

EU ETS modelling Macro-economic modelling and competitiveness

Some examples

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Macro Economic Models

- To look at GDP and employment impacts
- To look at impacts across sectors
- To look at competitiveness concerns

- GEM E3, PACE: Applied General Equilibrium Models, global coverage
- E3MG: econometric model (energy-economy-environment), global coverage

Example: analysis outcome Copenhagen Summit

- Impacts policy scenarios are compared to:
 - **For the EU the reference case, i.e. EU has 20% GHG reduction target**
 - For others baseline
- 3 types of policy scenarios:
 - Low: All countries do low pledges
 - Mixed: All countries do low pledges but EU steps up to 30%
 - High: All countries do high pledges and EU does 30%
- With and without access international credits

Pledges major countries (base year)

Region	Low (base year)	High (base year)
US	-17% (2005)	-17%(2005)
Japan	-25% (1990)	-25%(2005)
EU27	-20% (1990)	-30%(1990)
Russia	-15% (1990)*	-25% (1990)
China	-40% (CO2/GDP)	-45% (CO2/GDP)
India	-20%(C/GDP)	-25%(C/GDP)
Brazil	-2.7%(BAU)	-8%(BAU)

* In GEMe3 low pledge Russia -20%

Impacts GDP EU (% change in 2020 compared to reference)

EU27	All pledges Internal			Access to international credits		
	Low	Mixed	High	Low	Mixed	High
GEM E3	-0.4	-1.0	-1.0	-0.2	-0.5	-0.6
E3MG	-0.5	-1.2	-1.5	-0.1	-0.2	-0.4

- Still impact on the EU if others doing something while we do not increase target (trade effects)
- International trade reduces costs

Impacts GDP EU (% change in 2020 compared to reference)

E3MG				
	Low	Mixed	High	High
				+ Carbon Tax non-ETS
EU27	-0.1%	-0.2%	-0.4%	-0.1%

- Carbon pricing and how revenues are used matter for the overall economic outcome

EU Employment (change compared to reference case)

	Access to international credits			
ETS	Free allocation	Auctioning for Power	Auctioning all ETS sectors	Auctioning all ETS sectors
non-ETS	Free allocation	Free allocation	Free allocation	Tax
Low	0.0%	0.1%	0.2%	0.5%
Mixed	-0.3%	-0.1%	0.1%	0.7%
High	-0.3%	-0.1%	0.1%	0.7%

- Overall limited negative impact on employment but revenue recycling can make a difference ...

Competitiveness impacts: PACE model

- Copenhagen pledges improve relative competitiveness EU energy intensive sectors exposed to global competition
- Full auctioning for these sectors would have negative impact on these sectors

PACE model Output changes (% change in 2020)	REFERENCE impacts package (-20%) vs BAU	Additional impacts of Copenhagen Accord (compared to reference) EU stays at -20%, other do Low End Pledges	
		Free allocation	Auctioning
Fertilizers	-1,0	0,3	0,1
Inorganic chemicals	-1,0	0,4	0,1
Chemicals, rubber and plastics (other)	-2,8	0,4	0,3

Competitiveness impacts: PACE model

- Step up to 30%:

PACE model Output changes (% change in 2020)	REFERENCE impacts package (-20%) versus BAU	Additional impacts of pledges Copenhagen Accord (compared to reference)	
		Free allocation	Auctioning
		EU steps up to “-30%” Other remain Low	
Fertilizers	-1.0	-0.2	-0,6
Inorganic chemicals	-1.0	-0.1	-0,5
Chemicals, rubber and plastics (other)	-2.8	-0.7	-0,8