INTERNATIONAL ECONOMICS

Lecture 2 — November 8, 2022

Julian Hinz
Bielefeld University

Last week

- Secular growth in world trade and other aspects of globalization

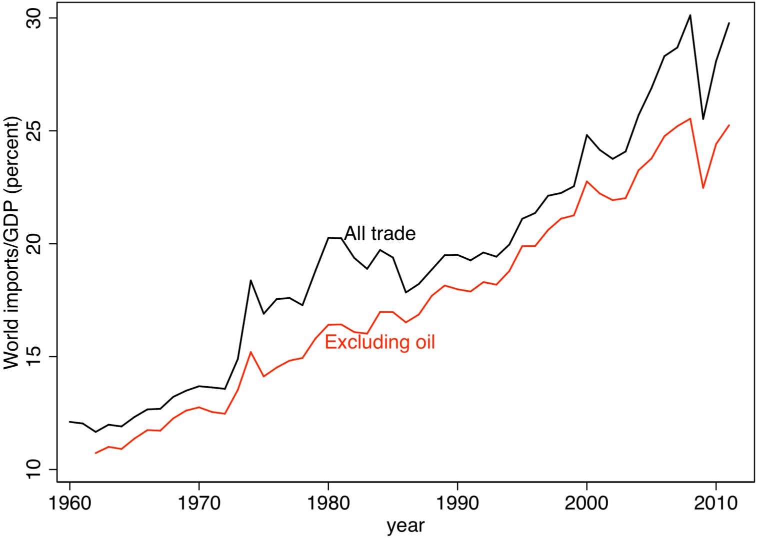
  $\rightarrow$ Reason: Global growth and shrinking trade costs

This week

- Global economy far from ”flat world”
- Gravity Model: who trades with whom, and how much?
- Naive and general gravity
- Structural gravity

MEASURING OPENNESS

Openness



Source: Head & Mayer (2013)

Openness index

- What means openness? What is maximum openness?
- Idea from Helpman (1987): Idealized world without (trade) barriers

  $\rightarrow$ no discrimination between domestic and foreign goods

  $\rightarrow$ with perfect specialization: each country consumes its shares in global production *from every other country in the world*

Globalization potential

- Define exporter i, importer j and the world w
- Exports from country i to country j are X_{ij}
- Production in country i is $X_i = \sum_j X_{ij}$
- World production is $X_W = \sum_j X_j$

Globalization potential

- Then bilateral imports can be rewritten as $X_{ij} = \frac{X_j}{X_W} X_i$
- .. and "world imports" as $\sum_j \sum_{i \neq j} X_{ij} = \sum_j \frac{X_j}{X_W} (X_W - X_j)$

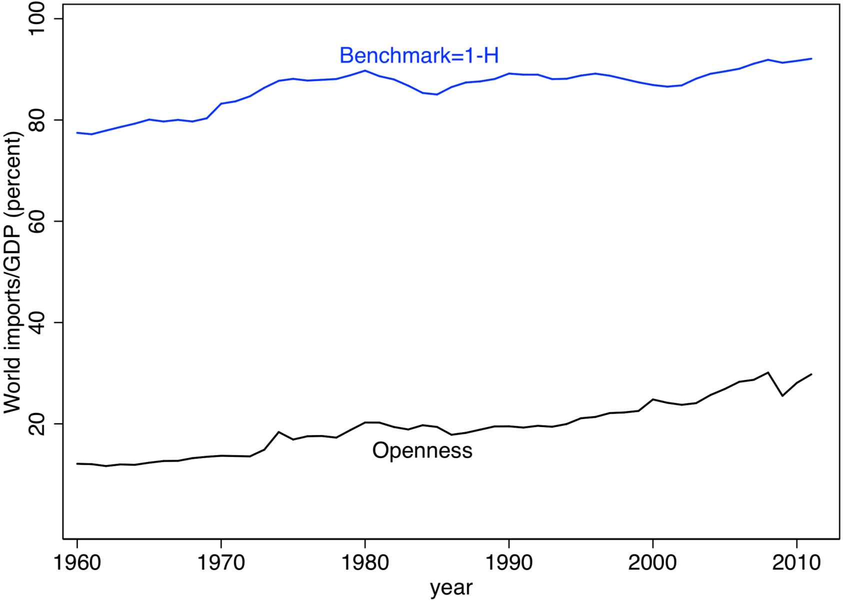
Globalization potential

The share of imports in world production can then be expressed as

$$\sum_j \sum_{i \neq j} \frac{X_{ij}}{X_W} = \sum_j \frac{X_j}{X_W} - \sum_j \left(\frac{X_j}{X_W}\right)^2 = 1 - H$$

$\rightarrow$ H is the Herfindahl index for the concentration of consumption

Globalization Gap

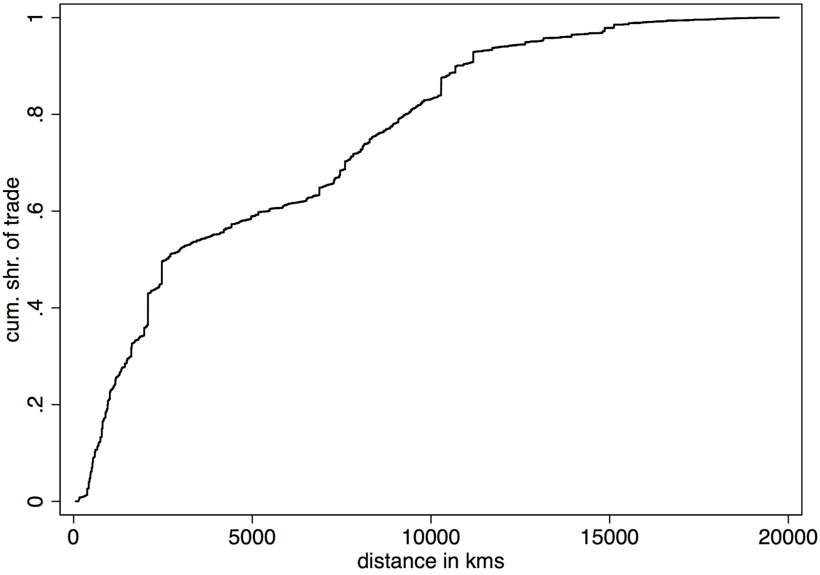


Flat world

– Alternative measure: Trade between countries without impact of bilateral frictions

$$X_{ij}^{*} = \frac{X_j}{X_W} X_i$$

$\rightarrow$ What would international trade look like in such a world?


cum. shr. of trade
0
.2
.4
.6
.8
1
0
5000
10000
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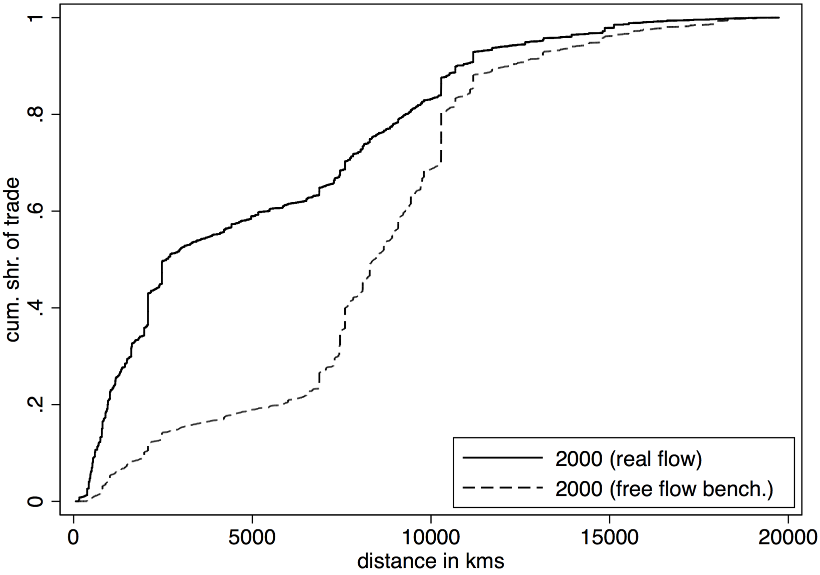
distance in kms



cum. shr. of trade
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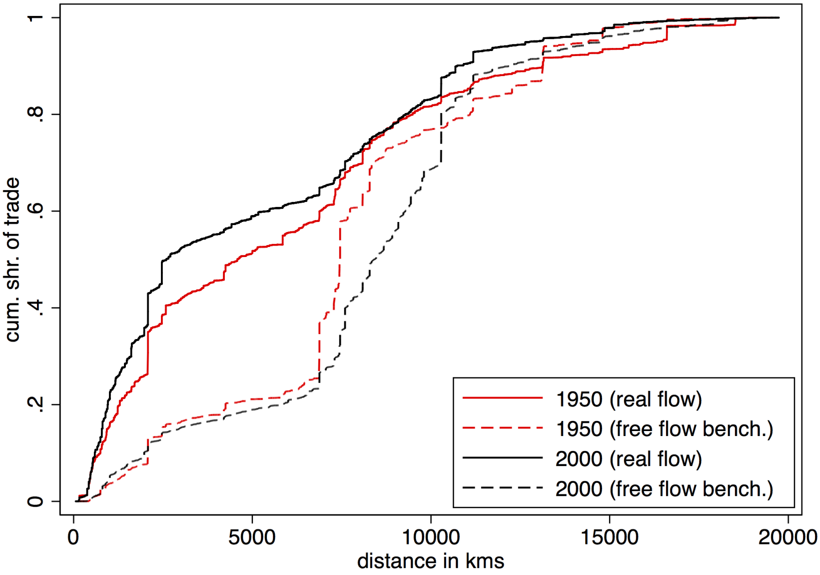
2000 (real flow)
2000 (free flow bench.)



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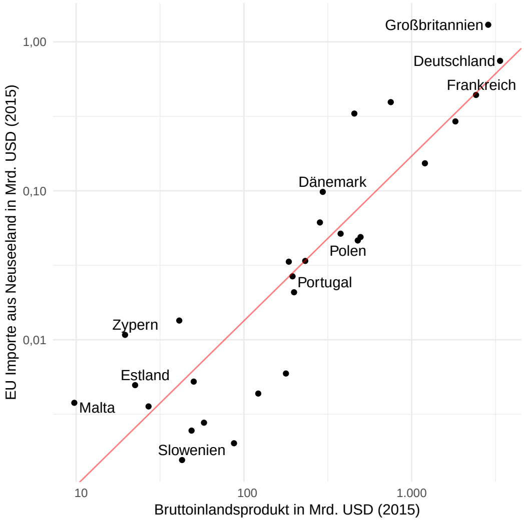
GRAVITY

Data exploration

Now: aggregate trade flows

- total exports: no products
- country to country: no firms
- just one year (2015)

Trade and economic size



Source: Own computation and visualization, data from UN Comtrade und CEPII

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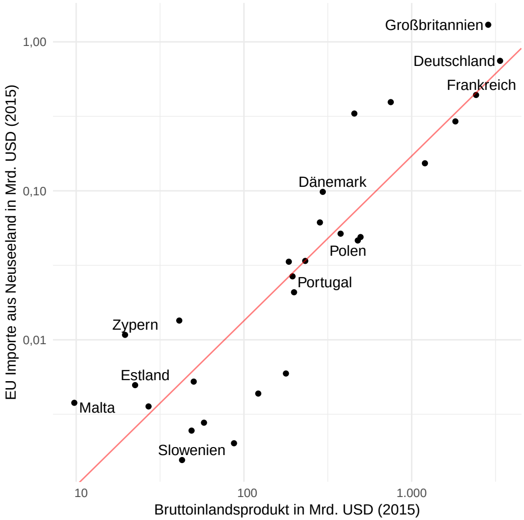

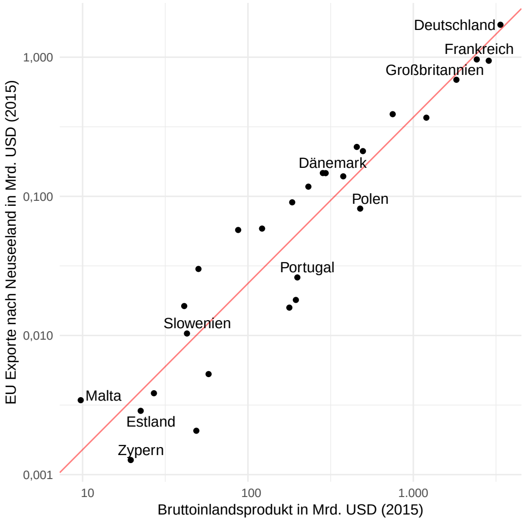

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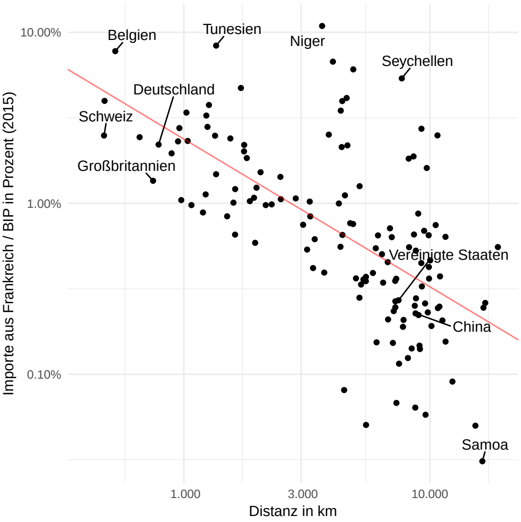
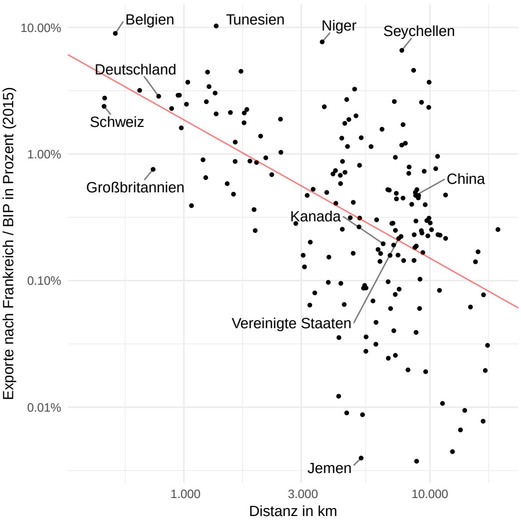
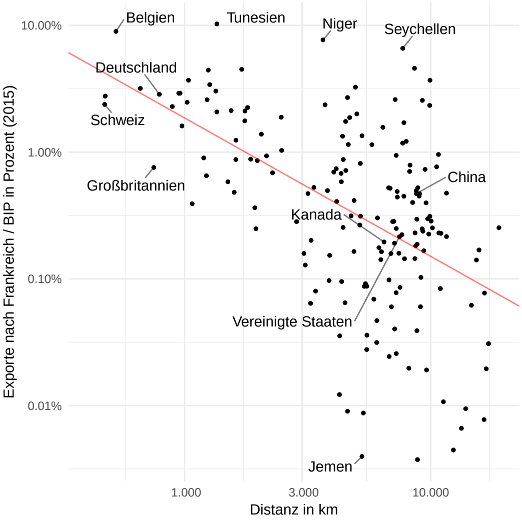
Handel und Distanz





Bilateral frictions: Distance, history, language and policy

other “distances”:



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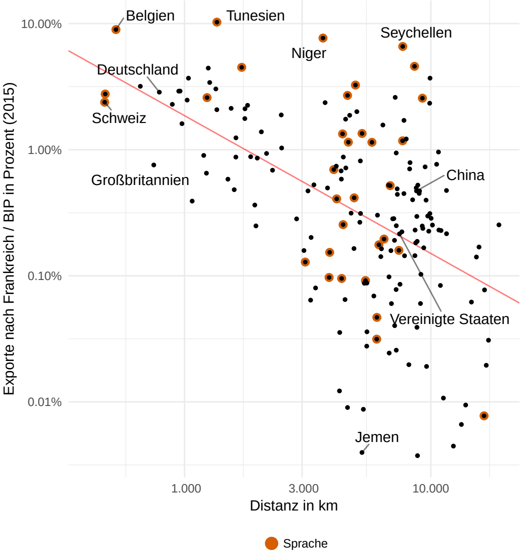

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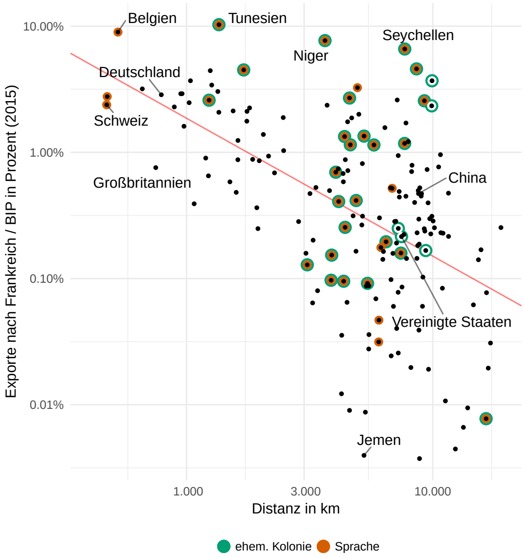

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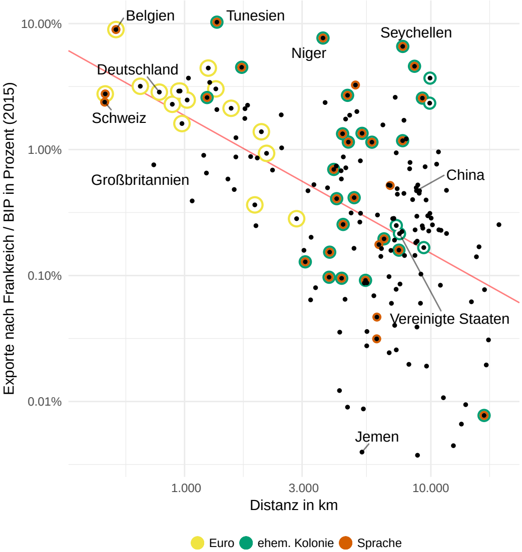
- Euro as currency



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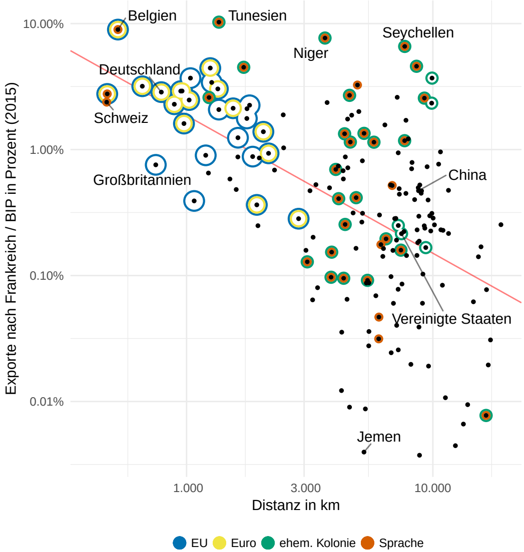

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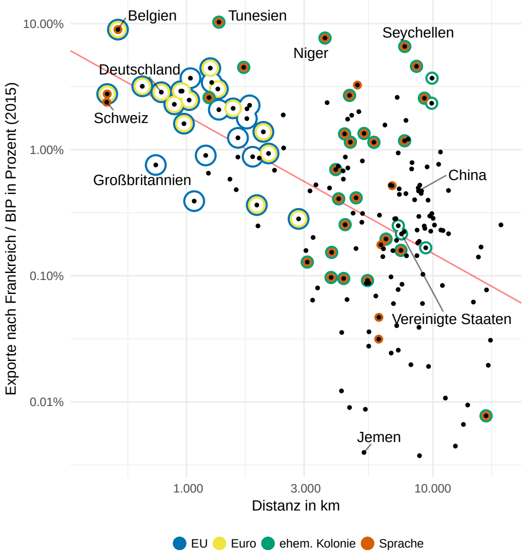

NAÏVE AND GENERAL GRAVITY

“Naive” gravity model

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– first application to trade flows: Tinbergen (1962)

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- first application to trade flows: Tinbergen (1962)
- but: very ad-hoc, what’s behind Y_i and E_j?

General Gravity

$$X_{ij} = G\, S_i\, M_j\, \phi_{ij}$$

- generalization of the "naive" version
- S_i and M_j are exporter and importer characteristics

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  $\rightarrow$ can be formalized in so-called structural gravity model

STRUCTURAL GRAVITY

From general to structural gravity

– Recall general gravity

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  $\rightarrow$ nests most modern microfoundations

Two conditions

1. Spatial allocation of expenditure for the importer
2. Market-clearing for the exporter

Allocation of expenditure

From above it follows that

$$X_{ij} = \pi_{ij} X_j \quad \text{with} \quad \pi_{ij} \geq 0,\ \sum_i \pi_{ij} = 1$$

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– "bilateral resistance"-weighted sum of exporter characteristics
– requires that expenditure shares are independent of income

Market-clearing

Sum of country *i*'s exports to all destinations equals value of production

$$Y_i = \sum_j X_{ij} = S_i \sum_j \frac{X_j}{\Phi_j} \phi_{ij}$$

Rearranging

$$S_i = \frac{Y_i}{\Omega_i} \quad \text{with} \quad \Omega_i = \sum_j \frac{X_j}{\Phi_j} \phi_{ij}$$

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– Ω is similar to "market potential" in economic geography

Structural gravity

Then

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Structural gravity

Then

$$X_{ij} = \underbrace{\frac{Y_i}{\Omega_i}}_{S_i} \underbrace{\frac{X_j}{\Phi_j}}_{M_j} \phi_{ij},$$

- $Y_i = \sum_j X_{ij}$ is value of production, $X_j = \sum_i X_{ij}$ is value of expenditure
- Ω_i and Φ_j are "multilateral resistance" terms, defined as

$$\Phi_j = \sum_\ell \frac{\phi_{j\ell} Y_\ell}{\Omega_\ell} \quad \text{and} \quad \Omega_i = \sum_\ell \frac{\phi_{\ell i} X_\ell}{\Phi_\ell}$$

Conclusion

- Openness: Far from perfect
- Gravity: Who trades with whom, and how much?

  $\rightarrow$ Main idea: the ”‘larger”’ the more; the ”‘closer”’ the more!
- Naïve vs. general vs. structural gravity