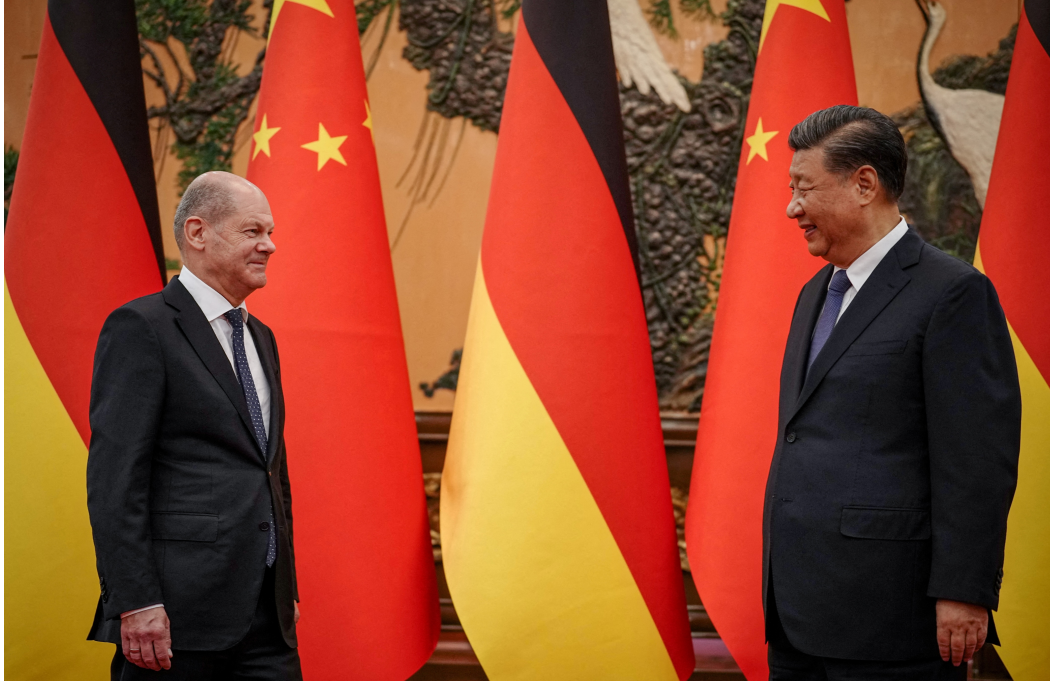
The Impact of China De-risking on the German Economy

Pre-conference for the ITCEI on Economic Security — October 18, 2023

David Baqaee,[1] **Julian Hinz**,[2] Ben Moll,[3] Moritz Schularick,[4] Feodora Teti,[5] Joschka Wanner,[6] and Sihwan Yang.[7]

[1] UCLA, CEPR, & NBER; [2] Bielefeld University & Kiel Institute for the World Economy; [3] London School of Economics; [4] Kiel Institute for the World Economy & Sciences Po; [5] Ifo Institute for Economic Research & University of Munich; [6] Würzburg University & Kiel Institute for the World Economy; [7] IMF.





De-risking vs. decoupling

“We are taking concrete steps to [. . .] coordinate our approach to economic resilience and economic security that is based on diversifying and deepening partnerships and de-risking, not de-coupling;”

— G7 Hiroshima Leaders’ Communiqué

De-risking vs. decoupling

"I believe it is neither viable — nor in Europe's interest — to decouple from China. […] Our relations are not black or white — and our response cannot be either. This is why we need to focus on de-risk — not decouple."

— Ursula von der Leyen, March 30, 2023

Gains from openness

- Trade in goods and services
- Foreign direct investment
- Technology transfer
- Migration

Roadmap

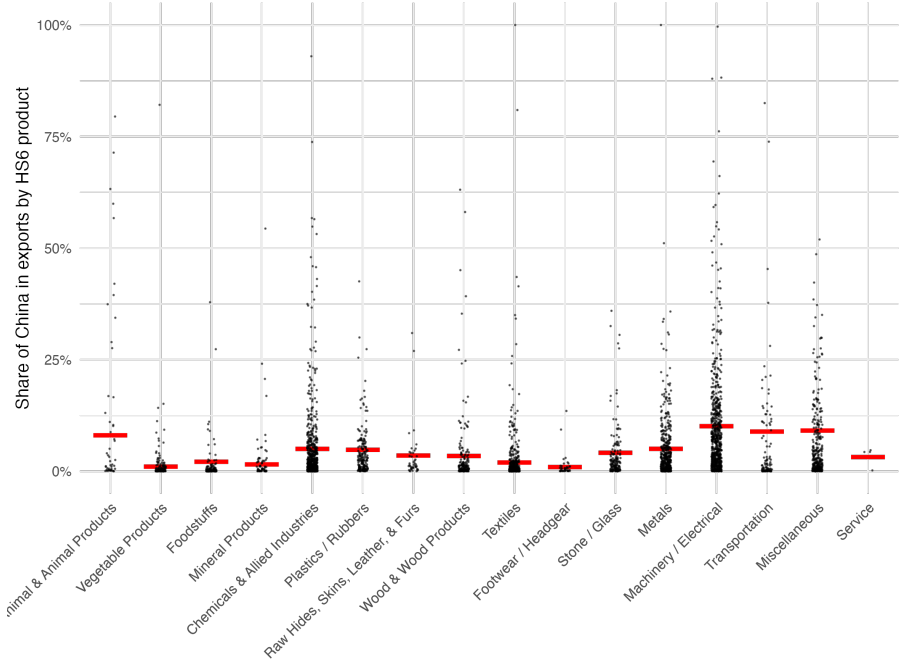
1. Economic context
2. Model simulations
3. Caveats

Economic context

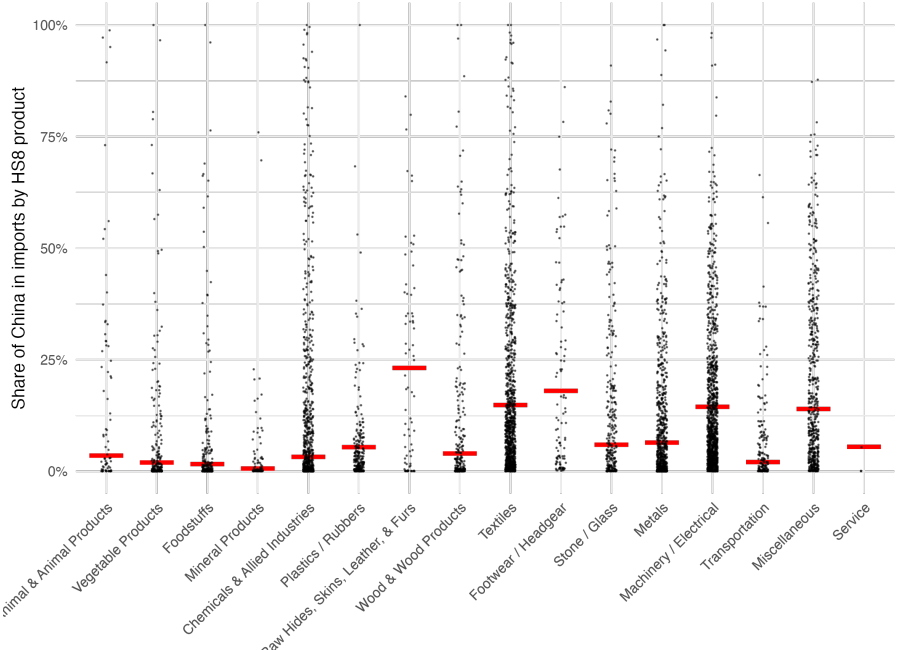
Simple empirical facts

- Look at the data: Trade
- Global trade data from UN Comtrade

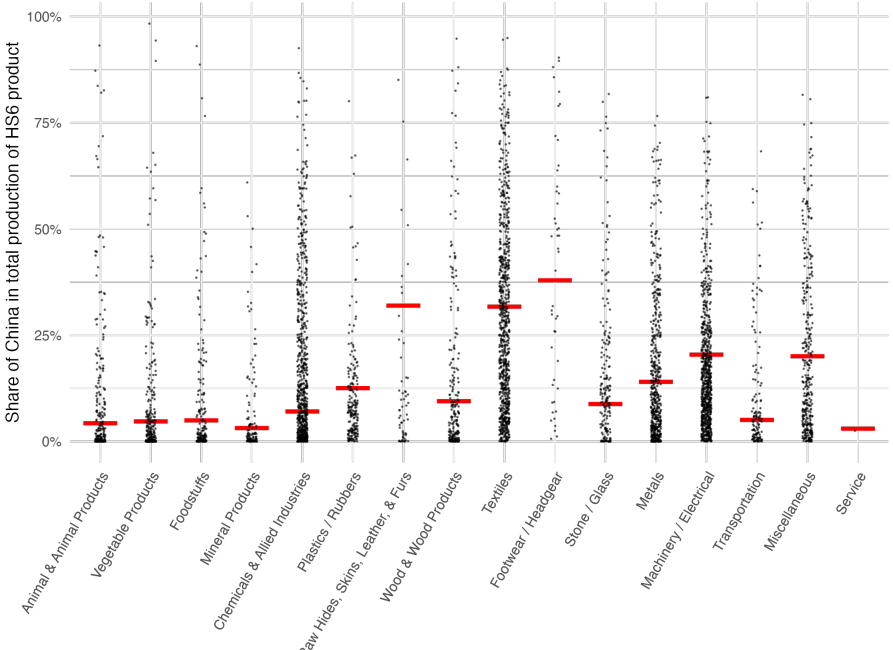
  → roughly 5000 products

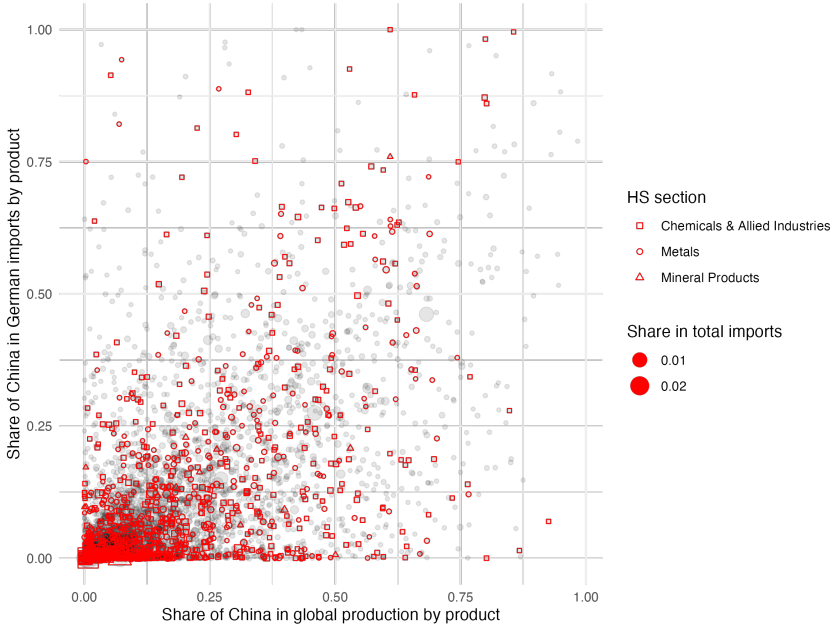

Share of China in exports by HS6 product
100%
75%
50%
25%
0%
ninal & Animal Products
Vegetable Products
Foodstuffs
Mineral Products
Chemicals & Allied Industries
Plastics / Rubbers
Raw Hides, Skins, Leather, & Furs
Wood & Wood Products
Textiles
Footwear / Headgear
Stone / Glass
Metals
Machinery / Electrical
Transportation
Miscellaneous
Service

	Sector	Share of China in total sector trade (in %)	Share of total sector trade in GNE (in %)	Share in GNE (in %)
Exports	Animal & Animal Products	2.62	0.57	0.01
	Vegetable Products	0.64	0.52	0.00
	Foodstuffs	1.44	1.19	0.02
	Mineral Products	0.97	0.82	0.01
	Chemicals & Allied Industries	4.36	5.98	0.26
	Plastics / Rubbers	4.68	2.42	0.11
	Raw Hides, Skins, Leather, & Furs	3.45	0.09	0.00
	Wood & Wood Products	3.09	1.02	0.03
	Textiles	1.56	1.04	0.02
	Footwear / Headgear	0.54	0.26	0.00
	Stone / Glass	3.37	0.99	0.03
	Metals	4.31	3.09	0.13
	Machinery / Electrical	10.37	10.88	1.13
	Transportation	10.70	6.07	0.65
	Miscellaneous	9.61	2.93	0.28
	Service	2.05	0.26	0.01
	Total	7.08	38.13	2.70


Share of China in imports by HS8 product
100%
75%
50%
25%
0%
nimal & Animal Products
Vegetable Products
Foodstuffs
Mineral Products
Chemicals & Allied Industries
Plastics / Rubbers
Raw Hides, Skins, Leather, & Furs
Wood & Wood Products
Textiles
Footwear / Headgear
Stone / Glass
Metals
Machinery / Electrical
Transportation
Miscellaneous
Service

	Sector	Share of China in total sector trade (in %)	Share of total sector trade in GNE (in %)	Share in GNE (in %)
Imports	Animal & Animal Products	2.41	0.62	0.01
	Vegetable Products	1.34	1.21	0.02
	Foodstuffs	1.28	1.13	0.01
	Mineral Products	0.11	2.46	0.00
	Chemicals & Allied Industries	4.91	4.32	0.21
	Plastics / Rubbers	6.10	1.81	0.11
	Raw Hides, Skins, Leather, & Furs	22.14	0.13	0.03
	Wood & Wood Products	3.92	0.86	0.03
	Textiles	15.20	1.45	0.22
	Footwear / Headgear	17.26	0.37	0.06
	Stone / Glass	4.10	1.21	0.05
	Metals	6.13	2.91	0.18
	Machinery / Electrical	16.10	8.57	1.38
	Transportation	3.13	3.61	0.11
	Miscellaneous	15.50	2.33	0.36
	Service	3.31	0.27	0.01
	Total	8.45	33.26	2.81


Share of China in total production of HS6 product
100%
75%
50%
25%
0%
Animal & Animal Products
Vegetable Products
Foodstuffs
Mineral Products
Chemicals & Allied Industries
Plastics / Rubbers
Raw Hides, Skins, Leather, & Furs
Wood & Wood Products
Textiles
Footwear / Headgear
Stone / Glass
Metals
Machinery / Electrical
Transportation
Miscellaneous
Service


Share of China in German imports by product
1.00
0.75
0.50
0.25
0.00
0.00
0.25
0.50
0.75
1.00
Share of China in global production by product
HS section
Chemicals & Allied Industries
Metals
Mineral Products
Share in total imports
0.01
0.02

Model simulations

General setup

- Baqaee and Farhi (2023): “Networks, Barriers, and Trade”

  $\rightarrow$ trade model with international production networks and arbitrary wedge-like distortions like markups, tariffs, or nominal rigidities

- 3 Blocks: “Friends” (EU+G7), “Rivals” (CHN, RUS), “Neutrals” (ROW)

- Shock: Decoupling (complete de-risking) as trade cost rise between “Friends” and “Rivals”

Key parameters

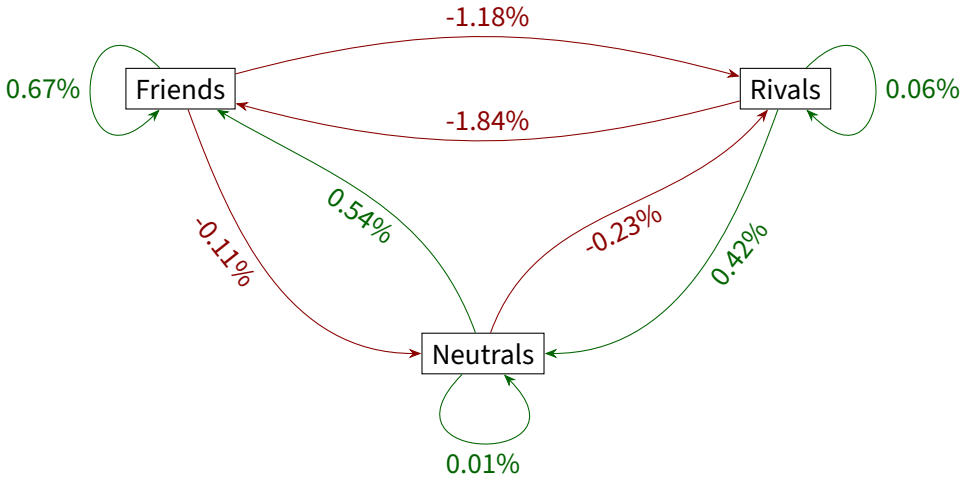
- Model describes allocation of consumption, intermediates, and factors in equilibrium
- Calibrated with data from World Input-Output Database for 2014
- Counterfactual governed by four “sectoral” elasticities and the trade elasticity

  $\rightarrow$ Reaction of consumption, intermediates, and factors to changes in prices
- Elasticities taken from the related literature

Model output to shock

- Trade volume response across 3 blocks
  - “Friends” (EU+G7) : 31 countries, 54% of world GDP
  - “Rivals” (CHN, RUS) : 2 countries, 15% of world GDP
  - “Neutrals” (ROW) : 11 countries, 31% of world GDP

Response of global trade flows



Pushing the welfare response to the extreme

	Total	Technology	Reallocation
$\varphi = 4$	-0.99%	-1.03%	0.04%
$\varphi = 1$	-3.09%	-3.26%	0.17%
$\varphi = 0.1$	-5.20%	-5.87%	0.67%
$\varphi = 0.01$	-5.35%	-6.30%	0.95%

- Technology: Welfare change holding all allocations constant
- Reallocation: Welfare change coming from the allocation of resources

Pushing the welfare response to the extreme

	Total	Technology	Reallocation
$\varphi = 4$	-0.99%	-1.03%	0.04%
$\varphi = 1$	-3.09%	-3.26%	0.17%
$\varphi = 0.1$	-5.20%	-5.87%	0.67%
$\varphi = 0.01$	-5.35%	-6.30%	0.95%

- Technology: Welfare change holding all allocations constant
- Reallocation: Welfare change coming from the allocation of resources

Pushing the welfare response to the extreme

	Total	Technology	Reallocation
$\varphi = 4$	-0.99%	-1.03%	0.04%
$\varphi = 1$	-3.09%	-3.26%	0.17%
$\varphi = 0.1$	-5.20%	-5.87%	0.67%
$\varphi = 0.01$	-5.35%	-6.30%	0.95%

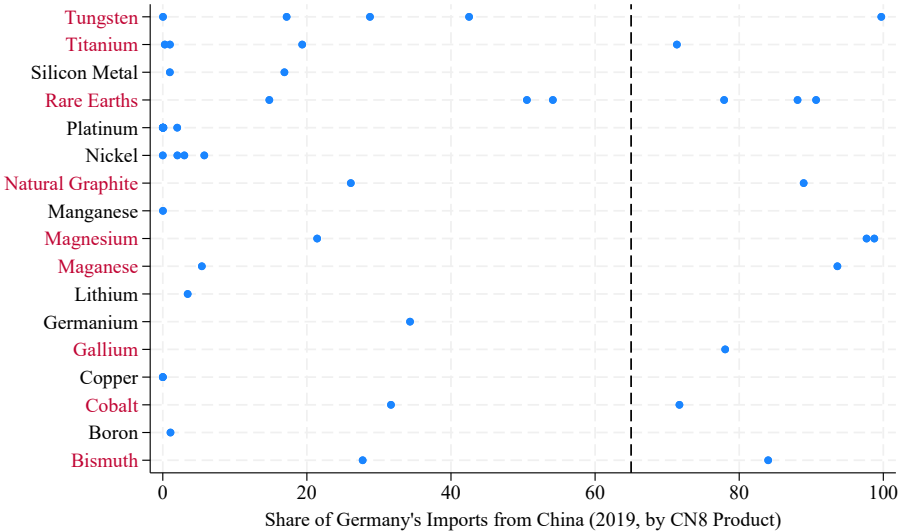
- Technology: Welfare change holding all allocations constant
- Reallocation: Welfare change coming from the allocation of resources

Model extensions

- Multinational production
  - Not only exports and imports, but production abroad
- Business cycle amplification: Nominal rigidities
  - Adjustment to shock “more painful”
  - Prices cannot downward adjust, unemployment

Caveats

Strategic raw materials



Strategic raw materials — Leontief production?

- For 9 / 17 raw materials highly dependent on China: import share from China $> 65\%$
- 5 / 9 raw materials likely easy to substitute, China's share of world production $< 70\%$

  $\rightarrow$ Gallium, Magnesium, Rare Earths, and Tungsten

  $\rightarrow$ Important for automotive and high-tech sector

- Still: Sectoral issue

  $\rightarrow$ 4.7 % of German GDP, 4% of labor force

Strategic raw materials — Leontief production?

- For 9 / 17 raw materials highly dependent on China: import share from China $> 65\%$
- 5 / 9 raw materials likely easy to substitute, China's share of world production $< 70\%$

  $\rightarrow$ Gallium, Magnesium, Rare Earths, and Tungsten

  $\rightarrow$ Important for automotive and high-tech sector
- Still: Sectoral issue

  $\rightarrow$ 4.7 % of German GDP, 4% of labor force

German FDI in China

	2010	2015	2020
Number of Companies	1,451	2,096	2,394
Employees (in thousands)	463	706	750
Annual Turnover (in million Euros)	122,615	264,752	330,868

Source: Deutsche Bundesbank & Bertelsmann Foundation.

Globally:

- $>$ 40,000 German companies outside Germany
- employing $>$ 8 million workers
- generating annual turnover of $\approx$ 3.1 trillion Euros

  $\rightarrow$ FDI profits in China 0.44% of GNE

German FDI in China

	2010	2015	2020
Number of Companies	1,451	2,096	2,394
Employees (in thousands)	463	706	750
Annual Turnover (in million Euros)	122,615	264,752	330,868

Source: Deutsche Bundesbank & Bertelsmann Foundation.

Globally:

- $>$ 40,000 German companies outside Germany
- employing $>$ 8 million workers
- generating annual turnover of $\approx$ 3.1 trillion Euros

$\rightarrow$ FDI profits in China 0.44% of GNE

German FDI in China

	2010	2015	2020
Number of Companies	1,451	2,096	2,394
Employees (in thousands)	463	706	750
Annual Turnover (in million Euros)	122,615	264,752	330,868

Source: Deutsche Bundesbank & Bertelsmann Foundation.

Globally:

- $>$ 40,000 German companies outside Germany
- employing $>$ 8 million workers
- generating annual turnover of $\approx$ 3.1 trillion Euros

  $\rightarrow$ FDI profits in China 0.44% of GNE

Migration

- Chinese in Germany
  - 149,550 / 13,383,910 $\approx$ 1,1 % of foreign population in Germany
  - 149,550 / 84,482,267 $\approx$ 0,18 % of total population
- Germans in China
  - 845,697 / 1,411,778,724 $\approx$ 0,06 % of population are foreigners
  - Germans second largest group of Europeans
  - Net flow -4,159 between 2015 and 2020

Preliminary conclusions

- Impact of de-risking likely manageable
- Extreme scenario of decoupling not catastrophic
- Critical dependencies: Invest asap in R&D, new technologies, improve recycling

  → Work-in-progress

The Impact of China De-risking on the German Economy

Julian Hinz

Bielefeld University and Kiel Institute for the World Economy

E-Mail: mail@julianhinz.com
Twitter/X: @julianhinz
Bluesky: @julianhi.nz

EU de-risking strategy

1. Boost Domestic Sectors: Lead in health, digital, clean-tech; secure critical supplies
2. Leverage Trade Tools: Enforce existing EU instruments for security and fair trade
3. Create Defensive Measures: Adapt to China’s policy shifts in sensitive tech areas
4. Align Globally: Update and form trade agreements; cooperate with partners

Key parameters

- 4 elasticities across sectors
  - σ — Across consumption
  - θ — Across intermediate and value-added
  - γ — Across factors
  - ε — Across intermediates
- φ — Trade elasticities across countries

Model calibration

- Elasticity calibration

Elasticity	Benchmark	Leontief	Cobb-Douglas
σ	0.9	0	1
θ	0.5	0	1
γ	1	0	1
ε	0.2	0	1

- Trade elasticity: $\varphi = 4$

  $\rightarrow$ Extreme cases: $\varphi = 1, 0.1, 0.01$

- Data : World Input-Output Database of year 2014 (most recent)
  - Covering 28 EU countries, 15 major countries, and the rest of the world

Trade volume (share of world GDP) response across blocks under Benchmark

Trade flow			Before shock	After shock	Δ
Friends	→	Friends	10.19%	10.86%	0.67%
Friends	→	Rivals	1.18%	0.00%	-1.18%
Friends	→	Neutrals	17.16%	17.05%	-0.11%
Rivals	→	Friends	1.84%	0.00%	-1.84%
Rivals	→	Rivals	0.13%	0.19%	0.06%
Rivals	→	Neutrals	1.56%	1.98%	0.42%
Neutrals	→	Friends	4.70%	5.24%	0.54%
Neutrals	→	Rivals	1.63%	1.40%	-0.23%
Neutrals	→	Neutrals	2.43%	2.44%	0.01%

→ Global trade Δ -1.65%

Trade volume (share of world GDP) response across blocks under Benchmark

Trade flow			Before shock	After shock	Δ
Friends	→	Friends	10.19%	10.86%	0.67%
Friends	→	Rivals	1.18%	0.00%	-1.18%
Friends	→	Neutrals	17.16%	17.05%	-0.11%
Rivals	→	Friends	1.84%	0.00%	-1.84%
Rivals	→	Rivals	0.13%	0.19%	0.06%
Rivals	→	Neutrals	1.56%	1.98%	0.42%
Neutrals	→	Friends	4.70%	5.24%	0.54%
Neutrals	→	Rivals	1.63%	1.40%	-0.23%
Neutrals	→	Neutrals	2.43%	2.44%	0.01%

→ Global trade Δ -1.65%

Trade volume (share of world GDP) response across blocks under Benchmark

Trade flow			Before shock	After shock	Δ
Friends	→	Friends	10.19%	10.86%	0.67%
Friends	→	Rivals	1.18%	0.00%	-1.18%
Friends	→	Neutrals	17.16%	17.05%	-0.11%
Rivals	→	Friends	1.84%	0.00%	-1.84%
Rivals	→	Rivals	0.13%	0.19%	0.06%
Rivals	→	Neutrals	1.56%	1.98%	0.42%
Neutrals	→	Friends	4.70%	5.24%	0.54%
Neutrals	→	Rivals	1.63%	1.40%	-0.23%
Neutrals	→	Neutrals	2.43%	2.44%	0.01%

→ Global trade Δ -1.65%