

Closing the Emission Gap: EU CO₂ Standards and Plug-in Hybrid Vehicles

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Extended Abstract

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Abstract Summary

Plug-in Hybrid Electric Vehicles have become central to manufacturers' compliance with the EU fleet-wide CO₂ standard, yet their real-world emissions exceed official values by 300 to 500 percent because the regulatory Utility Factor overstates electric driving. Commission Regulation (EU) 2023/443 corrects this measurement distortion in two steps in 2025 and 2027, without altering nominal fleet targets. We estimate a structural model of demand and supply for the German and French new car markets, combining a nested logit demand system with multi-product Bertrand competition under pool-level CO₂ constraints, and simulate counterfactual equilibria under the reform. The 2025 step is only mildly binding, while the 2027 step induces substantial reallocation: PHEV shares fall, BEV shares rise modestly, and aggregate emissions decline by about 4.8 million tonnes, generating welfare gains of roughly 940 million euros driven almost entirely by avoided carbon damages. Profit losses are heterogeneous and concentrated on manufacturers whose PHEV-heavy pools leave little room for internal substitution. Correcting a regulatory metric can thus deliver welfare gains comparable to a tightening of nominal targets, while limiting competitive disruption.