

How Firms Cut Carbon: Evidence from the European Emissions Market

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Abstract

Europe’s industrial emissions fell by over 30% during the first 16 years of the EU Emissions Trading System (EU ETS), despite limited evidence of job or output losses. We investigate this decline using firm-level data and a flexible production model that treats emissions as a costly input. Estimated substitution elasticities between emissions and other inputs are low, suggesting limited abatement occurred via marginal input adjustments. Instead, emissions intensity declined primarily through clean, factor-augmenting technology—improving by over 50% from 2005 to 2021. Counterfactual simulations show that, holding technology constant, carbon pricing reduces emissions by shifting output toward cleaner firms but leads to lower overall output and employment in regulated sectors. Improvements in clean technology mitigate these effects by lowering production costs, highlighting how clean technological progress can ease the short-run economic burden of carbon pricing.

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