Decentralization and lobbying in emissions trading schemes

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Agenda

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2. Modeling decentralization
   - General model structure
   - Integration of interest groups' lobbying behavior
   - Model outcomes
3. Relevancy to practice
   - EU Emissions Trading Scheme
   - Linking emissions trading schemes
   - Weight of political contributions
4. Conclusion

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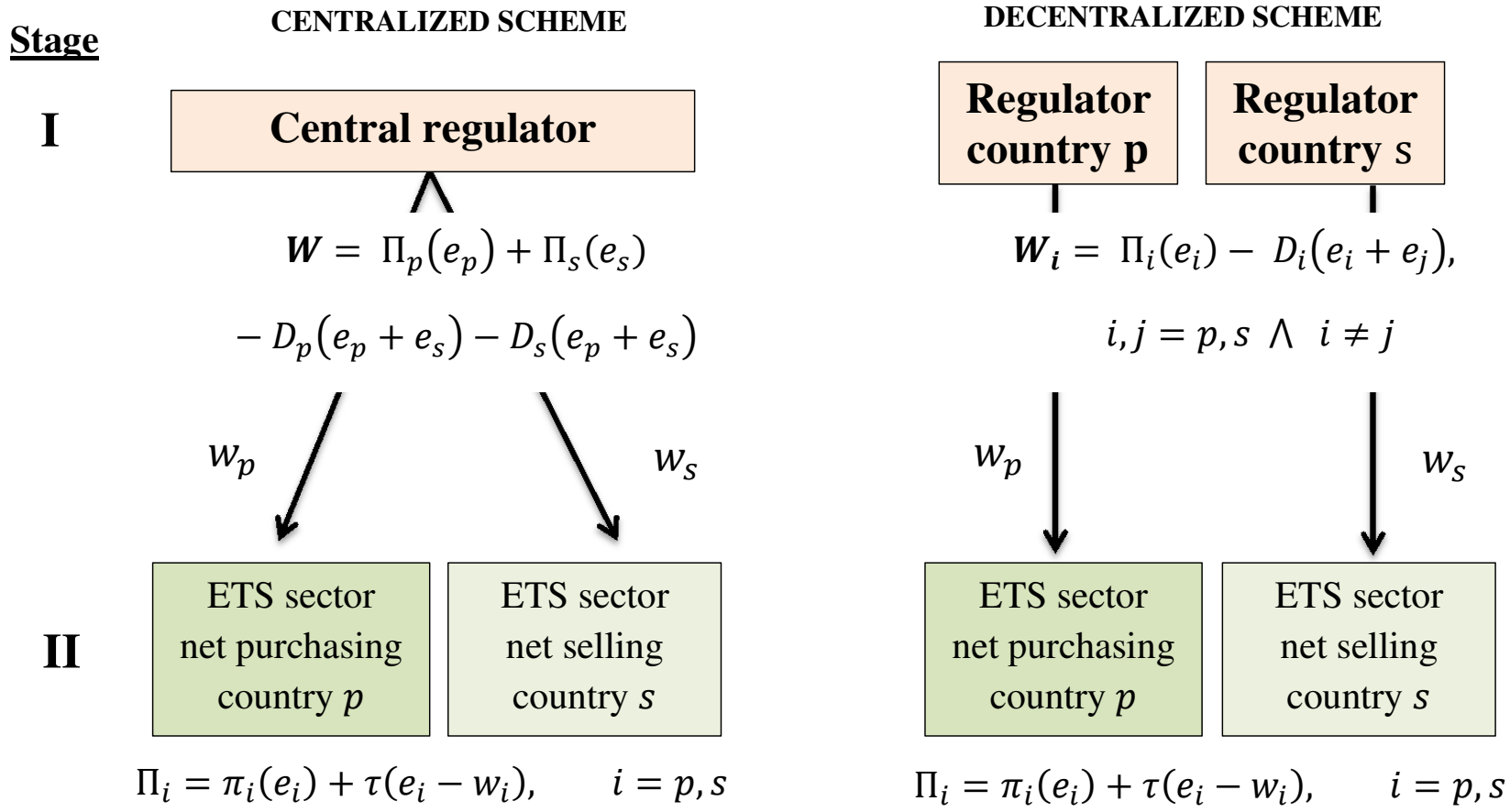
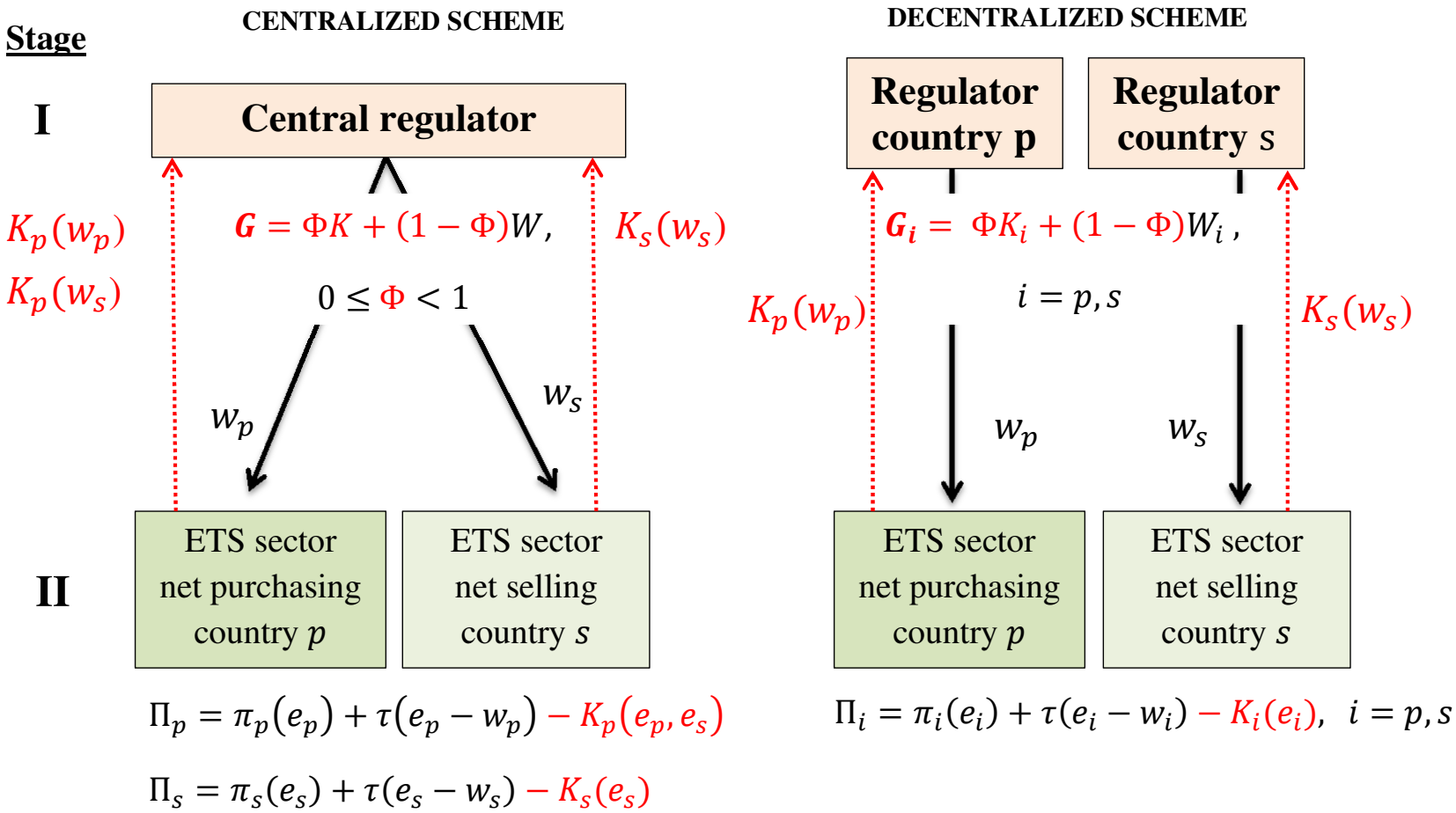
General model structure



Variables: **W** = welfare; **Π** = ETS sector's net profit; **D** = damages; **e** = emissions; **w** = allowance endowment; **π** = ETS sector's benefits; **τ** = allowance price

Integration of interest groups' lobbying behavior



$$\Pi_p = \pi_p(e_p) + \tau(e_p - w_p) - K_p(e_p, e_s)$$

$$\Pi_s = \pi_s(e_s) + \tau(e_s - w_s) - K_s(e_s)$$

$$\Pi_i = \pi_i(e_i) + \tau(e_i - w_i) - K_i(e_i), \quad i = p, s$$

New variables:

G = governmental welfare; **K** = political contributions of ETS sectors;

Φ = Regulators' weight of political contributions

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centralized	$\tau^{cen} = \frac{\partial D_p}{\partial w_i} + \frac{\partial D_s}{\partial w_i}$
decentralized - simultaneous	$\tau^{dec}_{sim} = \frac{1}{2}\left(\frac{\partial D_p}{\partial w_i} + \frac{\partial D_s}{\partial w_i}\right)$
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- Overallocation of EUAs in 2005-2007: $\sim$ 39 m t CO_2
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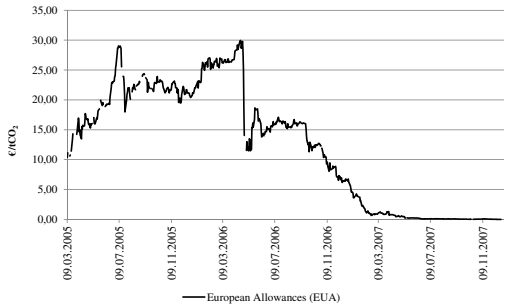

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Relevancy to practice - Linking emissions trading schemes

- Linkage of ETS as a bottom-up reinforcement of climate change policy
- Multi- or bi-multilateral linkage of ETS induces decentralized cap setting
- Strong lobbying activities in linking candidates - Oberthür and Ott (1999)
  - Anti-climate lobby groups, e.g. the US Global Climate Coalition
  - Lobbying expenses: ∼500 m US$ in the 1990s

	EU ETS	CPM	Tokyo ETS	South Korea ETS	RGGI	WCI
Level of implementation	Operating	Operating	Operating	Planned	Operating	Operating
Starting date	2005	2013/2014	2010	2015	2009	2012
Participating countries	EU-27 + Iceland + Liechtenstein + Norway	Australia	Tokyo (Japan)	South Korea	9 US States	California + 4 Canadian Provinces
Reduction due to cap	21% of 2005 levels by 2020	5% cut from 2000 levels by 2020; from 1st July 2015 annual cap setting	17% by 2019	30% of BAU levels by 2020	10% of 2009 levels by 2018	15% of 2005 levels by 2020
Gas coverage	CO_2, N_2O, PFCs	CO_2, CH_4, N_2O, HCFs, PHCs, SF_6	CO_2	CO_2	CO_2	CO_2, CH_4, N_2O, JDCs, SF_6 and NF_3
Sector coverage	Power stations, energy intense industry	Stationary energy, industrial and fugitive processes, non-legacy waste, partly transport	Commercial buildings and industrial (energy consumption ≥ 1,500 kBOE)	Industry, buildings, waste and forestry	Electricity sector (fossil fuelled electric power plants ≥ 25MW)	Electricity and Industry (facilities ≥ 25,000 t CO_2e)
Allocation	Gratuitous (Grandfathering, benchmarking): ~ 50% from 2013	Full auctioning from 1st July 2015; gratuitous allocation for energy intense trade-exposed sectors	Gratuitous	Gratuitous	Auctioning of approx. 90% of allowances	Auctioning of approx. 10% of allowances

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  Hird (1990) - clean up hazardous waste sites
  Cropper et al. (1992) - use of pesticide ingredient
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- The phenomena of decentralization and lobbying in ETS need to be assessed conjointly.

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Conclusion

- Objective of climate policy: Creation of a strict emissions price signal and effective emissions abatement $\rightarrow$ Centralized ETS are more conducive compared to decentralized ETS
- Accounting for governmental welfare parameters within the price building process leads in contrast to the one-dimensional focus on social welfare to the additional consideration of:
  - interest groups' lobbying behavior,
  - regulators' weight of political contributions.
- Decentralized setups can achieve equal or stricter price and emissions levels in contrast to centralized approaches because of transboundary lobbying behavior.
- The phenomena of decentralization and lobbying in ETS need to be assessed conjointly.

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Thank you for your attention!

References

Anger, N., Böhringer, C., Oberndorfer, U. (2008) *Public Interest vs. Interest Groups: Allowance Allocation in the EU Emission Trading Scheme.* ZEW Discussion-Paper No. 07-026, Mannheim.

Coates, D. (1996) *Jobs versus Wilderness Areas: The Role of Campaign Contributions.* In The Political Economy of Environmental Protection, edited by R. Congleton. Ann Arbor: University of Michigan Press, 69-96.

Cropper, M., Evans, W., Berardi, S., Ducla-Soares, S., Portney, P. (1992) *The Determinants of Pesticide Regulation: A Statistical Analysis of EPA Decision Making.* Journal of Political Economy, Vol. 100, 175-197.

D'Amato, A., Valentini, E. (2007) *Why so many Tradeable Permits within the European Union?* Universita "G. D'Annunzio"di Chieti-Pescara.

D'Amato, A., Valentini, E. (2011) *A note on International Emissions Trading with Endogenous Allowance Choice.* Economics Bulletin, Vol. 31, 1451-1462.

Goeree, J., Holt, C., Palmer, K., Shobe, W., Burtraw D. (2009) *An Experimental Study of Auctions versus Grandfathering to Assign Pollution Permits.* Resources for the Future, Discussion Paper 09-39, Washington.

Helm, C. (2003) *International emissions trading with endogenous allowance choices.* Journal of Public Economics, Vol. 87, 2737-2747.

Hird, J. (1990) *Superfund Expenditures and Cleanup Priorities: Distributive Politics or the Public Interest?* Journal of Policy Analysis and Management, Vol. 9, 455-483.

Hoagland, P., Farrow, S. (1996) *Planning versus Reality: Political and Scientific Determinants of Outer Continental Shelf Lease Sales.* In The Political Economy of Environmental Protection, edited by R. Congleton. Ann Arbor: University of Michigan Press, 145-166.

MacKenzie, I. (2011) *Tradable permit allocation and sequential choice.* Resource and Energy Economics, Vol. 32, 268-278.

Oberthür, S., Ott, H. (1999) *The Kyoto Protocol: International Climate Policy for the 21st Century*, Springer, Germany.

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