

International technology diffusion and converging CO₂ intensity

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The Kyoto Protocol on climate change has been criticized in the scientific and political communities for being too weak to have much impact upon future climate change and for being too strong in its obligations upon industrialized countries. These arguments build mainly on the claim that the Protocol will be ineffective without quantitative commitments for all parties, action by the industrialized countries would otherwise be offset by leakage of emissions as industries migrate from Annex I parties to non Annex-I parties to escape emission control. However, the leakage effect has to be weighted against diffusion of technological improvements and diffusion of policy and measures which both will result in reduced emissions in non-Annex I parties. Some experts have argued that the converging carbon emission intensity profiles (CO₂ emissions per unit of GDP) in the world are a result of mainly technology diffusion. However, all too often, it is claimed that technological progress is being made on the basis of compounds falling in relation to GDP. We have, hence, used physical indexes in this paper to analyze if international technology diffusion can be found in some of the most carbon intensive sectors; electricity generation, car transportation, pulp and paper manufacturing, and steel manufacturing. Technology diffusion effects resulting in converging physical emission intensities can be found in all these sectors. The convergence of technology use is strongest in the most internationally competitive sectors – car transportation, steel manufacturing and pulp and paper manufacturing. While the more domestic electricity generation sector do not show any strong convergence in emission intensity, the efficiency has still improved in all the analysed countries. We could not show that non-Annex I parties generally have higher physical emission intensity than Annex I parties, except for in the electricity sector. In the more international sectors the physical emission intensity were more correlated to domestic resources of fossil fuels.