so inter-regional transfers matter

• NZ Inc evaluations must consider how increased activity in one region affects activity elsewhere

• Effects can be:
  – negative (e.g. cannibalisation of existing activity); or
  – positive (e.g. upstream or downstream spillovers)

• These trade-offs are important for identifying unanticipated impacts
NZ Inc evaluations need to look at regional winners and losers.
2. OUR LATEST CGE PROVIDES CRITICAL REGIONAL ANALYSIS
Numerous tools exist for policy analysis

<table>
<thead>
<tr>
<th>Technique</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Benefit Analysis</td>
<td>Widely used; considers impacts over time; RoI; non-market effects</td>
<td>Regional spillovers and distribution hard</td>
</tr>
<tr>
<td>Multipliers</td>
<td>Cheap; easy to do; big numbers</td>
<td>No resource constraints; no regional spillovers; widely discredited</td>
</tr>
<tr>
<td>Financial modelling</td>
<td>Simple; RoI</td>
<td>Hard to get to trade-offs</td>
</tr>
<tr>
<td>Econometrics</td>
<td>Gets to drivers; can forecast</td>
<td>Regional interactions and sector impacts tricky</td>
</tr>
<tr>
<td>Descriptive</td>
<td>Can cover wide range of effects; not constrained by data or capability</td>
<td>Lacks persuasive numbers on trade-offs</td>
</tr>
<tr>
<td>Computable General Equilibrium (CGE) modelling</td>
<td>Robust; internally consistent; resource, region &amp; sector trade-offs</td>
<td>Requires investment; data-intensive</td>
</tr>
</tbody>
</table>

Focus of this presentation
CGE models show the whole economy

- NZ regions and Global economy
-Exports
-Imports

Productive sector
- Focus sectors
- Other sectors

Focus sectors
- Goods and services
- Labour and capital
- Wages and returns
-Gov't. services

Other sectors

Households
- Tax
- Services

Government
- Goods and services
- Gov't. borrowing

Financial / Investment markets
- Capital flows
- Investment

Imports
- Exports
- Imports

Goods and services
Labour and capital
Wages and returns
Gov't. services
Savings / Investment
NZIER’s suite of CGE models*

- GTAP model of global economy

- ORANI-NZ and ORANI-NZ-Green
  - Comparative-static (with top-down regional extension); ORANI-NZ-Green for Greenhouse Gas policy analysis

- MONASH-NZ
  - Recursive dynamic (with top-down regional extension)

- TERM-NZ (The Enormous Regional Model)
  - Each region has its own economy, but all are regions are linked via regional trade and movements in factors of production

* More information on the GTAP model is available at www.gtap.agecon.purdue.edu; background on ORANI, Monash and TERM models can be found at www.copsmodels.com
Our TERM CGE model captures inter-regional flows from the bottom up.
TERM-NZ contains a lot of detail

- 15 regional economies in New Zealand
- 106 industries
- 205 commodities
- Based on Statistics New Zealand 2007 input-output tables, updated and modified to 2014
- Regional economies linked by:
  - Inter-regional trade in commodities
  - Movement in labour and capital between regions
- A first in New Zealand as far as we are aware
3. OUR CGE IN ACTION: CANTERBURY REBUILD
Canterbury rebuild: a regional super shock

• Simulation
  – Increased residential and non-residential construction in Canterbury (~ $7.4 billion in 2015)
  – Assume rest of New Zealand is business as usual (to identify effects of rebuild alone)
  – Aggregate database to 4 regions for simplicity (Canterbury, Auckland, Rest of NI, Rest of SI)

• Analysis
  – National and regional impacts
  – How does the additional activity affect other regions?
  – How does the Canterbury rebuild affect price inflation in the NZ economy?
Summary of results

• New Zealand economy grows
  – Canterbury and Rest of South Island GDP expands; other regions contract
  – Resources (labour and capital) reallocate towards Canterbury

• Cost of domestic production goes up
  – Driven by higher wages and returns to capital

• This results in reduced export competitiveness
  – Non-tradable sector (construction) growth makes tradable activity more difficult due to resource re-allocation and price effects

• CPI/Inflation pressures increase across New Zealand
Key CGE insight: trade-offs abound

All impacts measured against baseline, % change

<table>
<thead>
<tr>
<th>Impact</th>
<th>New Zealand</th>
<th>Canterbury</th>
<th>Auckland</th>
<th>Rest of North Island</th>
<th>Rest of South Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP</td>
<td>0.6</td>
<td>6.6</td>
<td>-0.5</td>
<td>-0.3</td>
<td>0.2</td>
</tr>
<tr>
<td>Household welfare</td>
<td>1.1</td>
<td>8.4</td>
<td>-0.3</td>
<td>0.1</td>
<td>0.9</td>
</tr>
<tr>
<td>Investment</td>
<td>15.9</td>
<td>123.6</td>
<td>-0.3</td>
<td>-0.2</td>
<td>0.3</td>
</tr>
<tr>
<td>Exports**</td>
<td>-6.1</td>
<td>-12.6</td>
<td>-4.6</td>
<td>-4.9</td>
<td>-5.9</td>
</tr>
<tr>
<td>Imports**</td>
<td>5.6</td>
<td>38.6</td>
<td>0.2</td>
<td>0.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Employment</td>
<td>0.0</td>
<td>3.7</td>
<td>-0.7</td>
<td>-0.5</td>
<td>-0.1</td>
</tr>
<tr>
<td>Wages</td>
<td>2.9</td>
<td>3.2</td>
<td>1.1</td>
<td>1.3</td>
<td>1.7</td>
</tr>
<tr>
<td>CPI/Inflation</td>
<td>1.5</td>
<td>8.2</td>
<td>1.8</td>
<td>2.2</td>
<td>3.0</td>
</tr>
<tr>
<td>GDPPI***</td>
<td>2.1</td>
<td>5.4</td>
<td>1.4</td>
<td>1.6</td>
<td>2.1</td>
</tr>
</tbody>
</table>

** Overseas exports and imports; ***GDPPI means GDP price index
Key insight: Intra-regional trade changes

All impacts measured against baseline, % change

<table>
<thead>
<tr>
<th>From...</th>
<th>To...</th>
<th>Auckland</th>
<th>Canterbury</th>
<th>Rest of North Island</th>
<th>Rest of South Island</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>-1.1</td>
<td>18.6</td>
<td>-0.1</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Canterbury</td>
<td>-10.6</td>
<td>9.2</td>
<td>-12.5</td>
<td>-11.0</td>
<td></td>
</tr>
<tr>
<td>Rest of North Island</td>
<td>-1.9</td>
<td>19.8</td>
<td>-1.0</td>
<td>1.2</td>
<td></td>
</tr>
<tr>
<td>Rest of South Island</td>
<td>-3.4</td>
<td>21.7</td>
<td>-3.6</td>
<td>-0.9</td>
<td></td>
</tr>
</tbody>
</table>
4. KEY TAKEAWAY – OUR CGE MODEL HIGHLIGHTS THE RELEVANT TRADE-OFFS
Takeaways

1. Resources are constrained; there are always winners and losers
2. Traditional tools struggle with inter-regional transfers and trade-offs
3. NZIER’s TERM-NZ model can show regional initiatives in a new light
4. Inter- and intra-regional effects are captured
5. Using TERM-NZ can help identify the full range of economic impacts of regional policy and industry initiatives
Future TERM-NZ developments

• Add dynamics to show effects over time
• Incorporate labour and migration module
• Add tourism as separate sector
• Consider impacts of irrigation
• Different types of households
• Extend to Territorial Level Authority level
Because there is (sadly) no money tree!
For more information contact

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