Climate Cost-Benefit Analysis in an Unequal World

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Outline

• Use of cost-benefit analysis in climate policy
• Issues with standard cost-benefit analysis
• Equity weighting
UK history

• 2002 – early phase
  • Social Cost of Carbon: £70/tC or $29/tCO2
  • Multiple revisions (including Stern Review)
  • Uses include RIA of fluorinated gases regulation, road transport infrastructure appraisal, building regulations, energy investment appraisal, water sector asset management programs

• 2008 – Climate Change Act
  • Long-term climate policy (60% reduction from 1990 levels)
  • No cost-benefit analysis in setting the target
  • Ex post check with PAGE model

• 2009 – Major shift to marginal abatement cost estimates
  • ETS covered sectors: $32/tCO2
  • Other sectors from in-house energy modeling: $77/tCO2

Watkiss and Hope (2011)
US

• 2007: Supreme Court ruling *Massachusetts v. EPA*
• 2009: EPA Endangerment Finding
• Executive Order 12866

• 2010: Interagency Report sets Social Cost of Carbon to $21/tCO2
• 2013: Social Cost of Carbon updated to $39/tCO2

• Used three integrated assessment models
  • One of them FUND, which I co-develop ([www.fund-model.org](http://www.fund-model.org))

Greenstone et al. (2013)
Figure 2: Net benefits with and without valuing CO$_2$

Million 2011$

Observations in order of increasing net benefits (n = 50)

Hahn and Ritz (forthcoming)
Proposed rule for existing power plants - benefits and cost in 2020

- Compliance Cost
- Health benefits
- Climate benefits (3% dr)
- Climate benefits (2.5% dr)

Source: US EPA (2014), Table ES-8
Outline

• Use of cost-benefit analysis in climate policy
• **Issues with standard cost-benefit analysis**
• Equity weighting
Standing or “who’s welfare?”

Gayer and Viscusi (2014)
Pizer et al. (2014)
Kopp and Mignone (2013)
Social Cost of Carbon by Region

**RICE – SCC 2015 high discounting**
- India: 16%
- Middle East: 7%
- Latin America: 5%
- Africa: 16%
- Other developing: 13%
- EU: 8%
- China: 21%
- Japan/Eurasia: 1%
- US: 7%

**FUND – SCC 2010 middle discounting**
- USA: 13%
- Other developing: 13%
- Asia/CAN: 1%
- WEU: 21%
- EBU: 1%
- SSA: 5%
- SIS: 1%
- SAE: 5%
- NAF: 5%
- MDE: 3%
- AM: 2%

Source: Nordhaus (2011) and Anthoff et al. (2011)
Climate change damages 2100

Share of GDP

-2.6 – -1.5 %
-1.4 – -0.5 %
-0.4 – 0.0 %
0.1 – 0.5 %
0.6 – 1.5 %
1.6 – 5.0 %
5.1 – 10.0 %
> 10.0 %

Global
1.3%

Anthoff et al. (2009)
Outline

• Use of cost-benefit analysis in climate policy
• Issues with standard cost-benefit analysis
• **Equity weighting**
For same $\Delta c$:

$\Delta w_p > \Delta w_r$
Optimal taxes in 2005

FUND 3.4; $\eta=1; \rho=1\%$; USD 1995

Anthoff (2011)
Equity Weights - Caveats

• All costs and benefits need to be equity weighted consistently
  • UK didn’t do that...
• Based on one very specific and strong ethical position
• “You are trying to address world inequality via climate policy”
• Difficult to agree on specifics (degree of inequality aversion)
Conclusion

• Pragmatic point of view
  • Great success that carbon pricing is incorporated into federal regulatory analysis
  • Pushing for equity weighting in the regulatory process probably too ambitious at this point

• Academic view
  • A standard cost-benefit analysis really runs into major conceptual problems with climate change related to equity
  • Talk about it ("ideas matter")
Thank you!

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Literature


