DISTRIBUTIONAL EFFECTS OF THE AUSTRALIAN RENEWABLE ENERGY TARGET (RET) THROUGH WHOLESALE AND RETAIL ELECTRICITY PRICE IMPACTS

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The Australian Renewable Energy Target

- Goal: 20% of electricity demand met by RES by 2020
- Review of RET currently underway → Future uncertain
- Separate large-scale (LRET) and small-scale (SRES) schemes
  ⇒ This research: Focus on LRET
- Liable parties (mainly retailers) must purchase certificates on the market

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- Commonwealth Environment Research Facilities (CERF), Australian Research Council (ARC), Discovery Grant and the Australian Renewable Energy Agency (ARENA).

Indicative LRET Costs

- LRET costs for a retailer ($/MWh) = Renewable Power Percentage x Certificate price ($/MWh)
- Indicative LRET costs: Weighted average of LRET allowance in regulated retail tariffs
  ⇒ 3.38 $/MWh for 2011-12
  ⇒ 5.29 $/MWh for 2012-13
- Industry exemptions (equ. to ~15% of demand)
  ⇒ 90% highly emissions intensive (esp. Aluminium)
  ⇒ 60% moderately emissions intensive

Indicative Net Effects ($/MWh)

The Merit Order Effect of Wind

- Time-series estimation of merit order effect of wind generation in the Australian National Electricity Market (NEM)
  \[ \ln(\text{price}(t)) = \ldots + \beta_2 \text{wind} + \beta_3 \text{demand} + \sum \text{other factors} + \varepsilon \]
  ⇒ Volume-weighted average price (truncated to reflect 'normal operating conditions')
  ⇒ Dependent on total demand (assumption: inelastic in the short-run), wind feed-in, seasonal and weekend dummies
  ⇒ Tobit model employed

2011-12

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<th>Coefficient</th>
<th>S.E.</th>
<th>t-stat</th>
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<tbody>
<tr>
<td>Price (t-1)</td>
<td>0.578338</td>
<td>0.006109</td>
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<tr>
<td>Wind</td>
<td>-0.000060</td>
<td>0.000005</td>
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<tr>
<td>Demand</td>
<td>0.000030</td>
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<td>Constant</td>
<td>0.791780</td>
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2012-13

<table>
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<tbody>
<tr>
<td>Price (t-1)</td>
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<tr>
<td>Wind</td>
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<td>Constant</td>
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</table>

Add. Controls: Dummies for seasonal trends and weekends

Total MO Effect -2.30 $/MWh

The Role of Regulators

- Pass-through of merit order effect into regulated retail prices depends on methodology of estimating wholesale costs
  ⇒ Standalone Long-run Marginal Cost (LRMC) approach fails to adequately consider impact of renewables on wholesale price
  ⇒ Move to market-based methods in a number of jurisdictions

Political Implications

- Benefits and costs of RET could be distributed more equally
  ⇒ Merit order effect likely overcompensates emissions intensive industry for contribution to cost of RET
  ⇒ Costs to households could be reduced if exempt industry contributed to a larger extent and ...
  ⇒ ... if methods for calculating wholesale costs in regulated retail tariffs reflected merit order effects

Limitations

- Long-term effects
  ⇒ Retirement of generation as a result of expansion of wind
  ⇒ Investment in generation / network capacity
  ⇒ Environmental and energy security benefits