

Can the interaction between CBAM and current market-based mechanisms enable a low carbon transition for the industrial sector globally?

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Extended Abstract

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Abstract Summary

Market-based mechanisms (MBMs) have become central instruments in climate policy, reflecting a broader shift toward using price signals to address environmental externalities. Despite existing MBMs covering heavy industrial sectors, decarbonisation remains constrained by cost gaps between conventional and low-carbon production. We provide new empirical evidence on how policy interactions shape global industrial low carbon transition. More specifically, we evaluate whether Carbon Border Adjustment Mechanisms (CBAM) can improve the commercial viability of low-carbon industrial production globally. We develop a Market Intervention Viability Assessment Model (MIVAM) to assess plant-level investment decisions under interacting MBMs. The model is applied to over 3717 operational plants across cement, steel (BF-BOF and EAF), ammonia, and methanol sectors in over 190 countries. Results show that CBAM improves investment viability and expands economically feasible abatement. For example, in cement, viable CO₂ emissions abatement increases from 139Mt under current MBMs alone to 2,765Mt with EU CBAM and 2,737Mt with UK CBAM. Similar patterns are observed in ammonia, steel, where viable abatement increases under CBAM scenarios. Economically, CBAM reduces the shadow cost of abatement by narrowing the price gap between grey and low carbon products. Average MBM-adjusted prices shift closer to clean benchmarks (e.g., ammonia: \$421/t vs \$494/t clean), increasing demand-side viability. As a result, reliance on product price premiums reduces compared to current MBMs alone. These results indicate that CBAM enhances allocative efficiency by internalising carbon cost differentials across jurisdictions. However, equity implications remain underexplored: without mechanisms to recycle CBAM revenues, the policy risks reinforcing global asymmetries in industrial decarbonisation capacity.

Presenting Author Biography

Elsy Milan is a third-year PhD candidate at Imperial College London specialising in CCS commercialisation, industrial decarbonisation, and market-based mechanisms. Developer

of plant-level economic viability assessment models for CCS across cement, steel, ammonia, and methanol (MIVAM). Aside from her PhD work, she is a UNFCCC COP Article 6 & Technology Negotiator for the Lebanese Delegation. She also has gained applied consultancy experience translating CCS economics into decision-support tools for governments and industry. Her commitment to research, engagement in driving the role of women in STEM, and innovative spirit has rewarded her with Imperial College London's Student Award for Outstanding Achievement.