Carbon leakage or competitive advantage? Balancing industrial and climate policy

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Summary

The Swedish parliament passed the Climate Act in 2017, which stipulates that Sweden should reach net zero greenhouse gas emissions by 2045. Reaching this goal will likely require not only the adoption of low-emission technologies, but also a higher price on greenhouse gas emissions. There is a risk, however, that a higher carbon tax will increase the costs of firms and lead to the production of some goods being moved abroad. This phenomenon is called carbon leakage. The fact that greenhouse gases are transboundary pollutants means that carbon leakage has the potential to render unilateral climate action ineffective.

The bulk of Swedish CO2 emissions are regulated by the EU Emissions Trading Scheme (ETS), which sets a limit on the total amount of greenhouse gases that can be emitted by all 27 EU member states, in addition to Iceland, Norway, Liechtenstein and the United Kingdom. Swedish emitters included in the EU ETS do not pay the Swedish CO2 tax. If a Swedish firm were to relocate to a different country within the EU ETS due to tougher domestic climate policies in Sweden, this would result in 100 percent carbon leakage from Sweden, but it would not affect total emissions at the EU-level.

Types of carbon leakage

Carbon leakage may occur via several mechanisms. A firm can move its production from one country to another or domestic investments may be reduced, which indirectly leads to a reallocation of production to other jurisdictions. Carbon leakage may also occur in international fossil fuel markets, whereby a reduction in fossil fuel demand in one

country leads to a lower world price, which, in turn, leads to greater consumption in other countries.

Empirical studies of carbon leakage

We survey the empirical evidence of carbon leakage in the academic literature, focusing on industrialized economies similar to Sweden. The evidence of carbon leakage is mixed, despite recent methodological advances. The literature suggests that leakage most commonly occurs in manufacturing industries such as iron, steel, cement and paper products. Fuel taxes on domestic transport appear to have had a significant effect on Swedish transport-related emissions, but this is not a sector sensitive to carbon leakage.

Empirical studies using Swedish data suggest that carbon leakage has not been an issue. However, these studies were carried out at a time when carbon taxes were relatively low. We thus conclude that the current lack of conclusive evidence for carbon leakage in historical studies does not necessarily imply that carbon leakage will not be a problem in the future when carbon prices are expected to be higher.

Which Swedish industries are the most sensitive to carbon leakage?

Industries with relatively low greenhouse gas emissions are mainly unaffected by carbon taxes. Furthermore, industries producing goods that are less tradable and thus insulated from foreign competition are better able to pass on higher carbon taxes to consumers in the form of higher prices, while also being less affected by carbon taxes. We compare industries along these two dimensions in order to discern each industry's sensitivity to carbon leakage. The specific criteria are emissions per SEK value-added and the ratio of imports or exports to domestic production. Other factors are also likely at play, which are not included in our analysis. For example, sensitivity to carbon leakage is lower in industries characterized by a high degree of cluster externalities.

Our industry-level analysis suggests that the Swedish steel industry and pulp and paper industry are the most sensitive to carbon costs

and thus potentially to leakage, as they are both emissions-intensive as well as highly tradable. The cement industry, on the other hand, is not exposed to foreign competition, despite being included on the EU list of leakage-sensitive industries.

Sweden's clean energy

Strict climate policies do not only imply risks of leakage but also offer incentives for developing clean technologies, which may be a competitive advantage in an international market. One example is Sweden's clean energy. This energy mainly comes from electricity generated from wind, hydro, solar and bioenergy. Sweden's nuclear power production may also be regarded as clean in the sense that it does not emit greenhouse gases.

From a climate perspective, the environmental benefits reaped from exporting Swedish clean electricity to continental Europe are likely similar to the environmental benefits of consuming this electricity in Sweden. From a national economic perspective, however, it is advantageous to consume the electricity domestically in industries providing positive externalities in the local economy; for example, industries providing technology and knowledge spillovers between firms and individuals. In contrast, certain types of businesses, such as data centers and bitcoin mining, which employ few workers and offer few opportunities for positive spillovers, represent a less attractive use of Sweden's clean electricity from a national perspective. Current subsidies or tax rebates for data centers thus seem unwarranted.

Policies for clean production

There are several types of policies that may generate clean production. In general, taxes tend to encourage leakage, while subsidies tend to attract economic activity. Research indicates that a combination of environmental taxes and subsidies is the optimal approach. Sweden and the EU primarily use taxes or costly emission allowances to achieve environmental policy goals, but it should be noted that subsidies or free emission allowances might also provide incentives for firms to reduce emissions.

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