The Price vs Quantity debate: climate policy and the role of business cycles

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EU ETS carbon spot price, € per tonne

Source: Thomson Reuters Point Carbon

Environmental policy under uncertainty

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- The P vs. Q: *fixed* policies; the relative slopes rule $\Rightarrow$ P is preferred to Q in the short-run when damages are "flat"
- Environ. policies & business cycles: taxes and emissions are procyclical; stringency of regulation responsive to economic fluctuations

This paper

Question: what is the optimal instrument *design* and *choice* under uncertain economic fluctuations?

Framework: RBC model with distortionary fiscal policy (Heutel, 2012)

Policies: State-contingent and fixed instruments

Approach: Characterize dynamics under an optimal carbon tax policy and cap-and-trade in response to productivity shock

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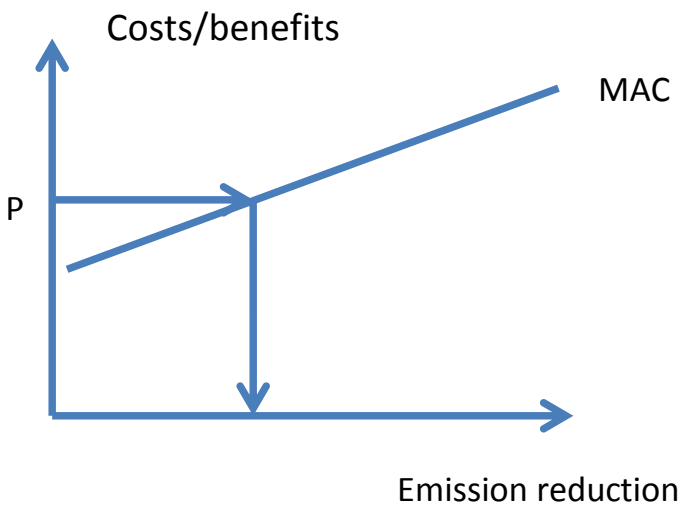
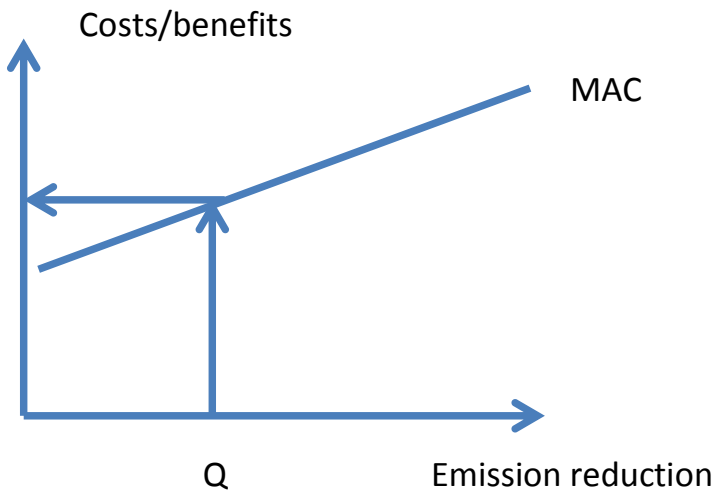
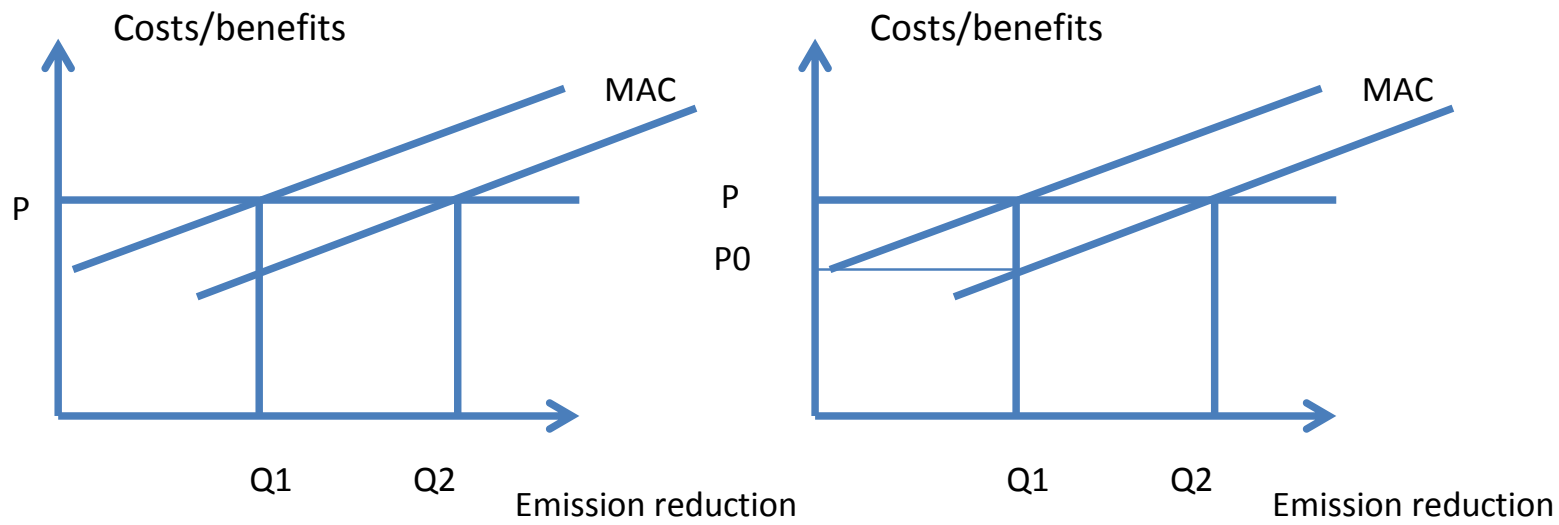
- Fixed policies: USD 232.83/person vs. USD 258.22/person
- Heutel (2012): carbon tax stabilizes the economy

Tax vs Cap-and-trade





Tax vs Cap-and-trade under RBC shocks



The role of carbon tax in Heutel (2012)

Carbon taxes appear in two equations:

1) MC(A)=tax;

2) Intertemporal consumption allocation (Euler equation)

"It is variance in consumption, not in pollution stock, that leads to the variance in the emissions tax"

(In)Complete tax system

Optimal taxation theory (Chari and Kehoe, 1998):
tax system is *incomplete*:
A (first-best) socially efficient allocation is characterized by "zero wedge" condition:

$$E_t \frac{MRS_{c_t,c_{t+1}}}{MRT_{c_t,c_{t+1}}} = 1 \tag{1}$$

Heutel (2012):

$$E_t \frac{MRS_{c_t,c_{t+1}}}{MRT_{c_t,c_{t+1}}(\tau_{Et})} = 1 \tag{2}$$

our model:

$$E_t \frac{MRS_{c_t,c_{t+1}}}{MRT_{c_t,c_{t+1}}(\tau_{Et},\tau_t)} = 1 \tag{3}$$

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pure revenues raising is best done with large-base taxes (labor, VAT etc) and *not* energy taxes

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Carbon taxes are unlikely to be justified to use as a macro-stabilization tool

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- Dynamics of abatement costs over the business cycle make P advantageous over Q
- Provides an additional argument and lend support to the findings of Pizer (1999), Hoel and Karp (2002) and others

extra slides

Heutel (2012) vs our paper

	Standard deviation (%)		
Model	τ_E	y	e
Heutel's	2.02%	2.04%	1.4%
ours	0.48%	0.77%	0.53%
ratio	4.2	2.6	2.6

Table: Standard deviations of carbon tax, output and emissions