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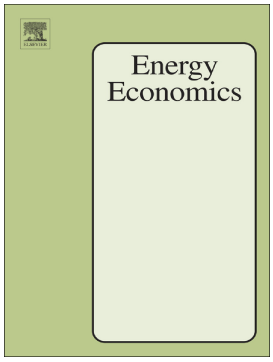

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Trade between Mass- and Rate-Based Regulatory Regimes: Bad for Emissions?

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Abstract

If one jurisdiction regulates power plant emissions with a cap-and-trade (mass) program and another with an intensity (rate) standard, is it a good idea for them to link? Specifically, what effects does introducing electricity and rate-mass allowance trade between differently-regulated regions have on emissions and ultimately welfare? We explore these questions first with a simple theoretical model and then with a sophisticated numerical model of the electricity sector. The theoretical model isolates the policy effects by assuming that two otherwise identical regions are regulated differently. With fixed demand, their autarky marginal abatement costs are identical, but electricity prices are lower in the rate-limited region. Adding electricity trade shifts generation to the rate-limited region, expanding its allowance allocation, while emissions remain capped in the mass-capped region. Adding rate-mass allowance trade exacerbates this shift in generation and expansion of emissions. The increase of emission damage could make the net welfare effects negative. However, if the mass cap is sufficiently more stringent than the rate limit, allowing rate-mass allowance trade in the presence of electricity trade can lower emissions. The numerical model of the eastern US illustrates the effects predicted in the theoretical model, and projects their magnitudes. In our simulation that is loosely based on the US Clean Power Plan, the estimated CO2 damage makes the estimated net benefits of allowing rate-mass trading negative. Our results also illustrate that linking can shift the geographic distribution of SO2 and NOX emissions, which can counteract the effect of the CO2 damage on estimated total welfare.

Keywords: Cap and trade; carbon price; performance standard; linking; leakage; electric power

JEL Classification Numbers: Q48, Q41, Q42, Q53, Q54, Q58

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