

CARBON LEAKAGE: OPTIONS FOR THE EU

Centre for European Policy Studies (CEPS)

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The evolution of the economics of carbon leakage

Carbon Leakage: An Overview
A synthesis of the Background Paper

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My agenda

- **Carbon leakage in view of widening energy price and tax gaps amount countries**
- **Damages done to carbon leakage concerns by the credibility gap of many model based analyses**
- **Gaps still to be discovered and closed in the ongoing carbon leakage discussions**

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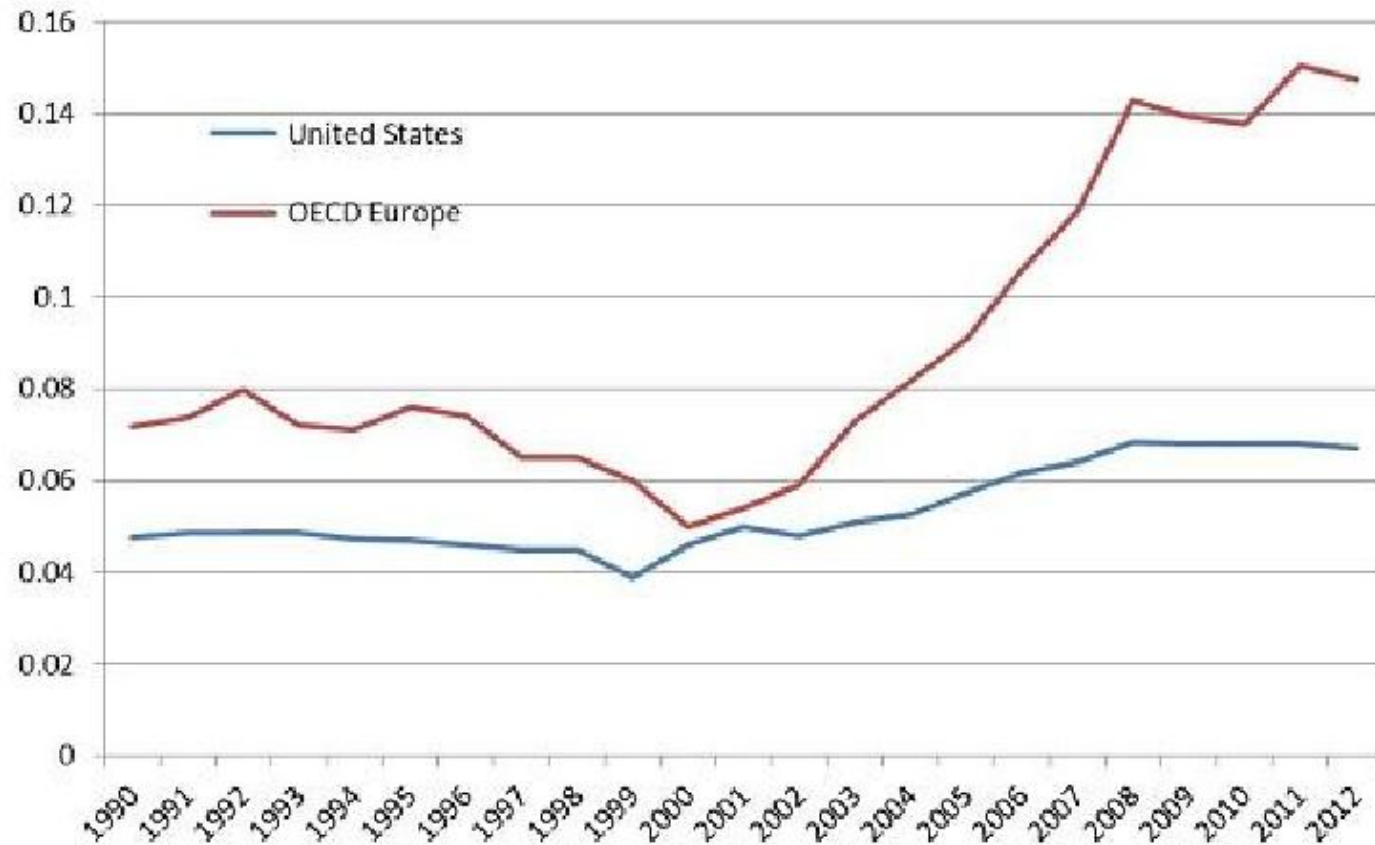
Energy price and tax gaps

**Widening gaps among countries in
energy prices and energy taxation
are dominating
leakage from carbon prices**



The widening energy price gaps

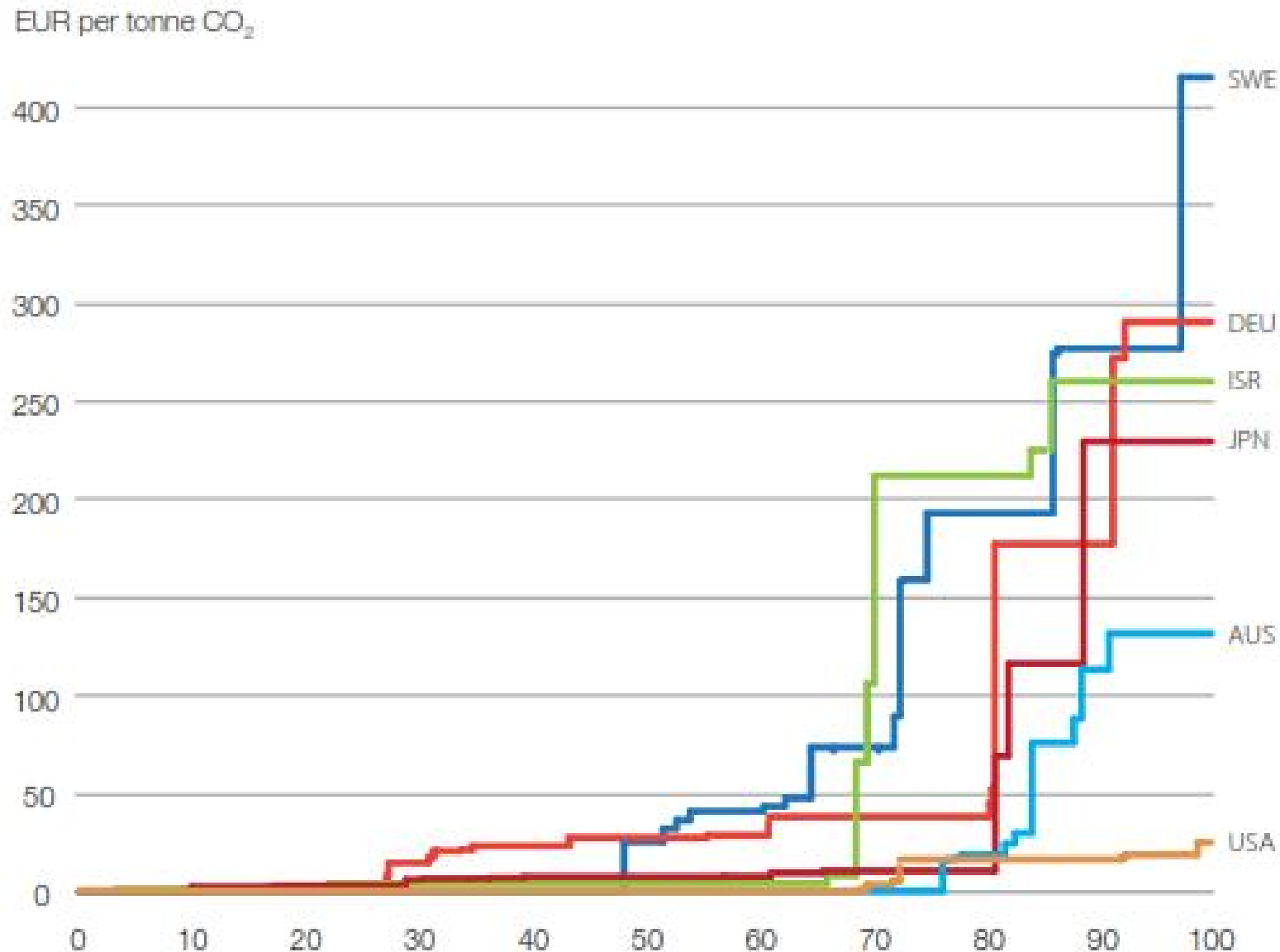
- **The example of German car manufacturing**
 - **Remained competitive**
 - **Sharp increase of aluminum imports**



Source: IEA, 2013

Effective tax rates on a carbon emissions basis

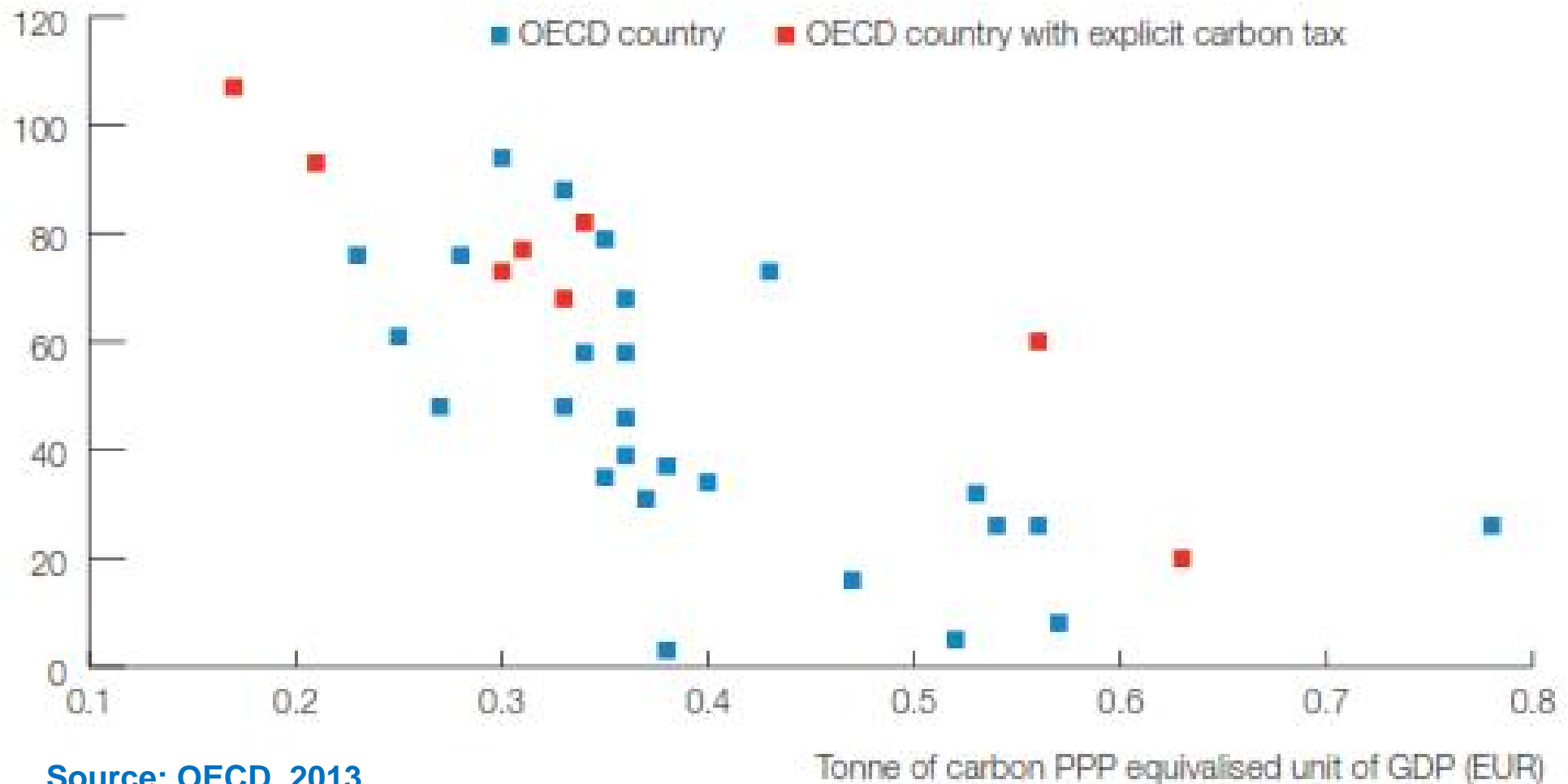
- 10 percent of Germany's energy is subject to a tax equivalent to 290 €/t CO₂e



Source: OECD, 2013

Implicit carbon taxes and carbon intensity of GDP

Implicit tax rate per tonne of CO₂



Source: OECD, 2013

The empirical evidence about carbon leakage

- In contrast to what was predicted there is hardly any evidence about carbon leakage
- This may not be attributed only to the breakdown of EU ETS

Creditability gap of existing models

**Model based economic analyses
are facing a credibility gap**

Abatement costs are not a well defined concept

Abatement options	Operating decisions no investments	Investment decisions different levels of investments
Change of output		
Change of energy efficiency		
Change of energy mix		

- This is caused inter alia by the difference between **integrated** and **add-on** abatement technologies

A clash of economic paradigms

■ Top-down modeling approaches General equilibrium type models

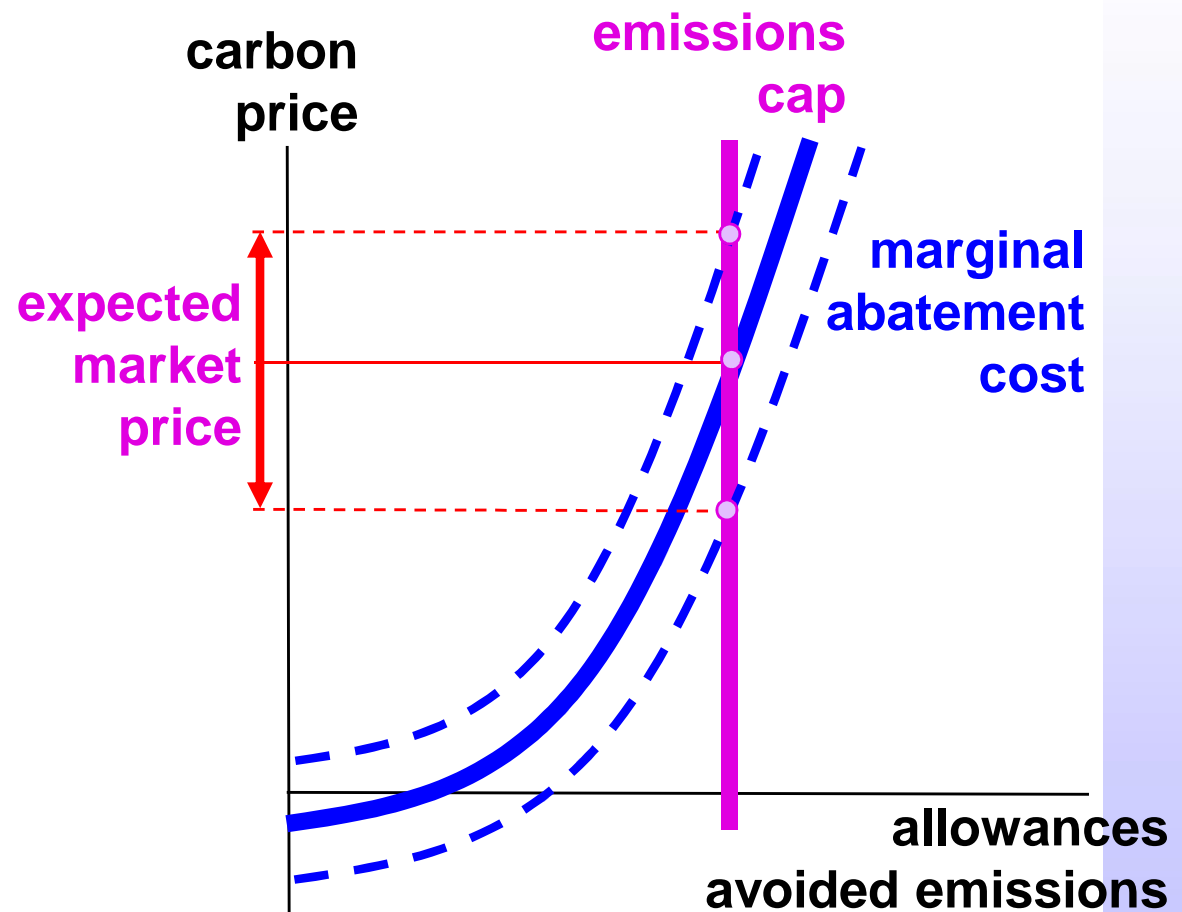
- Do not sufficiently differentiate between operating and investment decisions
- Tend to overestimate the impact of carbon prices

■ Bottom-up modeling approaches Cost-structure based models

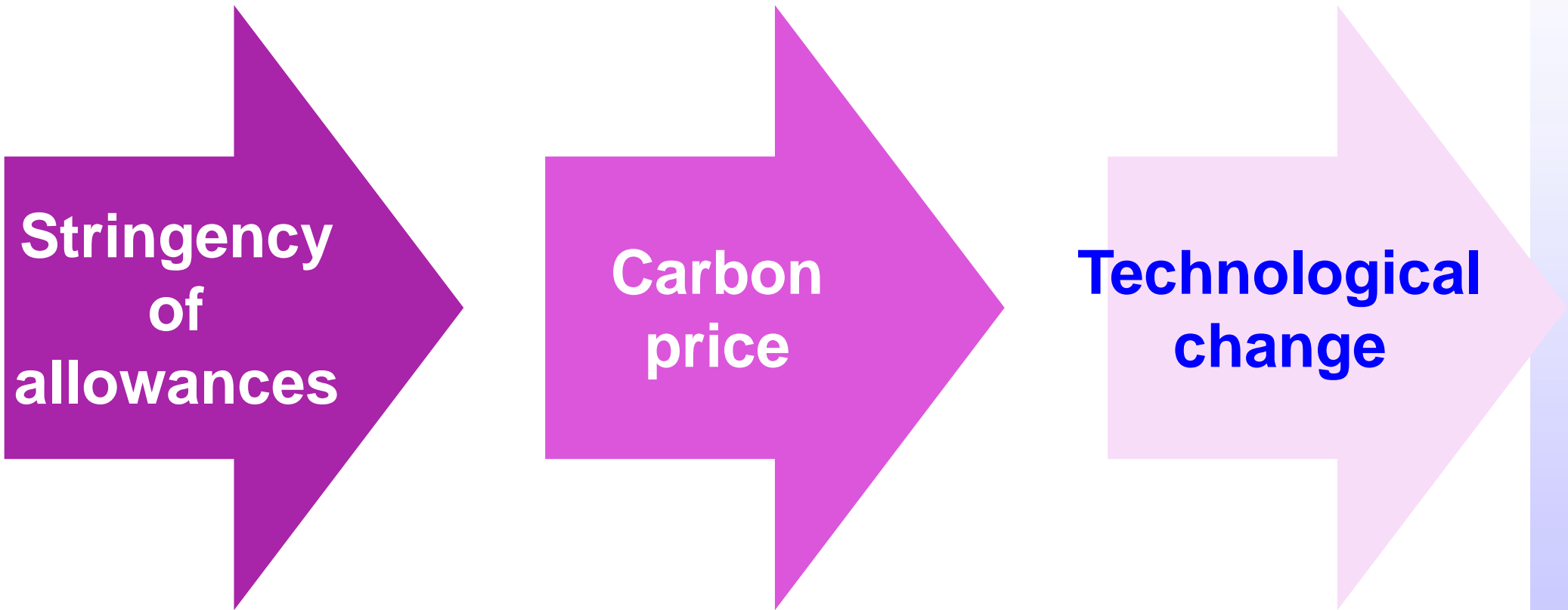
- Composition of cost components in a competitive setting
- This information is rather confidential
- How relevant are cost differentials for operating and investment decisions?

The founding paradigm of cap and trade is fading

- There is high uncertainty about abatement costs
- Abatement costs vary
 - Interest rates
 - Capital depreciation rates
 - Energy prices
 - Cyclical fluctuations
- Abatement costs may not be unique at all
 - e.g. joint production structures



The causality from the stringency of allowances to technological change is highly uncertain



- Carbon prices of a conceivable size have only a very limited impact on the choice of technologies

(3)

Gaps in the carbon leakage discussions

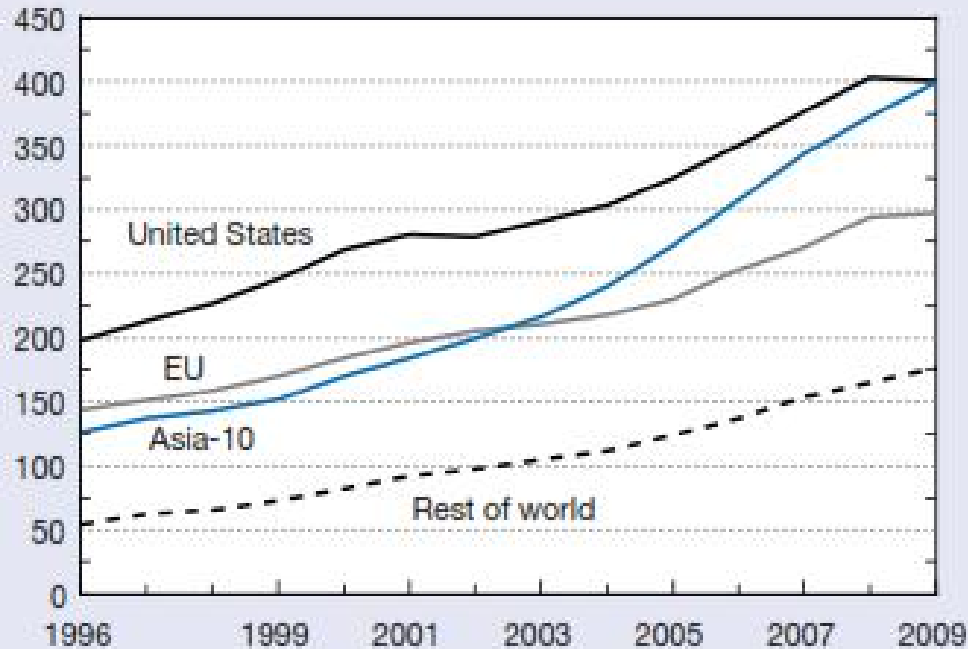
**A comprehensive rethinking
of targets and mechanisms**

Europe's decline in innovation

National Science Board (2012): Science and Engineering Indicators

R&D expenditures for United States, EU, and 10 Asian economies: 1996–2009

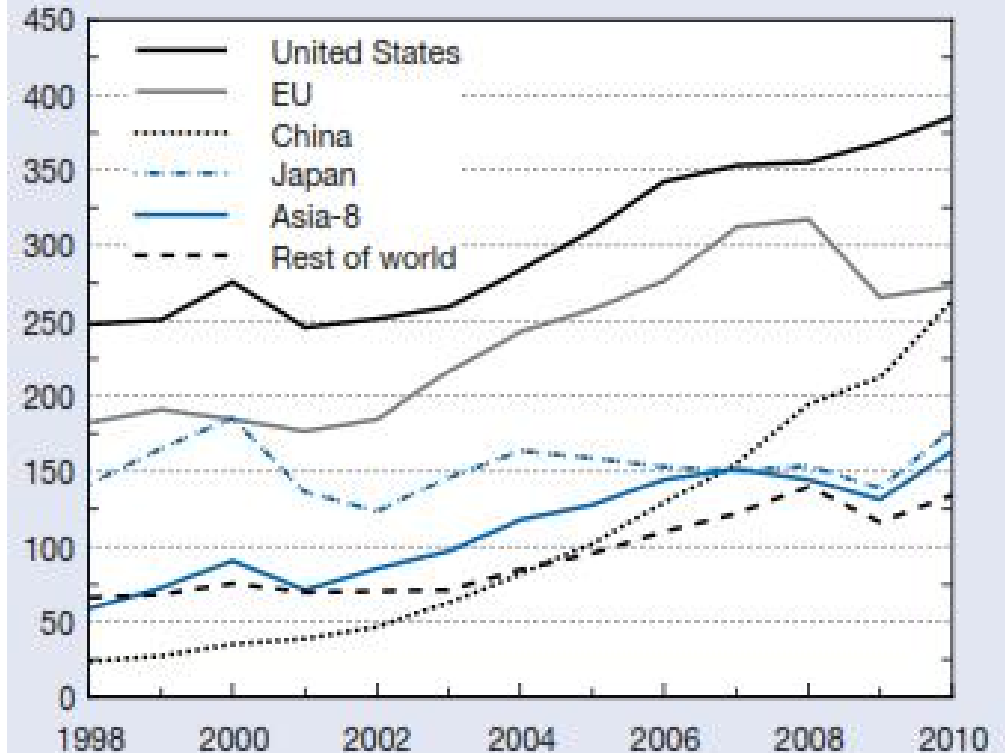
Dollars (billions)



Asia-10 = China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand; EU = European Union

Value added of high-technology manufacturing industries, by selected region/country: 1998–2010

Dollars (billions)



Refocussing the targets

- **EU energy and climate policy may be embedded into an innovation driven industrial policy**
- **The targets should be closely linked to developing and disseminating break-through technologies**
- **A targeted innovation policy for improving competitiveness will substantially lower the threat of carbon leakage**

Reconsidering the mechanisms for achieving the targets

- **Considering the basics of mechanism design**
 - Incentive compatible
 - Self-enforcing
- **One mechanisms does not fit for all**
 - Power and heat versus other sectors
 - Big versus small installations

Realigning EU ETS in view of a comprehensive industrial innovation policy

- Three elements would be essential for a structural reform which currently, however, is rather unlikely to happen
 1. Focusing on the **top 15 percent emitters** which contribute 90 percent of EU ETS emissions, or even only on power and heat sector
 2. Agreeing on a **flexible supply mechanism** which maintains the stringency of the current target emissions reduction path
 3. Switching from an emissions based to an **emissions intensity based target path** would make EU ETS less vulnerable as to economic fluctuations

Thank you.

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