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BRIEFING NOTE

The impact of the European Carbon Trading Scheme on EU competitiveness

Arguing that carbon costs would threaten their competitiveness, a vast majority of the manufacturing sectors, accounting for 95% of all industrial carbon emissions, receive exemptions from the EU Emission Trading System (ETS). However, competitiveness is a whole economy issue and therefore it is crucial to understand the EU-wide costs and benefits of carbon leakage exemptions. Modelling a range of carbon prices and auctioning rates, we find that phasing out special treatment for energy-intensive industries could benefit the European economy and result in a net increase in European GDP and jobs. The benefits of saved subsidies and a more efficient EU ETS outweigh the sizeable negative direct effects on the profitability of specific industrial sectors such as steel and cement.

Background

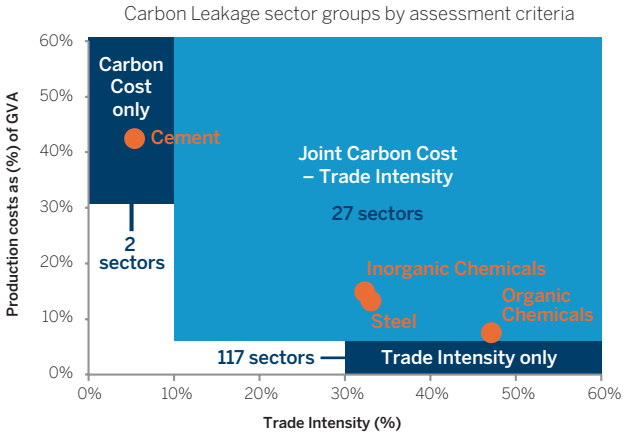
1.2 The EU ETS, which covers power generators, manufacturing sectors and airlines, was designed to achieve decarbonisation at the lowest abatement cost to the EU economy. By imposing the same unit cost on all emitters it is ensured that abatement will be chosen by those who have the lowest cost abatement technology.

1.3 However, the majority of the manufacturing sectors – 162 out of 258 in total representing 95% of industrial emissions[1] - receive exemptions from the EU ETS in order to preserve their competitiveness vis-à-vis non-EU competitors that do not face similar environmental costs.

1.4 The threat of carbon leakage, i.e. the risk of losing production to competing countries with laxer environmental regulations, is assessed by the European Commission based on the sector's production costs and exposure to international trade. A sector is deemed to have sufficient exposure to carbon leakage if it satisfies any of the following criteria:

- Carbon cost criterion – production costs would increase by at least 30% of the sector's gross value added (GVA);
- Trade intensity criterion – the sector's intensity of international trade is greater than 30%;
- Joint carbon cost and trade intensity criterion – production costs would increase by at least 5% of GVA and trade intensity is greater than 10%; or
- Qualitative criteria – a more detailed analysis based on emissions reduction potential, market characteristics and profit margins.

Figure 1: Carbon leakage sectors by criteria



1.5 The free permits and the state aid that the carbon leakage sectors receive redistribute economic rents to these sectors from other parts of the economy: non-exempt sectors and households.

1.6 While policy discussions have centred on the competitiveness of a few sectors[2] it is crucial to understand the EU-wide costs and benefits of exemptions and their impact on the EU's competitiveness as a whole. This study contributed to the policy debate by providing the first economy-wide assessment of the costs and benefits of exempting some sectors from the costs of carbon leakage.

1.7 We modelled 9 scenarios for the ETS, with 3 different carbon prices (€5, €20 and €40 / tonne of CO2) and three different auctioning percentages: 34% (as applies to the non-CL manufacturing sectors in 2015), 70% (as applies to the non-CL manufacturing sectors in 2020), and 100% (full auctioning).

[1] Delft: "Carbon Leakage and the Future of the EU ETS market", 2013.

[2] Policy discussions of carbon leakage are dominated by the impact of carbon cost on the cost structure of a few sectors: e.g. steel, cement, chemicals, oil refining, aluminium and paper and pulp.

Costs of removing carbon leakage exemptions

1.8 We developed detailed cost and profitability models for two keys sectors (steel and cement) and used these results to extrapolate the findings to the rest of the sectors at risk of carbon leakage.

Steel and cement sectors

1.9 We modelled the impact of carbon costs on the cost structures and production volumes of the typical EU plants in the steel and cement industries. These sectors are the two highest emitters accounting for 40% of the total emissions of the carbon leakage group[3].

1.10 There are two major technologies used in the steel sector: Blast-Oxygen-Furnace (BOF) and Electric-Arc-Furnace (EAF) accounting for 57% and 43% of production, respectively. The environmental costs of these technologies are very different: the BOF plants are high carbon emitters but less energy intensive and the EAF plants are very energy intensive but they hardly emit any carbon. While the impact of carbon costs on BOF plants at low carbon prices is relatively small – less than 2% point of EBITDA loss –, it becomes significant at higher carbon prices and auctioning levels. The impact on the EAF plants' EBITDA remains low – less than 2% point – at all carbon price and auctioning levels.

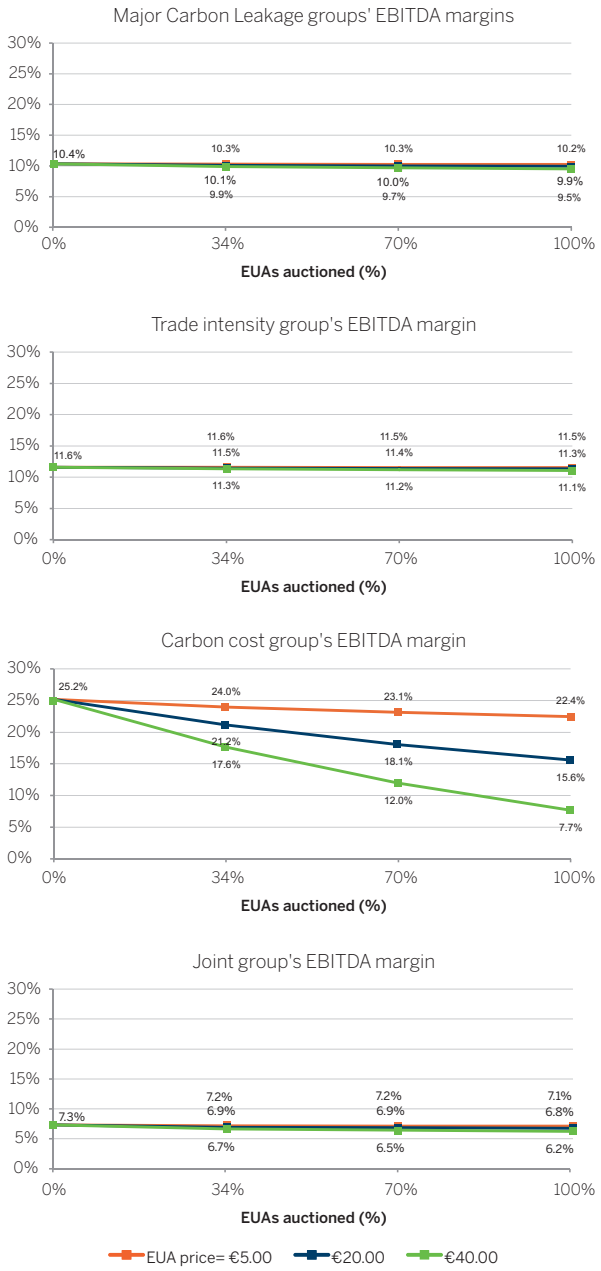
1.11 We similarly distinguish two types of producers in the cement sector: coastal and inland operators. Since cement is a highly localized sector due to very high transportation costs, inland operators are much more shielded from extra-EU competition than coastal operators and can pass on a larger share of the carbon costs to downstream consumers. Cement is a highly profitable sector (with 2.5-3 times higher EBITDA than the steel sector) and the impact of carbon costs on the sector's profitability is small at low carbon prices (€5 per carbon tonne). At higher carbon prices and auctioning levels the impact of carbon costs on both types of producers becomes significant, however inland operators retain close to 20% EBITDA margin even at €40 per carbon tonne price and full auctioning.

All carbon leakage sectors

1.12 Steel and cement are just two of over 140 sectors[4] that qualify for carbon leakage exemptions on quantitative criteria. Based on the free permits that are allocated to the carbon leakage sectors in 2013 and using past energy intensity estimates we quantified the impact of carbon costs on the three main carbon leakage groups: carbon cost only, joint criteria and trade intensity[5].

1.13 The impact of carbon costs is largest on the carbon cost group which includes only two sectors: manufacturing of cement and lime. The impact on the joint criteria group is small even though it includes the steel sector, part of which – as we have seen – is quite sensitive to carbon costs. This is because the steel sector is significantly more emission-intensive than the rest of the sectors: it alone emits as much carbon as the other 26 sectors in this group. Finally, the impact on the trade intensity sectors is marginal. This can be seen by comparing their total EBITDA of €260 billion to their 157 million tonne of CO2 emissions (free permits) which represents a cost of only €6 billion even at €40 per carbon tonne price.

Figure 2: The effect of removing exemptions on the carbon leakage sectors' profitability



[3] We assessed the sectors' ability to pass on part of the costs to downstream consumers through discussions with sector representatives and applying a comprehensive framework of competitiveness (Porter's 5 forces).

[4] The exact number depends on how sub-NACE 4 industries are classified: at sub-NACE 4 level or rolled up to NACE 4 level.

[5] The steel sector is representative of the joint criteria group and the cement sector of the carbon cost group. The cost pass through ability of the steel and cement sectors was used as a proxy for the cost pass through ability of the joint criteria and carbon cost groups, respectively. For the trade intensity sector zero cost pass through was assumed.

Dynamic economic impact of removing carbon leakage exemptions

1.14 We supplemented the static modelling with estimates of the long term effects of phasing out carbon exemptions. Macroeconomic theory suggests that the sectors charged with carbon costs will adjust in the long term the amount of labour and capital they employ to reflect the lower remuneration of these inputs. We used the literature on the impact of increasing social contributions on GDP and employment to estimate the impact of this adjustment on the EU economy[6].

1.15 We calculated the increase in social contributions and the decrease in capital return that equate to the estimated decline in the carbon leakage sectors' EBITDA. Utilizing the elasticity of labour to labour cost and the elasticity of capital to capital remuneration found in the literature, we translated the direct EBITDA impact to a decline in EU GDP and employment[7].

Benefits of removing carbon leakage exemptions

1.16 The main sources of benefits of abolishing carbon leakage exemptions would stem from the macroeconomic effects associated with the recycling into the economy of the revenues from auctioning permits and state aid savings. These extra government revenues can be used to reduce public debt, to reduce social contributions on workers, and / or earmarked to specific projects and channelled back into the economy, resulting in increased GDP and employment.

Auctioning revenue and state aid savings

1.17 If exemptions were abolished, the carbon leakage sectors would need to purchase permits at auctions, along with the non-exempt sectors. The revenue that would accrue to the government could be earmarked to different projects and channelled back to the economy, resulting in increased GDP and employment. In this study we analyse three scenarios:

- in the first, the EU government spends the revenue in line with its typical budget (public administration, defence, education etc.);
- in the second, the funds are earmarked to R&D and clean-technology according to the European Commission's six "Priority Action Lines" for investment; and
- in the third, the funds are channelled back to the manufacturing sectors.

1.18 An additional source of revenue if exemptions are abolished, is the saved compensation that certain energy intensive sectors, including aluminium, steel and chemicals, can claim for indirect carbon costs. The size of the saving would depend on the percentage of indirect costs national governments choose to compensate (the maximum permissible aid intensity is 85%). For example, the German government has set aside €350 million for 2013, using an aid intensity of 70%; the UK government has allocated up to £113 million over the Spending Review Period (approximately £50m annually) based on an aid intensity of 85%; and the Netherlands intends to provide €624m over eight years (approximately €78m annually).

1.19 The above two sources of government revenue would be offset by the decline in tax receipts that results from the sizeable decline in the carbon leakage sectors' profitability. Our estimates of the net revenue from the above three sources range from €1.5 billion to €29 billion (depending on the carbon price and auctioning percentage).

1.20 As mentioned earlier, the revenue could be channelled back to the economy in different ways, increasing output and employment not only in the sectors where the funds are spent, but in all of the supplier and consumer sectors linked to them. Considering this multiplicative impact and assuming that the funds are earmarked to R&D and clean technology, we estimate that EU GDP would increase by between €3 billion[8] and €61 billion[9] (0.02%-0.5% of the EU's GDP in 2012), and employment would increase by between 33 thousand and 790 thousand employees (0.01-0.4% of EU employment in 2012).

Figure 3: Benefits of removing carbon leakage sectors' exemptions

(€ billions)	Ineffective ETS with high compensation	Moderate ETS with medium compensation	Effective ETS with no compensation
Carbon price	€5	€20	€40
% auctioning	34%	70%	100%
Initial change in EU wide final demand			
(1) Additional EUA auction revenues*	€1.3bn	€10.3bn	€29.5bn
(2) State aid savings*	€0.8bn	€3.3bn	€6.6bn
(3) Reduction in corporation tax*	-€0.6bn	-€2.9bn	€7.3bn
Total (1 + 2 + 3)	**€1.5bn**	**€10.7bn**	**€28.8bn**
Multiplicative change in economic output and employment			
Additional EU GDP	€3bn (0.02% of EU GDP)	€23bn (0.2% of EU GDP)	€61bn (0.5% of EU GDP)
Additional employment**	33,000 - 34,000 (0.01% of EU employment)	242,000 - 310,000 (0.1% of EU employment)	653,000 - 790,000 (0.4% of EU employment)

Source: FTI Consulting analysis

* Through the use of 10 tables, government spending is earmarked to R&D and clean technology. All member states are assumed to provide state aid.

** Employment impact was estimated using two methods; assuming a constant ratio of GDP / employment and back calculating the increase in labour renumeration as a result of increase GDP and the number of employees corresponding to the given renumeration.

[6] E.g. Nickell S., et R.Layard (1999), "Labor market institutions and economic performance. , in O.Aschenfelter and D.Card (eds), Handbook of Labor Economics, vol 3., (Amsterdam, North Holland) and Nickell S. (2004), "Employment and taxes", Centre for economic performance discussion paper n° 634, London School of Economics.

[7] Ibid.

[8] With a carbon price of €5/tonne and 34% auctioning.

[9] With a carbon price of €40/tonne and 100% auctioning.

Net benefits of removing carbon leakage exemptions

1.21 We find that the benefits of higher EU-wide output and employment from removing the carbon leakage sectors' exemptions will likely outweigh the costs of a fall in profitability in the carbon leakage sectors and the overall costs to EU-wide employment and GDP. We estimate that phasing out exemptions would result in a loss in GDP of between €1.5 billion and €24 billion, and a fall in employment of between 16,000 and 255,000 (again, depending on the carbon price and auctioning percentage). The benefits, on the other hand, would be an increase in GDP of between €3 billion and €61 billion, and a gain in employment of between 33 thousand and 790 thousand employees.

Conclusions

1.22 Competitiveness is a whole economy issue and therefore it is crucial to understand the EU-wide costs and benefits of carbon leakage exemptions. Our findings suggest that only a few sectors and plants with particular technologies or in particular locations would be significantly impacted if they had to pay for carbon costs. The benefits of phasing out compensation for carbon leakage are a net increase in EU GDP and jobs and a lower total cost of decarbonisation.

Figure 4: Costs and benefits of removing carbon leakage sectors' exemptions

Costs of carbon leakage		Benefits of abolishing CL exemptions	
Ineffective ETS, high compensation		**Ineffective ETS, high compensation**	
GDP loss	€1.5 - 2.0bn	GDP gain	€3.2bn
Employment gain	16,000 - 22,000 employees	Employment gain	33,000 - 34,000 employees
Moderately effective ETS, medium compensation		**Moderately effective ETS, medium compensation**	
GDP loss	€7.0 - 9.5bn	GDP gain	€22.6bn
Employment gain	76,000 - 103,000 employees	Employment gain	242,000 - 310,000 employees
Effective ETS, no compensation		**Effective ETS, no compensation**	
GDP loss	€17.5 - 23.6bn	GDP gain	€60.6bn
Employment gain	189,000 - 255,000 employees	Employment gain	653,000 - 790,000 employees

This article was developed jointly by FTI Consulting and Compass Lexecon.

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