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Addressing leakage in the EU ETS: Border adjustment or output-based allocation?

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Some dates

- 2005 : Implementation of the European Union Emissions Trading System (EU ETS)
 - Directive 2003/87/EC
- 2013-2020 : 3rd period
 - No satisfying international climate agreement to date
 - European unilateral commitment: reduction of its GHG emissions of 20% (relatively to 1990 emissions)
 - EU ETS: -21% in 2020 (relatively to 2005 emissions) and partial auctioning

Carbon leakage risk



- Post-2012: there may be no carbon price in GHG-intensive industries outside Europe
 - Increase of the production cost of European producers in GHG intensive sectors, some of which are exposed to international competition
 - Possible loss of markets shares of European Industry with two main consequences
 - job losses and
 - an increase in GHG emissions in non-European countries, i.e. **carbon leakage**.

Directive 2009/29/EC: provisions to limit carbon leakage



- Carbon leakage compromises environmental efficiency of the EU ETS
 - Continued free allowance allocation to the “sectors or subsectors which are exposed to a significant risk of carbon leakage” (Article 10a-12).
 - “An effective carbon equalization system could be introduced with a view to putting installations from the Community which are at significant risk of carbon leakage and those from third countries on a comparable footing. “(recital 25)
 - Border adjustment: trade measure designed to level the playing field between domestic producers facing costly climate policy and foreign producers with no or little constraint on their GHG emissions.
 - Several possible configurations (Monjon and Quirion, 2010, Energy Policy)
 - » WTO-compatible
 - » Preservation of the « good will » in the international climate negotiations

Objectives



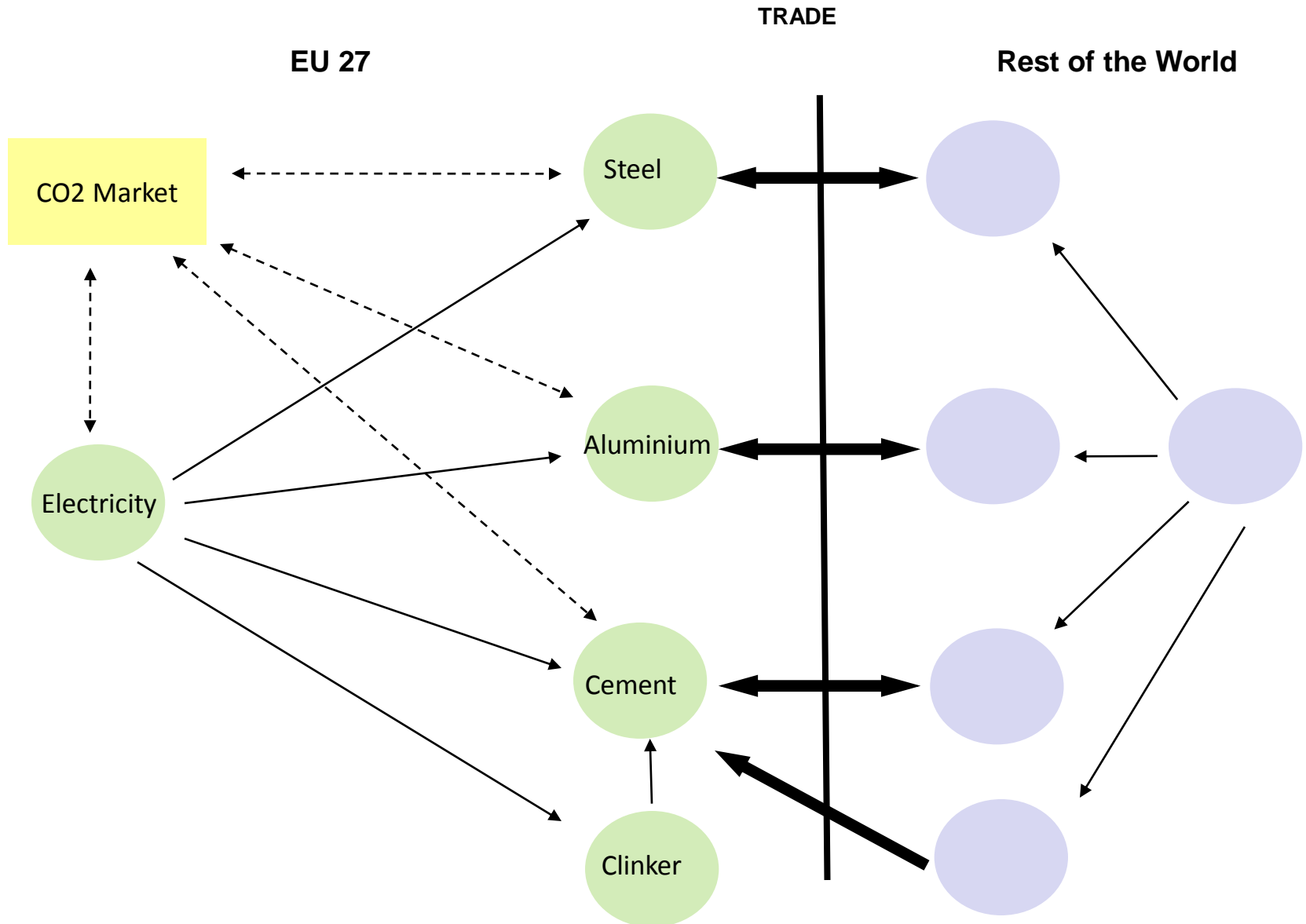
- Different options implementable in the EU ETS to limit the carbon leakage
 - Free allocation and border adjustment
 - Several configurations of each option: impact on their capacity to limit carbon leakage and/or production loss
- Results at a disaggregated level. For each sector:
 - Production, prices and trade flows
 - Unitary emissions and total emissions variations
 - Leakage-to-reduction ratio for each sector and for the whole ETS.

$$CLrate = \frac{Emissions_{SC}^{RoW} - Emissions_{BAU}^{RoW}}{Emissions_{BAU}^{EU} - Emissions_{SC}^{EU}}$$

The model CASE II

- Static and partial equilibrium model
- 2 regions: EU27 & rest of the world (RoW)
- 4 sectors: Cement, Aluminium, steel and Electricity
 - Potential large cost impact of carbon pricing but uneven characteristics on their direct and indirect emissions or on their exposition to international competition.
- Cement sector:
 - Substitution between clinker (the CO₂-intensive intermediate product) and CO₂ substitutes (e.g. fly ashes or blast furnace slag)
 - Substitution between domestic and imported clinker.

Structure of the model



Scenarios



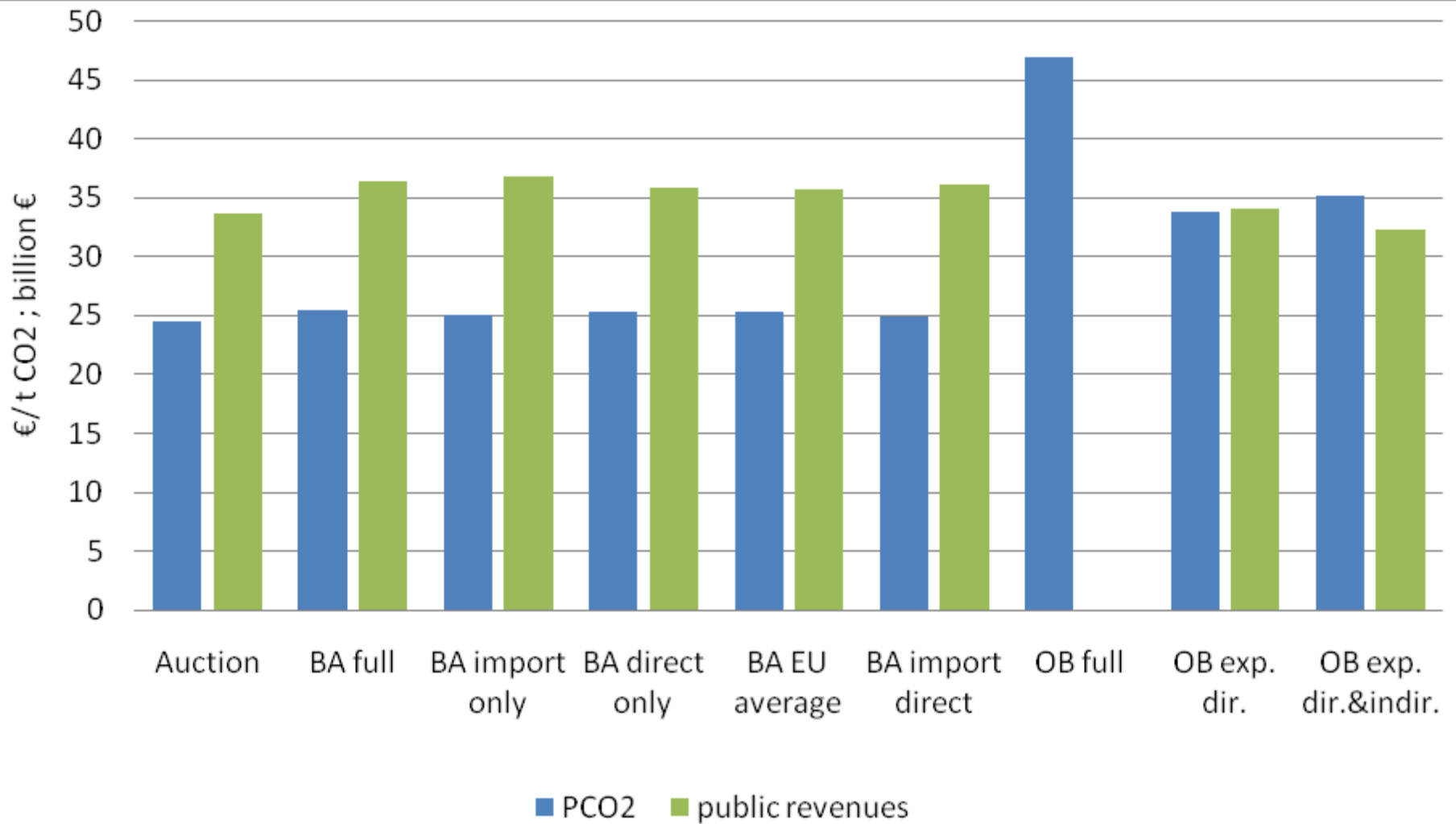
- Emission reductions of 15% in 2016 compared to 2005
- Comparison with business-as-usual scenario
- **Auction:** 100% auctioning, no border adjustment
- **Scenarios with auction and border adjustment**
 - **BA full:** BA on exports & imports, and on direct & indirect emissions. Exports: EU average. Imports: RoW average
 - **BA import only:** same as BA full without export adjustment
 - **BA direct only:** same as BA full but only for direct emissions
 - **BA EU average:** same as BA full but with EU average for import adjustment
 - **BA import direct:** same as BA full but only for direct emissions and without export adjustment

Scenarios

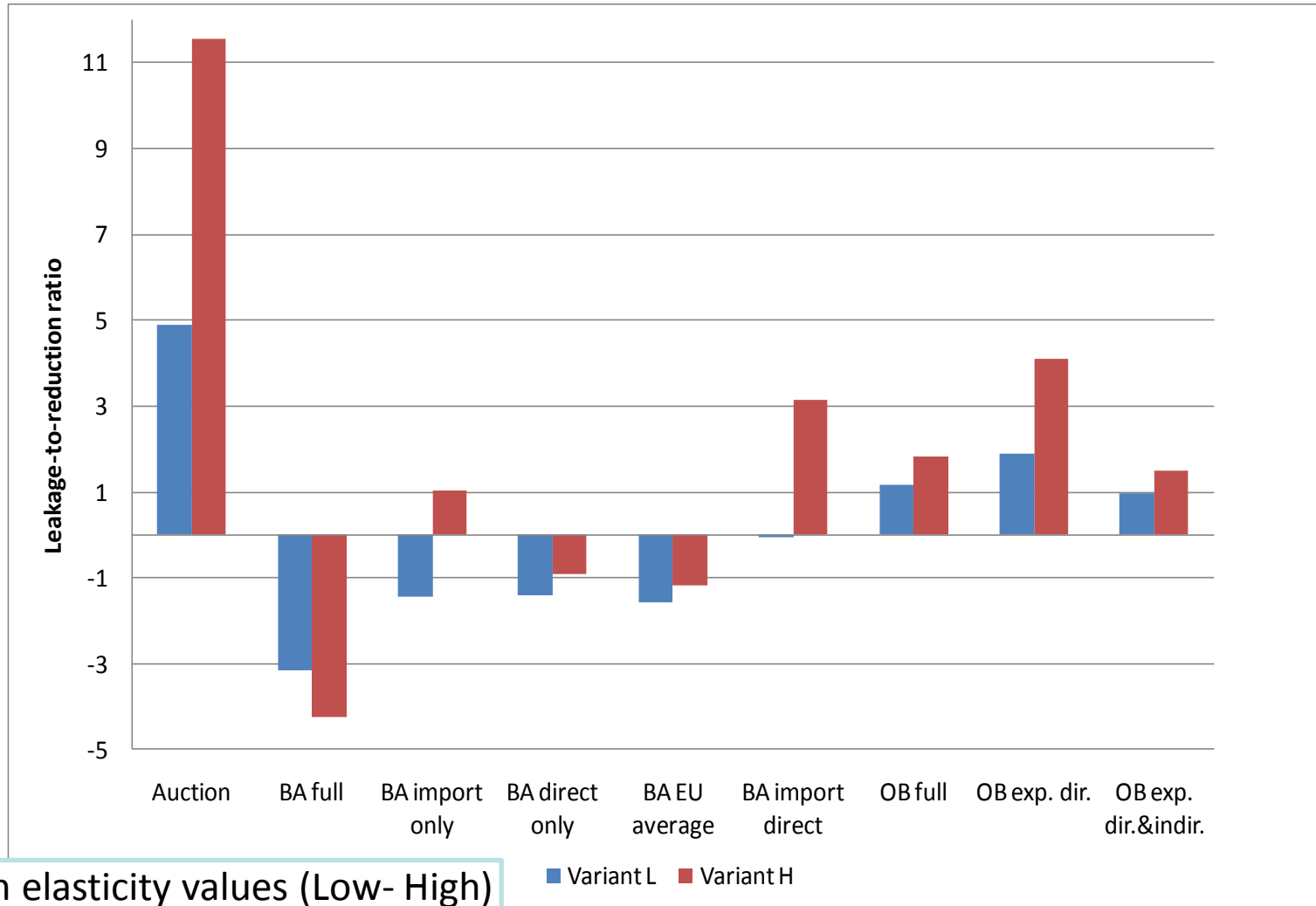


- **Output-based (or home rebate) scenarios**
 - Free allocation in proportion of current production
 - **OB full:** output-based allocation in all sectors.
 - In every sector, the amount of allowances allocated per unit produced is computed by applying a common reduction ratio to the 2005 unitary emissions.
 - **OB exposed direct:** auctioning in electricity, output-based allocation in exposed industries (cement, aluminium and steel) for direct emissions
 - **OB exp. dir.&ind.:** auctioning in electricity, output-based allocation in exposed industries for direct and indirect emissions.

CO₂ price and public revenues (low Armington value)

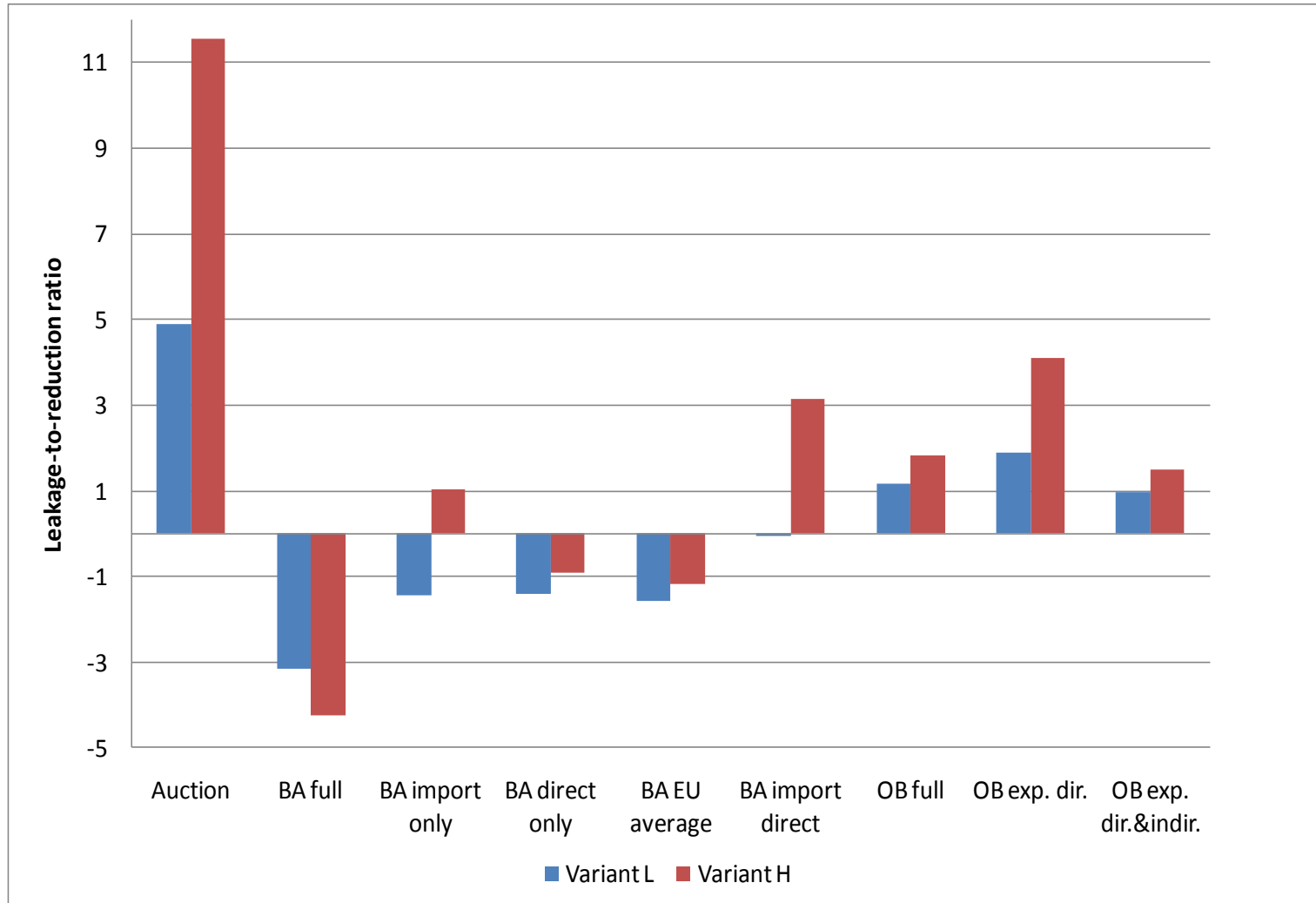


Aggregate leakage-to-reduction ratio

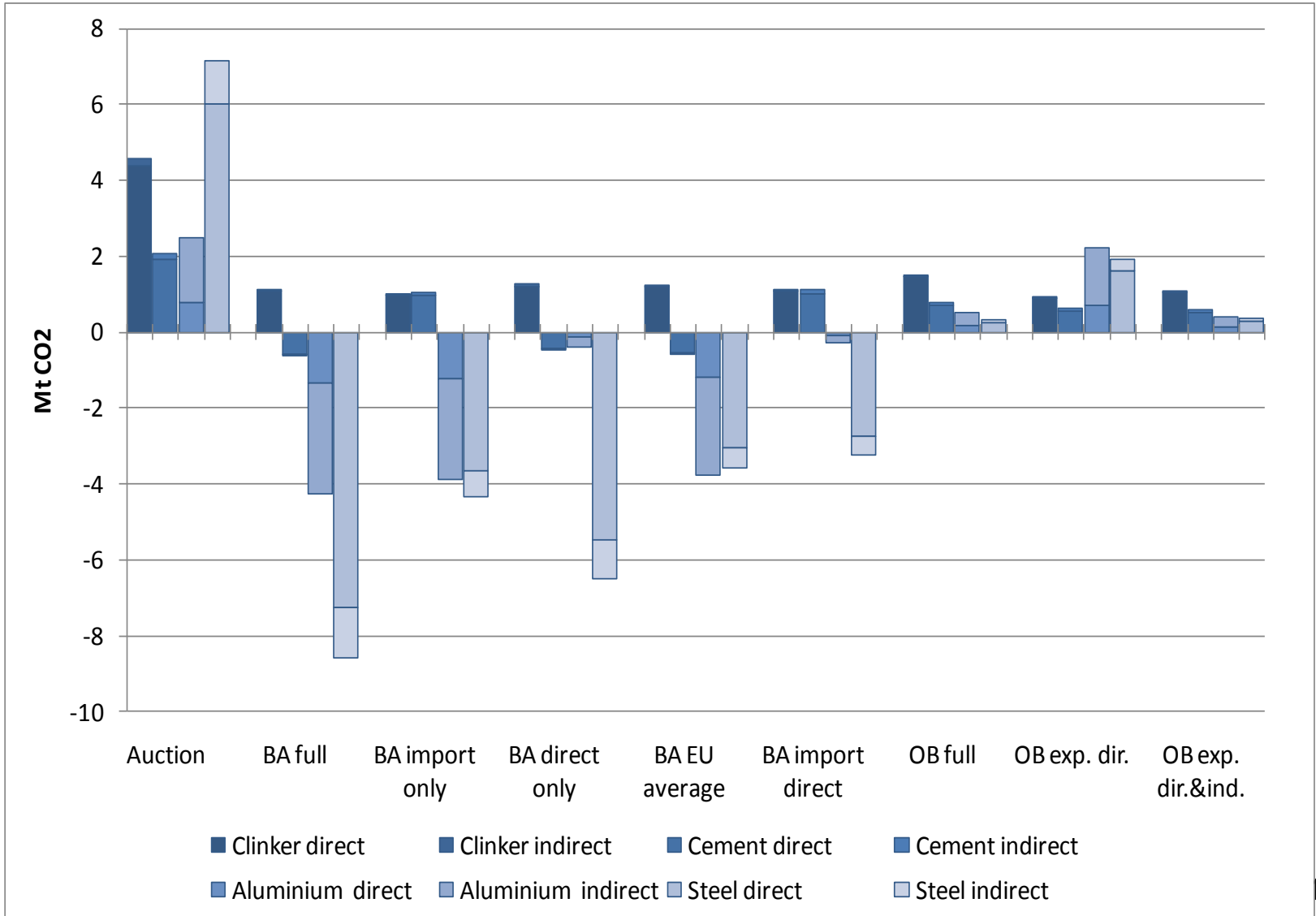


Armington elasticity values (Low- High)
 cement: 1.5 – 3
 steel: 2 – 5
 aluminium: 2 – 3.5

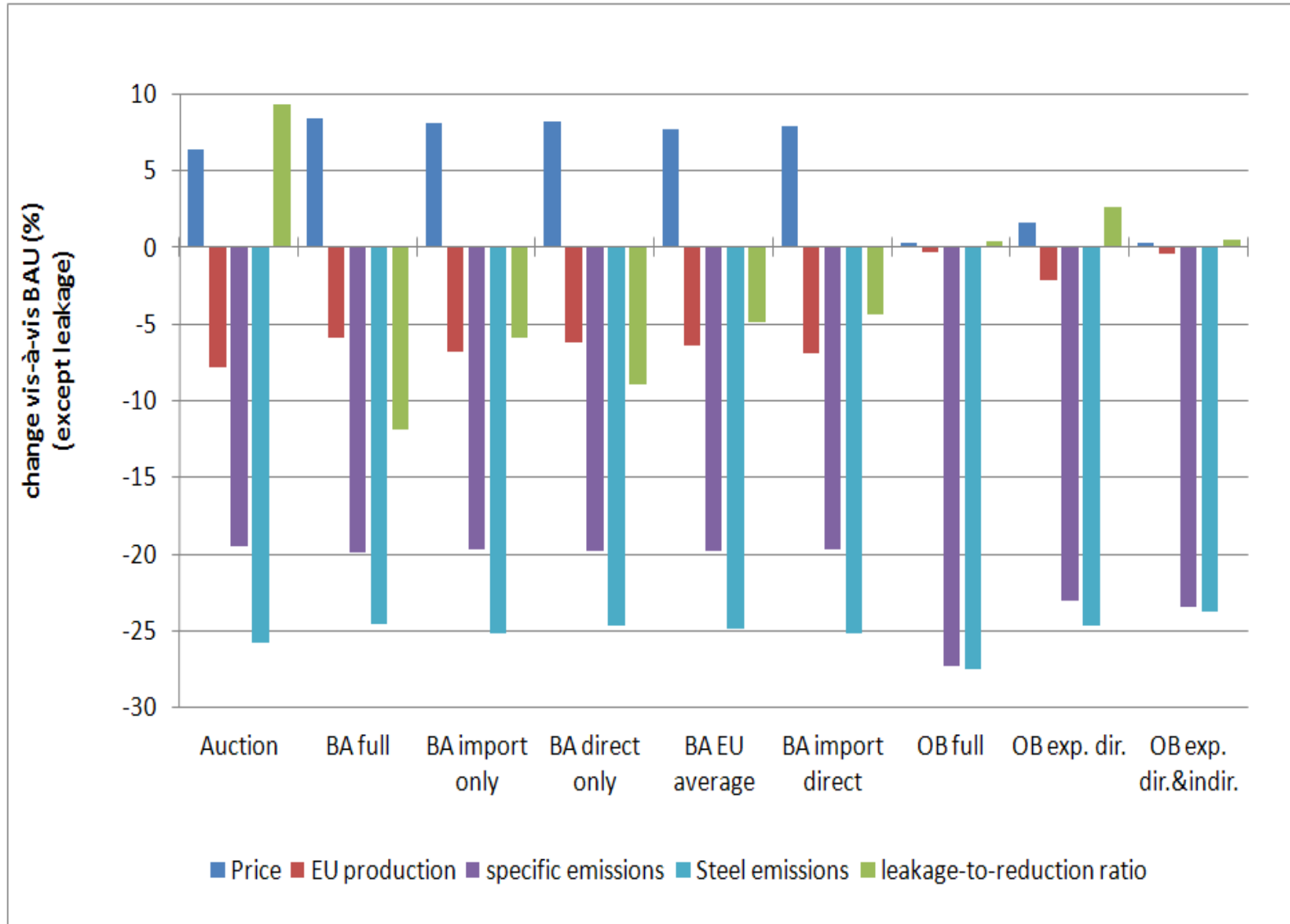
Aggregate leakage-to-reduction ratio



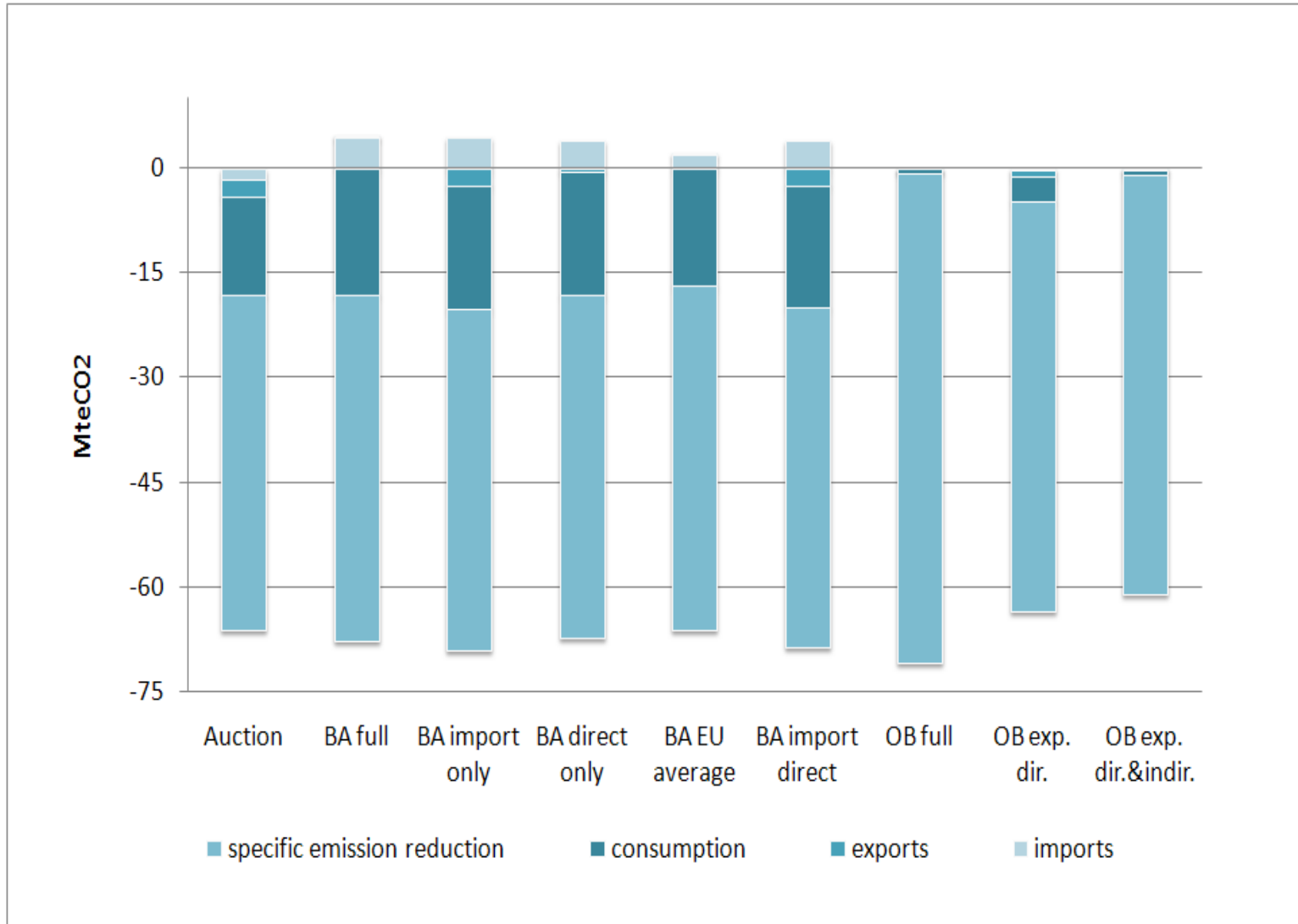
Emission variations in RoW



Steel



Channels of the emissions reduction in the steel sector



Conclusion



- Conclusion on the “best” option depends...
 - ... on the sector and
 - ...on the objective, ie limit of the carbon leakage or of the loss of European production.
- Border adjustment
 - A full BA more than compensates carbon leakage: a lighter BA is enough to have carbon leakage close to 0%
 - BA increase auction revenues
 - BA consistent with a “consumption-based” commitment
- Output based allocation
 - Decrease of the carbon leakage: between 1-4% (5-12% under Auction)
 - If only for exposed industry, auction revenues almost as high as under auctioning
 - Prevents decrease in clinker ratio
 - Best option for CO₂-intensive goods consumers



Thank you for your attention

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