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Research Commentary

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Kimberly Clausing, Allan Hsiao, Gilbert Metcalf, Marilyn Pereboom, Catherine Wolfram

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I. Introduction

On April 8, U.S. Senators Bill Cassidy (R-LA) and Lindsey Graham (R-SC) introduced their latest version of the *Foreign Pollution Fee Act* (FPFA). The bill levies a tariff on imports in certain industrial sectors, proportional to the carbon emitted when the good was produced abroad. The co-sponsors of the bill present it as a way to level the playing field for US manufacturing, which in many industrial sectors is less carbon-intensive than production in countries it trades with. As Sen. Cassidy noted in the bill release, "Other countries can decrease their cost of manufacturing by 20 percent by not enforcing the laws we take for granted. This means they take our jobs too. This is wrong." Sen. Graham added that, "It is long past time that the polluters of the world, like China and others, pay a price for their policies. [...] We are leveling the playing field, and American manufacturers and business will be the biggest beneficiaries."[1]

Without taking a stand on the extent of the competitive disadvantage to US production due to federal regulation of air pollution in general and greenhouse gas pollution in particular, this research commentary analyzes the new bill and assesses

*Author Affiliations and Acknowledgements

Clausing: UCLA School of Law. *Hsiao*: Stanford University. *Metcalf*: Tufts University and MIT Sloan School of Management.
Pereboom: MIT Sloan School of Management. *Wolfram*: MIT Sloan School of Management.

We thank Drew Story and Bethany Patten at the MIT Climate Policy Center for helpful input and James Stock at Harvard University for his comments.

1 Sens. Cassidy and Graham press release: https://www.cassidy.senate.gov/newsroom/press-releases/cassidy-graham-introduce-latest-version-of-trade-manufacturing-policy-to-hold-china-accountable/, April 8, 2025.

the potential impacts on several economic and environmental outcomes. The analysis draws on a model developed in Clausing et al. (2025) and simulates the reshuffling of global trade relationships when carbon tariffs are introduced.[2] This commentary addresses the following questions: How does the FPFA's proposed fee structure impact domestic production and prices? How does the proposed fee structure impact imports and exports? What are the revenue impacts of the FPFA? We also consider the impact of the bill on US and global carbon pollution. Our analysis focuses on three energy intensive, trade sensitive sectors: aluminum, cement, and iron and steel.

Our analysis suggests that the FPFA is unlikely to have any effect on trade in cement. For the aluminum and iron and steel sectors the model suggests very small impacts from the imposition of FPFA. In particular:

- The price of covered products in the US modestly increases—no more than one percent—while the price paid to firms in exporting countries falls by one-tenth of a percent or less.
- Producer revenue for US firms in the iron and steel sector increase by less than two-tenths of a percent while revenue to US aluminum firms fall by one-half of a percent.
- No revenue is collected by the FPFA as other countries reallocate exports to avoid the tariff. For example, the model predicts that China—given its relatively high carbon intensity—will stop exporting steel and aluminum to the US. These exports are replaced by increased flows from relatively cleaner countries, such as steel from Mexico and aluminum from Canada. The model simulates a scenario in which the EU CBAM is imposed and suggests that, without the FPFA, the EU CBAM could reduce the flow of cleaner products (like Canadian aluminum) to the US, as they are redirected to the EU. At the same time, it could increase the flow of dirtier products (like Chinese aluminum) to the US, as they are reshuffled away from the EU due to the CBAM. The ease with which trade is redirected, which shapes the outcomes produced by our model, depends on trade elasticities. Later in the paper, we discuss the model's trade elasticity assumptions and compare them to those used in other analyses of the FPFA.
- Greenhouse gas emissions associated with consumption in the United States fall while global emissions are unaffected.[3] Emissions associated with production in the U.S. increase slightly by 0.14%.

We also compare our data on carbon intensity—measured as tons of emissions per ton of product produced—with data used in many earlier studies of US border measures, which report tons of emissions per dollar of revenue generated from production. The latter approach makes US production appear cleaner, since US prices are higher, partly because of existing tariffs. The FPFA specifies using the former measure, as we do: tons of emissions per ton of product produced.

The rest of this research commentary describes the model results in detail.

II. Background

A number of countries have implemented policies to reduce carbon emissions in carbon-intensive sectors. These sectors tend to be energy-intensive and trade sensitive. Many countries have implemented carbon pricing, usually in the form of a cap-and-trade system for emissions. The European Union, for example, has had an emissions trading system (ETS) since 2005. Several countries in the EU also have a carbon tax in place. Countries with an emission trading system typically

2 Kimberly Clausing, Jonathan Colmer, Allan Hsiao, and Catherine Wolfram, "The Global Effects of Carbon Border Adjustment Mechanisms," Working Paper No. w33723. National Bureau of Economic Research, 2025. Also published as MIT CEEPR Working Paper 2025-12, MIT Center for Energy and Environmental Policy Research, June 2025.

3 Emissions can be measured on a production basis where emission are allocated to countries based on where the gases are released to the atmosphere or on a consumption basis where emissions are allocated to countries based on where the goods that give rise to emissions are consumed. This model tracks emissions on a consumption basis.

apply a carbon tax to sectors not covered by their cap-and-trade system.[4] Within the United States, California has an emissions trading system in place as does a consortium of states in the Eastern United States in the Regional Greenhouse Gas Initiative. In addition to these regional carbon pricing schemes, the federal government has a number of stringent air quality regulations affecting the transportation, industrial and energy sectors. The US, however, is the only large high-income country without a carbon price of some form (Richter, 2025).[5]

Carbon policies raise the price of carbon-intensive goods and create potential leakage concerns. Leakage occurs when buyers shift from using domestically produced goods—such as steel, aluminum, or cement—that are subject to the carbon price to importing those goods from countries that do not have carbon policies in effect, or when producers migrate abroad in response to higher regulatory burdens. In response to this leakage concern, the EU has implemented a *Carbon Border Adjustment Mechanism* (CBAM) that will levy a carbon price on imports from specified energy-intensive sectors based on the embodied carbon in those imports.

The European Union proposed its CBAM in 2021 and formally launched the policy with a phase-in period in October 2023. Initially, importers are required to report emissions associated with traded goods but not required to pay a fee. Starting in 2026, a CBAM fee will slowly be phased in. The EU CBAM initially covers the following carbon-intensive industries: iron and steel, aluminum, cement, electricity, fertilizer, and hydrogen. The United Kingdom has expressed its intention to implement a CBAM by 2027 but has not yet passed it into law.[6]

A country may be exposed to leakage impacts even if it does not have an explicit carbon price (either cap-and-trade or carbon fee). This could occur if the country has implemented more stringent pollution abatement regulations that drive up production costs while reducing the pollution intensity (pollution as a share of the value of production) of goods. The US has a relatively low pollution intensity in a number of sectors, though the extent to which this is due to regulation or other factors is an unsettled question. For example, US steel production is relatively clean because over two-thirds of U.S. crude steel is produced with electric arc furnaces, a substantially cleaner process than basic oxygen furnaces.

The FPFA levies a tariff on imported products from key energy-intensive sectors with the tariff rate tied to the degree to which production of the imported products is more pollution intensive than domestically produced equivalent products, calculated on a country-wide basis. Covered sectors include aluminum, cement, iron and steel, fertilizer, glass, hydrogen, solar products, and battery inputs.[7] The FPFA defines pollution as greenhouse gas emissions, including carbon dioxide, hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons, and sulfur hexafluoride. Pollution intensity is defined as the pollution, measured in metric tons of carbon dioxide equivalent, emitted in the production of a metric ton of a covered product.

The tariff levies the fee based on the *pollution intensity difference* (PID) of imports compared to the US-average pollution intensity of like domestic products; the difference is measured in percentage terms. The fee varies depending on the extent of the difference. Products in Tier 1 have a PID between 10 and 20 percent. Tier 2 products have a PID between 20 and 200 percent. Tier 3 products have a PID greater than 200 percent. The tariff on Tier 1 products ranges between five and twenty-five percent. The tariff in Tier 2 ranges from twenty-five to eighty percent. Tier 3 products have a tariff that starts at eighty percent and rises linearly with the PID with the tariff capped at 100 percent. Figure 1 illustrates the fee structure.

4 For an overview of European carbon taxes, see Gilbert E. Metcalf and James Stock. "The Macroeconomic Impact of Europe's Carbon Taxes" *American Economic Journal: Macroeconomics* Vol. 15:3 (2023) p. 265 – 286.

5 Danny Richter, "The US is an Island Alone without a Carbon Price" Pricing Carbon Initiative, November 12, 2024.

6 The UK Revenue and Customs office of the Treasury has released a position paper outlining its plans.

7 The covered sectors include both raw and finished products included in various categories of the US International Trade Commission's Harmonized Tariff Schedule. The text of the bill is available at https://www.cassidy.senate.gov/wp-content/uploads/2025/04/FPFA-2025.pdf.

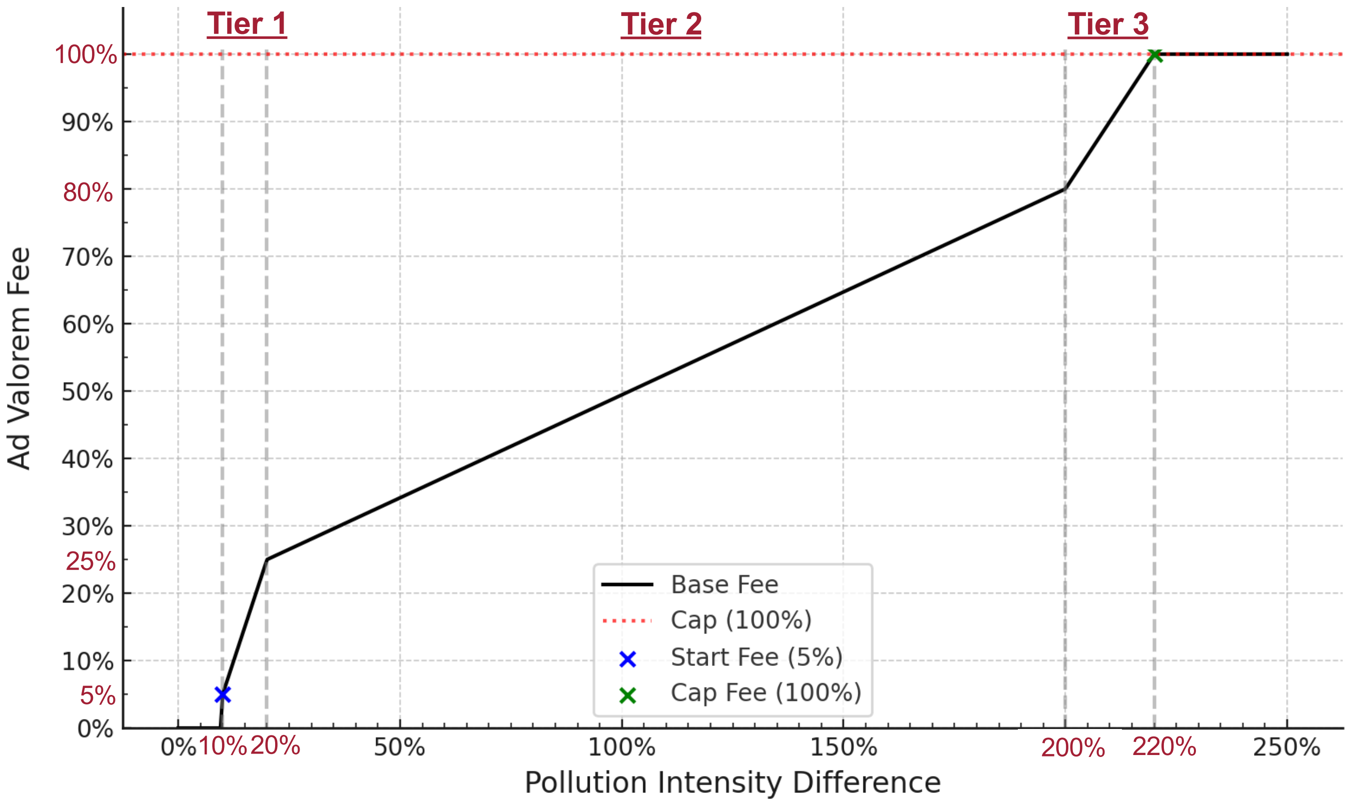

Figure 1. Modeled FPFA Fee Structure.
Source: The 2025 Foreign Pollution Fee Act

III. Data

We analyze the impact of the FPFA focusing on three sectors: aluminum, iron and steel, and cement. To begin, we note that the bulk of emissions in the cement sector are process emissions and there is very little variation in pollution intensity across countries. Granular data from Climate TRACE (Tracking Real-time Atmospheric Carbon Emissions), an independent non-profit that monitors and reports global greenhouse gas emissions, indicate that the most pollution-intensive cement producing country is Kazakhstan with a PID of 7 percent.[8] Based on these data, we project that no cement imports will be subject to a tariff under the FPFA.[9]

To analyze the impacts of the FPFA on the aluminum and steel sectors, we compute country-level carbon intensity as the ratio of metric tons of CO_2 equivalents emitted over metric tons of aluminum or steel produced. Both variables are measured in 2023. We include both direct emissions and emissions associated with the production of any electricity used to produce the product (scope 1 and scope 2). We obtain steel data at the plant level from Climate TRACE.[10] Climate TRACE publishes monthly estimates of steel production, capacity, and emissions for plants in the Global Steel Plant Tracker (GSPT) database from Global Energy Monitor (GEM). These data include 892 plants across 77 countries, covering the universe of steel mills with a capacity of more than 500 thousand metric tons. Scope 1 emissions derive from satellite data that capture plant-level activity. Scope 2 emissions are based on regional estimates of the emissions intensity of electricity production from Ember, a

8 Ashank Sinha and Verity Crane, Manufacturing and Industrial Processes sector: Cement Manufacturing Emissions. TransitionZero, UK, Climate TRACE Emissions Inventory, 2024. https://climatetrace.org.

9 The two biggest cement exporting countries to the United States are Canada and Turkey with PIDs of -4 percent and 1 percent, respectively.

10 Ashank Sinha and Verity Crane, Manufacturing and Industrial Processes sector: Iron & Steel Manufacturing Emissions. TransitionZero, UK, Climate TRACE Emissions Inventory, 2024. https://climatetrace.org.

global energy think tank, as well as estimates of electricity use by production process from the Mission Possible Partnership's 2024 Steel Transition Strategy.[11]

We have detailed data on primary aluminum production and scope 1 and 2 emissions at the plant level from Wood Mackenzie (WoodMac), a leading data and analytics provider focused on energy industries and related sectors. Scope 1 emissions include direct emissions from fuel combustion and process emissions from aluminum smelting; scope 2 emissions are those from the electricity used in production. These data include 153 plants, covering all primary aluminum smelters in 2023. We measure secondary aluminum production at the country level with data from the World Bureau of Metal Statistics (WBMS). We observe production for the top 10 secondary producers which account for 90% of global secondary production in 2023. Figure 2 shows our estimates of the relative carbon pollution intensity in the aluminum and steel sectors.

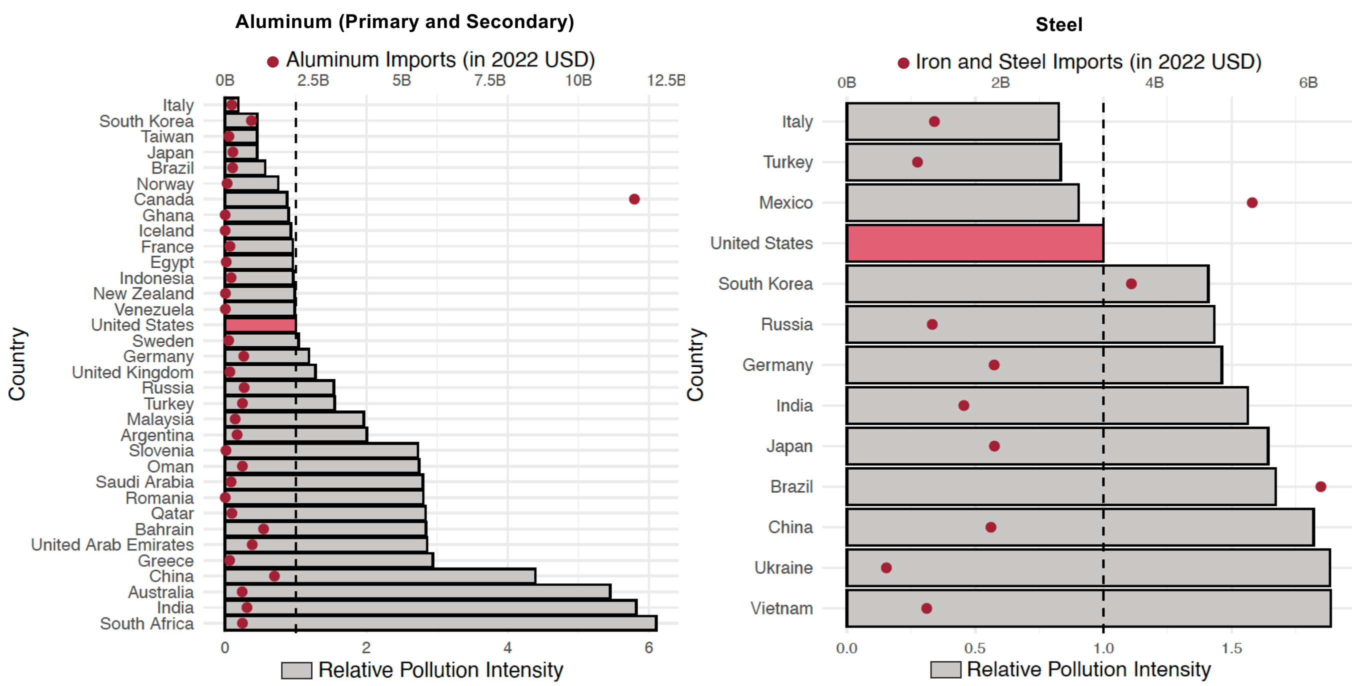

Figure 2. Carbon Intensity in Aluminum and Steel.

Source: Data on primary aluminum production and emissions are from WoodMac. Secondary aluminum production is from the World Bureau of Metal Statistics and emissions are estimated at 10% of primary production. Trade data is from the Atlas of Economic Complexity by the Growth Lab at Harvard University.

Relative to the US, several countries from whom we import aluminum can have carbon intensities two to six times the US intensity. Our largest importing partner for aluminum is Canada whose carbon intensity is slightly below that of the US. Mexico is a major source of iron and steel and has a carbon intensity about 10 percent lower than that of the US. Other countries from whom the US imports significant amounts of iron and steel (South Korea and Brazil, in particular) have carbon intensities between 40 and 70 percent higher than that of the US.

A few reports have modeled the effects of the FPFA or a similar policy including Rorke et al. (2025)[12], Rennert et al. (2025)[13],

11 Ember, Regional grid intensity retrieved from: Monthly Electricity Data. Ember, 2024. https://ember-energy.org/data/monthly-electricity-data/; MPP, Steel emissions factors retrieved from: MPP. Mission Possible Partnership Steel Transition Strategy, 2024. https://www.missionpossiblepartnership.org/action-sectors/steel/

12 Catrina Rorke, Scott Nystrom, and Daniel Hoenig. "America's Carbon Advantage 2025." *Climate Leadership Council*, March 18, 2025. https://clcouncil.org/media/2025/03/2025-Carbon-Advantage_report-1.pdf.

13 Kevin Rennert, Mun Ho, Katarina Nehrkorn, and Milan Elkerbout. "Projected Effects of the Foreign Pollution Fee Act of 2025." *Resources for the Future*, May 21, 2025. https://media.rff.org/documents/IB_25-07.pdf.

David et al. (2025)[14], and Sandler et al. (2025)[15] with differing results. As carbon intensity is the key metric with which to compute the tariff rates imposed by the FPFA, it is useful to compare the data used for these papers. Additionally, Section 4693 of the 2025 version of the FPFA includes a table of tariff rates to be used in the "initial application" period before the final rules regarding the fees calculated in accordance with the tiered structure (shown in figure 1) are issued. Pomerleau (2025)[16] analyzes the FPFA under the assumption that the fees published in this table will be held constant. We backed out the relative carbon intensities that would produce these fees if calculated according to the tiered structure. The average fee on the EU is not reported so we do not calculate the EU-average relative carbon intensity. Additionally, Rennert et al. (2025) does not report EU-average carbon intensities, but we show production-weighted estimates based on the provided data for the constituent countries. Sandler et al. (2025) use the same data (GTAP) as Rennert et al. (2025) to compute carbon intensities. While Sandler et al. (2025) does not report specific intensity values, we assume they are approximately the same as those used in Rennert et al (2025). Table 1 compares the average carbon intensity for the EU, China, Canada, and Mexico as a percentage of US carbon intensity for the aluminum and steel sectors as reported in these recent reports. Cells highlighted in green illustrate sectors in countries where production is cleaner than the US.

			Carbon Intensity as Emissions over Economic Value (USD)			**Carbon Intensity as Emissions over Physical Quantities (Metric Tons)**					
	FPFA (2025) Section 4693: Determination of Variable Charge, Initial Application Fee Table		Rorke et al. (2025) *Climate Leadership Council*	Rennert et al. (2025) *Resources for the Future* (Uses same GTAP data as Sandler et al. (2025) *Harvard Kennedy School*)		David et al. (2025) *Silverado Policy Accelerator*			Our Data		
	Aluminum	Steel	Basic metals	Aluminum	Steel	Aluminum	Primary Aluminum	Steel	Aluminum	Primary Aluminum	Steel
EU	-	-	120%	~65%	~65%	92%	54%	107%	93%	35%	135%
China	272%	>320%	270%	362%	324%	349%	123%	200%	450%	141%	197%
Canada	127%	123%	130%	152%	134%	115%	36%	107%	90%	24%	135%
Mexico	127%	163%	130%	165%	151%	-	-	93%	-	-	85%

Table 1. Average carbon intensity of select trading partners as a percentage of US carbon intensity (CI).

Both our data and David et al. (2025) use plant-level data to compute carbon intensity with carbon emissions in the numerator and metric tons of aluminum or steel produced in the denominator. Both analyses perform these calculations for primary aluminum, total unwrought aluminum (including primary and secondary aluminum), and steel (including EAF and BOF-produced steel). Rorke et al. (2025), Rennert et al. (2025), and Sandler et al. (2025) use data from multi-sector, multi-region input-output tables based on national account frameworks; Rorke et al. (2025) uses OECD Inter-Country Input-Output Tables (ICIO) data and Rennert et al. (2025) and Sandler et al. (2025) use data from the Global Trade Analysis Project (GTAP). All papers compute carbon intensities as scope 1 and scope 2 greenhouse gas emissions associated with production in a sector over gross economic output of that sector in USD. There are some discrepancies between the estimates. Both sets of quantity-based estimates (ours and David et al., 2025) find Mexican steel production to be cleaner than US steel production while the value-based calculations find Mexican steel to be dirtier. Additionally, both quantity-based calculations find EU steel to be dirtier than US steel, while Rennert et al. (2025) determine EU steel to be cleaner on average. Lastly, both quantity-based calculations find Canadian aluminum to be cleaner than the value-based calculations.

14 Andrew David, Andrew Knipe, Paige Graham, and Brooklyn Graham. "Economic and Environmental Impacts of a U.S. Border Pollution Measure on Steel and Aluminum." *Silverado Policy Accelerator*, February, 26 2025. https://silverado.org/reports-and-publications/economic-and-environmental-impacts-of-a-border-pollution-measure/

15 Ely Sandler, Christine Jiang, Daniel P. Schrag. "The Revenue Potential and Country Exposure of a U.S. Border Carbon Adjustment." *Harvard Kennedy School Belfer Center for Science and International Affairs*, June 2, 2025. https://www.belfercenter.org/research-analysis/us-border-carbon-adjustment

16 Shuting Pomerleau, "The 2025 Foreign Pollution Fee Act: Revenue Effects and Analysis," *American Action Forum*, April 21, 2025. https://www.americanactionforum.org/insight/the-2025-foreign-pollution-fee-act-revenue-effect-and-analysis/.

Each analysis discussed above depends on a different data source. For example, the base year for the GTAP database used by Rennert et al. (2025) and Sandler et al. (2025) is 2017, while our data and the data used in David et al. (2025) are from 2023. There is no reason to expect identical results, but one possible explanation for the discrepancies in these carbon intensity figures is heterogeneity in prices. When industrial output is measured in value terms rather than physical quantities, the differences in carbon intensity figures across countries will conflate variation in prices with variation in physical quantities. For instance, Canada and Mexico might have lower prices per metric ton for steel and aluminum on average than the US, which could explain why our quantity-based estimates find Canadian aluminum and Mexican steel to be cleaner than the value-based estimates. The GTAP-based estimate for China's steel carbon intensity (relative to the US) in Rennert et al. (2025) is 62-64% higher than those from plant-level data from David et al. (2025) and our data. Figure 3 shows the historical ex-works mill price of hot rolled steel in the US and China. (Hot-rolled steel is the most heavily traded steel product.[17]) The ex-works cost excludes any tariffs or transport duties. From 2007 to 2024, US prices are 64% higher than Chinese prices, approximately equal to the difference in value-based and quantity-based relative carbon intensities.

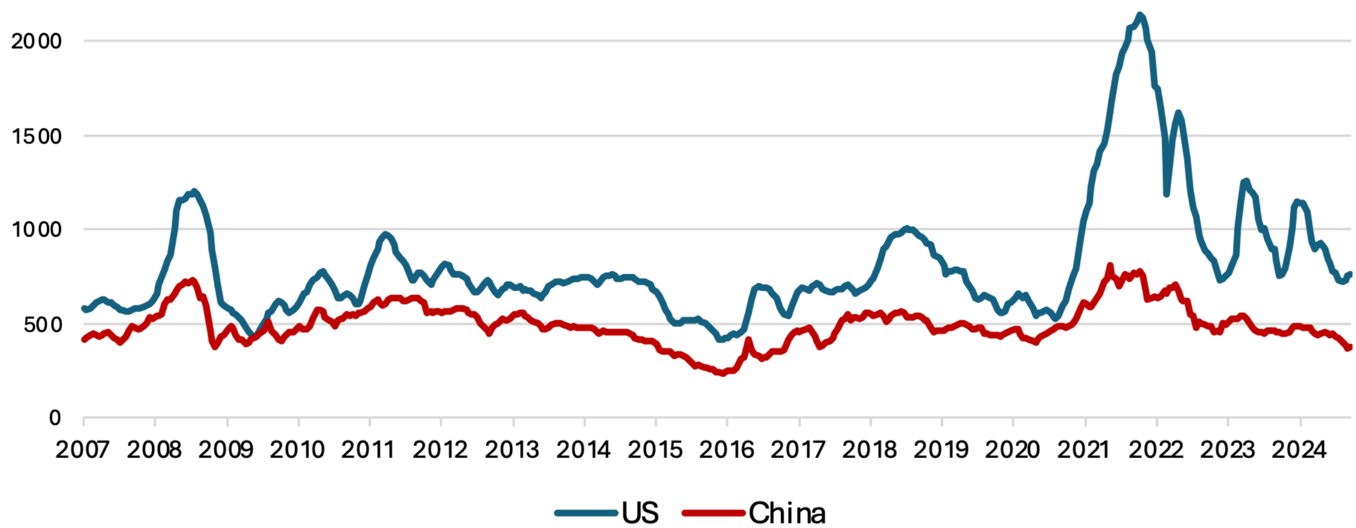

Figure 3. Ex-works price for hot-rolled steel in the US and China.
Source: steelbenchmarker.com

IV. Analysis

Our analysis extends an economic trade model in Clausing et al. (2025). We represent three markets: the US which levies a pollution import fee; a market with a high degree of regulation (the European Union and the United Kingdom with their carbon cap and trade programs and CBAMs); and a market with a low degree of regulation. Producers reduce emissions in response to carbon prices and can choose which markets to sell into. Global supply consists of supply from each of the three markets which, in equilibrium, equals demand in that market. Based on the pattern of production, the carbon prices imposed in different markets, and the pattern of global demand, the model solves for the equilibrium prices and production in all three markets, noting that some markets will import the good while others will export. The analysis measures pollution intensity as metric tons of carbon dioxide equivalent per ton of output, incorporating both scope 1 and 2 emissions.[18]

The model assumes that both the EU and the UK have a carbon border adjustment in place and that the carbon price is $96 per metric ton of scope 1 and 2 CO_2e emissions, which was the EU ETS allowance price in 2023 according to the World

17 According to the Observatory of Economic Complexity, in 2023, the most traded product within the iron and steel industry was hot-rolled steel (HS code 7208). See https://oec.world/en/profile/hs/iron-and-steel

18 Both aluminum smelting and steel production with an electric arc furnace are electricity-intense processes, Countries that rely on low- or zero-carbon sources of electricity such as hydropower will have a much lower relative carbon intensity than if just direct emissions (scope 1) were regulated.

Bank Carbon Pricing Dashboard.[19] It also assumes that no allowances are allocated for free in those countries. In thinking about the impacts of a foreign pollution fee, there are two impacts of note. First, the fee may raise the prices in the US as the fee raises prices of imported goods subject to the tariff. This will occur as purchasers face higher prices on covered imported goods due to the tariff and as purchasers substitute away from imported to domestic goods thereby driving up demand and prices on domestic goods. Second, the US market becomes less attractive to foreign producers subject to the tariff who seek out other markets. This increases supply into non-US markets and may drive prices down elsewhere.

At the macro level, the FPFA leads to very small increases in the price of aluminum and steel in the United States—increases of at most around one percent—and very small decreases in prices in carbon intensive exporting countries. Global production of and emissions from the production of aluminum and steel are unchanged. There is a shuffling of trade in the two goods' production, with production from carbon intensive countries shifting to regions without carbon border mechanisms. Because exporters have the ability to reallocate exported goods to countries without border tariffs, the United States collects no revenue from the FPFA.

Figure 4 shows model results for aluminum products.

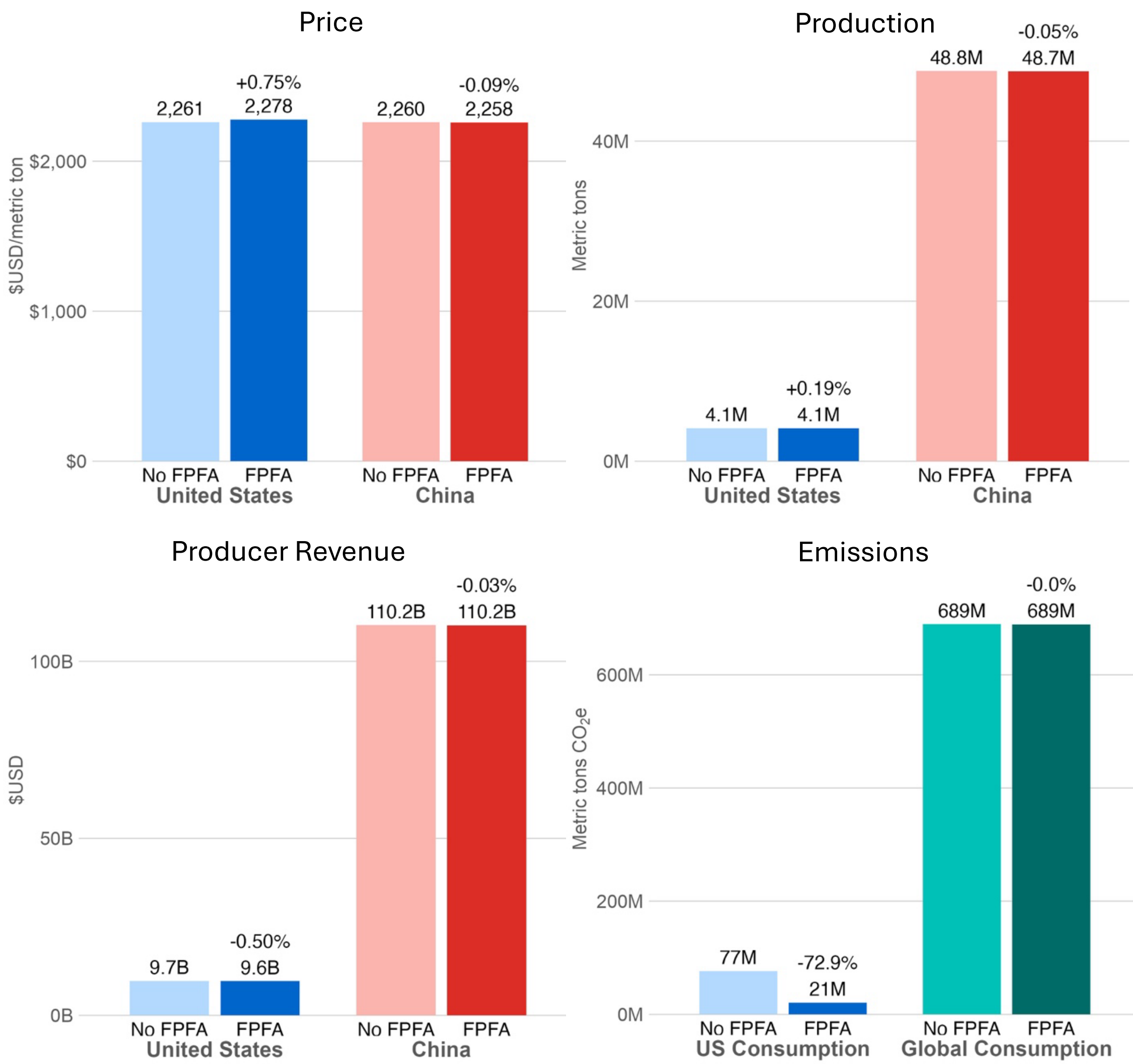

Figure 4. Aluminum Sector Impacts.

19 The World Bank Carbon Pricing dashboard reports prices set by emissions trading systems and carbon taxes around the world as of April 1 of each year in US$/t$CO_2$e. See https://carbonpricingdashboard.worldbank.org/.

The upper left panel shows impacts of the FPFA on prices in the United States and in China. Prices rise by 0.75% in the US and fall by one-tenth of a percent in China. We see a modest shift of production towards the US with domestic production rising by 0.2 percent while it falls in the non-border adjusting countries. In China, which produces about 60% of global aluminum, prices decline by less than 0.1 percent due to the FPFA. Producer revenue falls in both the US and China (lower left panel), due to lower demand from US consumers, and emissions (on a consumption basis) fall significantly in the US (due to the reallocation of cleaner aluminum production sources toward the United States) while remaining unaffected globally (lower right panel).

We also observe significant changes in trade patterns for aluminum.[20] The high CBAM price in the EU-UK makes it attractive for US producers to export their low carbon aluminum to the UK. With the imposition of the FPFA, it now becomes advantageous for US aluminum consumers to purchase domestic aluminum rather than import cheaper, higher carbon aluminum. Figure 5 shows how US and China's aluminum production changes between a scenario where the EU CBAM is in place but not the FPFA (left, "No FPFA") to a scenario that reflects the imposition of FPFA (right, "FPFA").

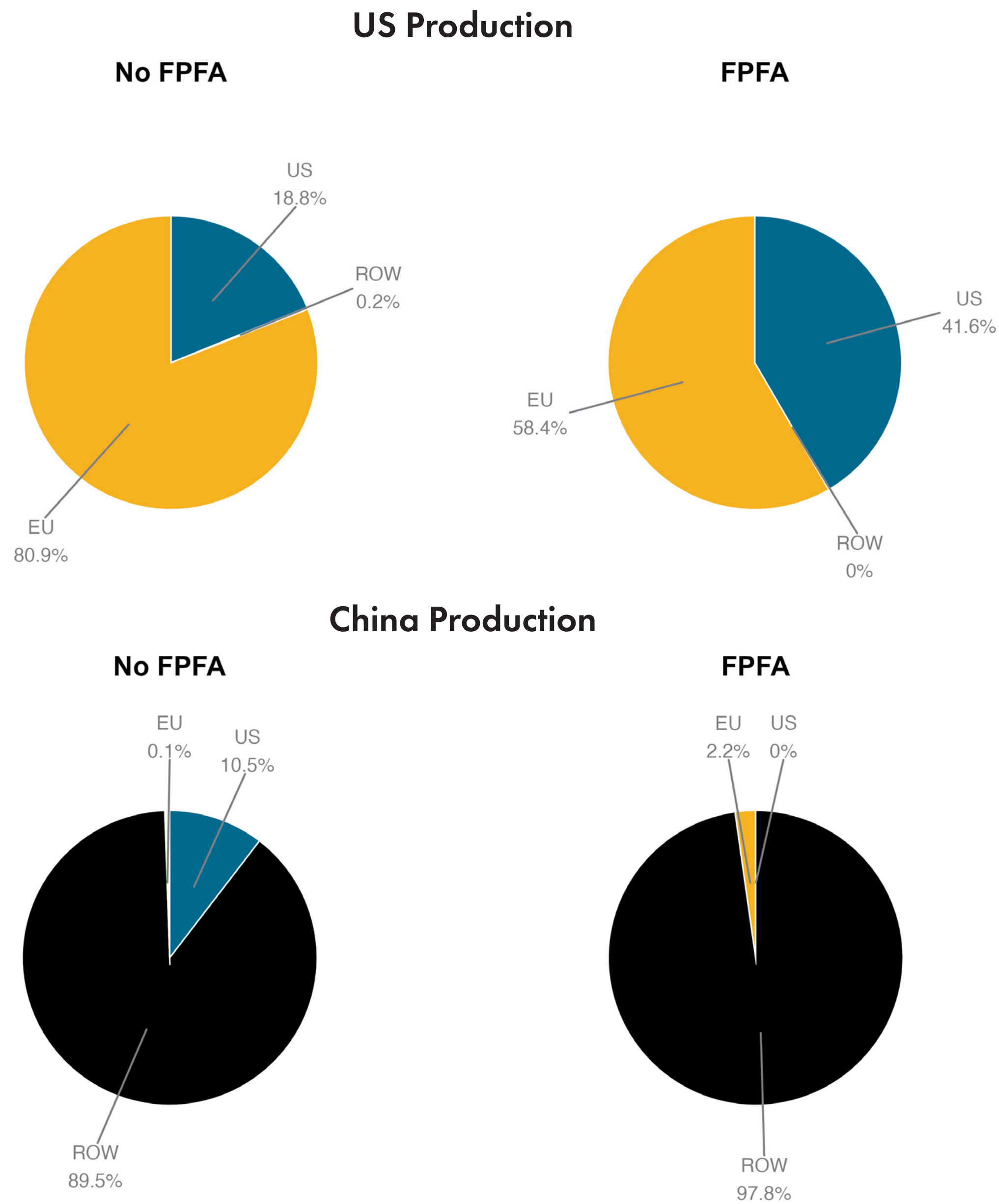

Figure 5. US and Chinese Aluminum Production by Destination.

20 This analysis was done prior to the latest steel and aluminum tariff announcements; see https://www.whitehouse.gov/fact-sheets/2025/06/fact-sheet-president-donald-j-trump-increases-section-232-tariffs-on-steel-and-aluminum/. While those tariffs may be subject to court challenge, that remains uncertain. See https://www.piie.com/blogs/realtime-economics/2025/courts-will-decide-if-trump-exceeded-his-emergency-trade-authorities.

US imports of Chinese aluminum drop from 10 percent to zero while domestic consumption of US production more than doubles. Finally, figure 6 shows the source of aluminum used by US firms under the "No FPFA" and "FPFA" scenarios.

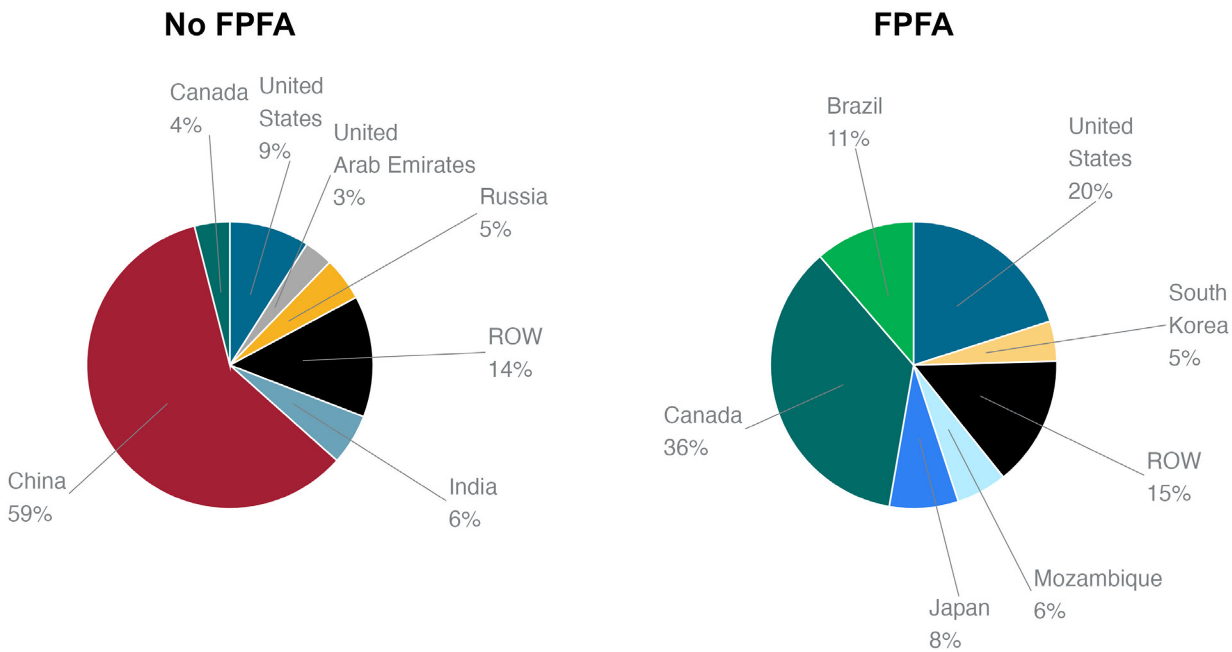

Figure 6. US Aluminum Suppliers.

In our model, China is a major source of aluminum for the US in the absence of the FPFA as Chinese aluminum is not attractively priced in the EU or UK given the CBAM. With the FPFA in effect, Chinese aluminum is diverted, primarily to the rest of the world (but with a small portion going to the EU). The Canadian share of US aluminum supply increases ten-fold and Brazil becomes a significant source of aluminum in US markets.

The impacts on iron and steel price, production, and emissions are similar as in the case of aluminum (figure 7 on the following page).

The one qualitative difference is that producer revenue goes up for iron and steel in the United States. This reflects the fact that nearly all US steel is consumed domestically so that the sector benefits from the higher domestic price without suffering any losses in foreign markets. China's production of iron and steel goes predominantly to the non-carbon pricing countries in the world both before and after imposition of the FPFA. Domestic suppliers continue to be the predominant supplier of iron and steel to US firms (figure 8). As noted above, China, which had been supplying nine percent of US steel supply drops to zero.

That the FPFA raises no revenue is a striking result and reflects the flexibility of producers to redirect their exports as global conditions change. It is important to note, however, that the trade model employed here does not incorporate any significant variations in shipping costs or other frictions. We assume that a country gets a slight cost benefit of 0.5% for selling within their own market. Frictions will impede exporting country efforts to redirect trade to avoid tariffs and so may result in some revenue accruing to the US Treasury. On the other hand, commodity goods with high value to weight, such as aluminum and steel, likely face few frictions.

It is also noteworthy that the FPFA has no impact on global emissions. This is largely because the policy does not incentivize domestic emissions reductions, unlike broader global carbon pricing and CBAM efforts abroad. For example, the zero effect on emissions is in striking contrast to the emissions impact of the CBAM as modeled in Clausing et al. (2025) which reports that the EU policy would reduce global emissions in the aluminum and steel industries by over 83 MT CO_2 (with an EU carbon price of $100) or roughly 0.16 percent of global emissions. When Clausing et al. (2025) model possible

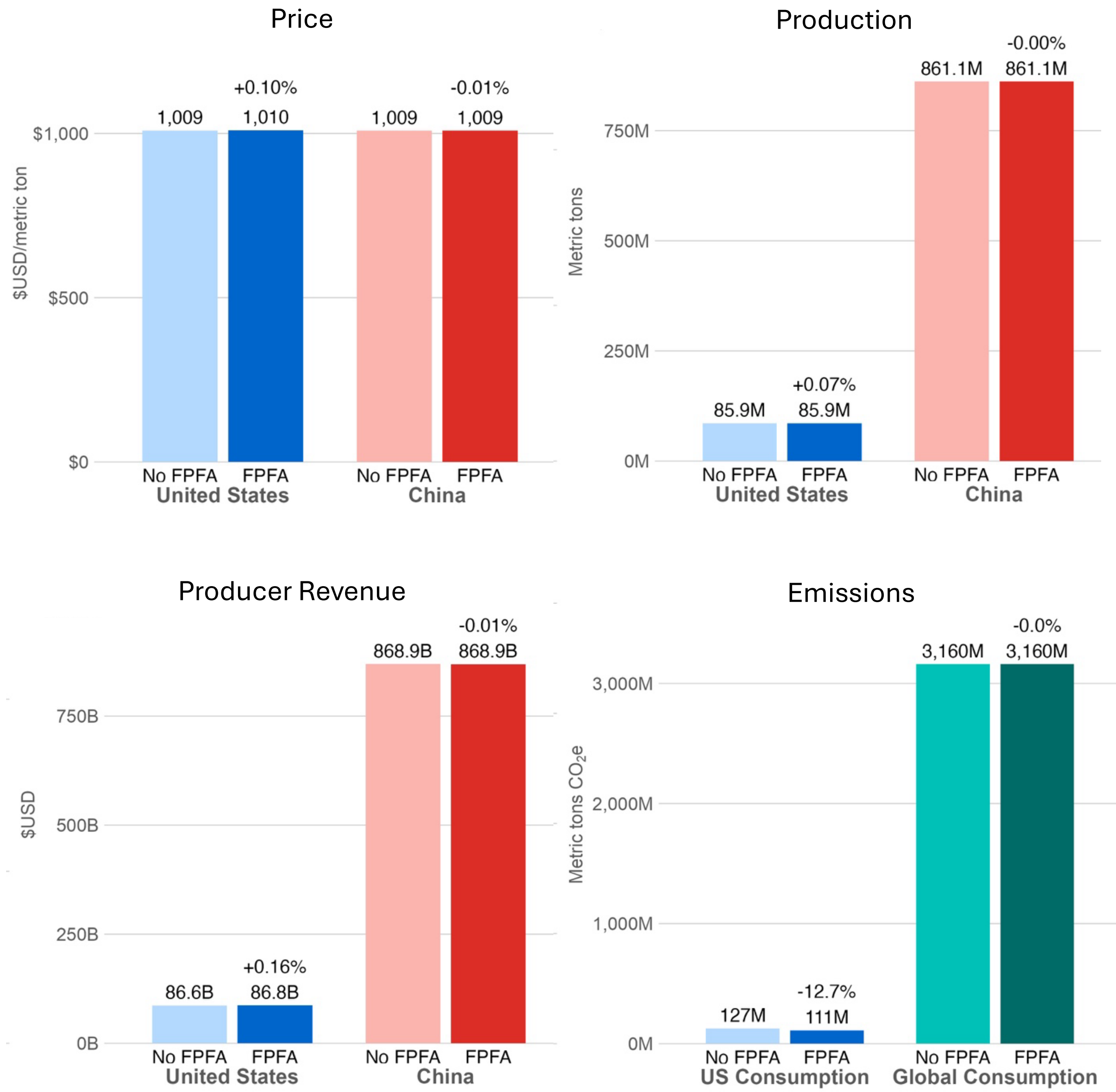

Figure 7. Steel Sector Impacts.

policy spillovers, emission reductions increase to 1,180 MT CO_2 or 2.2% of global emissions. Similarly, a recent OECD analysis finds that the CBAM leads to a reduction in global emissions relative to a world without CBAM. That analysis finds that the EU ETS reduces global emissions by 0.39 percent; adding the CBAM leads to a global emissions decline of 0.54 percent.[21] They argue this occurs as countries exporting to the EU shift to cleaner technologies as a result of the CBAM. Their model uses input-output modeling to derive this result. It is not clear to what extent trade patterns shift in their model. In the model underlying this analysis, trade patterns are key to the results.

The model results here differ from other studies that find that the FPFA raises significant revenue for the US Treasury including Rennert et al. (2025), Nystrom and Rorke (2025)[22] and Pomerleau (2025), and Sandler et al. (2025) which all report positive revenue

21 Antoine Dechezlepretre and Antton Haramboure, "EU Carbon Border Adjustment: What is it, how does it work and what are the effects?" https://www.oecd.org/en/blogs/2025/03/eu-carbon-border-adjustment-mechanism-what-is-it-how-does-it-work-and-what-are-the-effects.html.

22 Scott Nystrom and Catrina Rorke, "The Council's Revenue Estimator for Foreign Pollution Fees," *Climate Leadership Council*, March 4, 2025. https://clcouncil.org/media/2025/05/Revenue-Estimator-for-Pollution-Fees_.pdf.

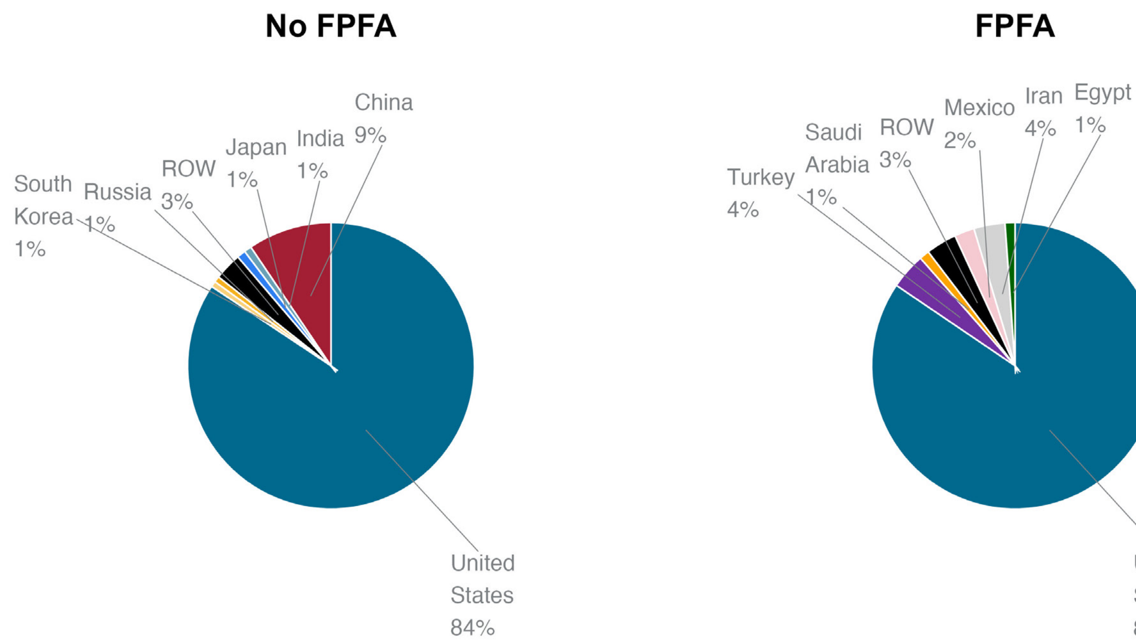

Figure 8. US Iron and Steel Suppliers.

from the FPFA. In an analysis of a previous version of the FPFA, Nystrom and Rorke (2025) constructed a revenue calculator and estimated that the tariff would collect $120-140 billion over a ten-year period. On the revised version of the bill, Pomerleau (2025) provides revenue estimates of $133.6-$185.4 billion from 2026-2035. On the more recent version of the FPFA, Rennert et al. (2025) report revenue estimates of $2.8 billion in the first year or $33 billion over 10 years. Using the same version of the FPFA, Sandler et al. (2025) project a five-year revenue potential of $198.1 billion.

In these models, an important parameter that affects the revenue estimate is the trade elasticity which determines the response of trade to changes in prices. Trade elasticities are generally considered to be governed by the demand side of the economy and depend on consumers' willingness to substitute between domestic and imported goods and to substitute between sources of imports. The model in Rennert et al. (2025) is based on GTAP and the elasticity of substitution across exports from different countries is -8.4 for aluminum and -5.9 for steel. For example, if US consumers face 1% higher prices for aluminum from China than from Brazil, these values suggest that their consumption of Chinese aluminum relative to Brazilian aluminum will fall by 8.4%. The elasticity of substitution between domestic and foreign goods is set at one-half of those figures. Elasticities are constant across countries. The parameters are larger (in absolute value) than those used in Nystrom and Rorke (2025) or Pomerleau (2025) which could explain the lower revenue estimates in the Rennert et al. analysis. Pomerleau (2025) uses the trade elasticities published in Boehm et al. (2023) which are -0.76 in the first year and converge to -2 by year 10.[23] Nystrom and Rorke (2025) use a constant trade elasticity of -0.75 across sectors and countries.[24] Sandler et al. (2025) take a different approach: using 2023 trade flow data from the US Census Bureau as a baseline, they do not model any trade responses and instead assume that the trade flows will remain unchanged after the fee is imposed.

In our model, goods like aluminum and steel are homogenous commodities, and we treat steel and aluminum from different countries as perfect substitutes. Since consumers are indifferent as to the source of the metals, the elasticity of substitution between them is infinite, meaning that if US consumers face 1% higher prices for Chinese aluminum than from Brazil, they will increase consumption of Brazilian aluminum as much as possible given Brazilian production constraints. Domestic

23 Christoph E. Boehm, Andrei A. Levchenko, and Nitya Pandalai-Nayar. "The Long and Short (Run) of Trade Elasticities." *American Economic Review* 113 (4): 861–905, 2023.

24 The CLC elasticity is taken from a study that looks at an across-the-board tariff. See Kimberly Clausing and Maurice Obstfeld, "Can Trump Replace Income Taxes with Tariffs?" Peterson Institute for International Economics, June 20, 2024.

production has a slight cost advantage, as described above. As a result, our model assumes non-smooth responses to the FPFA. This assumption of perfect substitutability leads to revenue estimates that are orders of magnitude lower than other approaches.

V. Summing Up

The Foreign Pollution Fee Act is framed as an attempt to level the playing field between American manufacturers of carbon intensive products and foreign producers with higher pollution intensities. Focusing on three sectors (aluminum, cement, and iron and steel), this analysis finds that the FPFA will have very small effects on prices and producer revenue for US firms and will likely collect little or no tariff revenue. While US emissions (measured on a consumption basis) will fall, global emissions will be unaffected. The minimal impacts found in this analysis follow from the ability of exporting countries to shift trade away from countries with tariffs (or other border adjustment mechanisms) toward countries with no carbon pricing in effect.

About the Authors

Kimberly Clausing holds the Eric M. Zolt Chair in Tax Law and Policy at the University of California Los Angeles (UCLA) School of Law, and she is a nonresident senior fellow at the Peterson Institute for International Economics. During the first part of the Biden Administration, Clausing was the Deputy Assistant Secretary for Tax Analysis in the US Department of the Treasury, serving as the lead economist in the Office of Tax Policy. Her research examines how government decisions and corporate behavior interplay in the global economy. She has published numerous articles on taxation, climate policy, and international trade, and she is the author of Open: The Progressive Case for Free Trade, Immigration, and Global Capital (Harvard University Press, 2019). Professor Clausing received her Ph.D. in economics from Harvard University in 1996.

Allan Hsiao is an assistant professor of economics at Stanford University. Hsiao works on questions in environmental and development economics using tools from empirical industrial organization and international trade. His recent work examines the distributional impacts of climate change and related policy, including carbon border adjustment mechanisms, agricultural trade policy, and adaptation to sea level rise. Prior to joining Stanford, Hsiao was an assistant professor of economics and public affairs at Princeton University. He received his Ph.D. in economics from MIT in 2021.

Gilbert Metcalf is a Visiting Professor at the Center for Energy and Environmental Policy Research and the Sloan School of Management at MIT. He is also the John DiBiaggio Professor of Citizenship and Public Service Emeritus at Tufts University. In addition, he is a Research Associate at the National Bureau of Economic Research and a University Fellow at Resources For The Future. Metcalf's primary research area is applied public finance with particular interests in taxation, energy, and environmental economics. During 2011 and 2012, he served as the Deputy Assistant Secretary for Environment and Energy at the U.S. Department of Treasury where he was the founding U.S. Board Member for the UN based Green Climate Fund. Metcalf received a B.A. in Mathematics from Amherst College, an M.S. in Agricultural and Resource Economics from the University of Massachusetts Amherst, and a Ph.D. in Economics from Harvard University.

Marilyn Pereboom is a pre-doctoral research associate in the applied economics department at the MIT Sloan School of Management. Her research focuses on environmental and energy economics and industrial organization. Prior to joining MIT, Pereboom worked as a public finance investment banking analyst at TD Securities, where she supported public power entities in structuring and issuing municipal bonds to finance infrastructure projects. Pereboom received her B.A. in economics from the University of Pennsylvania in 2022.

Catherine Wolfram is the William Barton Rogers Professor in Energy and a Professor of Applied Economics at the MIT Sloan School of Management. She previously served as the Cora Jane Flood Professor of Business Administration at the Haas School of Business at UC Berkeley. From March 2021 to October 2022, she served as the Deputy Assistant Secretary for Climate and Energy Economics at the U.S. Treasury, while on leave from UC Berkeley. Wolfram has published extensively on the economics of energy markets. She is currently working on several projects at the intersection of climate, energy, and trade, including work on the impact of the EU carbon border adjustment mechanism (CBAM) on Mozambique, policy spillovers from the EU CBAM, border adjustments for methane emissions from the oil and gas sector, and the price cap on Russian oil. She received a Ph.D. in Economics from MIT in 1996 and an A.B. from Harvard in 1989.

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Environmental Policy Research
Massachusetts Institute of Technology
77 Massachusetts Avenue, E19-411
Cambridge, MA 02139-4307
USA

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