

TITLE: Carbon leakage in 3D: on the dynamics of green, dirty and relocating firms under the ETS

ABSTRACT: The debate on the carbon leakage risk of unilateral climate policies is gaining momentum along with the increase in carbon prices and in the ambition of emissions reduction targets. While empirical evidence on carbon leakage is weak or absent so far, more firms might decide to delocalize their activity in the future due to higher carbon prices. To investigate this issue, we propose a simple theoretical model which analyses the choices of a population of firms subject to an Emissions Trading System (ETS). Each firm has three alternative strategies at disposal: (i) "green": stop polluting by investing in a clean technology, (ii) "dirty": keep polluting by purchasing the correspondent emission allowances under the ETS, (iii) "relocating": keep polluting by relocating its activities to an ETS-free jurisdiction.

We examine the dynamics emerging from the interaction of green, dirty and relocating firms and perform comparative dynamics at different values of some key ETS design features, such as, the number of allowances granted for free to ETS firms, the quantity of allowances being auctioned, and the allowances minimum price level. Numerical simulations show the presence of cyclic behaviors and the possible extinction of one or more kinds of firms under different parameter values. Finally, we discuss the policy implications deriving from the results of the model stressing the impact of the ETS design on firms' decarbonisation and delocalization.