

# Climate Strategies WS

## Linking of Carbon Markets

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### **Leakage and Linking**

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## Setting the stage

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Multiplicity of related problems w.r.t. climate change and abatement policies:

- Environmental effectiveness (leakage)
- Cost efficiency
- Competitiveness
- Distributional impacts and global climate justice
- ...



Linking might be a solution to some of them, but is it a solution to leakage???

# Main Questions

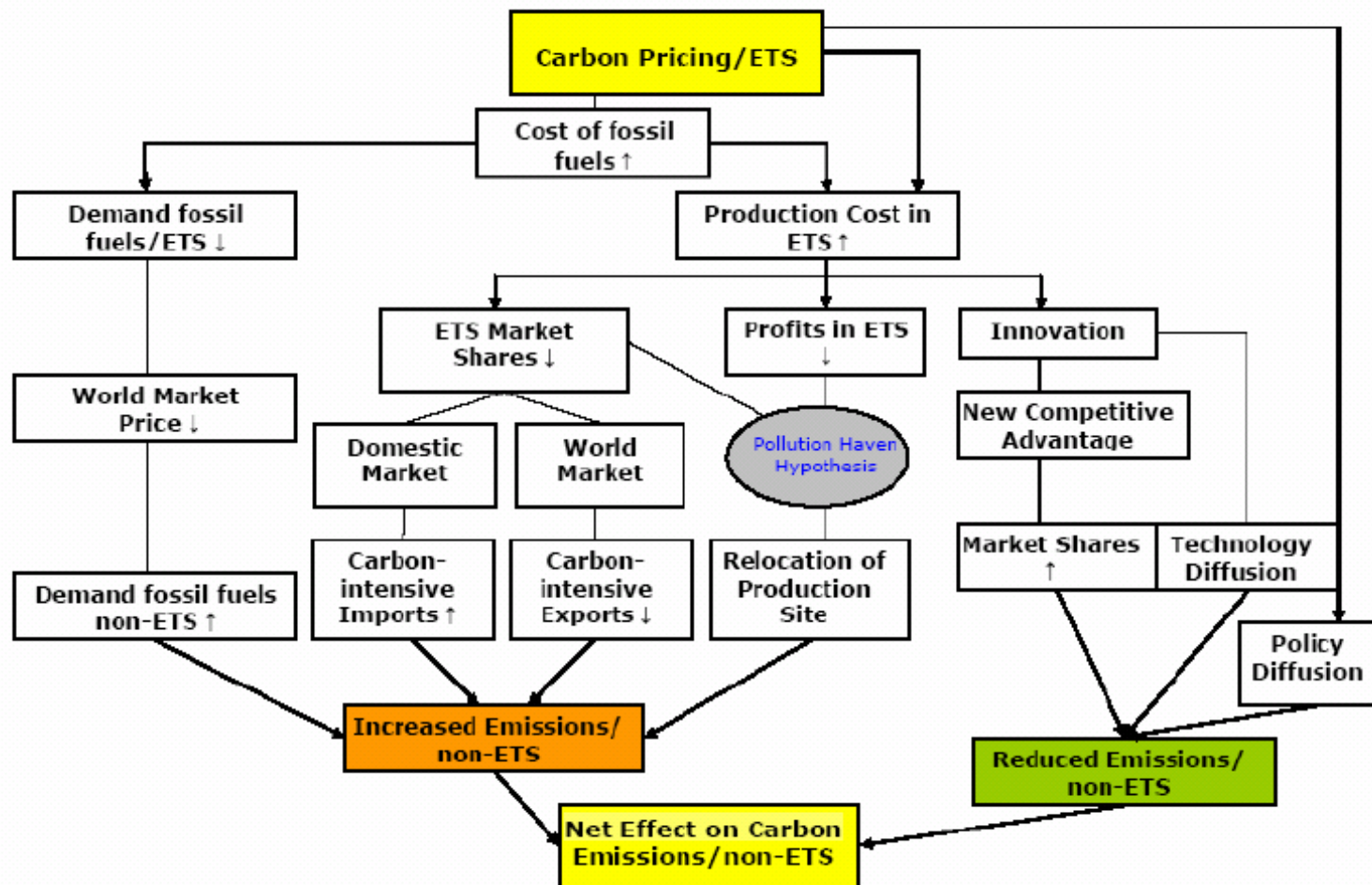
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To what extent is linking a solution to leakage concerns?

To what extent does linking reduce leakage over and above simply introducing a non-linked scheme or carbon price?

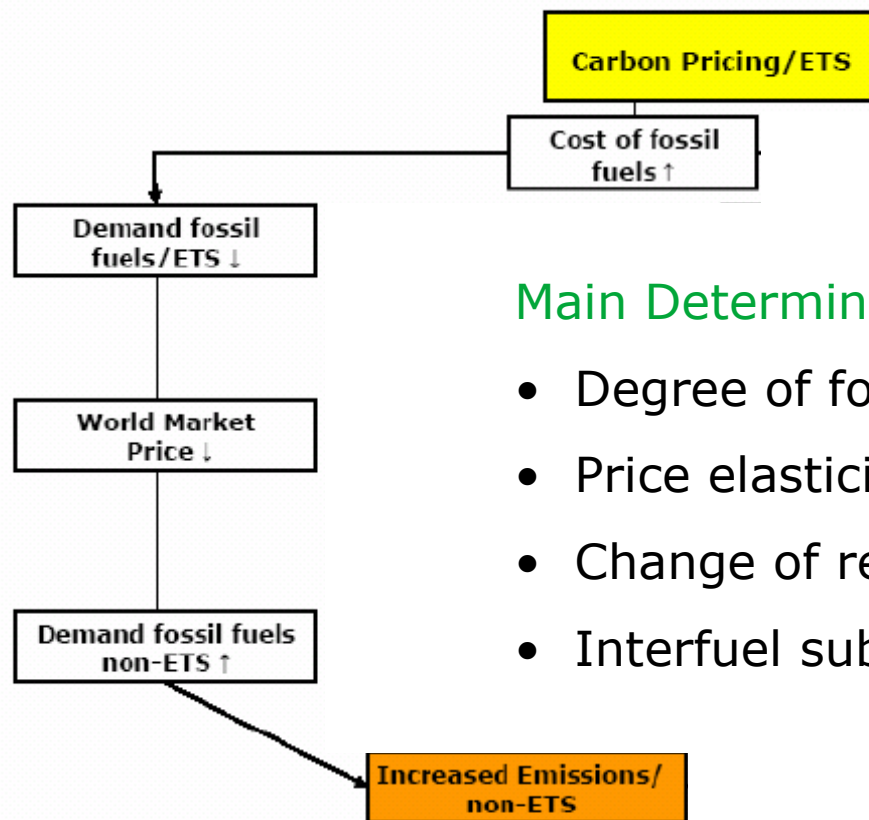
# Leakage Channels

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# Leakage via the Energy Channel

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## Main Determinants:

- Degree of fossil fuel market integration
- Price elasticities (demand, supply, each fuel)
- Change of relative fuel prices
- Interfuel substitution elasticities

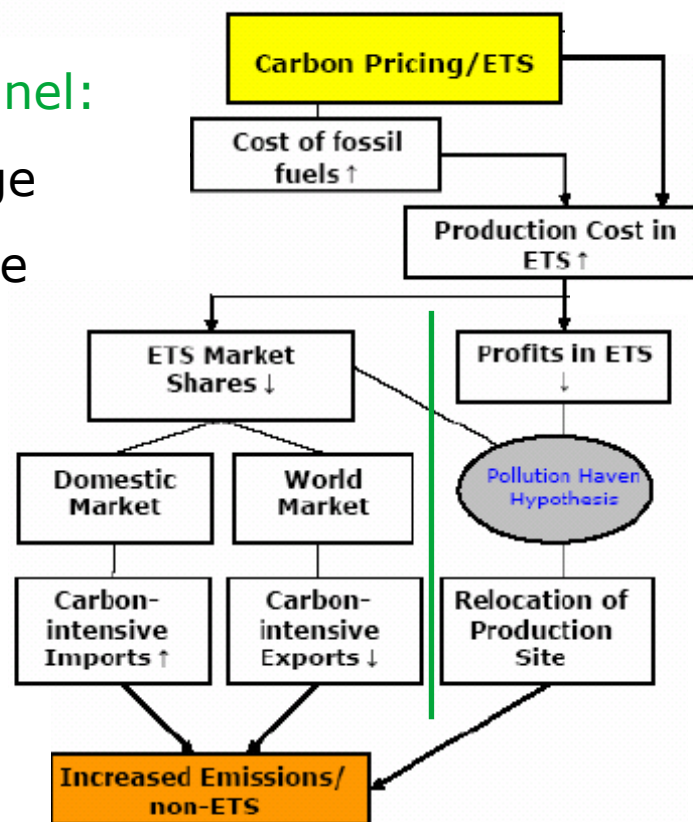
Relevance, e.g.: Is there a „RUSSIAN GAS GAP“?

# Leakage via the Industry Channel

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## Production Channel:

- Import leakage
- Export leakage



## Relocation Channel

### Main Determinants:

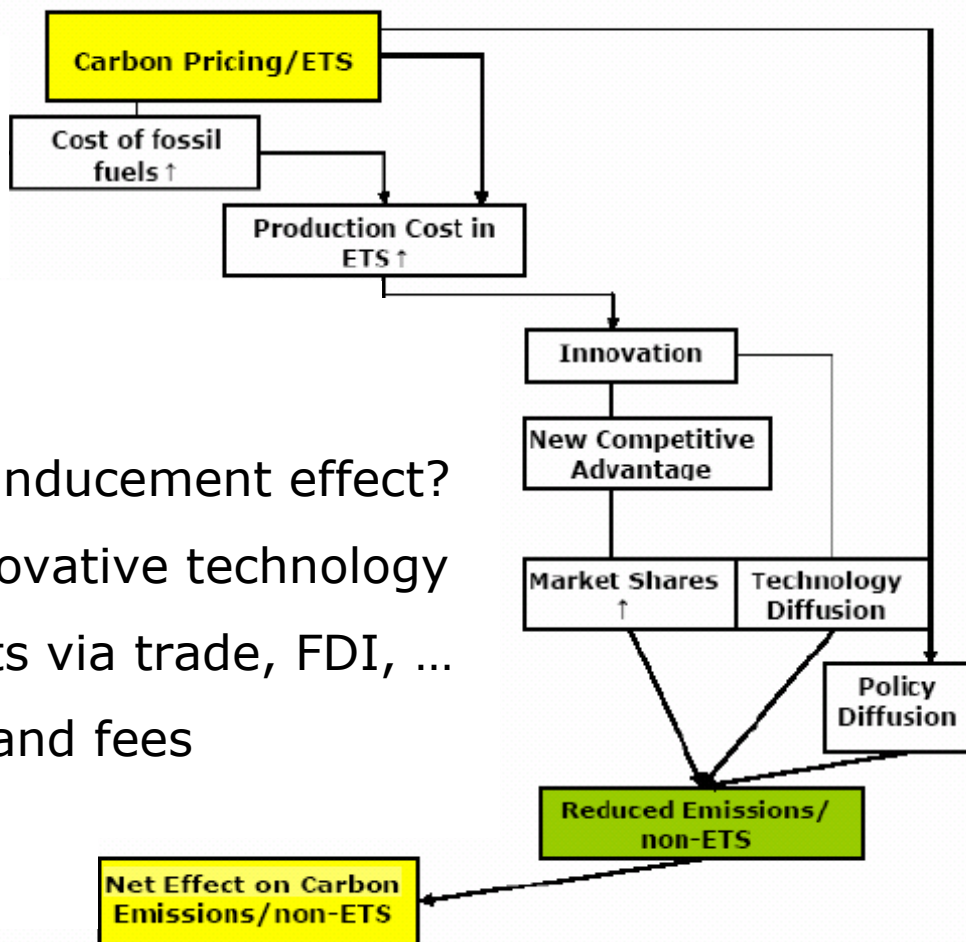
- Carbon cost differential
- Trade intensity
- Homogeneity of sectors
- Emission-intensity

# Induced Innovation and Net Leakage Effect

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## Main Determinants:

- How strong is the inducement effect?
- Accessibility of innovative technology
  - Spillover effects via trade, FDI, ...
  - Tech markets and fees



# 1. Conclusion on leakage debate

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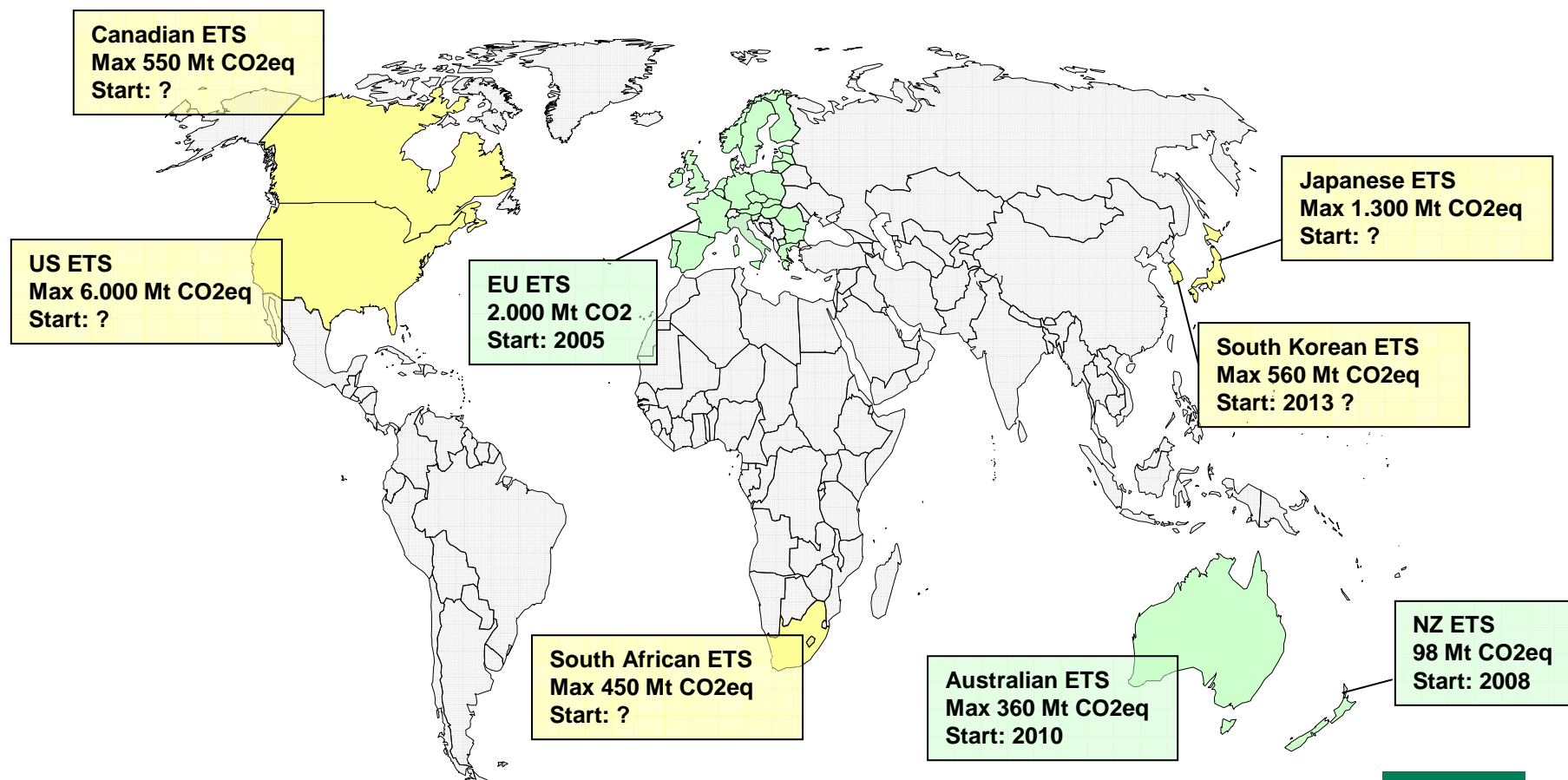
- Unsurprisingly, debate has focused on the industry channel.
  - Most easy one to tackle
    - from technical point of view and
    - from policy point of view (overlap of climate policy and industrial policy interest)
  - ... though major difficulties remain!
- BUT: Part of the problem remains ...

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How does the introduction of additional caps affect leakage?

What does linking add to this?

# Existing and Emerging ETS



## Reminder: Leakage Definition

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In words: Bilateral leakage rate

$$LR_{A,B} = \frac{\text{Increase of GHG emissions in B}}{\text{Decrease of GHG emissions in A}}$$

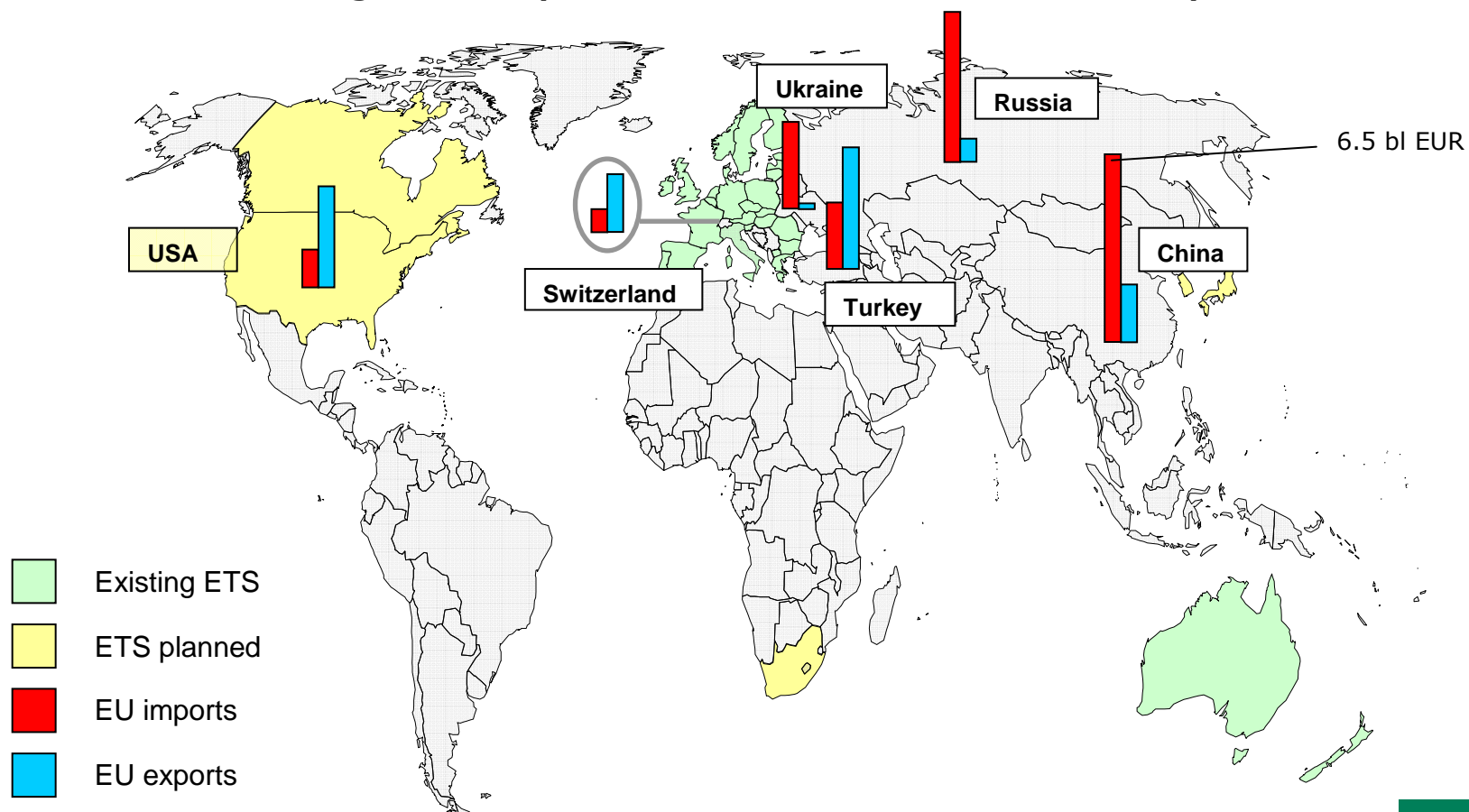
*both of which are due to A's climate policy ( $p_A$ ) and compare to a hypothetical situation without ( $p_0$ )*

**-> Capping B's emissions eliminates leakage from A to B!!!**

... irrespective of A's and B's CO<sub>2</sub>-prices

# EU ETS and Extra-EU Iron and Steel Trade 2007\*

Sectoral Leakage Rate (EU ETS, 2016, 100% Auction): ~39%\*\*



\*These 6 countries accounted for approximately 50% of total non-EU iron and steel trade in 2007

\*\* CASE model estimate of CIRED

## Linking and Leakage: Bilateral links

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- Linking leads one system's allowance price to increase and the other's to decline
- Will tend to increase leakage in the former system and reduce leakage in the latter system.
- Amount of leakage depends on the extent to which each system's allowance price changes, and on the sensitivity of leakage from each system to changes in that price (Stavins 2007)

## Example: RGGI

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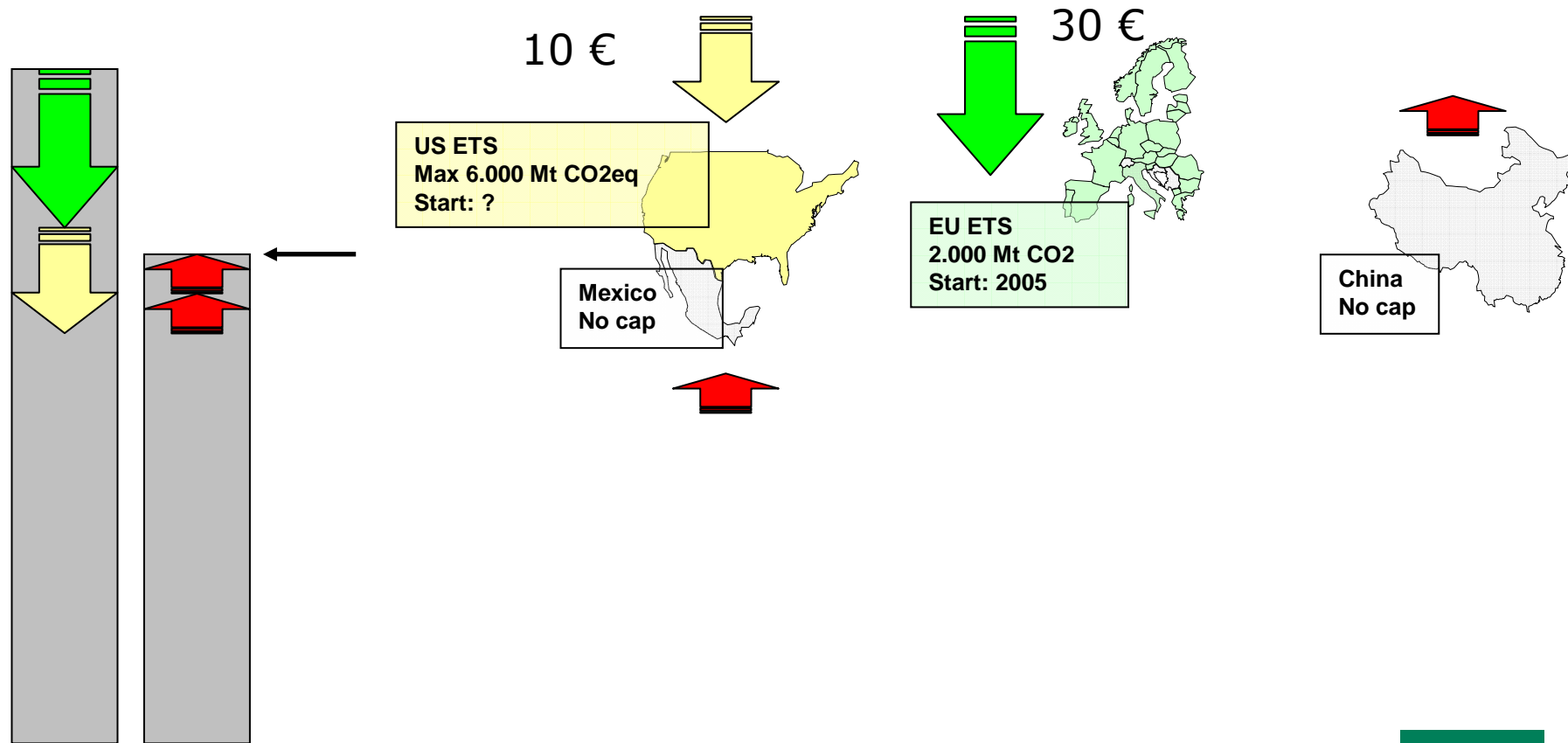
- Two-way link with the EU ETS, given each system's relative size and current allowance price expectations -> significant increase in RGGI's allowance price, relatively small decrease in the EU ETS allowance price
- Net increase in global emissions by increasing leakage from the RGGI system more than it reduces leakage from the EU ETS (Stavins 2007)

## Example: Linked US – EU ETS

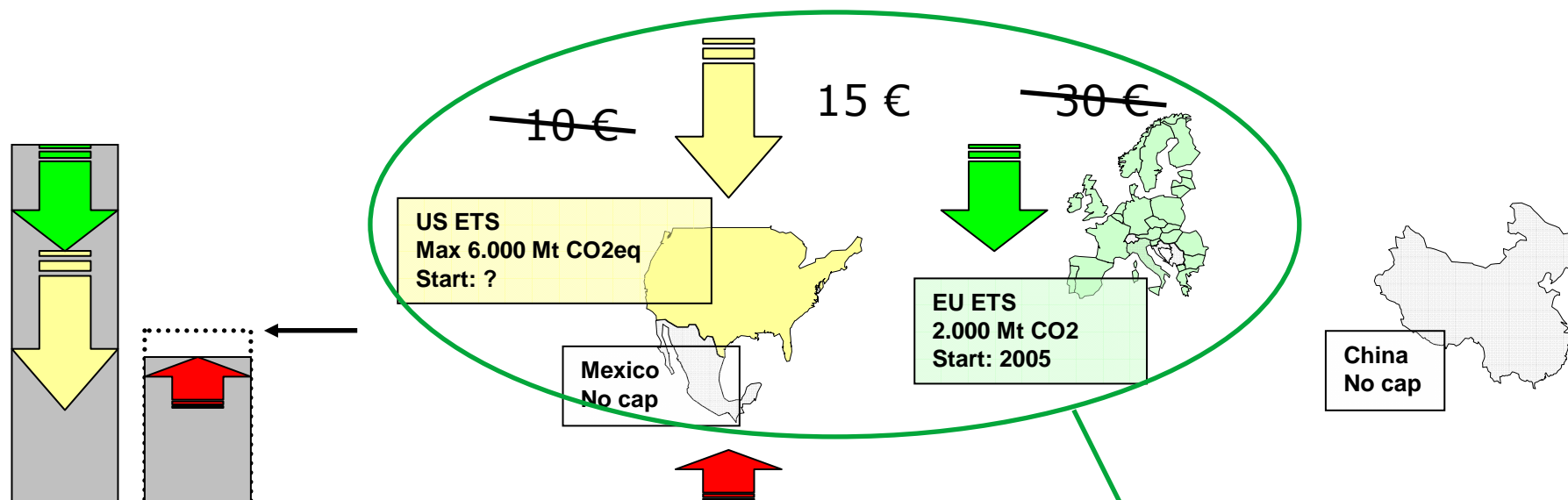
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- Linking of future US ETS (6.000 Mt CO<sub>2</sub>eq) with the EU ETS (2.000 Mt CO<sub>2</sub>) yields a different picture:
  - Higher decrease of EUA price than increase of US allowance price?
  - Leakage from EU ETS might be reduced more than leakage from US ETS increases

# Example: US and EU Exposure to Leakage



# Example (cont'd): Leakage from Linked Systems



- Equalization of allowance prices
  - weighed average??
- Capital flows from high-price to low-price system
- Redistribution of investments in abatement
- Change of exposure to leakage

## Linking and Leakage: Unilateral links

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- Trading will only occur if the other system's allowance price is lower -> same effect as with bilateral link, i.e. price convergence up to certain limit
- CDM
  - Usage of the CERs lowers the internal allowance price -> lower carbon prices imply lower leakage
  - Additionality problem -> higher leakage due to perverse investment incentives

## Conclusion: Linking as Solution to Leakage?

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- ❑ NO, but as part of a solution to address distortions in competitiveness
- ❑ Linking can play a role in addressing leakage, but it can also aggravate it
- ❑ „Bilateral“ leakage is already addressed by the introduction of separate caps in both countries
- ❑ Unlinked caps do not address the competitiveness issue, but the intro of a cap breaks up the link between distortions in competitiveness and leakage