The Cost of (In)Credibility: Anticipation, Surprise, and the Investment Channel of the EU Carbon Border Adjustment Mechanism

Topic: Input-Output Modelling: Energy policies (3)
Author: Andres Gonzalez-RodrÃ-guez

The EU Carbon Border Adjustment Mechanism entered its definitive phase on January 1, 2026, covering imports of cement, iron and steel, aluminum, fertilizers, electricity, and hydrogen, with free ETS allowances phasing out through 2034. The phase-in schedule spans nearly a decade, from the start of the definitive period in 2026 to the full elimination of free allowances in 2034. Yet considerable uncertainty surrounds the policy's durability. The December 2025 simplification regulation already altered its scope. Industrial opposition has been sustained. Political support for the Green Deal has weakened across several member states. Internationally, the Trump administration's second withdrawal from the Paris Agreement and the partial dismantling of the Inflation Reduction Act have demonstrated that large-scale climate commitments can be reversed within a single electoral cycle. Escalating trade tensions raise the additional prospect that CBAM will provoke retaliation rather than emulation. In this context, firms deciding whether to commit capital to low-carbon production in CBAM-covered sectors face substantial policy risk. The answer depends on whether firms are right or wrong about the policy, and on how costly it is to reverse course. This paper asks how much the effectiveness and welfare cost of CBAM depend on whether agents anticipate it, and what the consequences are when announcements are not followed through. The existing literature cannot address these questions. Bellora and FontagnÃ© (2023), BÃ¶hringer et al. (2025), and the OECD (2025) employ static or recursive-dynamic frameworks in which agents cannot look ahead. Kwon et al. (2025) advance emission intensity measurement at the product level but share the same structural limitation: no intertemporal dimension in which anticipation or credibility can be represented.

We develop a multi-country, multi-sector general equilibrium model in which investment is forward-looking and capital reallocation is subject to friction. Firms solve an intertemporal optimization problem with Hayashi (1982) convex adjustment costs, so that sector-specific Tobin's q governs the rate of capital reallocation as the costate variable of the accumulation constraint. The central design element is a 2Ã—2 scenario matrix that crosses two belief regimes (agents anticipate CBAM or they do not) with two policy realizations (CBAM is implemented or it is not), yielding four perfect-foresight equilibria: correct anticipation, policy surprise, false promise, and business as usual. In the surprise scenarios, the model is re-solved from inherited capital stocks at a revelation date. The anticipation gap measures the welfare value of policy predictability. The credibility cost captures the deadweight loss from round-trip capital adjustment when an announced policy fails to materialize.

The model is calibrated to a multi-region input-output database with bilateral trade flows, emission intensities, and sectoral capital stocks. Trade elasticities and CES parameters follow the GTAP literature. Adjustment cost coefficients span the range documented from Gilchrist and Himmelberg (1995) to Cooper and Haltiwanger (2006), with systematic sensitivity analysis. Policy scenarios include CBAM as legislated, proliferation with UK and Canadian adoption, and endogenous carbon pricing responses by major trade partners.

The paper contributes on three fronts. First, it bridges the macro-finance literature on climate transition risk (Hambel and van der Ploeg, 2025) with the applied climate-trade tradition, acting on the finding of Babiker et al. (2009) and Weitzel et al. (2016) that restricting intertemporal adjustment systematically overstates policy costs. Second, the 2Ã—2 credibility design provides a tractable framework for quantifying the economic cost of climate policy uncertainty, connecting to the literature initiated by Baker, Bloom, and Davis (2016) but within a structural model that identifies transmission channels rather than reduced-form correlations. Third, the model produces sector-country trajectories of Tobin's q as endogenous indicators of stranding risk and the

investment channel of carbon leakage, a mechanism discussed in qualitative terms but not previously quantified in a multi-country applied framework. A welfare decomposition isolates transition costs attributable to adjustment friction from standard terms-of-trade, allocative efficiency, and leakage effects. Preliminary results indicate that a credible CBAM reshapes investment allocation before the mechanism formally binds, that the welfare gap between anticipated and surprise implementation is quantitatively significant, and that the false promise scenario generates deadweight losses comparable in magnitude to the effects of the policy itself.