Effectiveness energy covenants: International evidence

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Voluntary Agreements
Content of presentation

- Voluntary Agreements (VA's) and Energy policy

- Measurement of VA's

- Analysis

- Sensitivity Analysis

- Main results

- Conclusions and recommendations

Voluntary Agreements
As policy instrument for Energy efficiency

- Since 1990's Voluntary Agreements important part in Policy mix to stimulate energy efficiency, carbon reduction and the use of renewable energy.

- Soft law: based on voluntary action, enforcement ranging from absent to sanctions (use of "real" regulations or taxes)

- Are Voluntary Agreements effective?

- Does the design of an agreement make VA's more effective?

Voluntary Agreements
Setup

- Literature ambivalent: based on US micropanels (e.g. Delmas and Montes, 2007, and Pizer at al., 2008)

- 6 econometric studies: 2 studies show positive results, 4 neutral

- 24 OECD countries, 1978 – 2006

- Compilation of database based on EIA database and literature

- 212 voluntary measures found: 78 "real" voluntary agreements

- From database we compiled different measures to characterise VA's
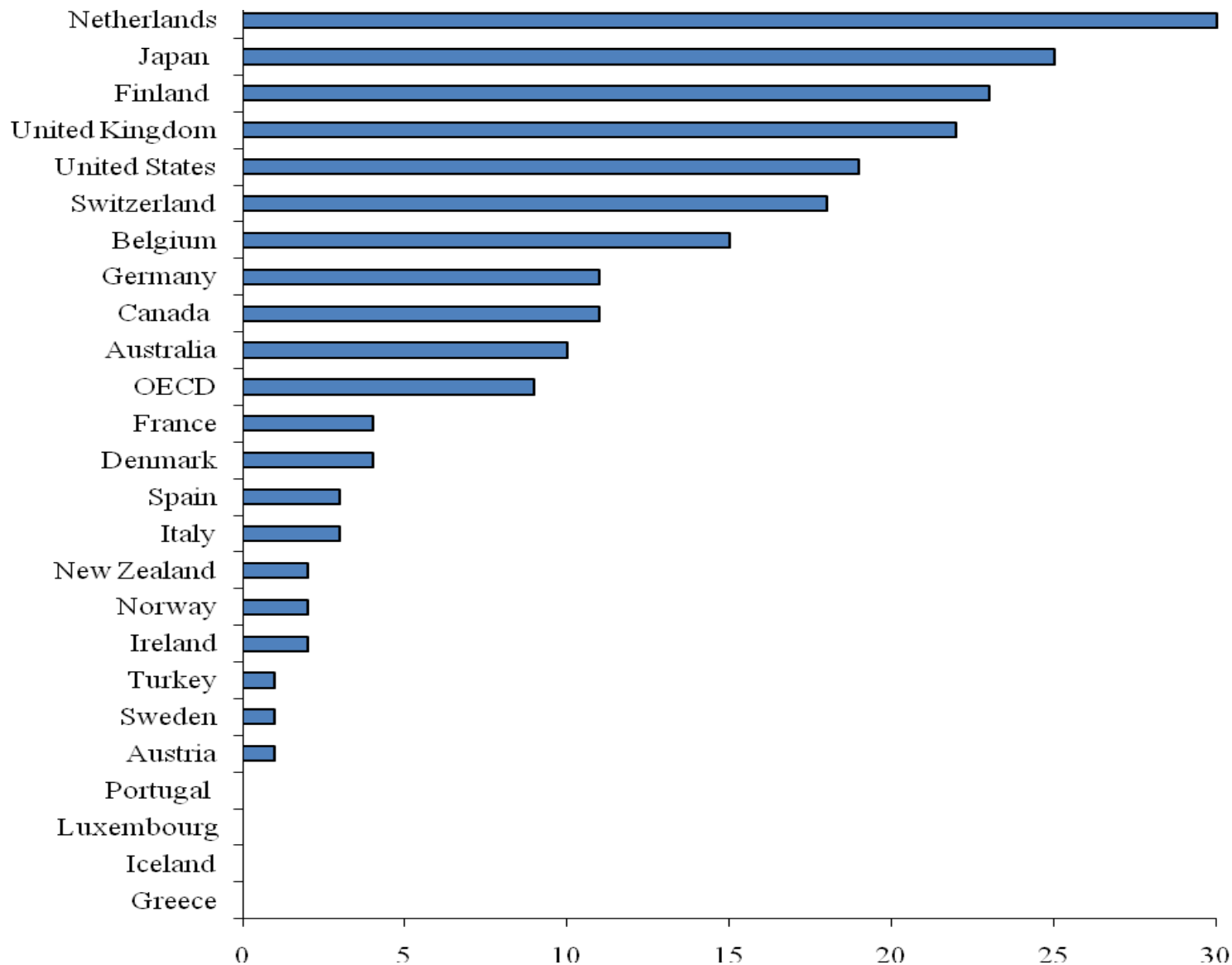
Voluntary Agreements
VA measurement

- Number of VA's: policy under which agreements are negotiated is counted

- Number of sub-agreements: based on number of participating sectors (NACE 1.1)

- Weighted count of three aspects: is VA nationwide, are goals measurable, is VA externally validated

- Subjective assessment: Count of 4 VA types based on: number of sectors, the ambition of targets, the use of sanctions for not reaching the goals and other aspects. Type I few sectors, low ambition, type 4 many sectors high ambitions

- VA Type and validation, explicit goals, sanctions

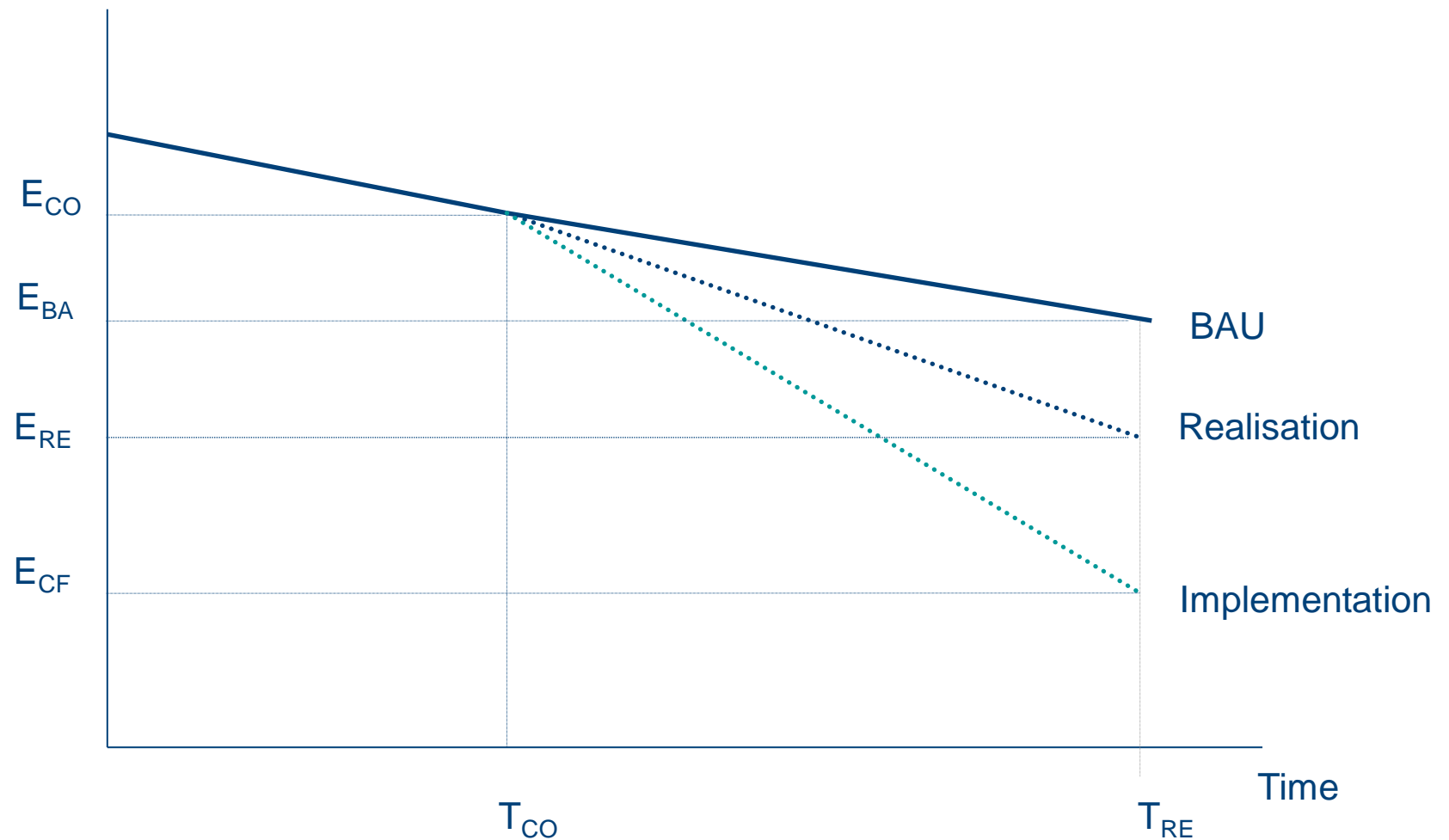# Voluntary Agreements
Use in 24 OECD countries

Voluntary Agreements
## Measuring effectiveness

Voluntary Agreements
Econometrics and variables

- Business as usual: time trends

- Counterfactual: Prices (proxy for taxes), Subsidies and Regulation

- Control Variables: precipitation, population density, urbanisation, temperature, openness economy, fertility

- Dependent: (LOG of) energy intensity divided by GDP, CO_2 intensity divided by GDP or share of renewable energy in TFC

- Fixed effects model: 696 observations

- National, industry, transport sector, electricity and "other" sectors

Voluntary Agreements
## Policy over time
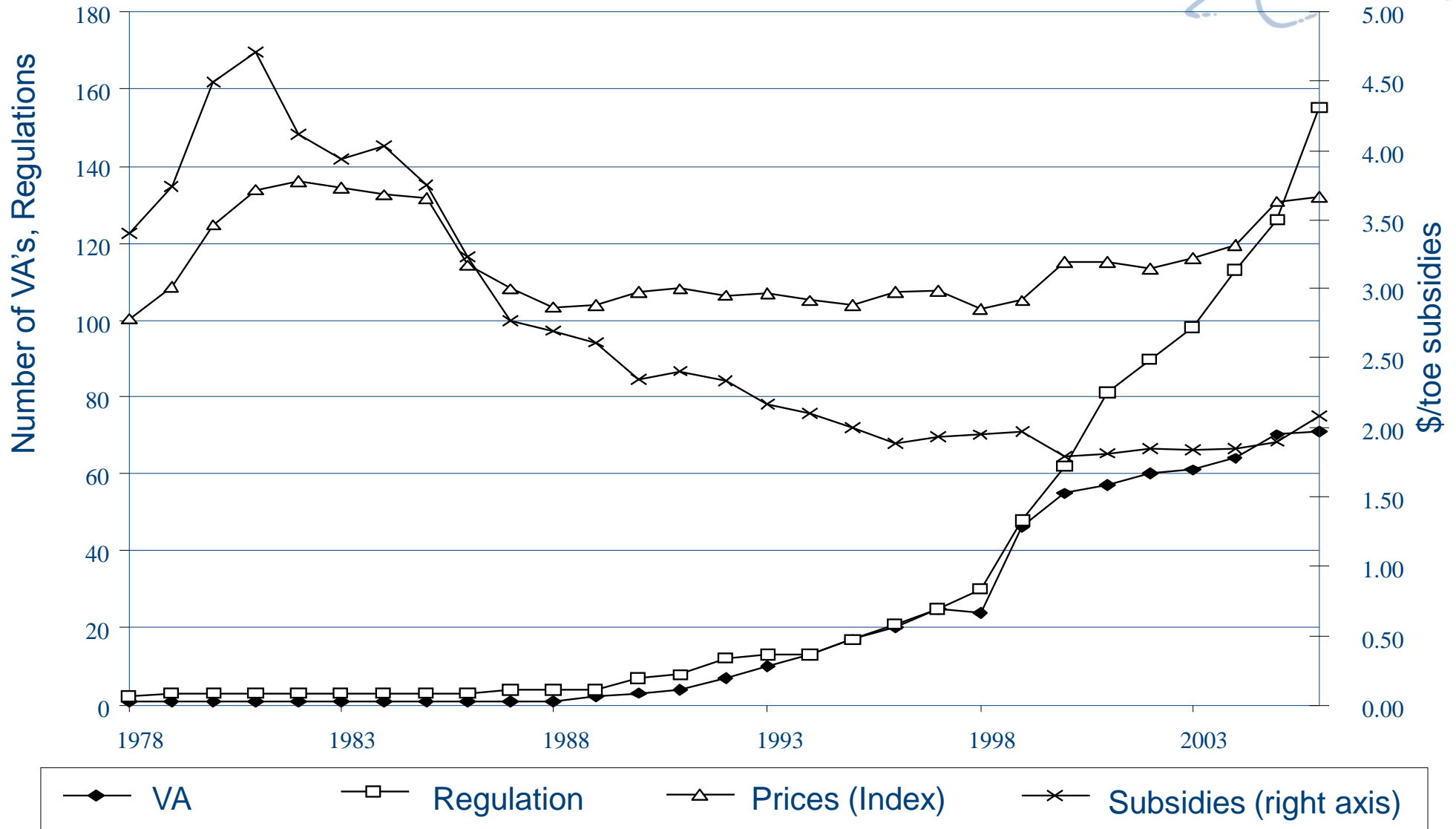
Voluntary Agreements
Sensitivity analysis

- Different VA measures

- Interaction with other policy instruments

- Separate analysis for different policy instruments

- Corruption and voluntary agreements

- Anticipation effects,

- Delayed effects

- Different control and dependent variables, clusters of time trends

- Chow breakpoint, strict endogeneity, Monte Carlo analysis

Voluntary Agreements
Results

Percentage significant result

Legend:
- National
- Industry
- Transport
- Electricity
- Other sectors

Categories: Covenants, Rules, Taxes, Subsidies
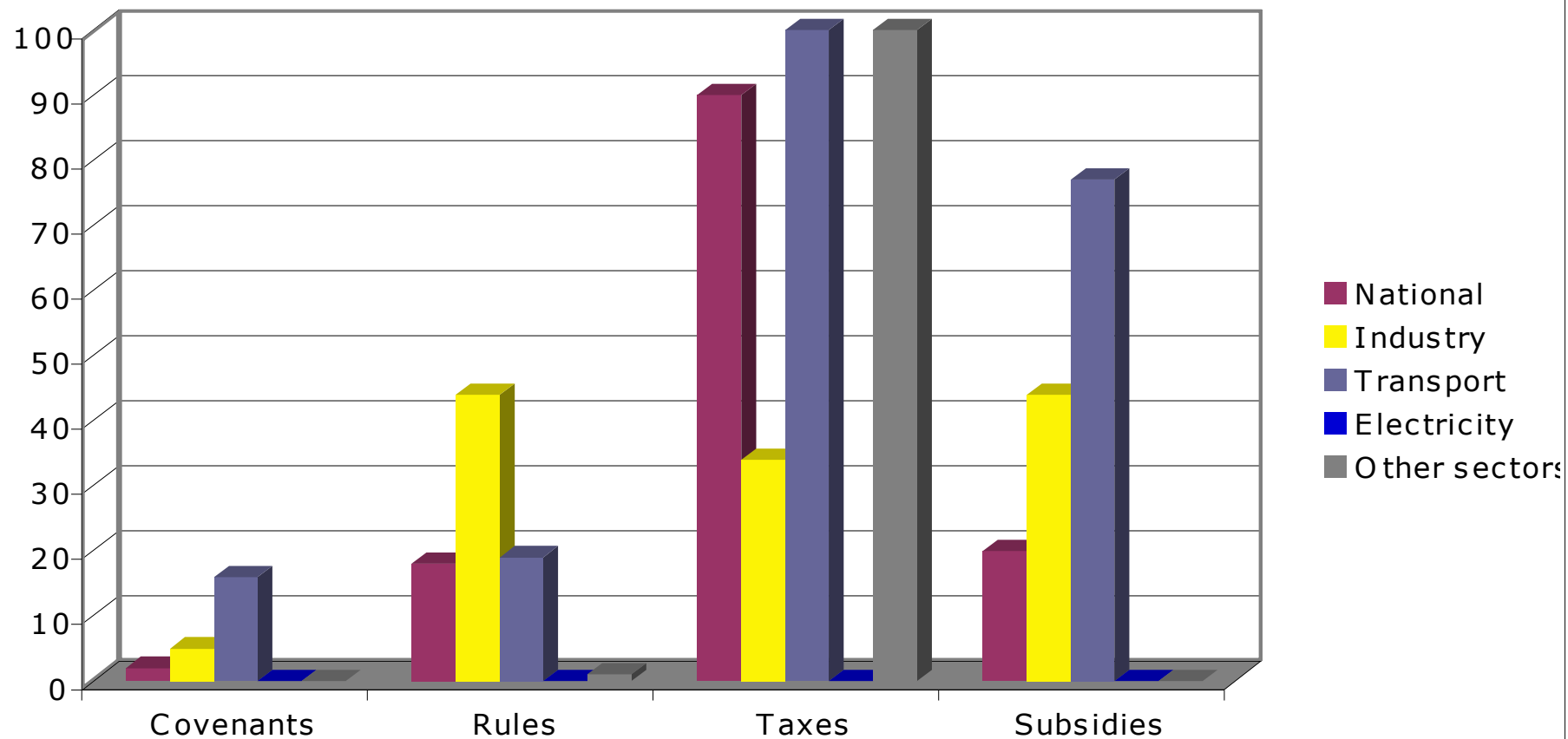
Voluntary Agreements
Conclusions

- Little, or no evidence that VA's are effective

- In case VA's are preferential instrument:

  Organise sanctions, encourage spillovers, leave initiative to companies, evaluate regularly and formulate integral targets

- Further research:

  - The possibility of spillovers as described by Lyon en Maxwell (2007).

  - Microstudies in different countries

Voluntary Agreements
Annex 1: Literature review

Authors	Country	Covenant	Counterfactual	Effects on environment[1]		
				Pos.	Neg.	Neutral
Hartman (1988)	USA	Energy savings households	No	Yes	No	No
Bjørner & Jensen (2002)	Denmark	Energy use industry	Tax, subsidy	Yes	No	No
Lyon & Kim (2006)	USA	Climate emissions electricity	No	No	No	Yes
Delmas & Montes (2007)	USA	Climate emissions electricity	No	EJ	LJ	No
Johnstone et al. (2008)	OECD	Renewable energy	Tax, subsidy, tradable permits, standards	1	No	4
Pizer et al. (2008)	USA	Climate emissions industry	No	1	No	1

1.EJ: Early joiners, LJ: Late joiners

Voluntary Agreements
Annex 2: Number of VA's

	Country	Industry	Transport	'Other'	Electricity	Renewables
Covenants (unweighted)	78	43	18	39	31	31
Subconvenants	245	223	na	na	na	na
Covenants (weighted)	64.25	36.75	14.75	31.5	25.75	25.75
Covenants (type)						
- I (less stringent)	27	9	8	15	6	6
- II	24	14	5	15	11	11
- III	11	7	0	2	5	5
- IV (most stringent)	17	14	5	6	9	9
Covenants (characteristics)						
- explicit goals	55	33	14	28	23	23
- sanctions	24	16	4	8	9	9
- external validation	46	30	9	22	20	20

Voluntary Agreements
Annex 3: Fixed effects model

$$E_{i,t} = \alpha + \beta_1 C_{i,t} + \beta_2 P_{i,t} + \beta_3 X_{i,t} + \beta_4 E_{i,t-1} + \beta_5 T_{i,t} + \delta D_i + \varepsilon_{i,t}$$

- $E_{i,t}$ represents energy-intensity, CO2- intensity or the share of renewable energy for country or sector i at time t.
- $C_{i,t}$ is our measure of the VAs.
- $P_{i,t}$ represents our vector of policy control variables, such as regulation, subsidies and (tax inclusive) energy prices.
- $X_{i,t}$ is a vector of other control variables,
- $T_{i,t}$ is a country or sector specific time trend,
- δD_i is a full set of country fixed effects dummies, and, finally,
- $\varepsilon_{i,t}$ is the normally distributed error term (with $\varepsilon_{i,t} \sim N(0; \sigma_i t)$).

- We estimate this model separately on the national level as well as for the different subsectors.

Voluntary Agreements
Annex 4: Main Results

Variable	(1)	(2)	(3)	(4)	(5)
Covenants	0.0022 (0.0024)	-0.0015 (0.0019)	-0.0001 (0.0025)		0.0011 (0.0024)
Regulations				-0.0041** (0.0018)	-0.0042** (0.0018)
Taxes				-0.0005*** (0.0001)	-0.0005*** (0.0001)
Subsidies (scaled)				-0.0026* (0.0014)	-0.0027* (0.0015)
Lagged energy-intensity		0.7183*** (0.0286)	0.5336*** (0.0312)	0.4669*** (0.0341)	0.4680*** (0.0342)
Time Trend	YES	YES	YES	YES	YES
Non-linear Time Trend	NO	NO	YES	YES	YES
Fixed effects	YES	YES	YES	YES	YES
Number of obs	696	696	696	596	596
Groups	24	24	24	24	24