

CLIMATE POLICY, INDUSTRY CONCENTRATION AND TECHNOLOGY ADOPTION: TAXES, SUBSIDIES AND REBATES*

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This version: May 11, 2026

Preliminary Draft - Please do not circulate

Abstract

In this paper, I investigate which policies can incentivise an efficient decarbonisation of the heavy industry sector. To do so, I develop a dynamic model of imperfect competition and endogenous production technology upgrading, using recent developments in the modelling of dynamic continuous investment choices. I show that a carbon tax alone leads to inefficient outcomes in the heavy industry sector. This is driven by the connection between existing market concentration and dynamic investment incentives. Market concentration already suppresses output, and at the same time, creates suboptimal low-carbon investment incentives for firms. As a consequence, a carbon tax alone cannot achieve both static and dynamic efficiency. Rather, an optimal carbon tax level must balance excessive output suppression with sufficient incentives to adopt available green technologies. Rather, a combination of a tax with an adoption subsidy, correcting the suboptimal investment incentives, or an output-based rebate with a high tax, subsidising production whilst maintaining strong investment incentives, both increase welfare. To quantify these effects, I estimate the model of the French cement industry, exploiting detailed data on low-carbon investment behaviour under EU ETS regulation. I show that, compared to a simple tax, a suitable combination of a tax and an adoption subsidy increases welfare by up to 1.5%, and an output-based rebate based on an efficiency benchmark can yield a welfare gain by up to 3.9%.

Keywords: Climate policy, heavy industry, market power, carbon pricing, green technology adoption

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I am indebted to Johannes Boehm and Stefan Pollinger for their incredible supervision and support throughout the entire project. I am also deeply grateful to Gautam Gowrisankaran for hosting me at Columbia University, where he provided invaluable feedback and guidance, especially considering the technical aspects of this paper. Further, I would like to extend a special thank you to Isabelle Méjean, who, in addition to countless helpful comments, provided me with access to the data, without which this project would not have been possible. I would like to thank Haoge Chang, Nicolas Cœurdacier, Antoine Ferey, Junnan He, Marleen Marra, Thierry Mayer, Kevin O'Rourke, Franz Ostrizek, Noémie Pinardon-Touati, Mar Reguant, Emma Du Puy, Andrey Simonov, and seminar participants at Sciences Po, Columbia University, IAE-CSIC Barcelona, PIK Potsdam and the University of Cologne for their helpful comments. The computing resources for this project were provided by the Nuvolos Fellowship Programme 2026.