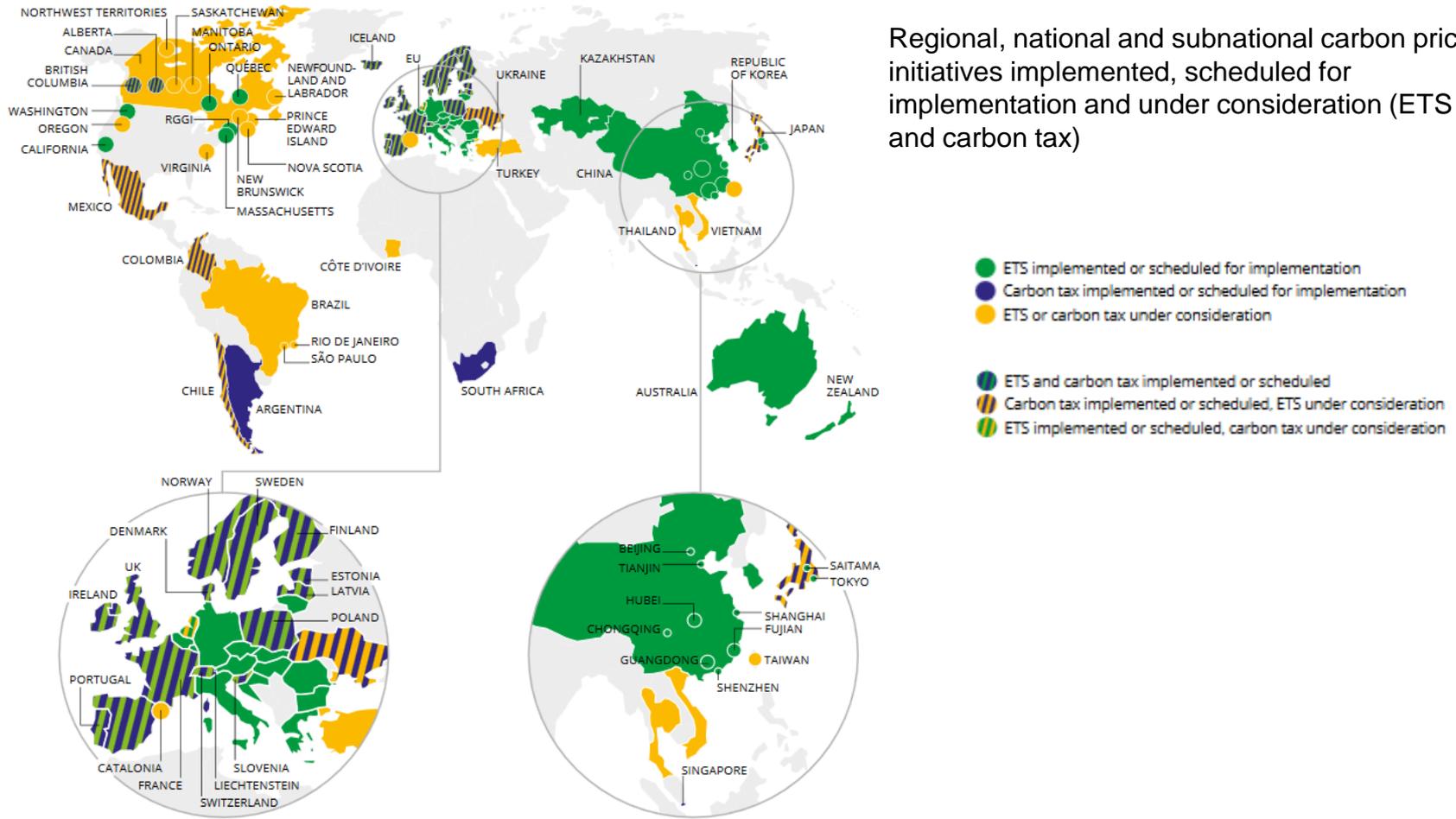


Using Emissions Trading Schemes to Reduce Heterogeneous Distortionary Taxes: the case of Recycling Carbon Auction Revenues to Support Renewable Energy

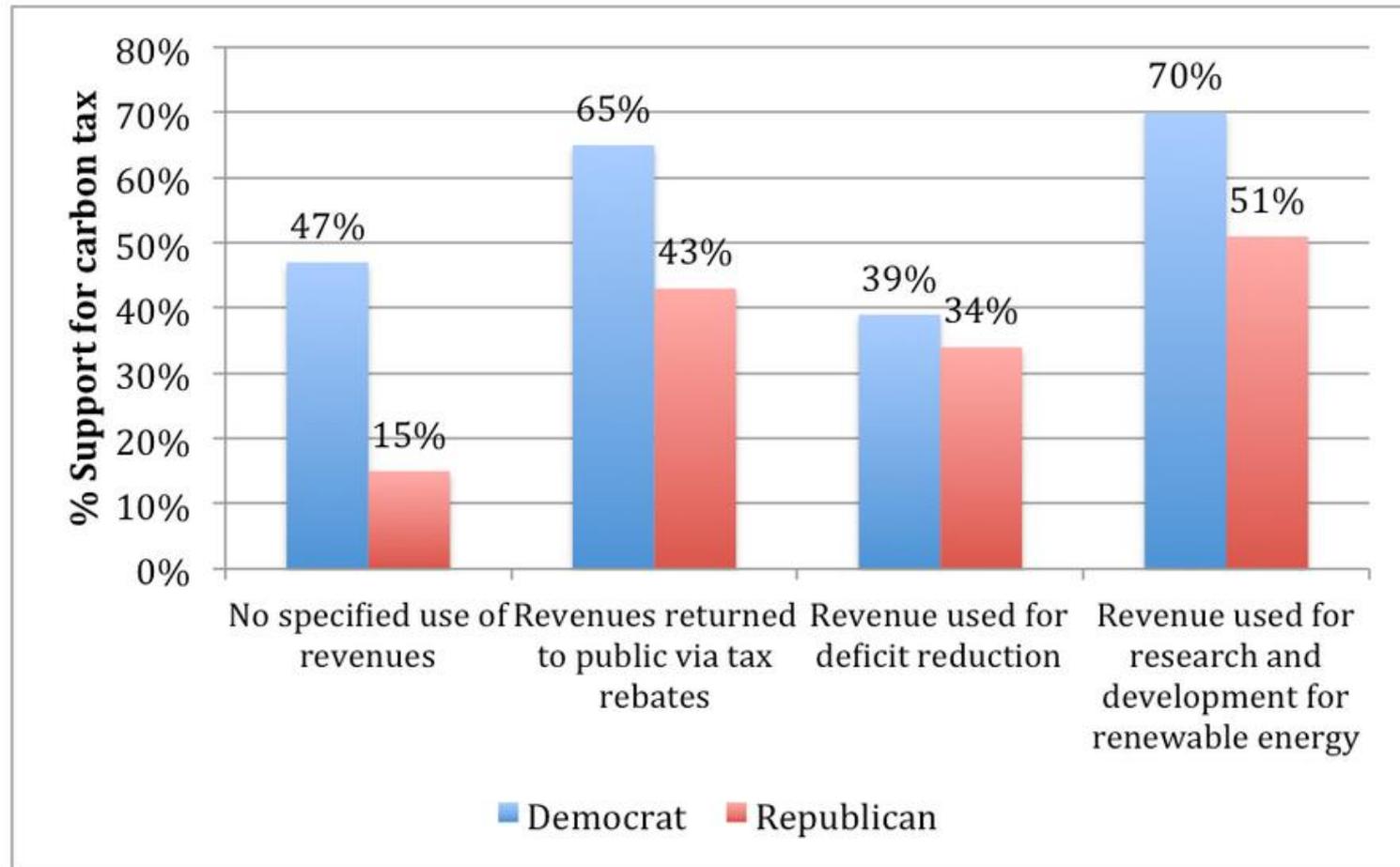
C. Gavard, S. Voigt and A. Genty

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Motivation and Research Question



Motivation and Research Question



Source: Energy Institute Blog, based on survey analysis by David Amdur, Barry G. Rabe, and Christopher Borick

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Motivation and Research Question

- Economic impacts of using carbon revenues to support RE?
- Economic impacts depend on how the pre-existing RE support policies are financed: general public budget or electricity levy (distortionary tax)
- Existing literature:
 - Negative impact of a distortionary tax
 - Benefit of using the revenues from a Pigouvian tax to reduce distortionary taxes (Ballard and Medema, JPE, 1993)
 - The optimal carbon tax is higher if tax revenues are used to reduce distortionary taxes compared to if they are transferred to households as a lump sum (Nordhaus, AER, 1993)

Motivation and Research Question

- Research question: Economic impacts of recycling carbon auction revenues to support RE if heterogeneous electricity levy among sectors?

Main Results and Contribution

- We extend the economic literature on environmental taxation in the presence of other taxes to :
 - carbon pricing in the form of an emissions trading scheme (ETS),
 - in the presence of a distortionary commodity tax that heterogeneously applies to all sectors of the economy
- Contribution to the literature on interactions between climate policy instruments

Main Results and Contribution

- Using carbon auctions revenues to reduce the electricity levy used to finance RE leads to:
 - Increase in electricity demand
 - Increase of the ETS price but reduction of the carbon constraint in the non-ETS sectors
 - Slight GDP improvement (reduction of the levy distortionary effect)
 - Minor impact on the non-ETS sectors (rather positive if relatively more electricity intensive)
 - ETS sectors:
 - Positive impact if the electricity levy applies to them
 - Reduced benefits due to general equilibrium effects if these sectors are exempted (except for sectors for which the positive demand effect from the non-ETS sectors dominates)

Focus on the EU

- EU Emissions Trading Scheme (ETS) since 2005
 - 43% CO₂ emissions reduction in the ETS sectors by 2030 compared to 2005 levels
 - Auctioning according to EU ETS regulation since 2013
- RE policy
 - EU objective: 32% RE in total energy consumption by 2030
 - Support policy at the Member State level, diversity of schemes
 - Financed through the general public budget (UK, PL, FI) or an electricity levy
- Effort Sharing Regulation for the non-ETS sectors: 30% CO₂ emissions reduction in the non-ETS sectors by 2030 compared to 2005 levels

Quantitative Framework

- Data
 - Global Trade Analysis Project 9.1
 - EU Reference Scenario 2016
 - International Energy Outlook

- PACE model

Model region	RE target
France	37.2
Germany	45.6
Italy	51.9
Poland	26.5
Spain	68.8
United Kingdom	49.9
Rest of Western MS	62.1
Rest of Eastern MS	36.3

Assumed renewable energy targets in electricity sector based on EUCO30 scenario*

* These assumptions are based on the 27% renewable energy objective for the whole EU, agreed in 2014.

Quantitative Framework

- RE support
 - Default: paid by tax payers
 - Developments: paid by electricity consumers (electricity levy)
 - With possible exemptions for energy intensive sectors
- Carbon auctions revenues
 - Default : lump-sum transfer to households
 - Development : recycled as a subsidy to power generation from RE

Policy Simulations

	RE support funding		
	Public budget	Electricity levy paid by all consumers	Electricity levy paid by all consumers except ETS sectors
Auctions revenues are transferred to households	PUBLIC	LEVY	LEVY_ETS_EXEMPT
Auctions revenues are used to subsidize power production from RE	PUBLIC_REN	LEVY_REN	LEVY_ETS_EXEMPT_REN

Results

Indicators	PUBLIC_REN	LEVY	LEVY_REN	LEVY_ETS_EXEMPT	LEVY_ETS_EXEMPT_REN
CO2 price ETS (2010 €)	77.2	74.0	75.2	74.1	75.4
Carbon constraint in the non-ETS sectors (2010 €)	163.9	182.8	174.3	187.9	176.8
GDP (% change vs. baseline)	0.0	-0.2	-0.1	-0.2	-0.1
Fossil fuel demand (% change vs. baseline)	0.0	-0.4	-0.2	-0.4	-0.2
Electricity demand (% change vs. baseline)	0.0	-4.5	-2.4	-4.1	-2.2
Primary energy consumption (% change vs. baseline)	0.0	-2.5	-1.5	-2.4	-1.4

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Electricity prices rise in some Member States when auctions revenues are used to support RE (e.g. 3% in France).

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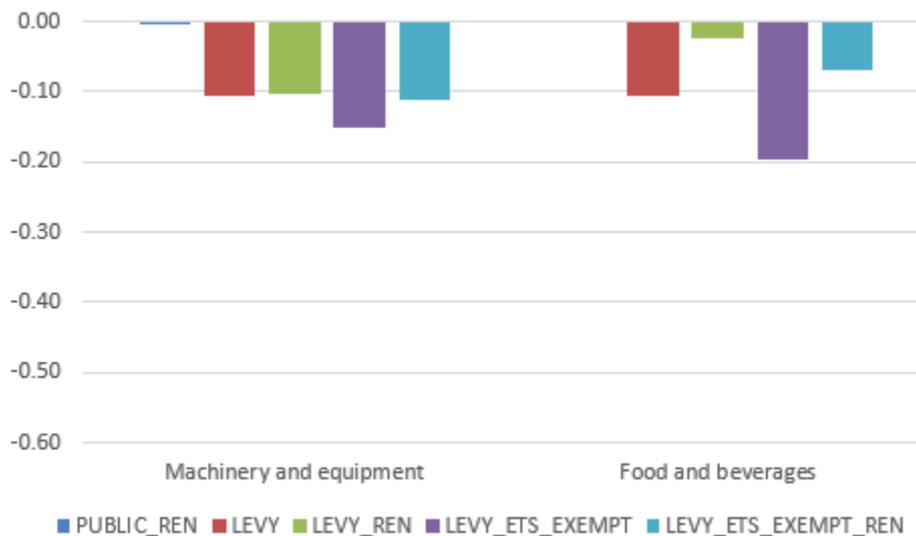
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Results

For the non-ETS sectors, two effects:

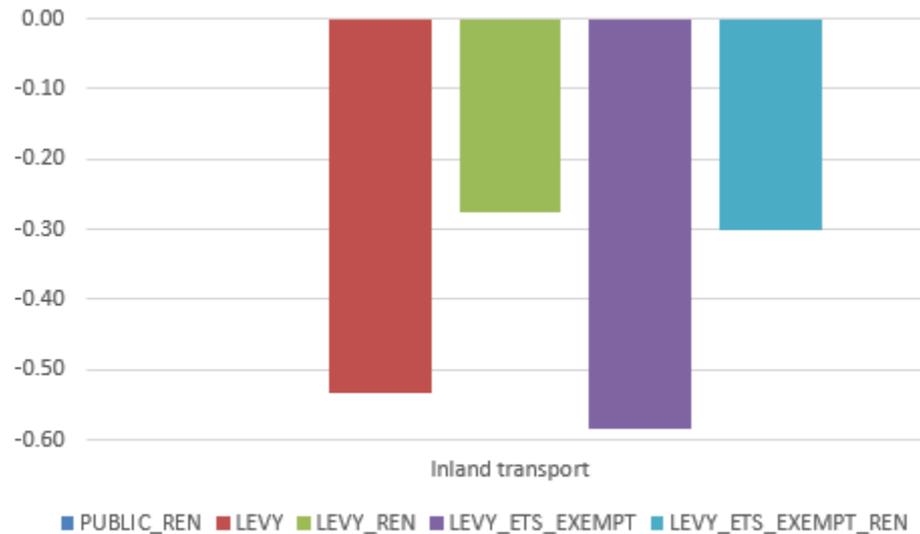
- Electricity levy reduction
- Slight increase in energy prices



Changes in output of selected non-ETS sectors in 2030 (% change vs. PUBLIC scenario)

Results

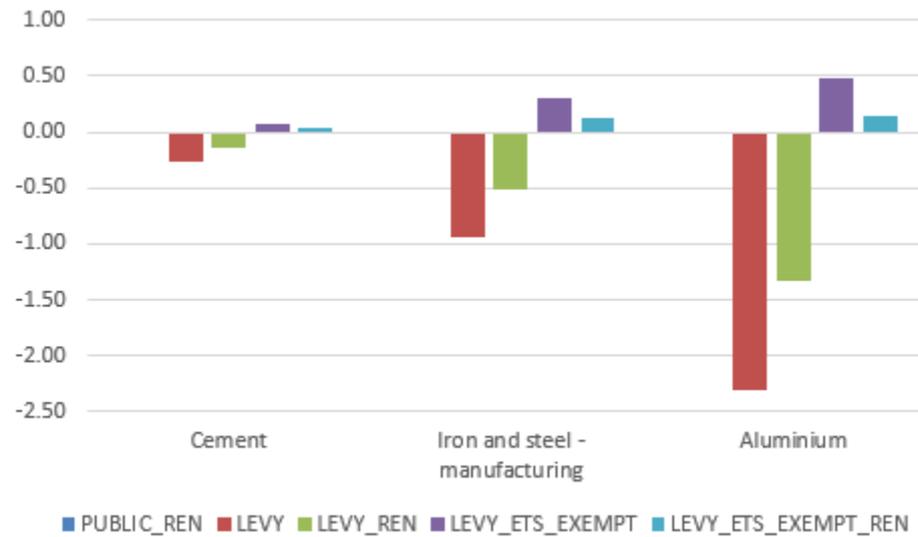
For the *inland transport* sector: demand effect from the non-ETS sectors that benefit from the revenue recycling option



Changes in output of the inland transport sector in 2030 (% change vs. PUBLIC scenario)

Results

The impact on ETS sectors depends on the electricity levy exemption rules.



Changes in output of selected ETS sectors in 2030 (% change vs. PUBLIC scenario)

Conclusion

- Using carbon auctions revenues to reduce the electricity levy used to finance RE leads to:
 - Increase in electricity demand (+2%)
 - Increase of the ETS price (+2%) but reduction of the carbon constraint in the non-ETS sectors (-5.9%)
 - Slightly higher GDP (+0.1%)
 - Minor impact on the non-ETS sectors (rather positive if relatively more electricity intensive)
 - ETS sectors:
 - Positive impact if the electricity levy applies to them
 - Reduced benefits due to general equilibrium effects if these sectors are exempted (except for sectors for which the positive demand effect from the non-ETS sectors dominates)

Thank you for your attention!

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