

Industrial policy and trade tensions in strategic sectors

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Motivation and Context

- Rise in industrial policies (IP) targeting sectors of “strategic” importance across advanced and emerging economies ([Evenett et al., 2025](#)).
- Need to assess their effects on trade and welfare across borders:
 - IP may be beneficial for the targeted sectors and countries if they correct market failures and production externalities ([Lashkaripour and Lugovskyy, 2023](#); [Bartelme et al., 2025](#)); but can create misallocation ([IMF, 2025](#); [Garcia-Macia et al., 2025](#));
 - They can also generate spillovers on other sectors and countries ([Hodge et al., 2024](#));
 - Spillovers can go through trade flows ([Rotunno and Ruta, 2024b,a](#); [Machado Parente et al., 2025](#)), contributing to sectoral trade balances and triggering distortive countermeasures.

In this Paper

- **Key questions:**
 - How would recent subsidies shape global markets for strategic industries in the **long run**?
 - How do **tariffs** change the trade effects of these subsidies?
 - What are the implications for global **efficiency and welfare**?
- **Key ingredients:**
 - Estimate **subsidies** across countries and sectors combining data on values and counts.
 - Employ quantitative trade model with **external economies of scale** to simulate the trade effects and welfare implications of policy changes since 2015.
- **Key findings:**
 - Increase in China's market share in **strategic sectors** driven by subsidies and surge in productivity as resources reallocate.
 - Recent tariff actions, biased toward strategic sectors, attenuate China's net exports in these sectors.
 - Combined subsidy and tariff surge lowers **global efficiency** and welfare.

Related literature

- Reduced-form evidence on the trade effects of industrial policy and subsidies on targeted relative to non-targeted products (Rotunno and Ruta, 2024b; Huang et al., 2025; Machado Parente et al., 2025).
 - General equilibrium approach identifying trade spillovers to non-subsidizing countries and sectors.
- Evidence on the global effects of subsidies in trade models with economies of scale (Lashkaripour and Lugovskyy, 2023; Bartelme et al., 2025; Ju et al., 2024; Hodge et al., 2024).
 - Focus on trade effects of subsidy shocks calibrated using novel estimates of subsidy rates.
- Recent work on the effects of industrial policy and tariffs on *aggregate* trade balances (IMF, 2026; Gourinchas et al., 2026; Itskhoki and Mukhin, 2025; Cesa-Bianchi et al., 2026).
 - Static trade model to study implications for *sectoral* trade balances, abstracting from implications for the current account.

Subsidy Estimation

Estimating government support through direct subsidies

- NIPO (New Industrial Policy Observatory) data provide values for subsidy measures across countries and sectors, announced since 2023.
- How can we estimate subsidies for previous years?:
 1. Find the “best” empirical relationship $f(\cdot)$ between subsidy values (S) and counts (NS) in the NIPO sample

$$\Delta S_{i,t}^j = f\left(\Delta NS_{i,t}^j\right) + \alpha_i + \mu^j + \delta_t + \varepsilon_{i,t}^j \quad (1)$$

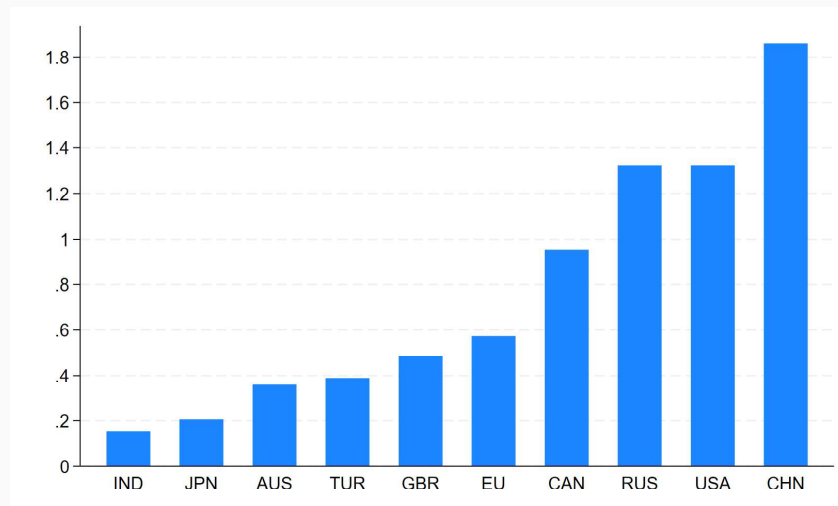
2. Apply it to data from GTA (Global Trade Alert) on counts of subsidies before 2023 to estimate subsidy values.
- 10-fold cross-validation ([James et al., 2013](#)) to select across candidates for $f(\cdot)$: (i) linear and linear-log; (ii) up to 20 bins by centiles of the distribution of NS: and (iii) polynomials (up to 5th).

Estimated Subsidy Rate

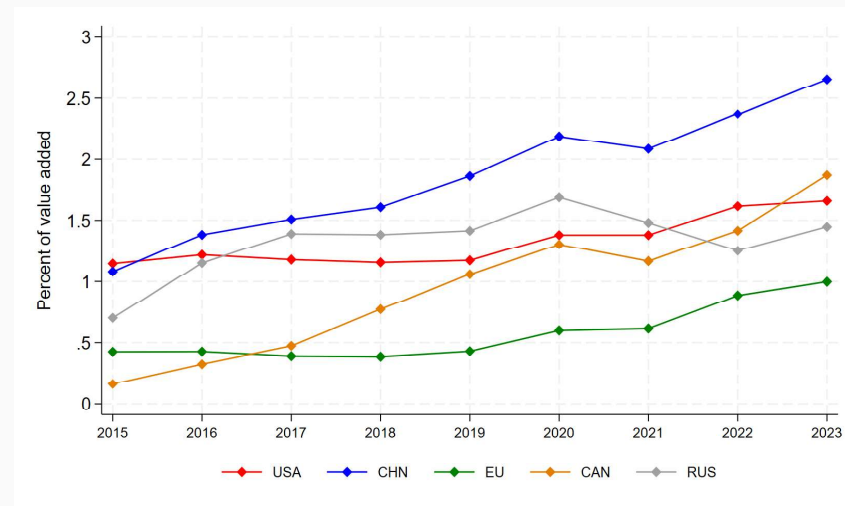
- The selected linear relationship (see [Model validation](#)) is applied to changes in counts of subsidies by sector.
- Levels of aggregate subsidy rates are close to those for China, the US and the EU ([Garcia-Macia et al., 2025](#); [OECD, 2025a](#); [European Commission, 2025](#)).
- Limitations and caveats:
 - Focus on direct transfers (e.g., state aid and grants) misses growing role of tax breaks and preferential access to credit ([OECD, 2025a](#));
 - Mix of government sources and firms' financial statements: firm- or region-specific measures that can belong to a single policy;
 - Differences in reporting and transparency across countries and over time
 - focus on largest ten subsidizers as under-reporting is more severe for emerging economies;
 - Value-count relationship in NIPO data could change over time.

Subsidies as a share of value added at the country level

(a) 2015-23 Average (in %)



(b) 2015-23 changes (in %)

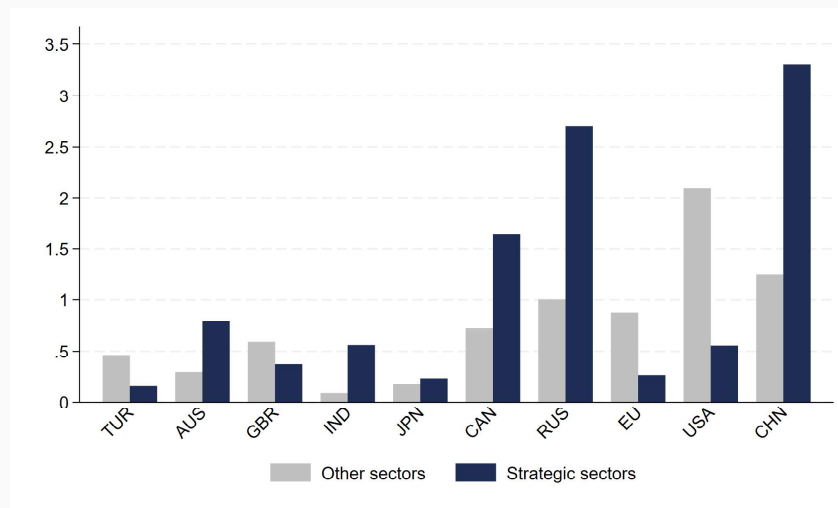


Note: Subsidy values are estimated applying a coefficient of 35.8 to yearly changes in counts of subsidy measures from the GTA data, and taking a cumulative sum over time. Values are divided by sectoral value added obtained from the OECD ICIO, and estimated for 2023 applying yearly GDP growth rates by country.

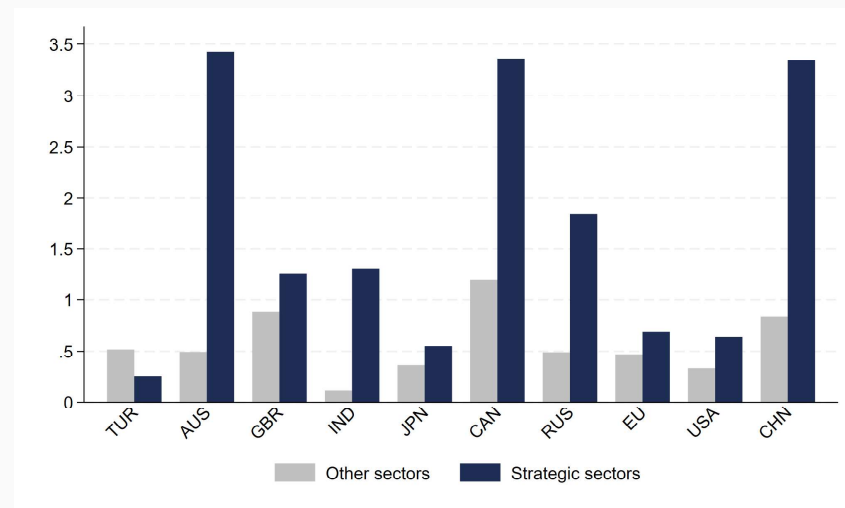
Subsidies as a share of value added across strategic and other sectors

Empirical definition of “strategic”: list of Advanced Technology Products (ATP) by US Census (e.g., biotech, semi-conductors, solar cells, electronics, robotics, nuclear, weapons).

(a) 2015-23 Average (in %)



(b) 2015-23 changes (in %)



Note: Ten countries with the largest estimated subsidy values over 2015-23. Subsidy values are estimated applying a coefficient of 35.8 to yearly changes in counts of subsidy measures from the GTA data, and taking a cumulative sum over time. Strategic sectors are sectors in the OECD ICIO tables with at least one HS 6 digit product included in the ATP list of the US Census bureau. Values are divided by sectoral value added obtained from the OECD ICIO, and estimated for 2023 applying yearly GDP growth rates by country.

The increase in subsidies to strategic sectors in the EU and US is lower than in most other countries.

Model and calibration

Quantitative trade model

- Multi-country, multi-sector general equilibrium model with global input-output linkages, one factor of production (labor), external economies of scale, and perfect competition (Ju et al., 2024).
 - Static model without labor market frictions -> long-run reallocation across sectors.
- Subsidies and import tariffs introduce a wedge between buyer and producer prices.
- Balanced government budget: any mismatch between tariff revenue and subsidy expenditure is offset by transfers to or from consumers.
- Fixed trade balance: Policies can affect net exports at the sector level through reallocation, without any effect on aggregate trade balances.

Trade Shares

- CES preferences and Frechet-distributed productivity within sectors give gravity-style bilateral expenditure shares:

$$\pi_{in}^j = \frac{X_{in}^j}{X_n^j} = \frac{T_i^j (\tilde{S}_i^j)^{\theta_j} (c_i^j \tau_{in}^j \tilde{t}_{in}^j)^{-\theta_j}}{(P_n^j)^{-\theta_j}} \quad (2)$$

- Unit costs c_i^j decreases with sectoral employment through external economies of scale (sectoral scale elasticities ψ_j).
- Subsidy factor $\tilde{S}_i^j = 1 + s_i^j$ amplify absolute advantage.
- Trade elasticity θ_j governs impact of import tariffs $\tilde{t}_{in}^j = 1 + t_{in}^j$ and trade costs τ_{in}^j .

Decomposing the trade effects of subsidies

$$\Delta \ln \text{Exp}_i^j \approx \theta_j \left[\underbrace{\Delta \ln \tilde{s}_i^j}_{\text{Subsidy}} + \underbrace{\psi_j \Delta \ln L_i^j}_{\text{Reallocation}} - \underbrace{\beta_i^j \Delta \ln w_i}_{\text{Wage}} + \underbrace{-(1 - \beta_i^j) \sum_s \gamma_{si}^j \Delta \ln P_i^s}_{\text{I-O Linkages}} \right] + \sum_{n \neq i} \bar{r}_{ni}^j \left(\underbrace{\theta^j \Delta \ln P_n^j}_{\text{Competition}} + \underbrace{\Delta \ln X_n^j}_{\text{Importer demand}} \right).$$

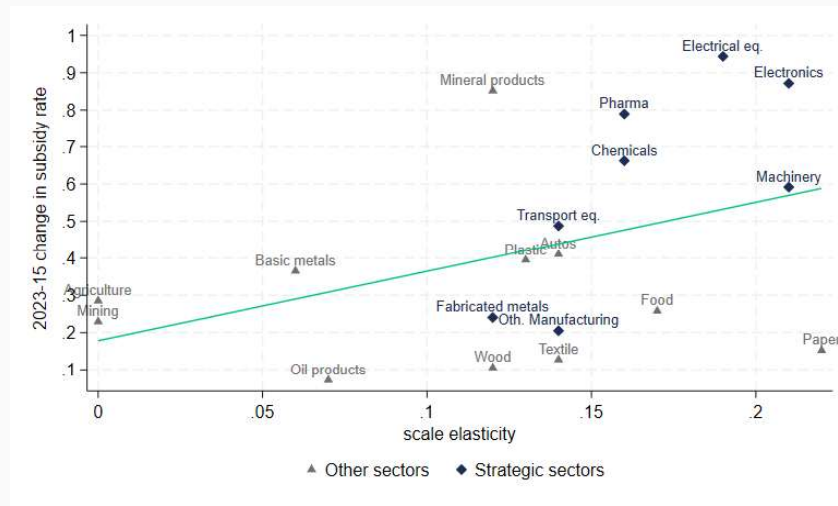
- Positive **Subsidy** effect is the direct PE impact through lower consumer prices (other effects are GE).
- **Reallocation** effect emerges because of EoS and depends on scale elasticity ψ_j .
- **Wage** effect captures terms-of-trade adjustments – normally negative for subsidizing country as w increases.
- Subsidies given to upstream sectors s (including j) lower input prices and boost exports in j through **I-O linkages**.
- Destination market n : negative **competition** effect through changes in the price index, and negative **external demand** effect.

- Policy scenarios:
 - **Subsidies:** Changes in estimated subsidy rates by China, EU and the USA separately, as well as all countries simultaneously.
 - **Tariffs:** US-China tariffs changes over 2018-19 and up to March 2026.
- The model is calibrated for the ten largest subsidizers and a RoW aggregate and 20 sectors (19 goods and a services aggregate). Data on trade, expenditure, production and value added come from OECD ICIO tables ([OECD, 2025b](#))
- Tariff data are from MacMap, [Bown \(2021\)](#) and the WTO-IMF Tariff Tracker ([WTO-IMF, 2026](#)).
- Scale elasticities are from [Bartelme et al. \(2025\)](#), estimated within a framework consistent with our model (correlated with 2015-23 subsidy changes Subsidies and scale elasticities).

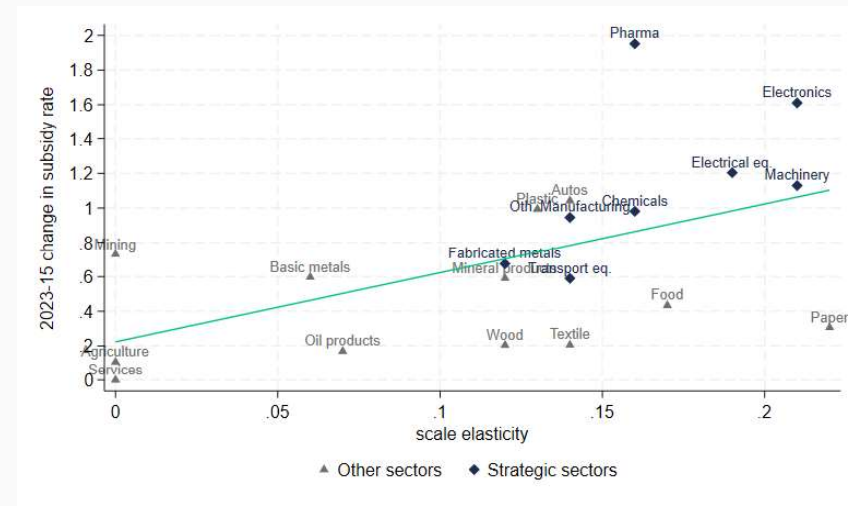
Subsidy shocks and scale elasticities

Changes in subsidy rates and scale elasticities across sectors

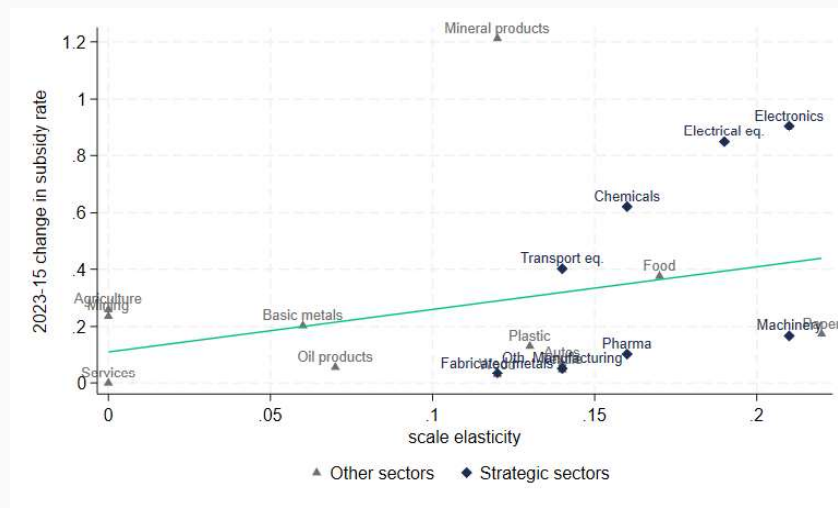
(a) Global



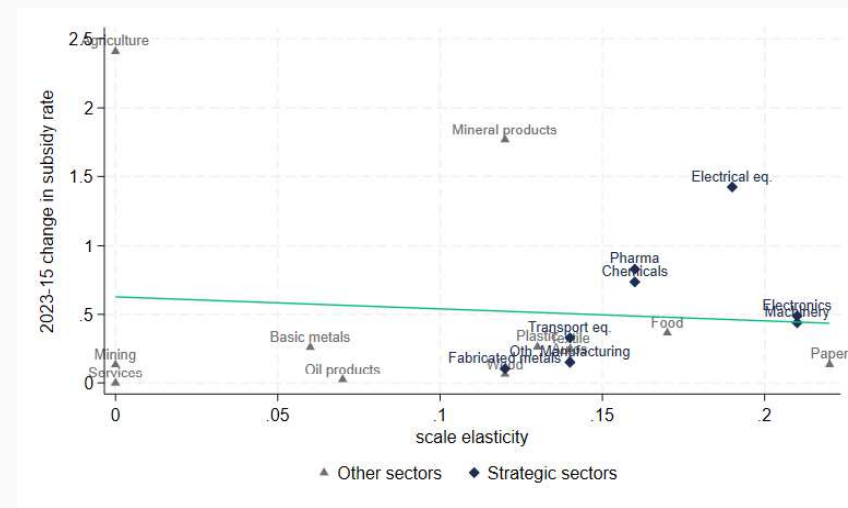
(b) China



(a) EU



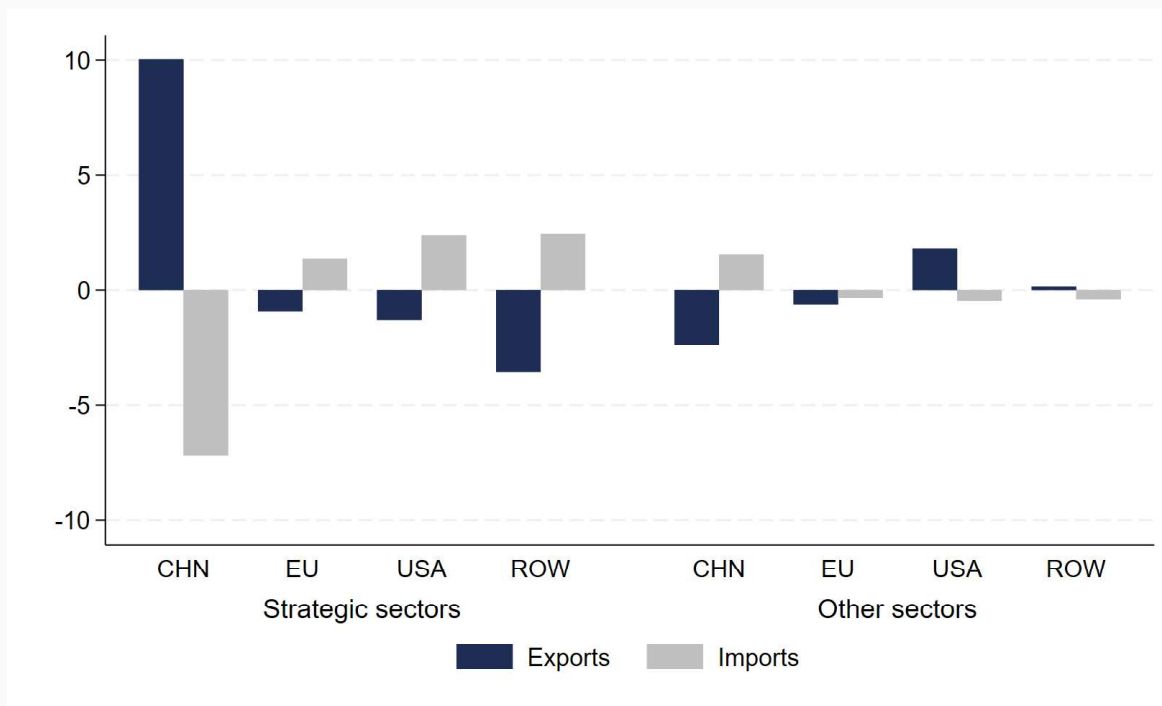
(b) USA



Results: Trade effects of subsidy shocks

Subsidies boost exports in strategic sectors and depress exports by countries that subsidize less

Simulated changes in trade values (in %)



China-only subsidies

EU-only subsidies

USA-only subsidies

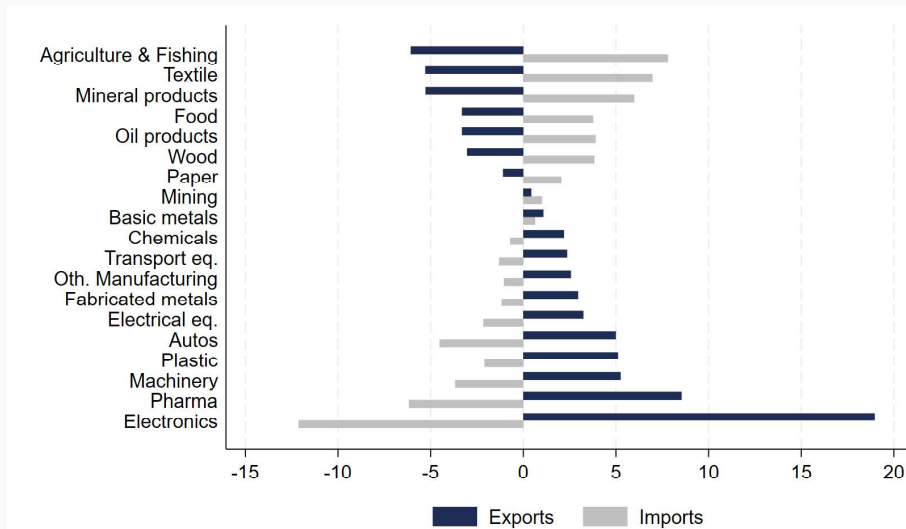
- Trade impact of China's subsidies dominates that of others' subsidies.
- Spillovers decreasing exports by other countries in strategic sectors.
- Opposite patterns in other sectors.

Different specialization patterns across countries

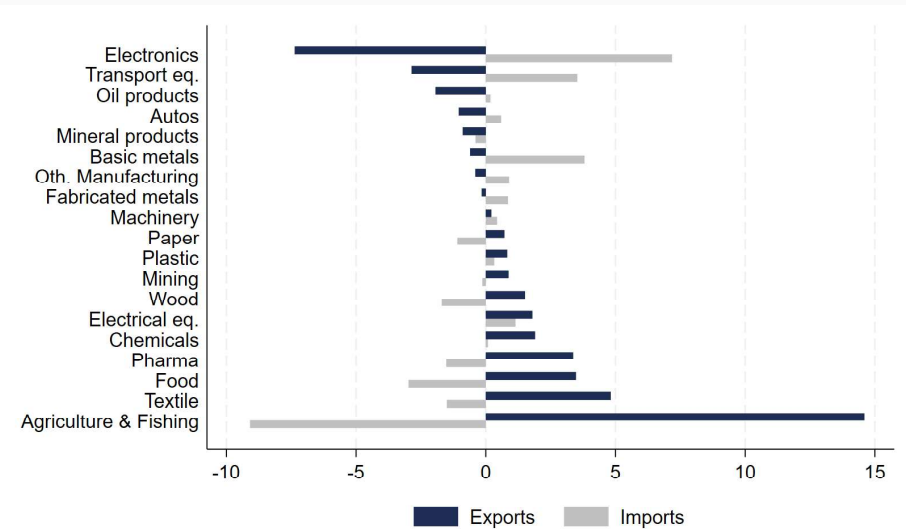
China specializes in electronics, while in the US, subsidies promote exports in non-strategic sectors.

Simulated changes (in %) in trade flows under an all-subsidies scenario

(a) China



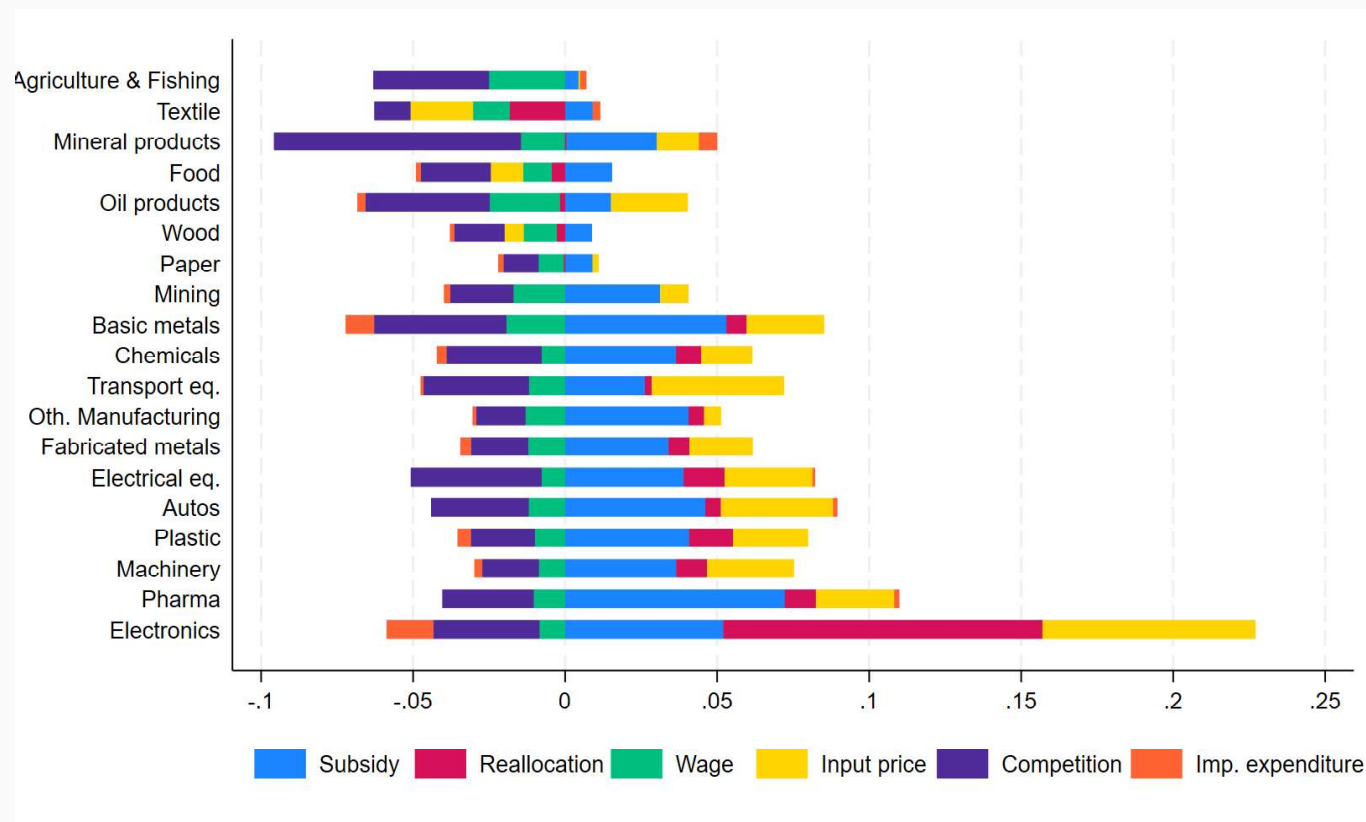
(b) USA



Decomposing the export effects of subsidies in China

- Direct effect of subsidies is amplified by the surge in productivity due to reallocation (e.g. electronics) and input-output linkages.
- Lower wages abroad increase competition and attenuate export increases.

Components of subsidy effects on China's exports

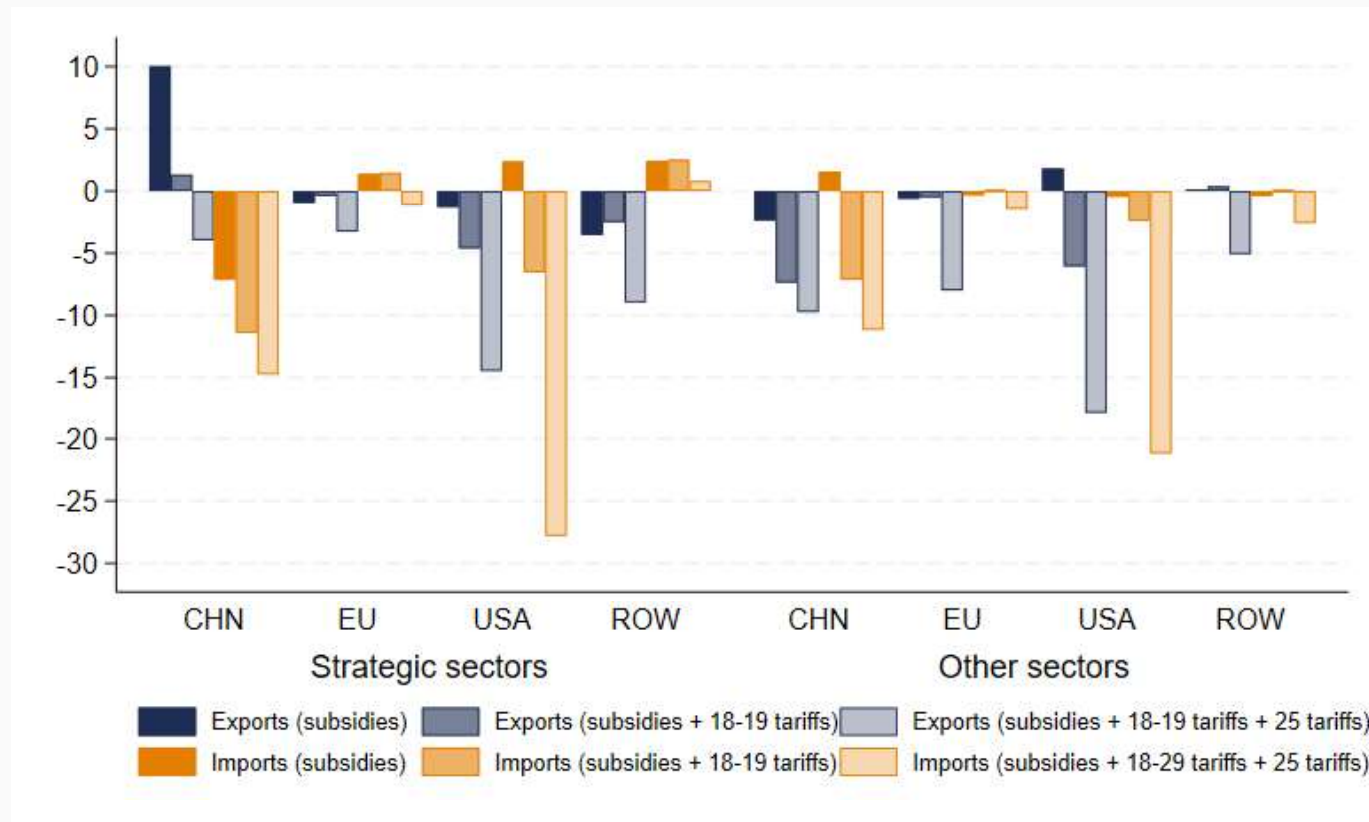


Results: Trade effects of subsidies and 2018-19 and 2025 tariffs

Tariff actions offset subsidy-led rise in China's exports

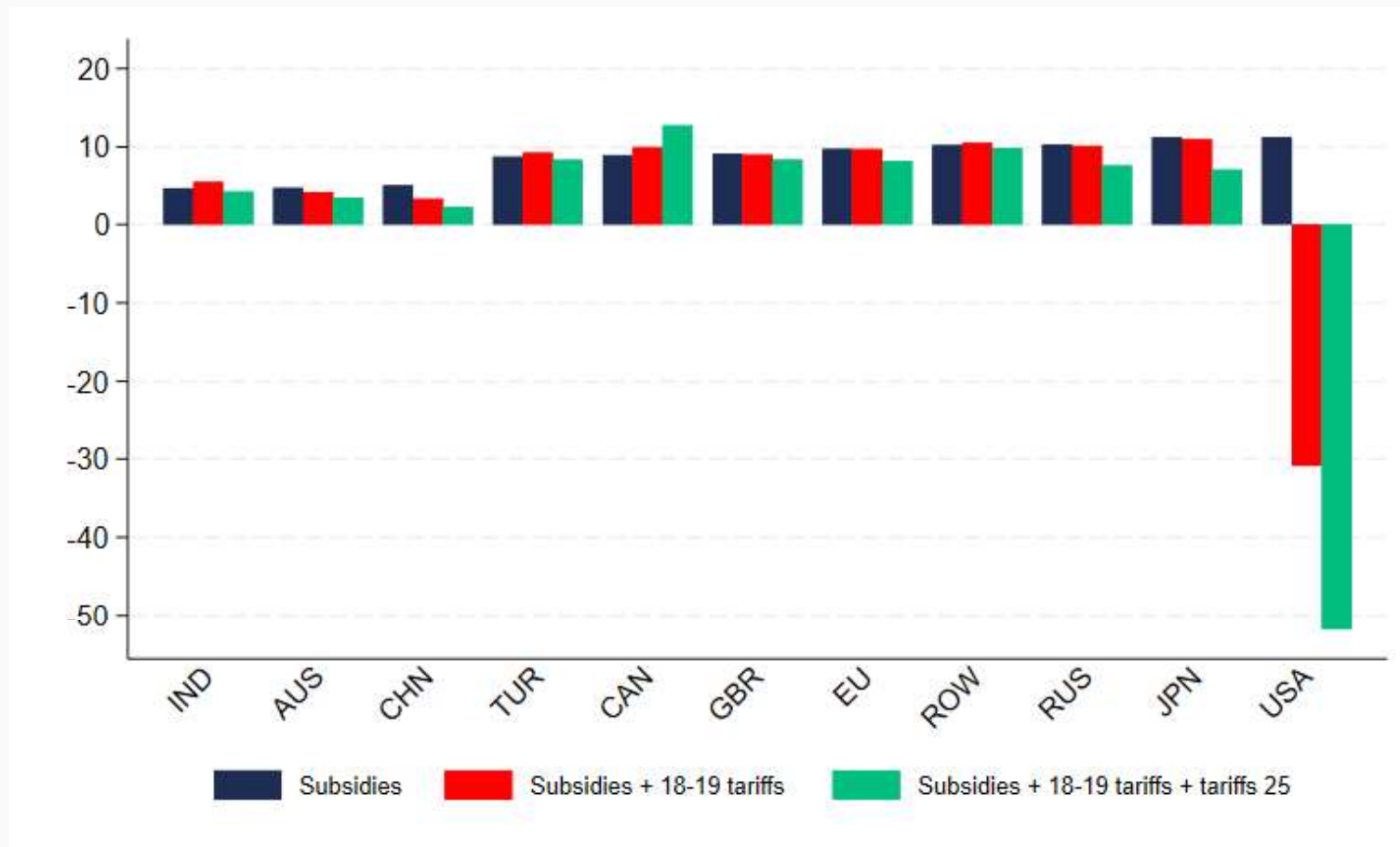
- Biased toward strategic sectors, US tariffs lower China's exports.
- The implicit subsidy through import tariffs boost domestic sales but fails to increase US exports in strategic sectors.
- Across-the-board US tariffs in 2025 deepen decline in US imports.

Simulated changes in trade flows (in %)



Negative productivity effects attenuate the increase in China's exports in strategic sectors

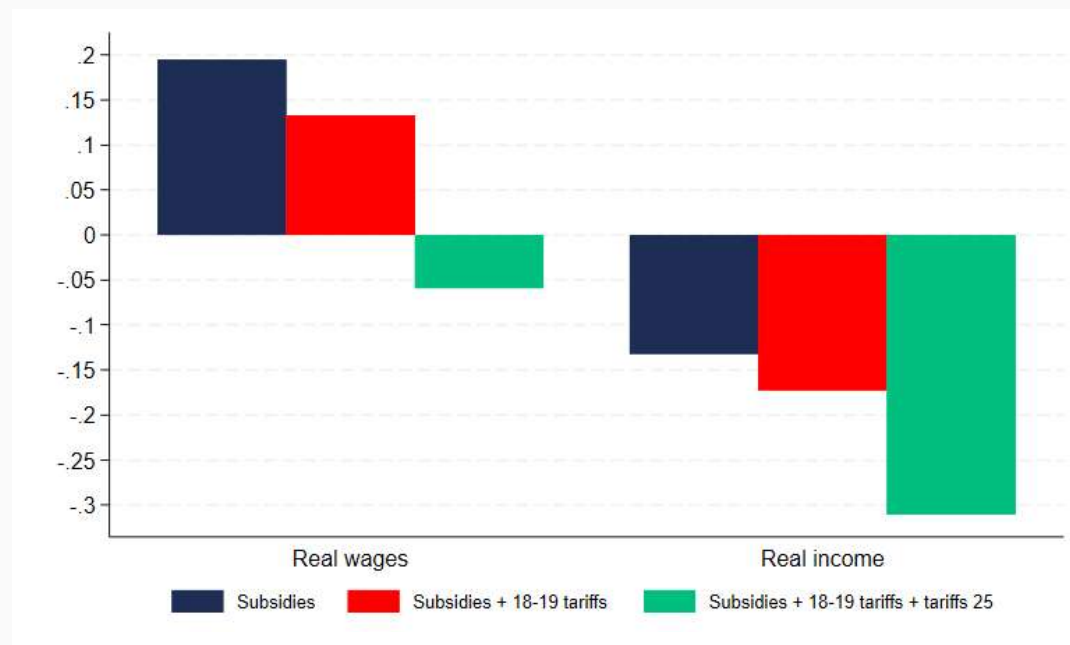
Simulated changes (in %) in China's sales in strategic sectors by destination



Results: Welfare effects

Uncoordinated subsidies and tariff actions deepen global inefficiencies

Simulated changes in global real wages and real income



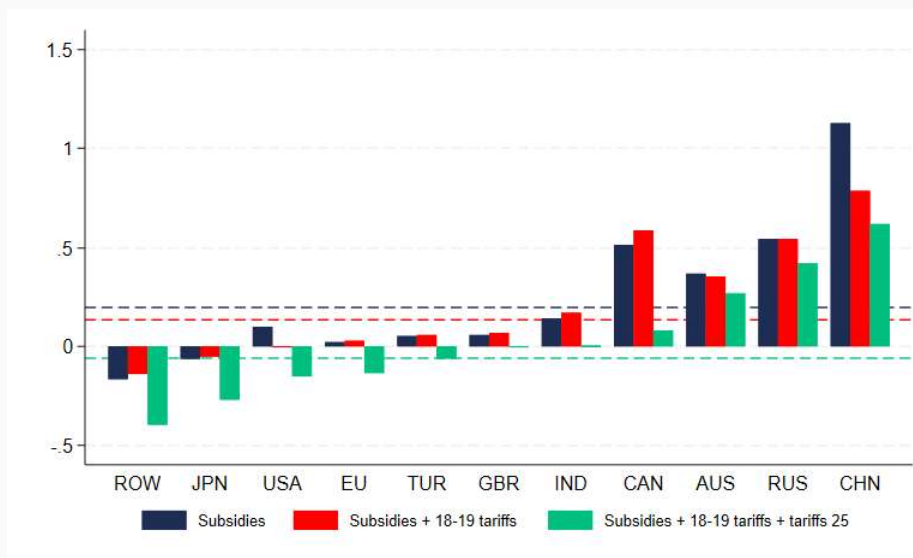
Note: Changes in real wages and real income averaged across countries in the calibration using real GDP at baseline in 2015 as weights.

- **Fiscal costs** outweigh any efficiency gains of 2013-15 subsidy changes correlated with **production externalities**.
- Distortions and negative externalities on third countries from unilateral tariff actions deepen global **inefficiencies**.

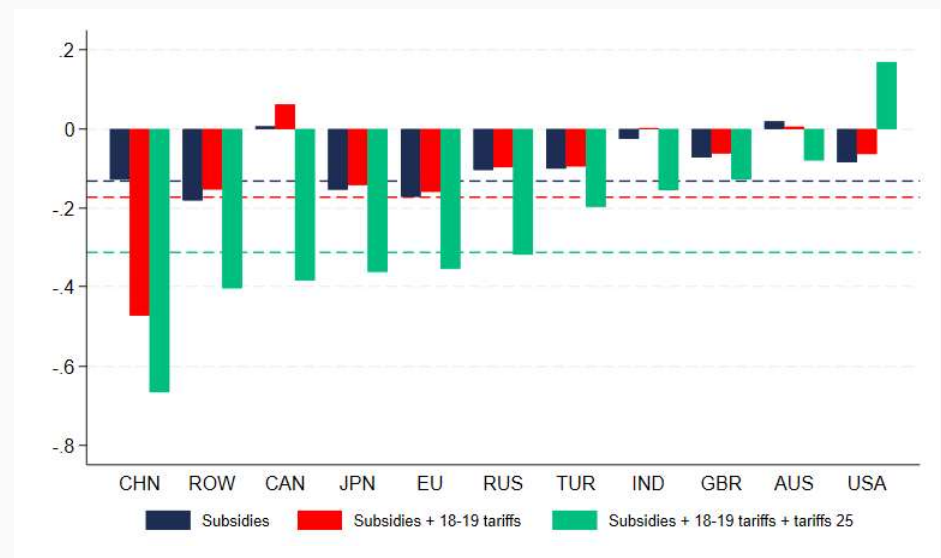
Efficiency and welfare effects across countries

- Efficiency gains from subsidies are reversed by fiscal costs especially in China.
- ToT gains and targeting toward sectors with stronger production externalities lead to welfare gains for the US under 2025 tariffs scenario.

(a) Simulated changes in real wages



(b) Simulated changes in real income



Note: Horizontal dashed lines are world averages, computed using real GDP in 2015 as weights.

Conclusion

Concluding remarks

- We investigate the trade and welfare effects of recent subsidies and tariff actions by major economies:
 - Novel estimates of **subsidies** across countries and sectors over 2015-23.
 - General equilibrium trade model with external economies of scale to assess the long-run **spillovers** of industrial policy.
- We find that industrial policy can reshape global markets across sectors:
 - Increase in China's net exports in **strategic sectors**, as subsidies reallocates trade away from other sectors.
 - Significant **cross-border spillovers**, with other major economies experiencing export losses in China-targeted sectors.
 - **Tariff** actions in 2018-19 and 2025 have the potential to offset the subsidy-led specialization, at the cost of significant global **inefficiencies**.

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