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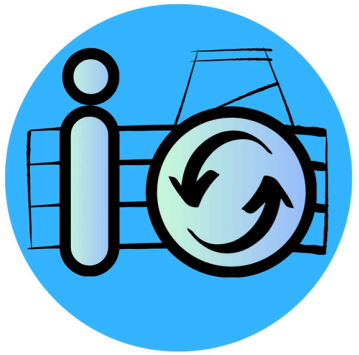

Decomposing the effective rate of protection in Brazil between 2005 and 2023: trade policy or technical change effects?

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Motivation

- The nominal tariff helps to understand the country's tariff barriers and import policy over time.
- Limitations when qualitatively comparing the level of protection granted to different sectors
  - Productive chains
  - protection effectively provided to national goods should also consider the protection given to suppliers of inputs used in the production process.

Motivation

- Effective rate of protection (ERP)
  - Balassa (1971) and Corden (1971).
  - Measures the level of protection given to final goods by adjusting for the protection of inputs.
  - Compares the nominal tariffs applied to final goods in different sectors from the tariffs on their inputs
  - Inputs: domestic and imported technical coefficients from input-output tables.

Objetive

- Examine the changes in the effective protection rate (ERP) for Brazilian tradable goods from 2005 to 2023

- The novelty of this study lies in its methodology, which unravels the changes in effective protection between two periods, thereby determining the contributions of tariff changes and technical coefficients (domestic and imported) to effective protection in percentage terms.

Definition of ERP

$$\pi_j = \frac{t_j \; - \sum_i \left[\left(d_{ij} \frac{(1+t_j)}{(1+t_i)} + m_{ij}(1+t_j) \right) t_i \right]}{1 - \sum_i \left(d_{ij} \frac{(1+t_j)}{(1+t_i)} + m_{ij}(1+t_j) \right)}$$

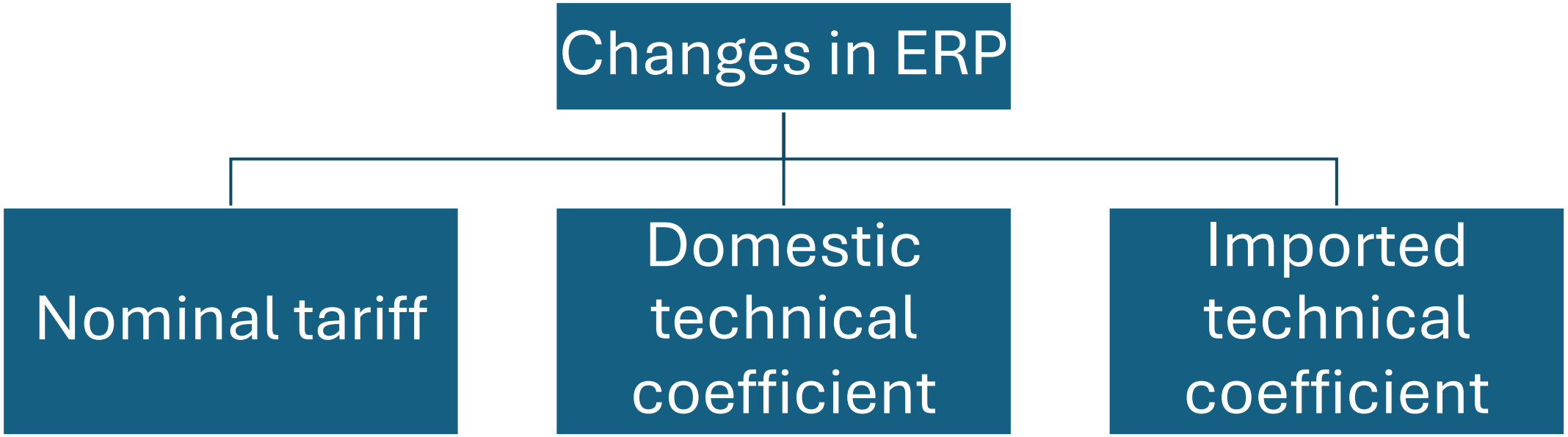
- π_j: ERP
- t_j: final goods nominal tariff
- t_i: input nominal tariff
- d_{ij}: domestic technical coefficient
- m_{ij}: imported technical coefficient

Data

- Nominal tariff
  - Secretariat of Foreign Trade (SECEX) of the Brazilian Ministry of Development, Industry, and Commerce
  - Nominal tariff by NCM (Common classification of MERCOSUR)
- Input-output tables:
  - Alves-Passoni and Freitas (2023)
  - 2005
  - 2024: we use IOT 2019 (before the pandemic of Coronavirus-19)
- Data level:
  - 91 commodities, but only 72 are tradable goods
  - Domestic and imported inputs by commodities after using a market-share matrix

Decomposition

- $\Delta\pi_j = \pi_j(2024) - \pi_j(2005)$
- $\Delta\pi_j = \Delta\mathrm{t} + \Delta\mathrm{d} + \Delta\mathrm{m}$



Decomposition

$$\pi_j = \frac{t_j - \sum_i \left[\left(d_{ij} \frac{(1+t_j)}{(1+t_i)} + m_{ij}(1+t_j) \right) t_i \right]}{1 - \sum_i \left(d_{ij} \frac{(1+t_j)}{(1+t_i)} + m_{ij}(1+t_j) \right)}$$

- Why the decompostion is important:
  - The exact impact of changes in in $t_j$and t_i on π_j is not clear and depends on the specific values of technical coefficients. It also relies on the relative magnitudes of t_j and t_i.
  - complex relationship between tariff policies and production dynamics, emphasizing the need for a detailed understanding of these factors in influencing trade outcomes.

Decomposition

- SDA with 3 variables – 6 different decomposition
  - Usual treatment: average of polar decomposition (Dietzenbacher and Los, 1998)
  - We use the weights given by the formula proposed by Siegel (1945) generalization of Bennet's indicator, which is a generalization of the Fisher index.
    - De Boer (2009) and de Boer and Rodrigues (2020) demonstrate that it is equivalent to the arithmetic mean of all elementary decompositions.
  - Advantages of Bennet:
    - Non-arbitrary decision in which decomposition is used,
    - consistency in aggregation
    - robustness to zero values and
    - changes in sign

Results

- The primary factor influencing changes in ERP is the alteration in nominal tariff rates.
  - This outcome is expected, given that tariff values are significantly larger in magnitude compared to technical coefficients.
- Second: domestic technical coefficients
- Third: imported coefficients

Results

- The first interesting observation when analyzing the ERP between 2003 and 2023 is that the average decreased.
- While this was largely due to the reduction in the nominal tariff (9.8% to 8.4%), the decrease in the ERP was less significant (11.4% to 10.9%).
- This is because there was a decrease in domestic technical coefficients, indicating lower use of inputs.
- However, imported technical coefficients contributed positively to the increase in tariffs, but to a lesser extent than the decline in domestic coefficients.
- Therefore, despite falling nominal tariffs, combining these effects meant that the ERP drop was smaller.

Results

- transmission effect between the sign of the difference in the variables in level and their contribution to the decomposition
  - The difference surges because the changes are weighted by the values of the other variables.

- Number of cases that goes in the same direction (positive or negative:)
  - Nominal tariff: 76.4%
  - Domestic coefficient: 58.3%
  - Imported coefficient: 69.4%

Results

- The most interesting case is the "Automobiles, trucks, and utility vehicles"
- This product has the highest ERP, and it changed from 60,6% to 63.9%, an increase of 9.8p.p.
  - The nominal tariff incresed from 31% to 33%. However, the contribution to the 3.6 change is: -0.51p.p.
- In the case of technical coefficient, the contribution of -6.08 percentage points. In this case, an increase in domestic technical coefficients (by 1%) was observed, but with a negative contribution to the tariff.
- The main explanation was the increase of imported coefficient
- Considering that the nominal tariff for this product also increased, the explanation for this negative contribution would be the difference between t_j and t_i, meaning that it is likely that the inputs used in the production of this product have increased relatively more than the product itself.

Results

- When examining the decomposition for 2005-2023, it was observed that 21 products experienced an increase in their ERP, representing 30% of the 72 analyzed products.
- Among these, 12 saw an increase in their nominal tariff, indicating that the contribution of the nominal tariff was in the same direction as the nominal variation.
- The products where this occurred are as follows: "Ethanol and other biofuels," "Tobacco products," "Other dairy products," "Clothing and accessories," "Manufacture of other textile products," "Beverages," "Automobiles, trucks, and utility vehicles," "Trucks and buses, including cabins, bodies, trailers, parts, and accessories," "Footwear and leather goods," "Household appliances," "Rubber articles," "Cast steel and non-ferrous metal parts."

Results

- The products that experienced the largest decrease in effective protection tariff are generally agricultural products, such a
  - "Fishing and aquaculture (fish, crustaceans, and mollusks)," "Coffee beans,"
  - "Vegetable and animal oils and fats,”
  - "Sugarcane,"
  - "Soybeans,”
  - "Rice, wheat, and other cereals,"
  - "Pulp," "Products of forestry and logging,"
  - "Cotton, other temporary crop fibers," and
  - "Corn."

Results

- Notably, the product "Aircraft, boats, and other transport equipment," which historically has great innovative potential in Brazil, is ranked 68th in tariff change, mainly affected by the decline in nominal tariff.
- Other capital-intensive products that reduced their effective tariffs include "Office machines and data processing equipment," "Electronic material and communications equipment," "Machinery and equipment," and "Machinery, appliances, and electrical materials," largely due to the reduction in nominal tariffs.

Final remarks

- Key Findings
  - ERP provides a more accurate reflection of protection levels than nominal tariffs alone.
  - Highlighted the complexities of import policy and its effects on domestic value-added and production competitiveness.
- Complexity of Tariff Impacts
  - Changes in nominal tariffs generally aligned with their contribution to ERP changes.
  - Domestic technical coefficients often exhibited sign reversals.
  - Changes in input usage and production structures significantly influence the effective protection experienced by different sectors.

Final remarks

- Decomposition Analysis
  - Provided a detailed evaluation of the effects of nominal tariffs, domestic, and imported technical coefficients.
  - Demonstrated the interconnectedness of tariff policies and sectoral dynamics.

- Policy Implications
  - Detailed, decompositional approach offers a clearer picture of how trade policies affect different sectors.
  - More accurate assessment of protection levels.
  - Informs policymakers on the nuanced effects of tariff changes, guiding more effective trade and industrial policies.

Thanks

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