# The Effectiveness of Development-Oriented Non-Reciprocal Trade Preferences in Promoting Agricultural Trade

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# Introduction

- Non-reciprocal trade preferences (NRTPs) have proliferated in recent decades (23 providers as of 2023 including EU-27)
  - Intended to facilitate export-driven growth for developing countries (DCs) through enhanced market access
  - Traditionally offered by advanced economies, however, a growing number of non-advanced providers (China, India, Thailand, others)
- NRTPs are of heightened relevance for agricultural trade
  - Tariffs on agricultural products remain enduringly high (average of 21.2% for ag compared to 12.9% for non-ag)
  - Agriculture still accounts for sizable shares of GDP and employment in DCs

# Introduction

We investigate the trade impacts of NRTPs at a detailed commodity level by conducting two interrelated empirical analyses:

1. Assess the trade impacts of NRTPs by estimating a structural gravity model of trade for 23 major agricultural commodities (worth $519 billion of trade as of 2018)
2. Quantify the size of the trade impacts of NRTPs in a counterfactual simulation exercise
    - Focusing in particular on exports from preference beneficiary countries to preference donor countries

# Introduction

**Value added by this paper**

- Existing work shows mixed impacts of NRTPs
  - Positive impacts of many NRTPs and Generalized System of Preferences (GSP) (Cirera et al., 2016; Gil-Pareja et al., 2016; Sharma et al., 2019, 2021)
  - Impacts attenuated by preference erosion, policy uncertainty, regulatory burdens (Francois et al., 2006; Hakobyan, 2015; Borchert and Di Ubaldo 2020)
- Most existing analyses focus on broad sectoral aggregations or specific preference schemes (e.g., US or EU GSP); many employ reduced-form gravity estimations
- We evaluate the trade effects of **all existing NRTPs** in a **completely theory-consistent** framework at the **product level**

# Introduction

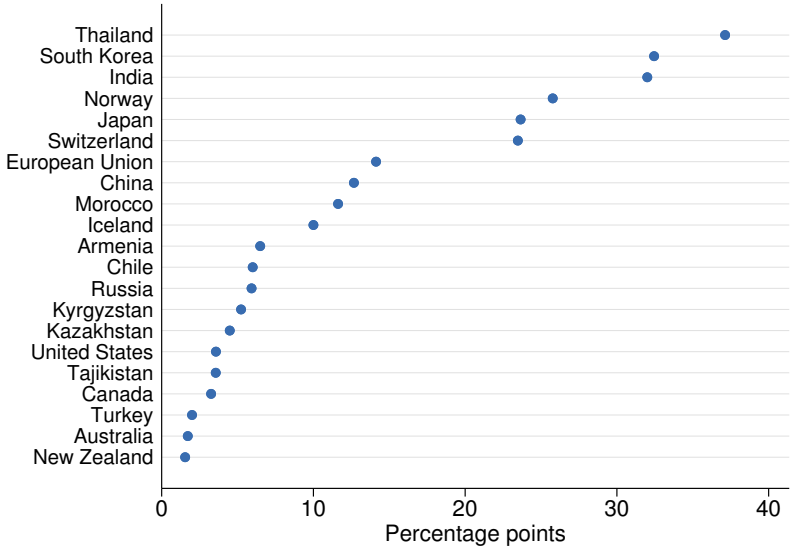
**Preview of results**

- Econometrics: we estimate tariff elasticities of bilateral trade for 23 products
  - Implied elasticities of substitution from –6.9 (cocoa beans) to –1.8 (wheat)
- Simulation: we quantify the trade impacts across countries and commodities
  - NRTPs account for **$1.4 billion** in expanded exports from beneficiaries to donors relative to a MFN counterfactual
  - Considerable heterogeneity across countries and commodities

# Commodities in Analysis

| Commodity | DC share of exports (%) | Avg. NRTP pref. margin (% points) | Commodity | DC share of exports (%) | Avg. NRTP pref. margin (% points) |
|---|---|---|---|---|---|
| Avocados | 67.2 | 4.0 | Rice | 83.2 | 32.5 |
| Bananas | 84.0 | 10.5 | Rubber | 93.9 | 2.3 |
| Cashews | 90.3 | 5.8 | Soybean Meal | 71.9 | 5.3 |
| Cocoa Beans | 92.3 | 4.9 | Soybean Oil | 70.3 | 5.9 |
| Coffee | 59.5 | 4.3 | Soybeans | 63.9 | 5.4 |
| Cotton | 48.1 | 4.3 | Sugar | 73.6 | 48.0 |
| Grapes | 45.7 | 4.6 | Sunflower Oil | 73.0 | 7.4 |
| Maize | 46.8 | 6.8 | Tea | 77.9 | 2.7 |
| Meat (Bovine) | 31.4 | 49.2 | Tobacco | 73.3 | 14.5 |
| Meat (Pig) | 7.4 | 12.8 | Tomatoes | 50.0 | 17.1 |
| Meat (Poultry) | 36.5 | 10.3 | Wheat | 48.6 | 16.4 |
| Palm Oil | 91.7 | 8.4 | | | |

# Average Preference Margins by Country



# Gravity Model and Empirical Approach

**Commodity-level structural gravity model**

$$X_{ijkt} = \exp\left\{\beta_{1k}\log\left(1+\tau_{ijkt}\right) + \boldsymbol{Z}'_{ijt}\boldsymbol{\beta} + \gamma_{ikt} + \delta_{jkt} + \eta_{ijk}\right\} + \epsilon_{ijkt}$$

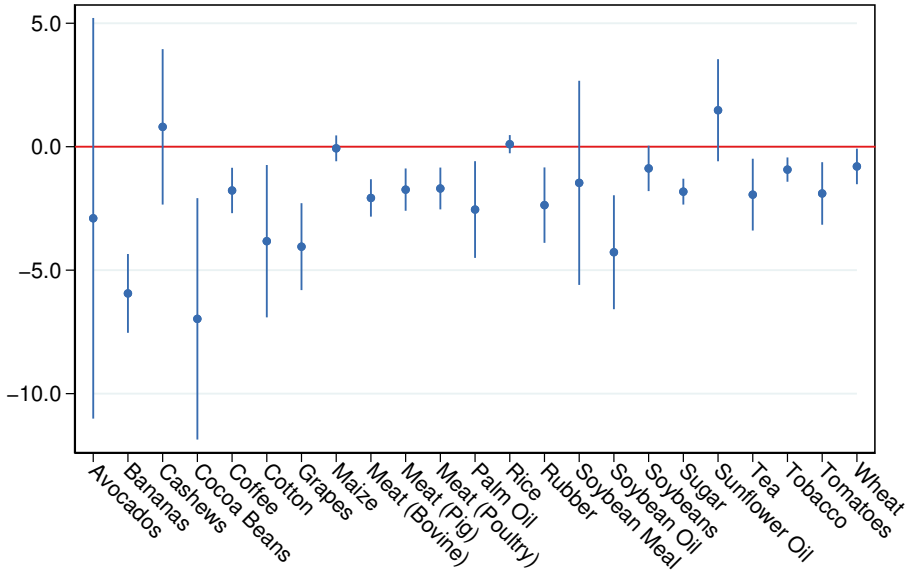
- Bilateral export volumes (including intra-national trade) as a function of trade policy and FEs
  - $\tau_{ijkt}$: Tariffs (pref. and MFN); from UNCTAD (2022) TRAINS
  - $\boldsymbol{Z}'_{ijt}$: PTA & WTO indicators
  - $\gamma_{ikt}$, $\delta_{jkt}$, $\eta_{ijk}$ FEs: exporter-year, importer-year, bilateral pair
- Estimate with PPML separately for each commodity based on annual data for 2000–2018, cluster $\epsilon_{ijkt}$ by bilateral pair

# Gravity Model and Empirical Approach

**Notes on the gravity estimation**

- $\gamma_{ikt}$ and $\delta_{jkt}$ **perfectly** account for multilateral resistance terms (MRTs), market sizes, non-discriminatory policies, etc. (Baldwin and Taglioni, 2006)
- $\eta_{ijk}$ captures **all time-invariant determinants of trade costs** and **mitigates endogeneity of trade policy** (Baier and Bergstrand, 2007)
- Inclusion of intra-national trade volumes: **consistency with theory**, **improved identification** of trade policy impacts (Yotov, 2022)

# Tariff Elasticity Estimates and 95% CIs



# Counterfactual Simulation Analysis

**Conditional GE Counterfactual Analysis (**Anderson et al., 2018**)**

Based on econometric estimates, simulate counterfactual bilateral trade volumes for 2018 (latest sample year)

- Baseline: tariff rates under observed NRTPs ($\tau_{ijk}^{B}$)
- Counterfactual: revert NRTP rates to MFN rates ($\tau_{ijk}^{C}$)
- Accounting for both the bilateral (direct) and multilateral (indirect) impacts of changes in trade policy
- Focusing on counterfactual impacts on preference beneficaries' exports to donor countries

# Counterfactual Simulation Analysis

**Two-step procedure:**

**Step 1**: Given $\widehat{\beta}_1$, $\widehat{\boldsymbol{\beta}}_k$, and $\widehat{\eta}_{ijk}$, estimate the constrained regression

$$X_{ijk} = \exp\left\{\widehat{\beta}_1 \log\left(1+\tau_{ijk}^{\mathsf{B}}\right) + \boldsymbol{Z}_{ij}'\widehat{\boldsymbol{\beta}}_k + \gamma_{ik} + \delta_{jk} + \widehat{\eta}_{ijk}\right\} + \epsilon_{ijk}$$

to obtain $\widehat{\gamma}_{ik}^{\mathsf{B}}$ and $\widehat{\delta}_{jk}^{\mathsf{B}}$ (for insig. $\widehat{\beta}_1$, use estimates from Fontagné et al., 2022)

- From Fally (2015), the FEs directly capture the MRTs consistent with observed output/expenditures
- Baseline trade:

$$X_{ijk}^{\mathsf{B}} \equiv \exp\left\{\widehat{\beta}_1 \log\left(1+\tau_{ijk}^{\mathsf{B}}\right) + \boldsymbol{Z}_{ij}'\widehat{\boldsymbol{\beta}}_k + \widehat{\gamma}_{ik}^{\mathsf{B}} + \widehat{\delta}_{jk}^{\mathsf{B}} + \widehat{\eta}_{ijk}\right\}$$

# Counterfactual Simulation Analysis

**Two-step procedure:**

**Step 2**: Using counterfactual (MFN) tariff rates ($\tau_{ijk}^{C}$), estimate

$$X_{ijk} = \exp\left\{\widehat{\beta}_1 \log\left(1+\tau_{ijk}^{C}\right) + \boldsymbol{Z}_{ij}'\widehat{\boldsymbol{\beta}}_k + \gamma_{ik} + \delta_{jk} + \widehat{\eta}_{ijk}\right\} + \epsilon_{ijk}$$

to obtain $\widehat{\gamma}_{ik}^{C}$ and $\widehat{\delta}_{jk}^{C}$ (FEs/MRTs under the counterfactual scenario)

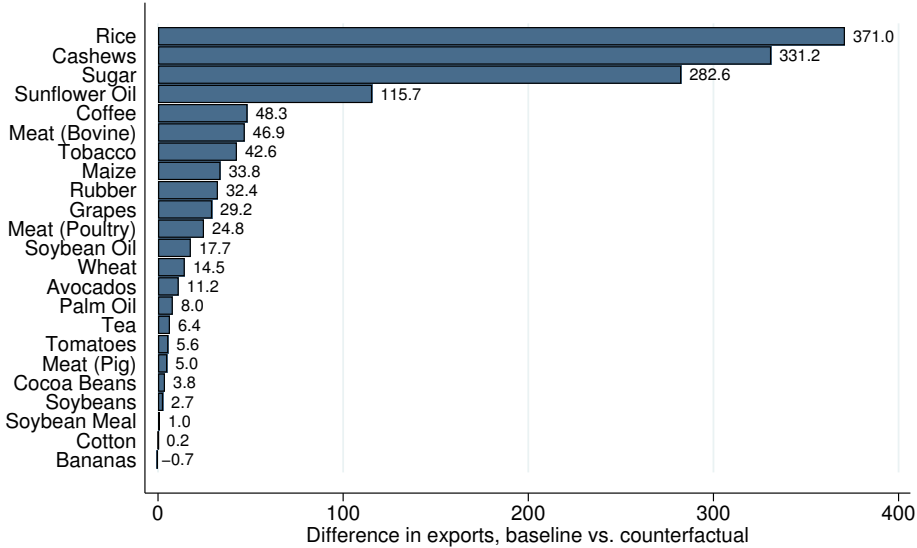
- Counterfactual trade:

$$X_{ijk}^{C} \equiv \exp\left\{\widehat{\beta}_1 \log\left(1+\tau_{ijk}^{C}\right) + \boldsymbol{Z}_{ij}'\widehat{\boldsymbol{\beta}}_k + \widehat{\gamma}_{ik}^{C} + \widehat{\delta}_{jk}^{C} + \widehat{\eta}_{ijk}\right\}$$

- Counterfactual trade impacts:

$$\Delta X_{ijk} \equiv X_{ijk}^{B} - X_{ijk}^{C}$$

# Counterfactual Trade Impacts by Commodity (in million USD)



# Counterfactual Simulation Analysis

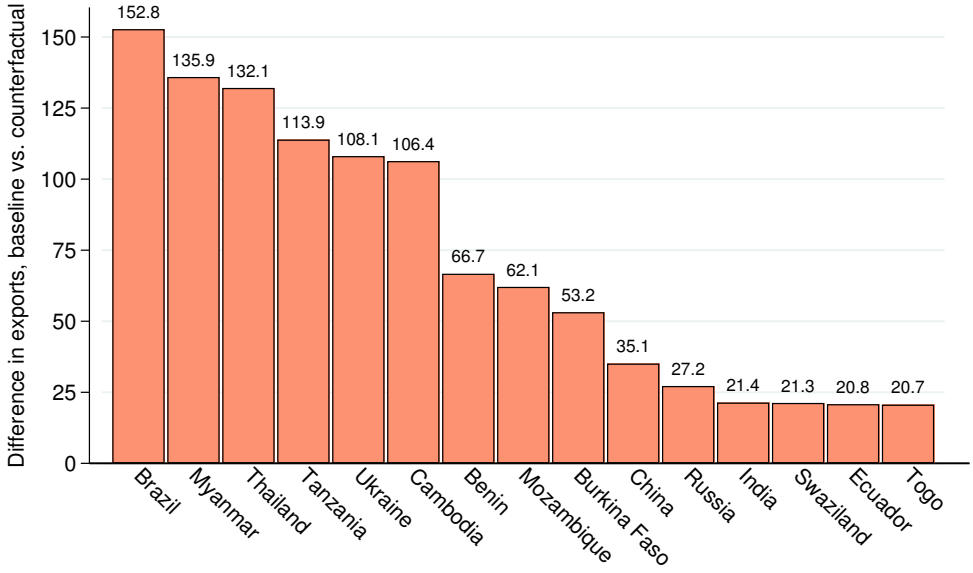
**Total estimated trade impacts: $1.4 billion**

Largest trade impacts are realized for

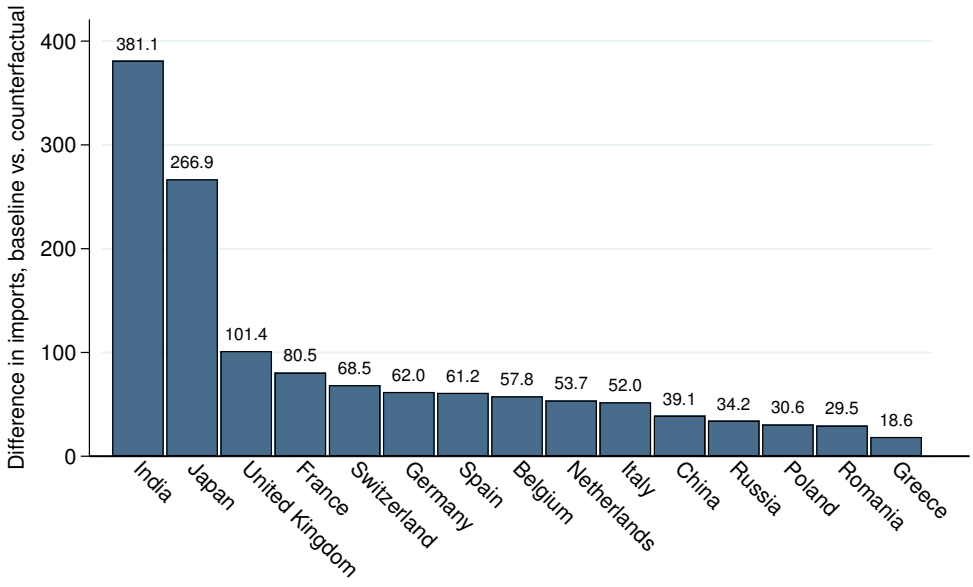
1. Commodities that face high preference margins
2. Commodities for which import demand is elastic
3. Commodities for which most exports are from DCs

- However, exceptions to each of these
- Notably, many extensively traded commodities (e.g., wheat, soybeans) see negligible impacts

# Counterfactual Export Impacts by Country (in million USD)



# Counterfactual Import Impacts by Country (in million USD)



# Linkages with the 15 Largest Counterfactual Impacts

| Exporter | Importer | Commodity | $\Delta X_{ijk}$ |
|---|---|---|---|
| Thailand | Japan | Rice | 175.0 |
| Tanzania | India | Cashews | 107.8 |
| Benin | India | Cashews | 69.2 |
| Colombia | United States | Bananas | 63.3 |
| Burkina Faso | India | Cashews | 55.1 |
| Mozambique | India | Cashews | 38.4 |
| Ukraine | Switzerland | Sunflower Oil | 35.3 |
| Cambodia | France | Rice | 32.3 |
| Myanmar | China | Rubber | 27.0 |
| Myanmar | Belgium | Rice | 25.4 |
| China | Japan | Rice | 22.9 |
| Brazil | United States | Sugar | 21.5 |
| Togo | India | Cashews | 19.2 |
| Uganda | India | Coffee | 17.4 |
| Brazil | Japan | Maize | 17.2 |

# Counterfactual Simulation Analysis

Widely dispersed impacts on exports, concentrated impacts on imports

- Most exporters see expanded trade in only a few commodities
  - e.g., Brazil's sugar exports ($102.4 million), Myanmar's rice and rubber exports ($102.7 million and $23.5 million, respectively)
- Strikingly, many donors which are DCs themselves see large import impacts
  - e.g., India, Thailand
- Muted impacts for many large NRTP providers (US, Canada, Australia)

# Conclusion

- We estimate the counterfactual impact of NRTPs to be around $1.4 billion in expanded exports from beneficiary countries to donor countries
- These impacts exhibit substantial heterogeneity, and most are concentrated in only a handful of commodities
  - Explained by a combination of preference margins, trade elasticities, and importance in DCs' exports
- NRTPs seem to be effective in promoting agricultural trade in some cases, but quite limited in others