Can Product Price Differentials Reveal Market Opportunities?

Lucien Chaffa, Aïchata S. Koné, Jeremy Schneider, Bilal Siddika, Adam Touré, Thierry Warin

Abstract

Escalating protectionism impacts margins and volumes, yet standard trade competitiveness indicators offer little insight on market opportunity. We introduce the Cost-based Comparative Advantage (CCA) indicator to identify opportunities for exporters to profitably redirect shipments and importers to cut costs. We operationalize price arbitrage using reference prices for switching partners, basing the opportunity on landed prices that account for differences in unit values, transport costs, and tariff rates. Using non-alloyed primary aluminum, we show that U.S. tariffs between 2018 and 2020 created clear incentives for Canada and Germany to reconfigure trade. The CCA offers a cost-grounded alternative to evaluate trade reallocation.

1. Introduction

The tipping geopolitical balance towards China, withering technological lead in strategic industries, and slowing economic growth have pushed governments to intervene more aggressively through industrial and trade policy (Evenett et al. 2024). The second Trump administration's trade policy has been marked with their abrupt and broad use of tariffs to exact concessions and commitments from both allies and rival states. While Fajgelbaum et al. (2024) provide empirical evidence of countries reallocating exports to alternative markets when targeted by U.S. or Chinese tariffs during 2018–19, a practical question remains: in such a fluid policy environment, can observable product price differentials reliably reveal where diverted exports are likely to go?

With tariffs seemingly here to stay, the era of preferential market access through free trade agreements, at least with the United States, appears to be in jeopardy. A country's comparative advantage in the trade of a product depends not only on productive efficiency, but increasingly on the level of market access shaped by tariff and non-tariff barriers (Costinot et al. 2015; Fugazza and Nicita 2010). Firms that lose ground in the U.S. market may redirect exports and pursue new markets to recover lost margins and volumes. In Canada, this dynamic has elevated trade diversification to a federal policy imperative aimed at reducing exposure to single-market dependence and foreign policy shocks[1].

Standard country-level indicators such as Revealed Comparative Advantage (Balassa 1965) and Economic Complexity (Hidalgo and Hausmann 2009) measure observed economic specialization using historical trade data. However, they fail to account for the specific costs or trade policy measures that define accessibility in individual markets. To address this limitation, we propose the Cost-based Comparative Advantage (CCA) indicator, which builds on the foundations of Ricardian comparative advantage by incorporating landed prices that are inclusive of transport costs and tariffs to provide a more realistic assessment of market opportunity. By estimating price differentials based on two-way reference prices, the indicator reveals latent profitable market opportunities that firms could exploit but have not yet realized.

2. Methodology

Trade flows between exporters and importers are shaped by the rational pursuit of cost efficiency. While supply chains are often sticky due to contracts and business relationships, significant shifts in trade policy create cost pressures that force market participants to re-evaluate their partnerships. Exporters seek to protect margins by prioritizing partners willing to pay higher prices, while importers minimize costs by seeking suppliers with the lowest landed price. Landed prices are defined as the tariff-inclusive import price, derived from unit values and transport costs, as done

1 Read https://www.pm.gc.ca/en/news/news-releases/2025/09/05/prime-minister-carney-launches-new-measures-protect-building

in previous studies (Amiti, Redding, and Weinstein 2019; P. D. Fajgelbaum et al. 2020; Fiankor et al. 2024).

The CCA indicator operationalizes this logic as it constructs a structural stress test for trade reallocation. The CCA evaluates whether an exporter, currently facing margin compression in a protectionist market, can profitably redirect trade given the transport costs to a new market and still undercut the incumbent supplier's landed price. By explicitly incorporating transportation and tariffs costs, the indicator controls for two major determinants of firms' effective cost structures shaping market access and supply decisions. By quantifying partner substitutability under rational behavior in both directions, the CCA captures the underlying mechanisms of comparative advantage, market contestability, and trade reallocation.

Consider two pairs of trading relationships for a homogeneous product k. The CCA assesses the opportunity for a "challenger" exporter i to reallocate trade from a "distressed" market j to a "target" market j', thereby displacing an "incumbent" exporter i'. Formally, the indicator defines the spread between the maximum allowable CIF price (the ceiling set by the incumbent) and the minimum viable CIF price (the floor set by the challenger's cost structure). The per unit CIF price is the addition of the FOB price and transport cost.

$$\mathrm{CCA}^{k}_{i,j\to j'} = \left[\left(P^{\mathrm{FOB},k}_{i',j'} + C^{\mathrm{trans},k}_{i',j'}\right) * \left(\frac{1+\tau_{i',j'}}{1+\tau_{i,j'}}\right)\right] - \left[\frac{P^{\mathrm{FOB},k}_{i,j}}{1+\tau_{i,j}} + C^{\mathrm{trans},k}_{i,j'}\right]$$

Where:

$P^{\mathrm{FOB},k}$ is the Free on Board unit value

$C^{\mathrm{trans},k}$ is the transport cost per unit

τ is the applied tariff rate between specific partners

The first term is the ceiling price that establishes the price to beat or in other words is the maximum allowable CIF budget the importer has for the challenger. We start with the incumbent's actual landed price $\left(P^{FOB,k}_{i',j'} + C^{trans,k}_{i',j'}\right) * \left(1+\tau_{i',j'}\right)$. This represents the total willingness-to-pay of the importer in market j'. We then normalize this price by dividing by the tariff rate the challenger would face $(1+\tau_{i,j'})$. This normalization allows us to capture the differential market access between the incumbent and challenger, either shrinking the target price or expanding it to reveal a structural advantage.

The second term estimates the challenger's cost to serve the new market, establishing the price floor. We define the baseline price not as the previous FOB but as the "squeezed FOB" price realized in the distressed market $\frac{P^{\mathrm{FOB},k}_{i,j}}{1+\tau_{i,j}}$. We assume that if the exporter i is continuing to sell to market j despite a tariff $\tau_{i,j}$, they have effectively absorbed that cost into their margin to maintain market share, even though in practice most of it is passed through and paid by the importer (Cavallo et al. 2021). This assumption allows us to use the observed FOB in market j as a profitable baseline and to quantify the motivation of an exporter to reallocate trade due to a reduction in market access caused by higher tariffs including the revenue lost from fewer units sold.

The CCA captures the pure addition to the FOB margin available to the challenger to match the incumbent's landed price in the target market. A positive CCA shows that the ceiling price is higher than the floor, indicating a double coincidence of wants. The challenger can exit the distressed market j, considering the transport costs to and import tariffs in j', and *still* land the goods at a price less than or at worst matching the incumbent. The positive value represents the surplus per kg that can be shared between the exporter (as higher margins) and the importer (as lower prices). A negative CCA shows that the floor price exceeds the ceiling. Even with margin compression, the exporter's prices or the structural costs of transport or tariff disadvantages in the new market make trade unviable.

In the presence of asymmetric tariffs, the CCA captures the differential impact of trade policy on cost competitiveness. By grounding the analysis in the opposing constraints of the importer's willingness to pay versus the exporter's willingness to accept, the indicator provides a signal consistent with the theory of contestable markets (Baumol et al. 1988), where entry is disciplined by the threat of substitution. Thus, the CCA acts as a practical tool for assessing the scope for optimizing trade relationships based on structural cost efficiency.

3. Case study

To validate the CCA framework, we apply it to a product characterized by high trade volumes and low product differentiation: non-alloyed primary aluminum (HS 760110).

3.1. Rationale and context

Aluminum serves as an ideal test case for two reasons. First, as a commodity priced via the London Metal Exchange (LME), it minimizes quality-driven price noise, ensuring that differentials largely reflect structural cost factors rather than brand premiums. Second, the sector has been a primary target of recent protectionism. In 2018, the United States imposed a 10% tariff on aluminum imports under Section 232. Tariffs on Canada and Mexico were lifted in 2019 after being in force for one full year, with more exemptions following for additional partners. More recently, the second Trump administration escalated these measures, raising tariffs to 25% in March 2025 and subsequently to 50% in June 2025 over pre-existing rates[2].

For Canadian exporters—the fourth-largest producers and the world's largest suppliers of primary aluminum—dependence on the U.S. market creates significant vulnerability. We test whether the

2 Read https://www.nytimes.com/interactive/2025/07/28/business/economy/trump-tariff-tracker.html

2018 tariff shock created a quantifiable arbitrage window for Canadian producers to diversify into Germany, a major industrial importer.

3.2. Data and design

We compute the CCA of non-alloyed primary aluminum between 2017 and 2021 using annual trade data from UN Comtrade at the HS6 level, applied-tariff data from UNCTAD TRAINS at the HS6 level, aluminum duties from the U.S. International Trade Commission at the HS8 level, and transport costs from the UNCTAD Trade and Transport dataset at the HS4 level (assumed consistent at HS6).

We define the parameters as follows:

- Challenger (i): Canada diverting from the U.S.
- Distressed market (j): U.S. imposing a 10% duty
- Target market (j'): Germany
- Incumbent (i'): Brazil (one of Germany's largest suppliers)

The CCA calculates the spread between the reference price (Brazil's landed cost in Germany, adjusted for Canada's tariff exposure) and Canada's potential price (derived from the "squeezed FOB" revenue realized in the tariff-hit U.S. market). To ensure precision, we apply the additional 10 percent U.S. duties on Canadian aluminum for 7 months in 2018 and 5 months in 2019.

3.3. Results

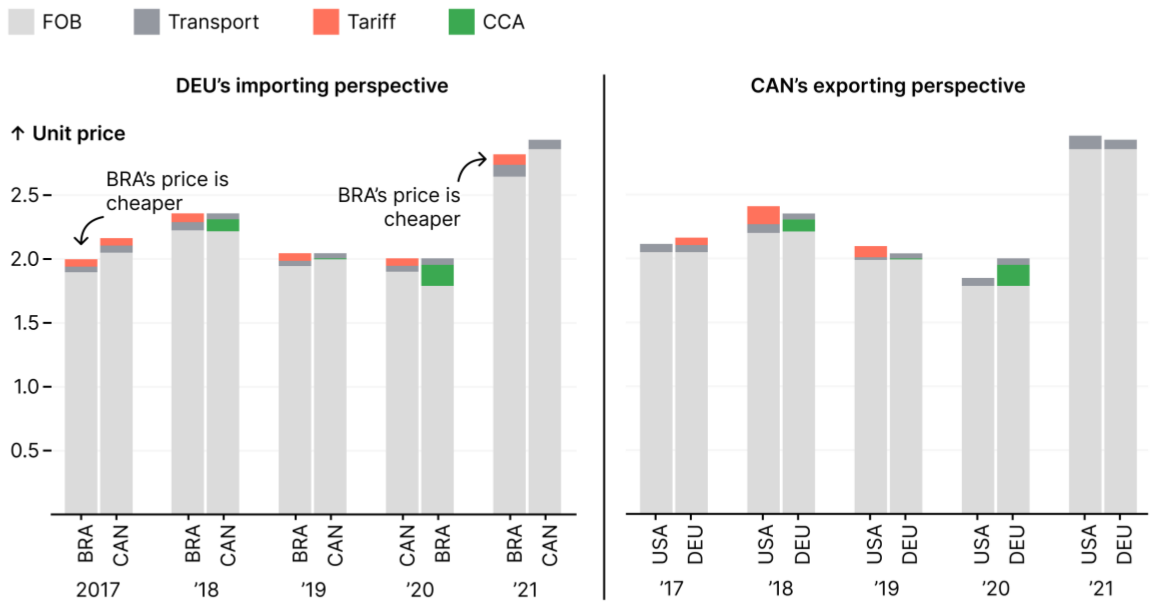
Figure 1 illustrates the evolution of the CCA.

- 2017 (Pre-tariff): The CCA does not appear in the figure as it is negative. Canada enjoyed tariff-free access to the U.S., resulting in a high FOB baseline. Consequently, Canada's minimum viable CIF price" (the floor) exceeded Brazil's landed cost in Germany (the ceiling). Structural costs made diversification unprofitable.

- 2018–2020 (The shock): The introduction of U.S. tariffs fundamentally altered the cost structure. As Canadian exporters faced margin compression in the U.S. (absorbing part of the 10% levy), their "squeezed FOB" baseline dropped. This lowered Canada's "floor" significantly. Simultaneously, Brazil continued to face a 3% MFN tariff in Germany, turning the CCA positive. The model reveals that between 2018 and 2020, Canada could have faced the higher transport costs to Germany and still undercut Brazil's landed price. The U.S. tariffs effectively "subsidized" the diversion by lowering the opportunity cost of exiting the American market.

- 2021 (Recovery): As prices normalized and exemptions were clarified, the CCA returned to negative. In Germany's perspective Brazil's price become comparatively cheaper to Canada's baseline in the U.S., closing the arbitrage window.

Figure 1: Comparison of price estimates from Germany's and Canada's perspectives



Caption: The figure compares the unit price components of non-alloyed primary aluminum from 2017 to 2021. From Germany's perspective (left panel), Brazil's aluminum remained cheaper than Canada's in 2017 and 2021. The CCA turns positive between 2018 and 2020 suggesting potential gains from switching to Canada. From Canada's perspective (right panel), export prices to Germany become favorable relative to the distressed U.S. market prices.

4. Conclusion

This paper introduces the CCA indicator to assess latent export opportunities by operationalizing price arbitrage. By decomposing landed prices into unit values, transport costs, and tariffs, the CCA identifies when price differentials create structural incentives for trade diversion. Our case study on non-alloyed primary aluminum confirms that U.S. tariffs (2018–2020) created quantifiable incentives for Canadian producers to reconfigure supply chains toward Germany. These findings illustrate the value of a cost-based approach for anticipating trade diversion and evaluating market contestability.

We identify three critical boundary conditions. First, reliance on unit values restricts utility to homogeneous sectors, as price observables may not capture quality differentiation. Second, because tariff incidence varies, the CCA operates as a competitiveness range, capturing incentives driven by either margin compression (absorption) or volume loss (pass-through). Third, the CCA represents a frictionless baseline; it identifies the financial potential for arbitrage but does not capture non-price frictions, such as port capacity or contracting costs, that restrict real-world reallocations.

Future research can expand the CCA's utility in three key directions. First, moving beyond annual data to high-frequency analysis would allow researchers to measure the lag time between a tariff shock and the materialization of trade diversion. Second, the framework can be adapted for industrial policy design such as to calculate the precise level of subsidy required to make a strategic market financially viable for domestic exporters. Finally, embedding the CCA into structural gravity models would enable counterfactual simulations that account for multilateral resistance and elasticity of substitution. This would transform the CCA from a static screening tool into a dynamic predictive model for global supply chain reconfiguration.

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