Eliminating Coal Subsidies in the EU27 -

Carbon Emissions and Welfare

GTAP-E

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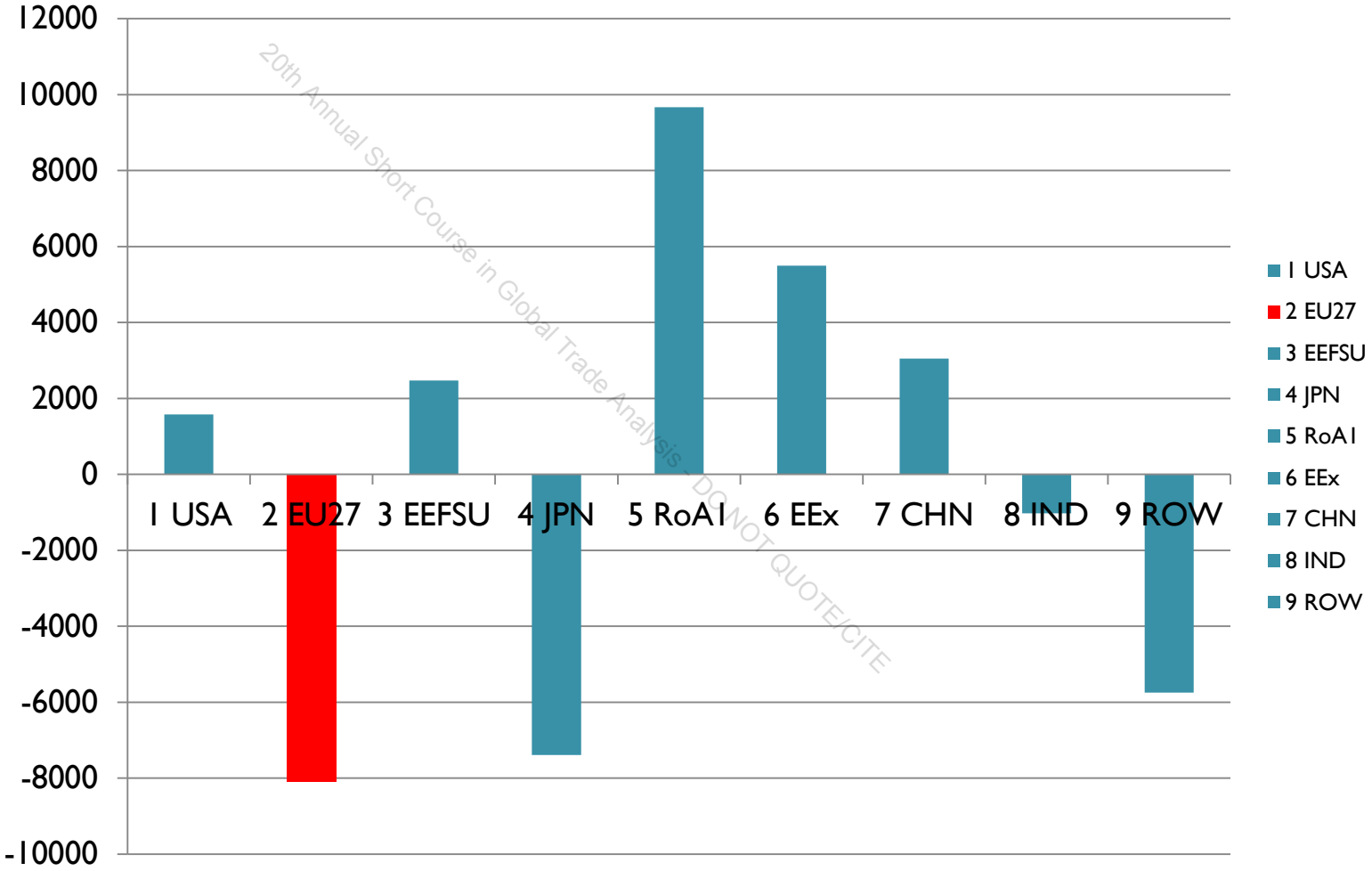
Policy issue

- EU
  - Subsidies to coal production (35%) to ensure employment (<0.1%)
  - Regional importance of coal industry
    - 15% unemployment compared to 7% average
- Kyoto Protocol
  - -17% GHG emissions
- Contradictory policies

Overview – coal net-trade



Current energy taxes / subsidies

rTO output tax (-) or subsidy (+) on energy

rTO	USA	EU27	EEFSU	JPN	RoA1	EEx	CHN	IND	ROW	Total
7 Coal	-8.7	**35**	0.6	15.3	-1.1	-1	0	-1.8	-0.2	38.1
8 Oil	-4.6	-3	-3.7	-1.9	-1	-5.7	0	-1.2	-8.5	-29.6
9 Gas	-3.9	-5	-9.8	-1.9	-1.4	-3.4	0	-1	-7.1	-33.4
10 Oil_pcts	-2.6	-10.1	-1.2	0	-0.3	-3.7	0	0	-11.4	-29.3
11 Electricity	-3.4	-5.3	6.4	-4.7	-2.7	-2.5	0	-2.2	-2.7	-17
12 En_Int_ind	-0.9	-3.4	1.2	-1.7	-0.7	-10.4	0	-2.7	-2.3	-20.9

Experiment

- Removal of 35% coal production subsidy in EU (rTO ("coal","EU") = 0)
- Emission reduction Kyoto (e.g., -17% in EU)
- No emission trading

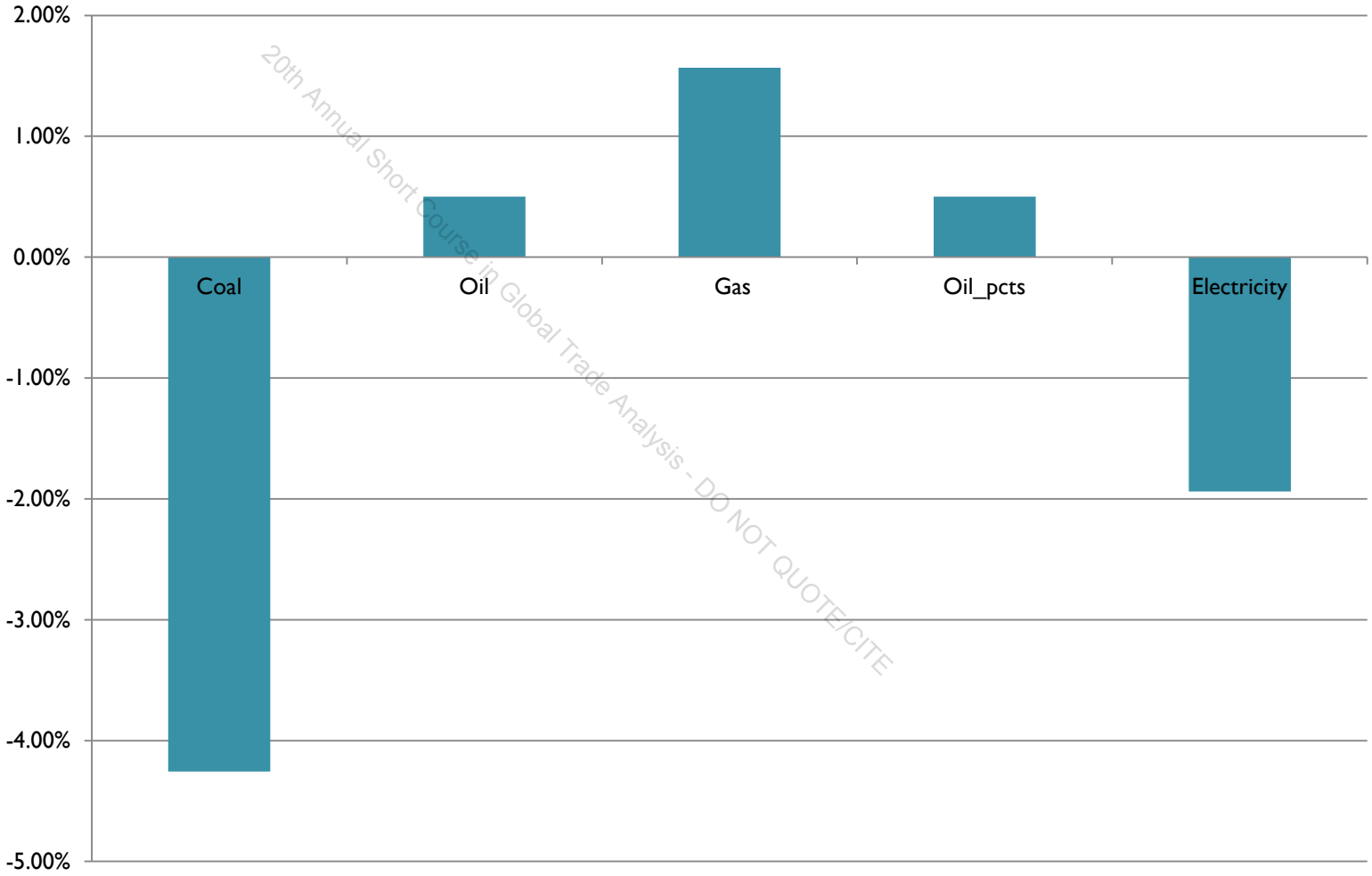
Hypotheses

- Lower CO2 price in EU and other Annex I regions
- Less welfare loss in EU
- Lower global emissions (lower leakage rate)

Results – price index effects

	With coal subsidy	Without coal subsidy
	World export price index (%Δ)	World export price index (%Δ)
1 Agriculture	0.76	0.75
2 Coal	-1.25	-0.03
3 Oil	-2.79	-2.76
4 Gas	-0.69	-0.63
5 Oil_pcts	-1.43	-1.34
6 Electricity	7.80	7.89
7 En_Int_ind	1.25	1.25
8 Oth_ind_ser	0.59	0.59

Results – global energy uses



Results – CO2 changes and prices

	No CO2 trade with subsidies		No CO2 trade without subsidies	
	CO2 emissions (% Δ)	CO2 price (US$/tC)	CO2 emissions (% Δ)	CO2 price (US$/tC)
1 USA	-17	67.7	-17	67.7
2 EU27	-17	90.0	-17	84.1
3 EEFSU	1.6	0	1.5	0
4 JPN	-30	248.2	-30	247.9
5 RoA1	-40	276.0	-40	276.1
6 EEx	1.60	n/a	1.59	n/a
7 CHN	0.40	n/a	0.42	n/a
8 IND	0.70	n/a	0.68	n/a
9 ROW	1.50	n/a	1.40	n/a
Leakage Rate	6.4		4.7	

Welfare implication

- No change in sign compared with base scenario
- Only changes in magnitude
- Welfare enhancing for the EU (+ 5%)
  - ToT- effect: -7% compared to baseline
  - Alloc. Effic. : +5% compared to baseline

Conclusions

- Abolishment of coal subsidies:
  - Reduces effort needed to reach Kyoto targets
  - Reduces GHG emissions non Annex I countries
  - Has positive welfare impacts in EU
- Hypothesis are supported

Discussion

- GHG emission factor based on CO2 / US$
- Not consistent with technical emission / conversion factors?
- Under/overestimate GHG reduction due to reduction coal subsidies ➔ over/underestimate leakage effects