

# ALTERNATIVE APPROACHES FOR LEVELLING CARBON PRICES IN A WORLD WITH FRAGMENTED CARBONMARKETS

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# Background

- The current state of international negotiations is leading to fragmented carbon commitments and the formation of multiple carbon markets
- There are growing concerns that unilateral action will
  - Foster carbon leakage
  - Undermine competitiveness of domestic industries in acting countries, particularly in Emission-Intensive & Trade-exposed (EIT) sectors
- Border Carbon Adjustments (BCAs) have been proposed as an instrument to offset these negative effects

- Issues with BCAs:
  - Ambiguous effects
    - Do they increase welfare?
    - Can they restore competitiveness?
    - Are they efficient in reducing carbon leakage?
  - Political acceptability
- What about these effects with alternative more ‘co-operative’ instruments?
  - Direct linking of carbon markets
  - Indirect linking through offsets
- Analysis with the ENV-Linkages computable general equilibrium (CGE) model

# The ENV-Linkages model

- Computable General Equilibrium (CGE) model
  - Simultaneous equilibrium on all markets; international trade
- Recursive-dynamic: horizon 2005-2050 (focus on 2020 for this study); vintages of capital
- This version: 17 regions, 27 sectors
- Main drivers: primary factor supply, relative price changes, factor productivity, energy efficiency improvement
- Link from economy to environment : Greenhouse gas emissions linked to economic activity
- Electricity generation technologies: fossil w/o CCS, coal w/ CCS, gas w/ CCS, hydro/geothermal, nuclear, solar/wind, biomass/waste



## Reference policy scenario: a fragmented carbon market scenario

- Acting regions, total GHGs reductions in 2020

Europe	-20%	w.r.t. 1990
USA	-17%	w.r.t. 2005
Japan	-25%	w.r.t. 1990
AUNZ	-5%	w.r.t. 2000 and -10 w.r.t. 1990
Canada	-17%	w.r.t. 2005
Other Annex I	-19%	w.r.t. 1990

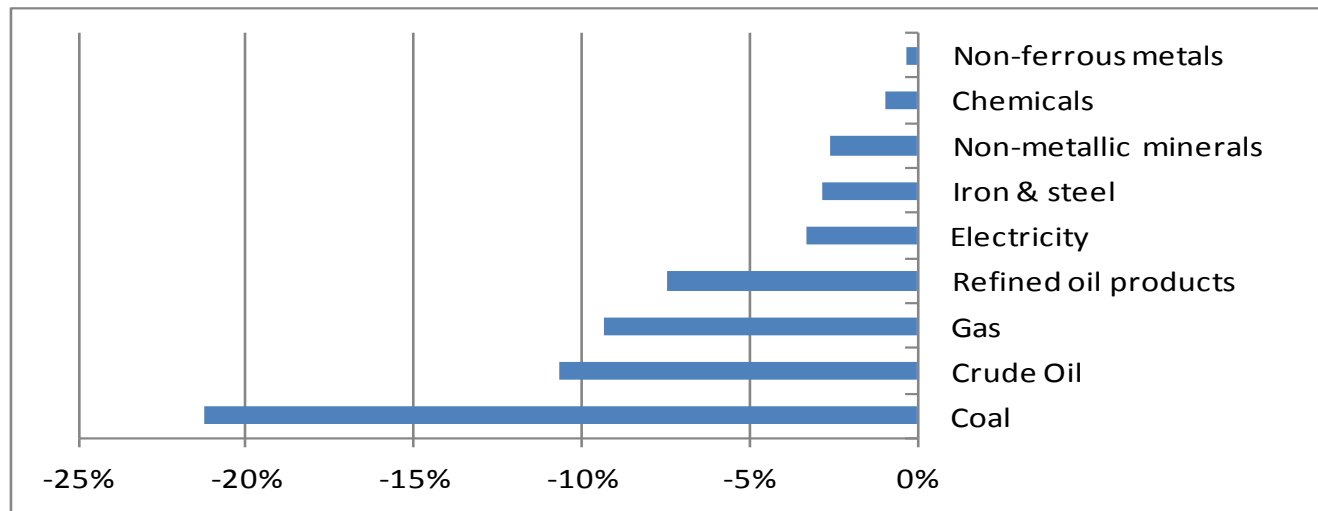
- Restrictions on cap

- CO<sub>2</sub> emissions only
- No cap on emissions from agriculture or households

# Impacts of fragmented policy scenario

	Acting countries	Non-Acting countries	World
<b>Welfare</b>	-	-	-
<b>Output (EIT sectors)</b>	-	+	-
<b>Exports (EIT goods)</b>	-	+	-
<b>GHG emissions</b>	-	+	-

## Output of EIT sectors in acting countries (% change wrt baseline in 2020)



# Policy scenarios: response policies

- **Border Carbon Adjustments**
  - Carbon-based import tariffs for goods produced in non-acting countries calculated on carbon content of goods
  - Domestic carbon-based export-subsidy support for acting countries
- **Direct linking of carbon markets**
  - International trading of carbon permits
- **Indirect linking of carbon markets through offsets**
  - Offsets allow emission reduction projects in non-Annex I countries
  - Credits are purchased by acting countries to meet part of their emission reduction commitments
  - Crediting mechanisms indirectly link the ETSs of countries covered by binding emission caps because credits are accepted in the different ETSs

# Policy scenarios

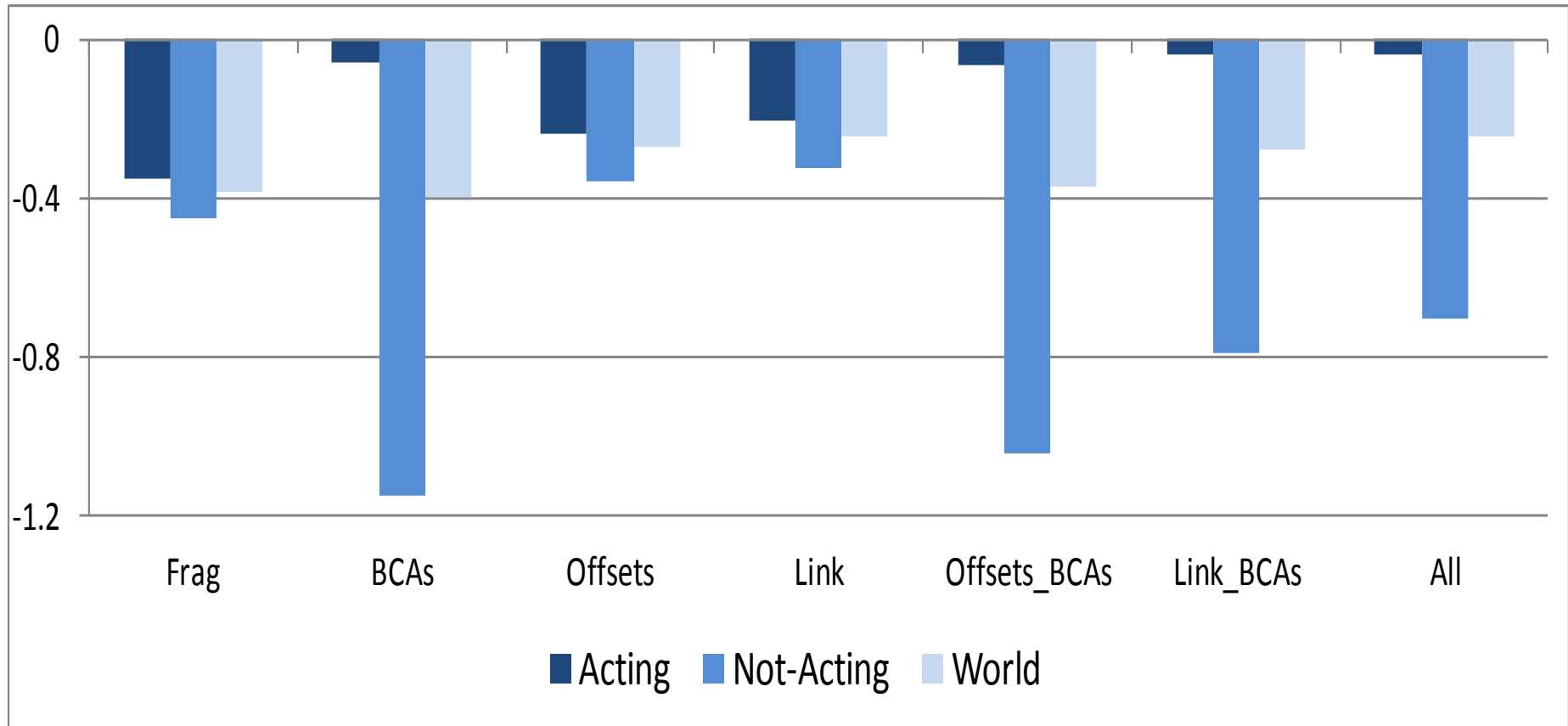
Scenario	Description
<i>Reference policy</i>	
Frag	Simple implementation of a carbon policy by each acting country individually
<i>Single-instrument response policies</i>	
BCAs	Carbon-based tariffs and export tariffs are levied on non-acting countries
Link	The acting regions are linked through an international carbon market
Offsets	Acting countries are allowed to implement emissions reduction projects in non-Annex I countries with no emissions constraints
<i>Multiple-instrument response policies</i>	
Offsets_BCAs	Offsets and BCAs
Link_BCAs	Linking and BCAs
All	Linking, offsets and BCAs

As in the cross comparison exercise global emission reductions across policy simulation are assumed to be the same as in the Frag scenario.



# Welfare impacts of response policies

Welfare impacts of response policies (% change wrt baseline at 2020)



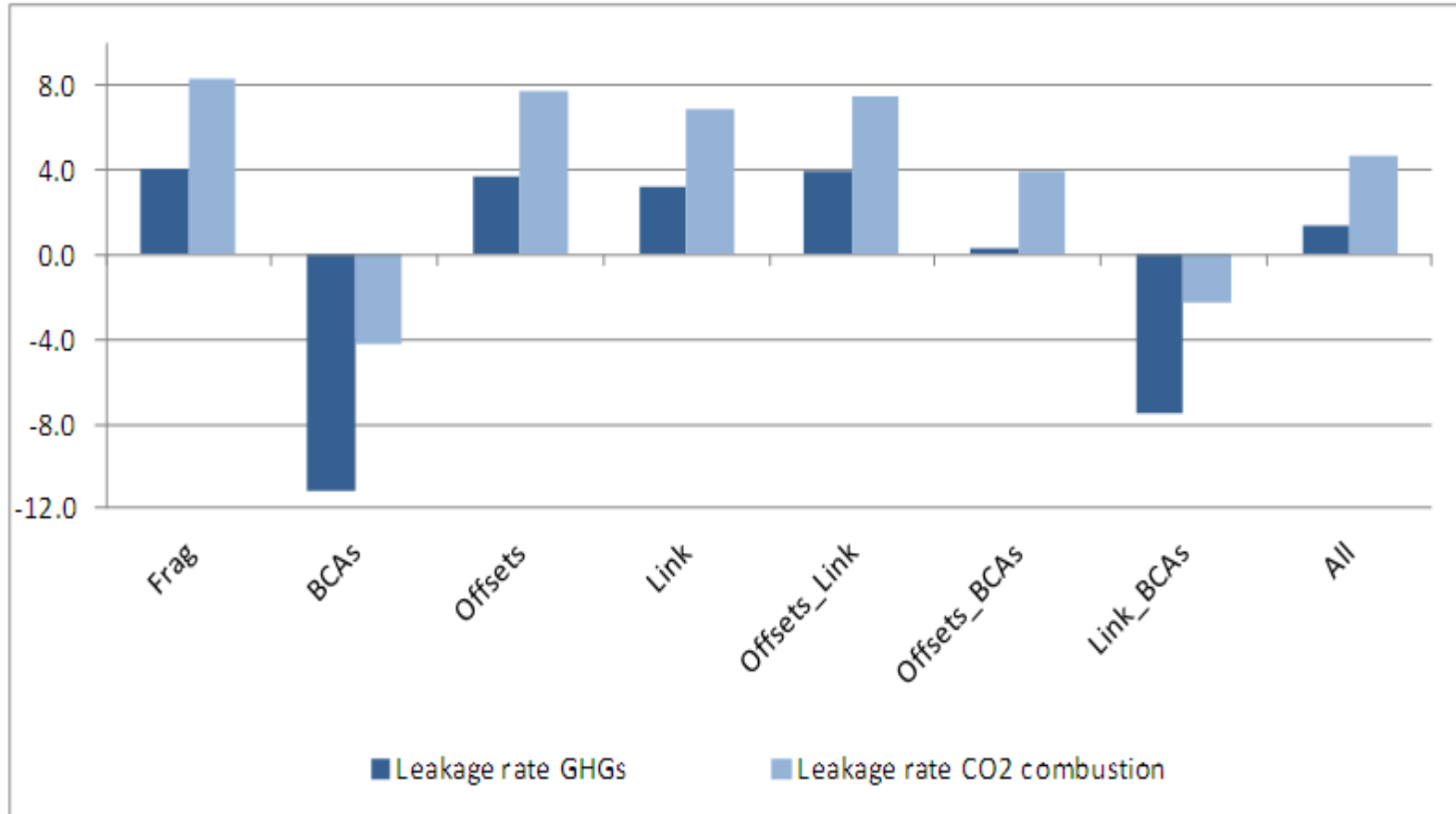
# Competitiveness impacts of response policies

## Competitiveness impacts of response policies in EIT sectors (% change wrt baseline at 2020)

Scenario	Output (EIT sectors)		Exports (EIT goods)	
	Acting	Non-Acting	Acting	Non-Acting
<i>Frag</i>	-2.7	1.5	-3.1	3.9
<i>BCAs</i>	-0.5	-0.6	-0.9	-3.9
<i>Offsets</i>	-1.9	0.9	-2.1	2.5
<i>Link</i>	-1.9	1.0	-2.4	2.8
<i>Offsets_BCAs</i>	-0.5	-0.5	-0.9	-3.3
<i>Link_BCAs</i>	-0.4	-0.4	-0.5	-2.5
<i>All</i>	-0.3	-0.4	-0.5	-2.1

# Emissions leakage rates

## World leakage rate under the different response policies (% change wrt baseline at 2020)



# Sensitivity analysis

- Sensitivity to:
  - BCA design (import tariffs only) -> BCAs less effective
  - GHG emissions (all GHG) -> linking relatively more effective
  - Coalition (smaller coalition) -> BCAs relatively more effective
- General conclusion
  - Extending carbon markets (to cover more countries or emission sources) increases the effectiveness of linking in comparison to BCAs

# Conclusion

- Fragmented carbon markets can cause competitiveness losses for acting countries and carbon leakage
- Both BCAs and linking can be considered as effective response measures to reduce competitiveness losses and carbon leakage
- BCAs better preserve the competitiveness of acting countries by shifting the burden of emission reductions to non-acting countries
- Linking is most effective at reducing welfare losses at global level
- The effectiveness of linking increases as more emission sources or countries are included, while effectiveness of BCAs decreases



## Thank you!

More information on our modelling work:

[www.oecd.org/environment/modelling](http://www.oecd.org/environment/modelling)

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