

Policy instruments to limit negative environmental impacts from increased international transport

An economic perspective

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The International Transport Forum

- Established by Transport Ministers as a platform to work on transport issues of global significance
- A successor institution to the European Conference of Ministers of Transport (ECMT)
- Part of the OECD family

An annual Forum meeting

- Highlight of the Forum activities is an annual meeting of Ministers & civil society
- Conclusions of the annual Forum are expected to send signals to transport sector worldwide
- 28-30 May 2008: “Transport & Energy, the Challenge of Climate Change”
- 27-29 May 2009: “Transport & Globalisation”

Policy instruments to limit negative environmental impacts from increased international transport

- an economic perspective
- focus on climate change
- emphasize road transport (LDVs)

Policy instruments to limit climate change impacts from transport

1. Responses to climate change
2. The challenge for transport
3. A closer look at policy options in
 - Road transport
 - Maritime transport
 - Aviation

Policy instruments to limit climate change impacts from transport

1. Responses to climate change
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 - Road transport: abatement costs
fuel economy standards
other external costs
transport and cap-and-trade
 - Maritime transport
 - Aviation

1. Responses to climate change

- Costly, uncertain and diverse consequences.
- Global public bad – abatement a global public good.
- No global enforcement, hence free rider problem.
- Wide range of responses; Kyoto Protocol main multilateral response; European Trading System (ETS) main compliance mechanism.

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Kyoto: 32% of global emissions (with US: 65% of 1990 emissions)

ETS: 8% of global emissions

EU compliance: 26% growth instead of 27.5% compared to 1990

1. Responses to climate change

Criticisms of Kyoto approach

- “Narrow and deep”: “Broad and shallow” better?
- Taxes better than cap-and-trade?
(But: auctioning, safety-valves, banking)

Order of magnitude: \$10/tCO₂ ~ \$0.09/gallon of gasoline in US

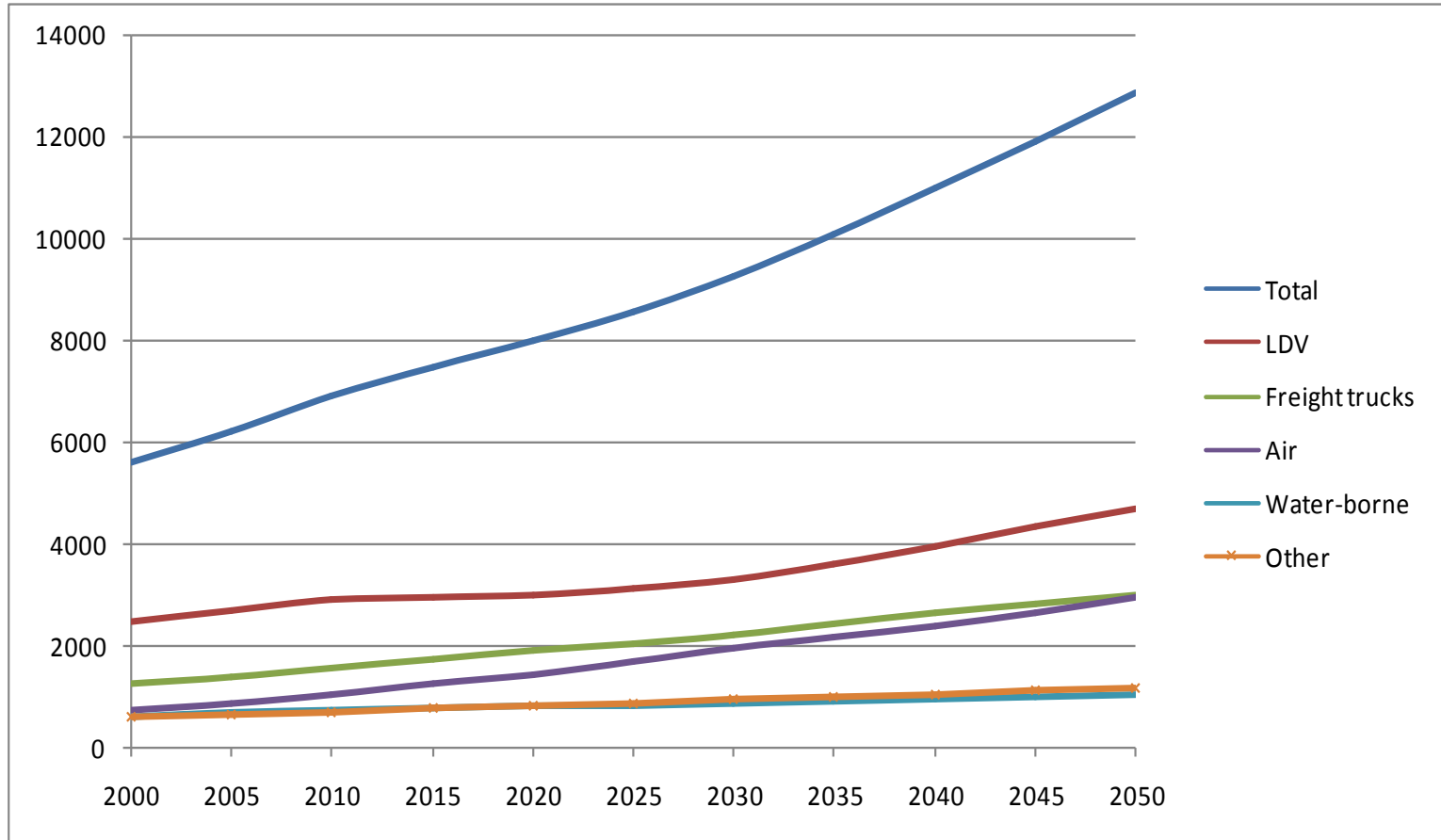
Top-down: monitor “fiscal cushioning” (effective carbon tax): WTO ?

Bottom-up: regional trading systems (club benefits), possibly linked later

- More attention for adaptation and for technological development (standards?).

2. The challenge for transport

“Where demand would like to go”: World Tank to Wheel CO₂ Emissions, BAU, 2000 – 2050, Mt of CO₂-equivalent (ITF/IEA MoMo)



3. Road transport : Abatement costs – cost effectiveness

Reductions of CO₂-emissions compared to baseline, Belgium

Year	Target % reduction compared to 1990	Country effort % reduction compared to baseline	Transport sector effort % reduction compared to baseline	Activity reduction cars %	Activity reduction trucks %
2010	-7.5	-18	-1	0	-2
2020	-30	-59	-17	0	-5
2050	-52.5	-76	-48	0	-5

3. Road transport : abatement costs – cost effectiveness

- High abatement costs in road transport: no easy substitutes, historically relatively high prices, relatively low carbon intensity
- But: scale economies, invalid economic inference – perfect market for fuel economy ?

3. Road transport : fuel economy standards ?

- Better fuel economy “no regret”?

EC impact assessment: + 1200€ for 130g/km; average fuel expenditures – 2500€ at 4% discount rate; **20% to equate**

- Market failure?
 - Costly effort explains error not underinvestment
 - Loss aversion instead of expected utility leads to low WTP for fuel economy (\$-32 instead of \$405)
Uncertainty on onroad fuel economy main factor.
...compelling explanation, but **not a market failure**

3. Road transport : fuel economy standards ?

- Loss aversion and cost-effectiveness: instrument choice

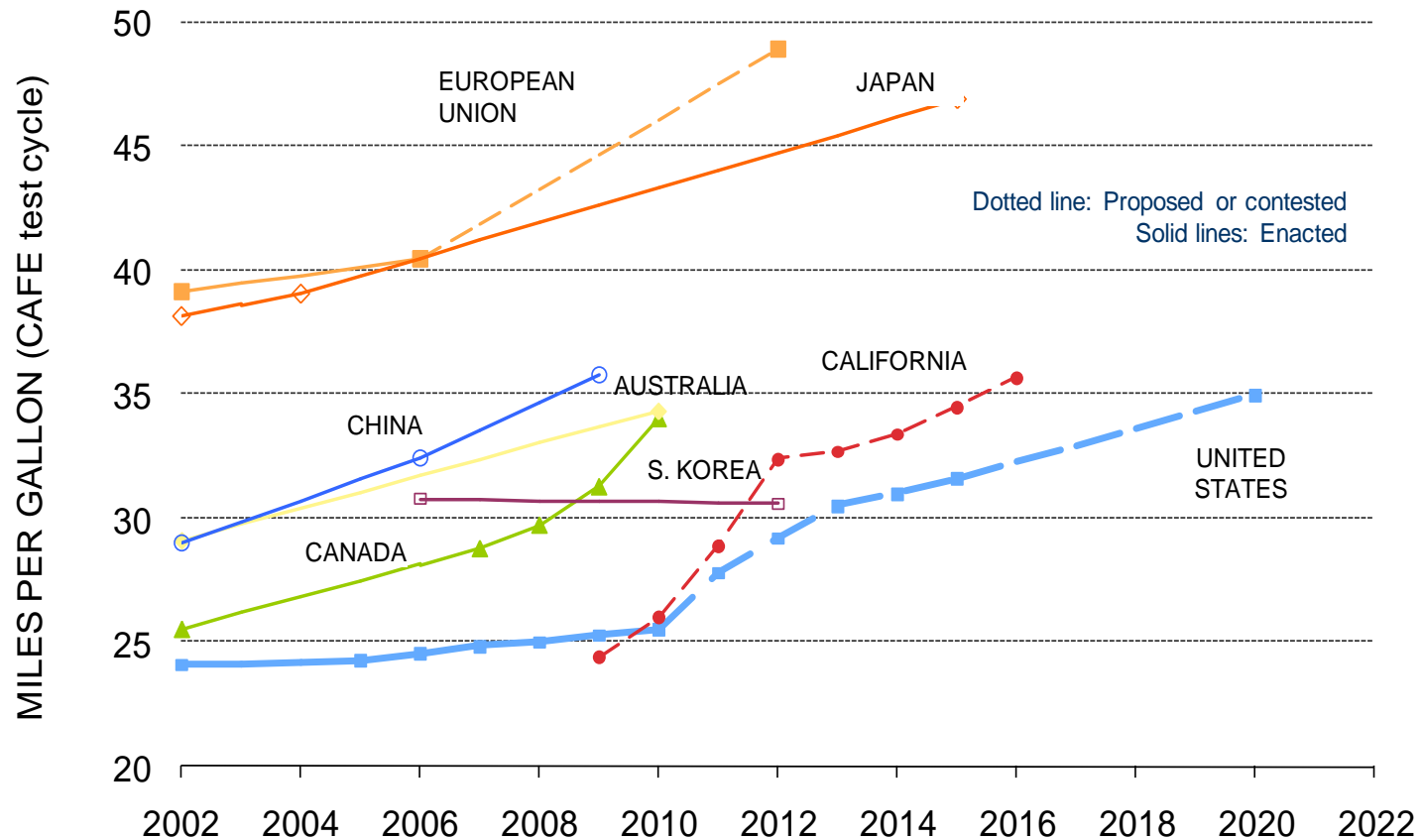
If government cares about how a target is reached, then low WTP for fuel economy is an argument in favor of standards:

If the regulator favors investment in fuel economy over other responses to reduce fuel consumption (harder to reverse, interest in diffusion of new technology), then a standard is more effective than taxes.

- And standards are popular...

3. Road transport : fuel economy standards

Actual and Projected Fuel Economy for New Passenger Vehicles by Country/Region, 2002-



Source: Passenger Vehicle Greenhouse Gas and Fuel Economy Standards: A Global Update, ICCT. 7 August 2008 update.

3. Road transport : marginal external costs from cars, US cents/mile, 2005 prices

	Harrington-McConnell (US & Europe)		Sansom <i>et al.</i> (UK)		Parry <i>et al.</i> (US)	High Fuel-related ^a (US)
	Low	High	Low	High		
Fuel-related:^a						
Climate change	0.3	1.2	0.5	2.0	0.3	3.7
Oil dependency	1.6	2.7	n.a.	n.a.	0.6	2.4
Driving-related:						
Congestion	4.2	15.8	31.0	35.7	5.0	5.0
Air pollution	1.1	14.8	1.1	5.4	2.0	2.0
Noise, Water	0.2	9.5	0.1	2.5	n.a.	n.a.
Accidents	1.1	10.5	2.6	4.5	3.0	3.0
Total	6.6	50.6	35.3	50.1	10.9	16.1

3. Road transport: fuel- and driving-related marginal external costs

Comparing marginal external costs to identify policy priorities:

- Rough indication (2nd best, functions)
- Driving-related costs (congestion, local pollution) dominate – policy priority?
- Fuel-oriented policies not very effective in handling them. Co-benefits of transport policy on energy use likely positive but limited.
- Use of averages is problematic for climate change.

3. Fuel- and driving-related marginal external costs

- Standard CBA framework suitable for handling unlikely but very costly climate change results?
- Weitzman (2008):
 - no – fat tail distributions call for other methods (don't handle through discounting at low rates);
 - Back-of-envelope applications suggest the “gradual approach” (Nordhaus) is an extreme lower bound; Stern “may be right for the wrong reasons”.

“I cannot judge the likelihood of the disaster scenario, but if there ever was a case for applying the precautionary principle in economic analysis, then this is it.”

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William Butler, FT 17/9/08, on the nationalization of AIG

3. Road transport and cap-and-trade

- Pre-existing policies (taxes, standards) affect energy consumption.

- CAFE: approx. \$100/tC *if* strictly a CO₂-policy.

But what about energy security, technology diffusion,...?

- Fuel taxes: higher abatement costs in EU *if* strictly a CO₂-policy.

But what about energy security, revenue raising, controlling other externalities,...?

...agree on policy purposes, agree on model, calculate policy stringency without and with climate change externality (optimal tax perspective)

...or calculate welfare cost of a marginal increase in stringency to reduce CO₂-emissions (tax reform perspective)

(role of instrument for congestion management very important).

3. Maritime transport

- Recent emission inventories revise numbers upward.
- Possibly cheap abatement options.
- Regional initiatives prone to leakage and offshoring.
- EU may act if IMO does not.

3. Aviation

- Possible inclusion in ETS.
- Limited impacts (upper bound: -5% demand at €20/tonCO₂), esp. as pass-through not always complete (Cournot markets, capacity-constrained airports);.
- Grandfathering may delay exit and limit abatement.

4. Concluding remarks

- Shipping and aviation: possible integration into broader frameworks
- Road transport: stricter pre-existing policies, but which purposes do they serve, and how?
- Fuel economy standards help diffuse technology while retaining desired mobility patterns.
- Paradox: policies become stricter where they are strict already (surface transport).
- Problem: slowing down or changing the global distribution of the depletion of carbon-intensive fuels is not enough.