The Geographical Incidence of Trade Wars: Regional Outcomes across Europe and the Role of the Single Market

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Reciprocal Tariffs
Country
Tariffs Charged to the U.S.A. Including Currency Manipulation and Trade Barriers
U.S.A. Discounted Reciprocal Tariffs
China 67% 34%
European Union 39% 20%
Vietnam 90% 46%
Taiwan 64% 32%
Japan 46% 24%
India 52% 26%
South Korea 50% 25%
Thailand 72% 36%
Switzerland 61% 31%
Indonesia 64% 32%
Malaysia 47%
Source: Reuters




Source: Volkswagen



Source: DPA



Source: DPA



Source: DPA

Motivation & research questions

- Global trade wars propagate through **input-output networks** and hit places unevenly

→ We quantify **sub-national** (NUTS2) incidence across Europe

- What **insurance** does the EU Single Market provide against foreign tariff shocks?
- Two/three baselines:
  - **Observed** (Single Market intact)
  - **No intra-EU integration** (integration benefits removed)
  - Planned: **Deepened integration** (Draghi plan)
- Framework: **Baqaee–Farhi style** GE framework with *intermediates and final goods*, extended with **regional** labor mobility.

Model

Model à la Baqaee & Farhi (2024) at a glance

- **Producers** in each region/country–sector use a *nested CES* over value added and intermediates; intermediates are CES bundles over sectoral inputs, value CES bundle over factors
- **Consumers** have CES across sectors and Armington within sectors

→ structural gravity for trade shares (final and intermediate)

- Wage (and rent) equalized across sectors
- Income derived from value added, tariff revenue; fixed trade balance
- Equilibrium in *changes* Dekle–Eaton–Kortum style used for counterfactuals

Labor mobility and equilibrium in changes

- **Cross-regional mobility**: workers relocate to equalize *real wages* within country/set of regions
- Factor location update:

$$\hat{L}_o = \frac{\sum_{j=1}^{J} \lambda_o^j \hat{\beta}_o^{F,j} \hat{\gamma}_o^{L,j} \hat{Y}_o^j / \hat{P}_o^C}{\sum_{d \in i(o)} \frac{L_d}{L_{i(o)}} \sum_{j=1}^{J} \lambda_d^j \hat{\beta}_d^{F,j} \hat{\gamma}_d^{L,j} \hat{Y}_d^j / \hat{P}_d^C} \quad \text{with} \quad \lambda_d^j = \frac{\beta_d^{F,j} \gamma_d^{L,j} Y_d^j}{\sum_k \beta_d^{F,k} \gamma_d^{L,k} Y_d^k}.$$

Labor mobility and equilibrium in changes

Solve order in fixed-point iteration (schematic):

1. Given $(\hat{\phi}, \hat{\tau})$, update price indices $\hat{P}^{j,k}, \hat{P}^{j,C}$ and unit costs $\hat{c}$.
2. Update trade shares π', outputs Y', cost shares (β', γ').
3. Compute $\hat{P}^{C}$, incomes I', tariffs T'.
4. Update $\hat{L}$ via factor location update, then update $\hat{w}$ (and $\hat{r}$); iterate to convergence.

REICIO construction

REICIO: What and why

- **REICIO** = Regionalized Inter-Country Input–Output table (OECD 2023)
- Replace each EU (plus UK, NO, CH) **country** in ICIO with its **NUTS2 regions**.
- Final system: **10 sectors** and **335 spatial units** (288 NUTS2 + 47 countries).
- Preserves *country totals* when re-aggregated; enables **sub-national incidence** of trade shocks.

REICIO: Construction pipeline

1. **Prep national ICIO blocks:** collapse to 10 sectors; split intermediate vs. final exports/imports.
2. **Regionalize (SRIO):** disaggregate production/absorption using regional accounts + LQ adjustments; infer regional exports; split into intermediate/final using national composition.
3. **Interregional patterns:** inject spatial structure from JRC freight/interregional matrices (origin–dest–sector–sector proportions).
4. **Balancing (EU MRIO):** blockwise IPF to match SRIO row/column totals while staying close to observed spatial patterns; keep intra-regional use fixed.
5. **Global embedding:** insert EU block back into ICIO; allocate non-EU $\leftrightarrow$ EU flows across regions by (i) regional shares and (ii) population-weighted distances (gravity-consistent), then lightly rebalance to recover original ICIO aggregates.

REICIO: Notes and limitations

- Advantages: explicit intermediate vs. final split before regionalization; sector-pair specific spatial priors; gravity-style extra-EU allocation.
- Current limitations:

→ No explicit cross-border commuting/factor income tweaks at NUTS2.

→ Regional export composition inherits national split within a country.

→ Single benchmark year for spatial patterns; some imputation in public/non-market sectors.

- Extensibility: method scales to NUTS3 (cf. Krebs, 2022, for Germany) given richer flows; can incorporate customs microdata when accessible.

Quantification

Scenarios and baselines

- **US Trade-war shock:** Trump tariffs hit final and intermediate goods.
- **Two/three baselines:**
  - Observed Single Market (integration intact)
  - Counterfactual without intra-EU integration (benefits removed)
  - Work-in-progress: Draghi’s Europe
- Outcomes of interest: real income per capita, real value added, labor reallocation, dispersion across regions.

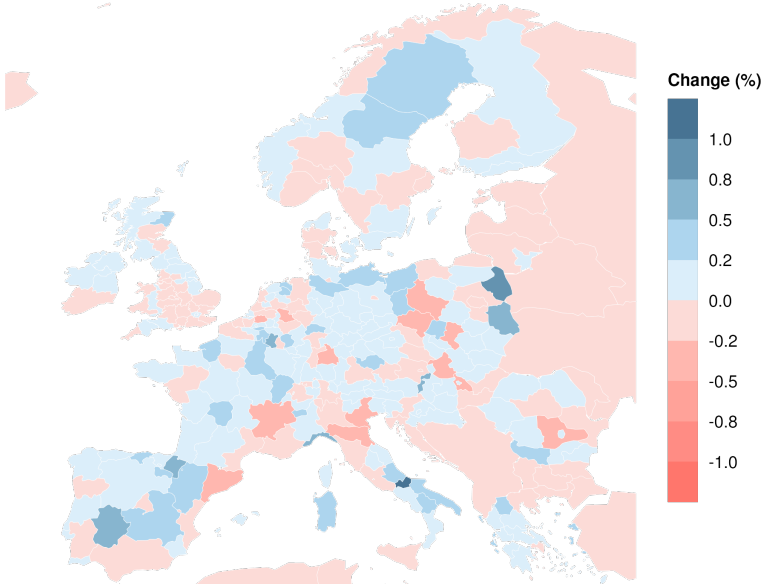


Figure 1: Factor location change: Within-country mobility

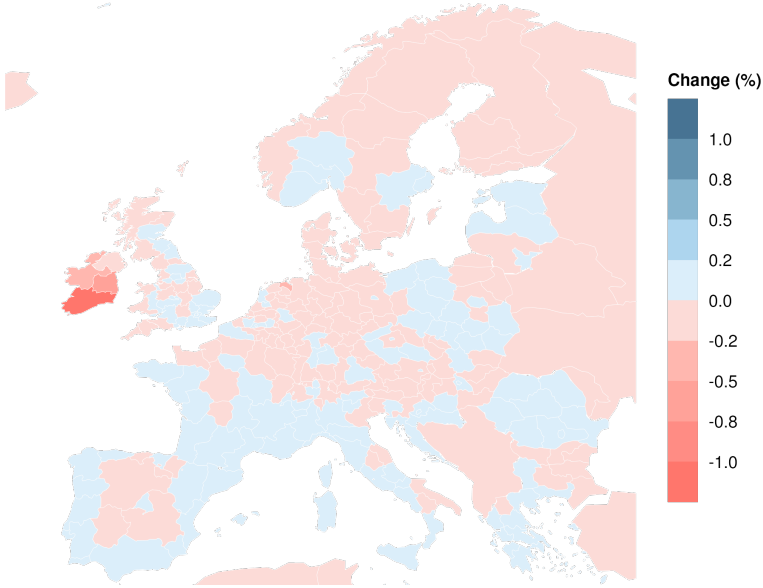


Figure 2: Factor location change: Within-EU mobility

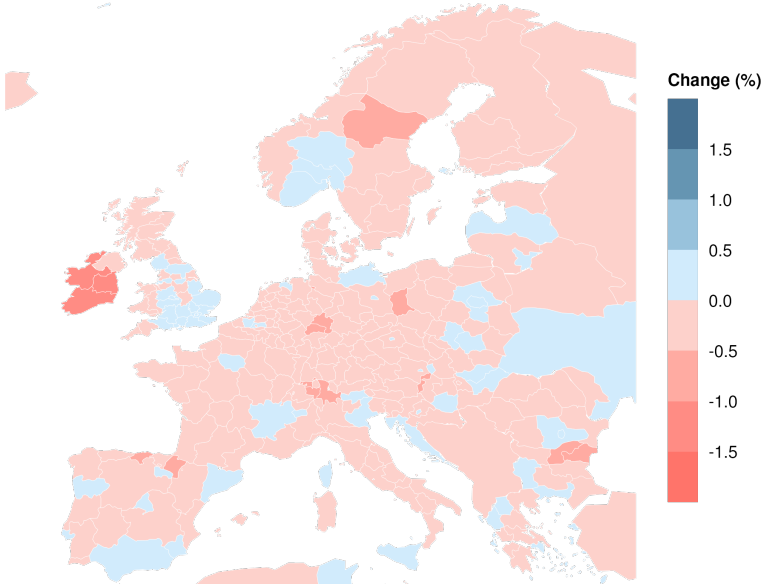


Figure 3: Real income per capita change: Within-country mobility

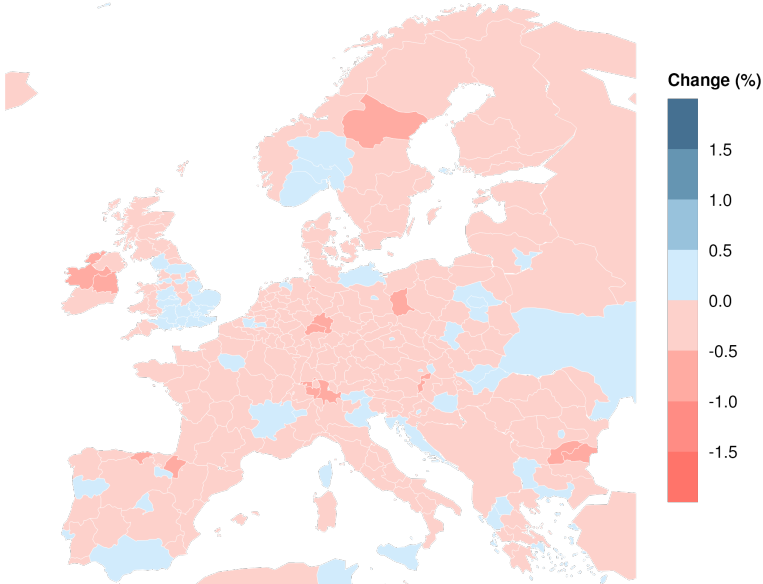


Figure 4: Real income per capita change: Within-EU mobility

Key patterns from preliminary simulations

- Trade-war tariffs generate **large intra-country dispersion**; country averages understate incidence.
- **Integration cushions shocks**: lower mean losses and **lower dispersion** across regions.
- For U.S. +25pp duties on EU imports, welfare losses are **notably larger** without intra-EU integration
- Sectoral specialization and GVC centrality explain where losses concentrate; mobility reallocates labor toward relatively sheltered regions/sectors.

Outlook

Work in progress & next steps

- **Frictional factor mobility**: introduce mobility costs/amenities by region and sector; quantify frictions vs. magnitude trade-offs.
- **Refined integration scenarios**: Single Market depth (goods/services/factors), realistic tariff pooling/redistribution ζ_d.