Romer or Ricardo?

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Romer or Ricardo?

- Models of Global Product Life-Cycle

  - ▶ Krugman, Grossman-Helpman

  - ▶ Rich country creates new varieties (Romer); Poor country imitates rich country's products (Aghion-Howitt, Grossman-Helpman)

  - ▶ Rich country exports new varieties (Krugman trade); Poor country exports Ricardian products

  - ▶ How do we know?

- Discipline model with data

- Extend the Krugman/Grossman-Helpman model

Romer + Ricardo Model

- Relative to Krugman/Grossman-Helpman:
  - ▶ Do not make polar assumptions about how countries innovate and what they trade
  - ▶ No assumptions about what poor vs. rich countries do
  - ▶ Multiple countries

- Ingredients:
  - ▶ Trade due to Romerian new varieties and Ricardian comparative advantage
  - ▶ New varieties
  - ▶ Improve quality of imported varieties
    - ★ Imperfect spillovers when poor country imitates import from rich country
  - ▶ Improve quality of own varieties

Growth: Innovation from all sources

- World growth (same in all countries) depends on innovation in *all* countries
  - ▶ Negative externality from innovation on imports by poor country
  - ▶ Own innovation by poor country builds on lower quality
  - ▶ Quality improvement on imports by other countries builds on lower quality

- Country specific innovation → TFP
  - ▶ What matters is innovation from *all* sources
  - ▶ Rich countries do not have to create new varieties; poor countries do not need to imitate rich countries

Trade: Innovation on imports vs. new varieties

- Trade in Steady State:
  - ▶ New varieties $\rightarrow$ Export Romerian products
  - ▶ Innovate on imports $\rightarrow$ Export Ricardian products

- Product Life-Cycle
  - ▶ Products reallocate across countries
  - ▶ Romer $\rightarrow$ Ricardo
  - ▶ Technology diffuses to more countries ("more Ricardian"?)
  - ▶ Exports diffuse to smaller countries as quality improves/costs fall.

Romer + Ricardo Model: Inference

- Growth and trade determined by innovation rate and type of innovation

- Type of innovation affect the _distribution_ of import and export growth rates

  ▶ New varieties or innovation on imports $\rightarrow$ new exports (or large increases)

  ▶ Innovation on imports $\rightarrow$ exit of imports (or large declines)

Empirical distribution of import decline, U.S. vs. China

Import decline rate
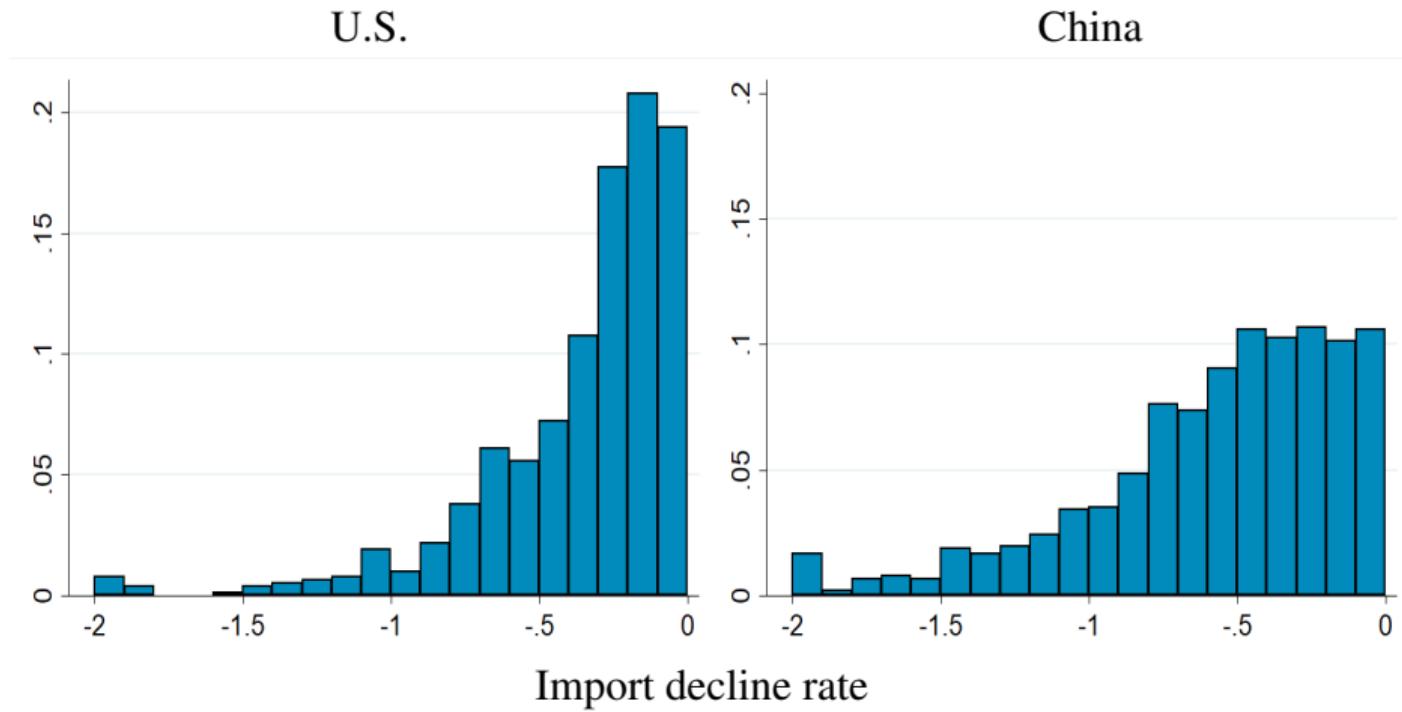
More innovation on imports in China compared to U.S.

Empirical distribution of export growth, U.S. vs. China

U.S.   China
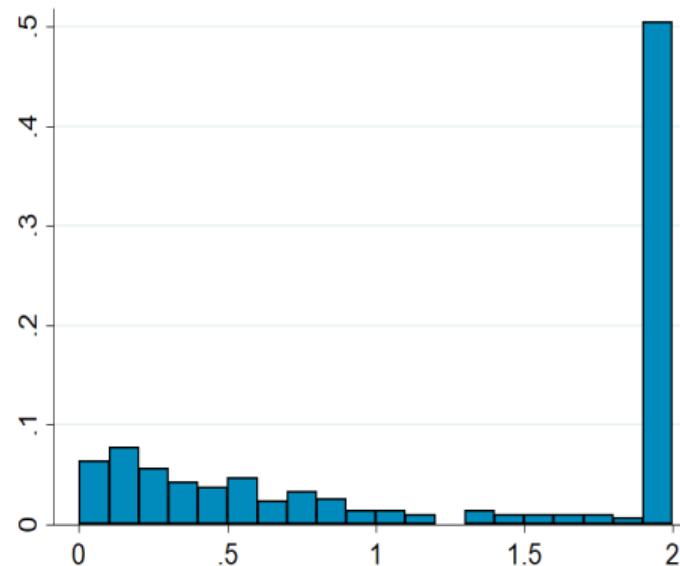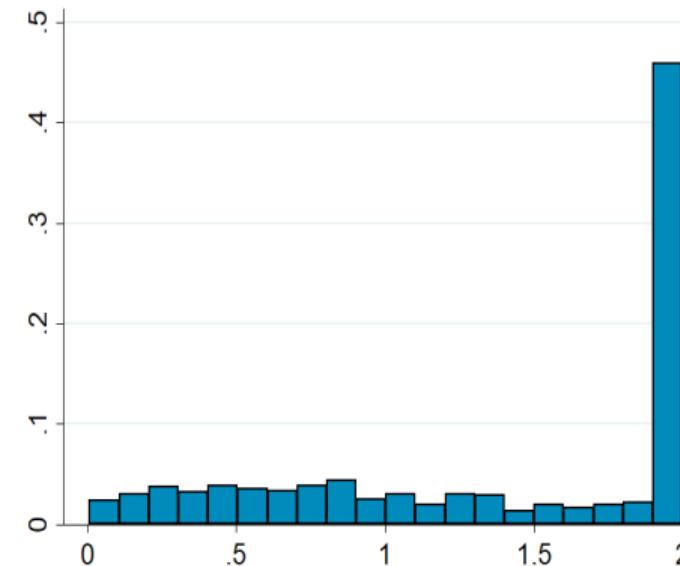
Export growth rate

Innovation on imports + new products about the same in U.S. and China

$\rightarrow$ More creation of new products in U.S.

# Inference: Distribution of import decline and export growth

Large Import Decline
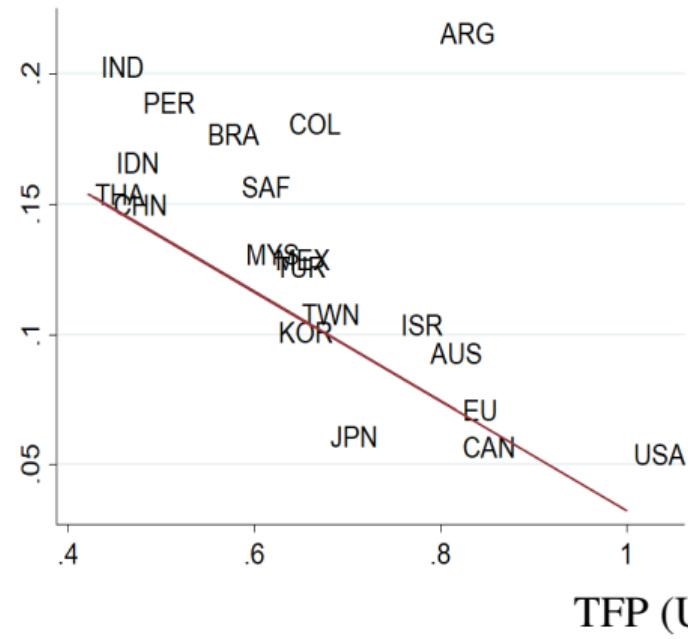
$$\frac{\text{Large Export Growth}}{\text{Large Import Decline}}$$

TFP (U.S.=1)
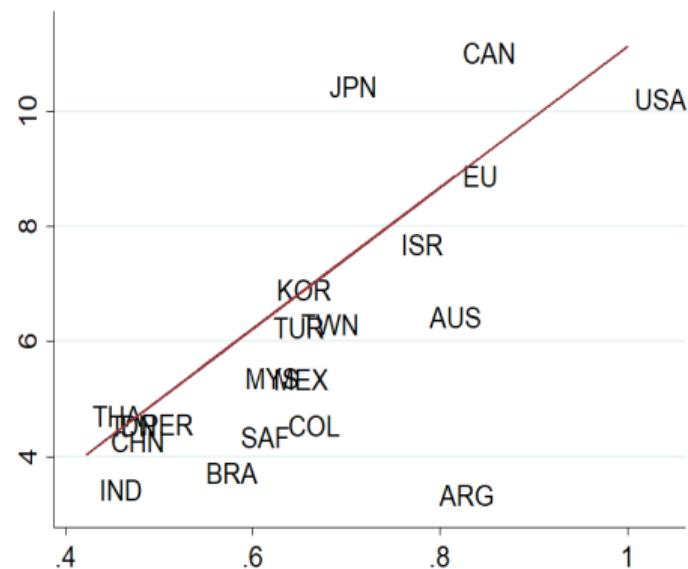
Sources of *world* growth
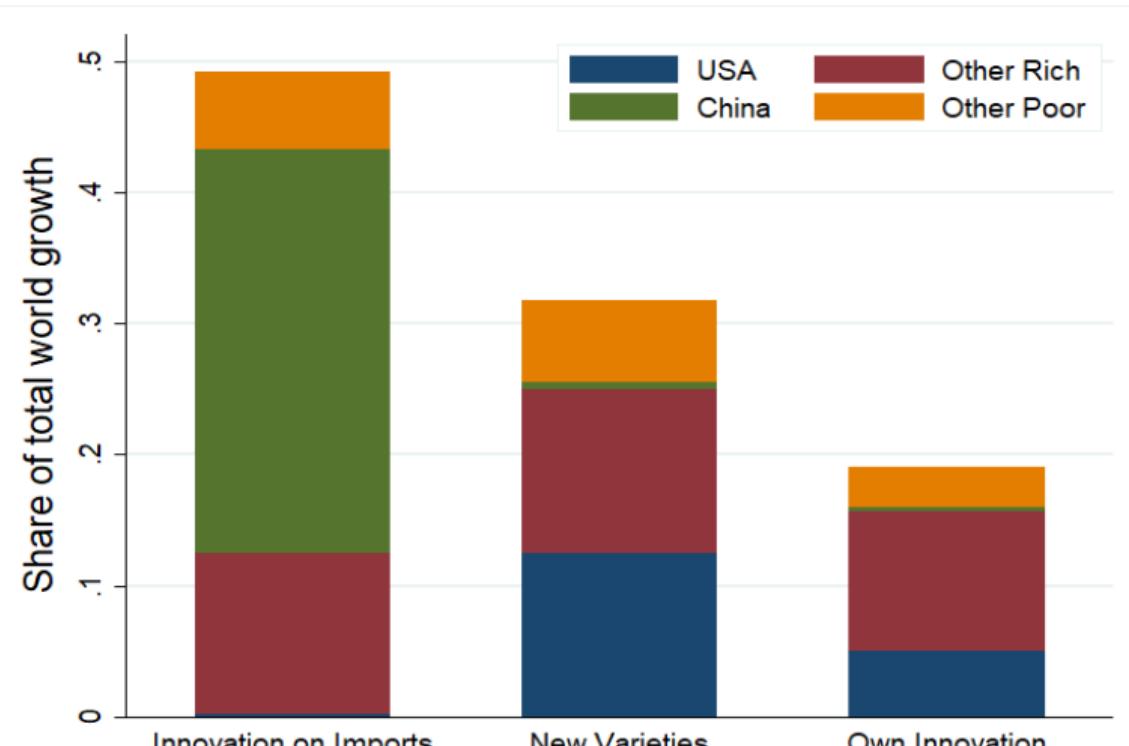
Growth from foreign new products


New to World   New to Country

Employment (U.S.=1)
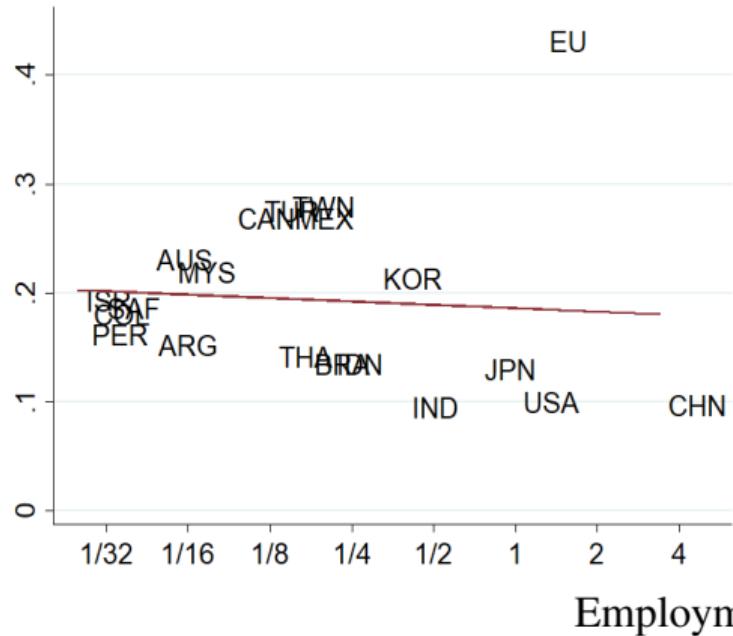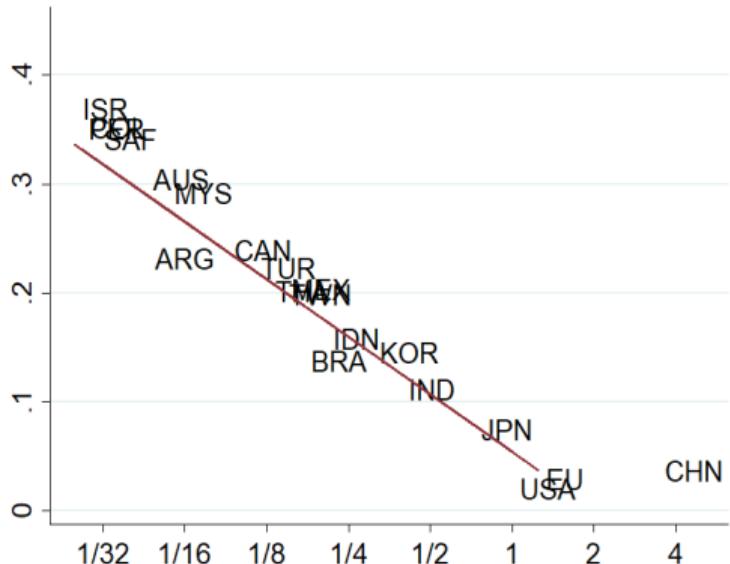
# Empirical distribution of import growth, U.S. vs. Colombia/South Africa
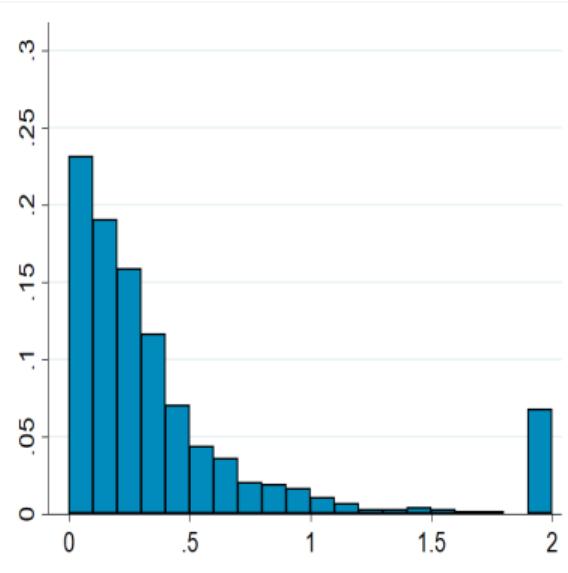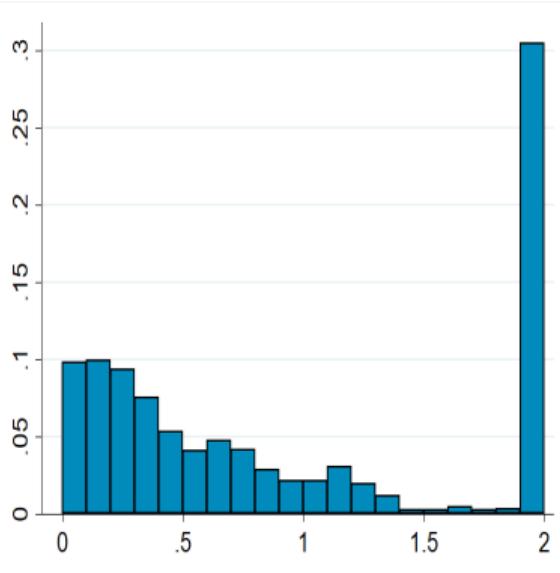

| U.S. | Colombia | South Africa |
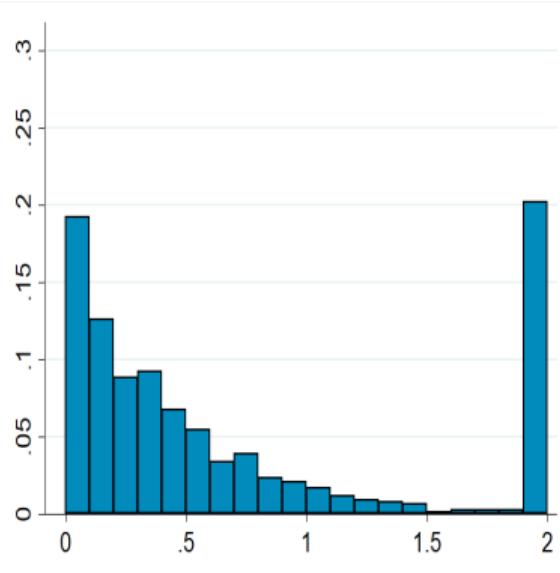
Import Growth Rate

# Reallocation of products across countries



U.S. and Other Rich Share
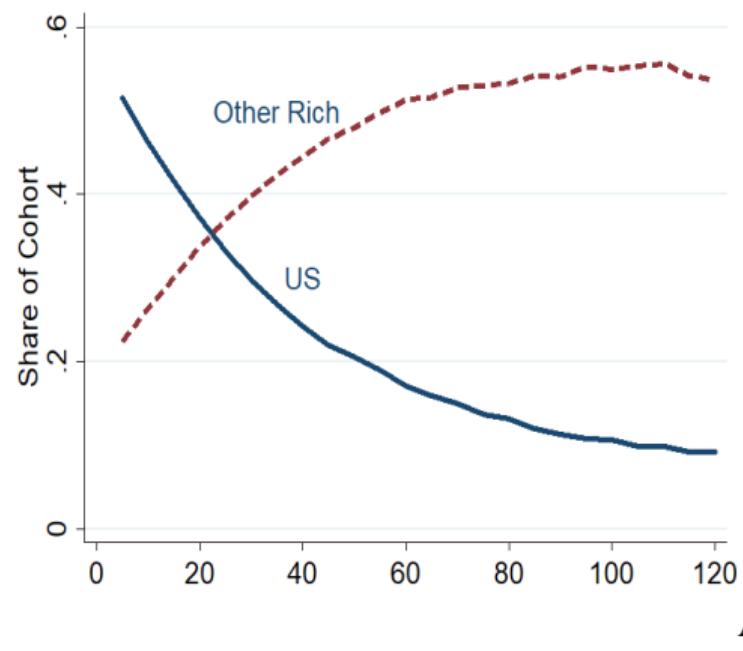
China and Other Poor Share
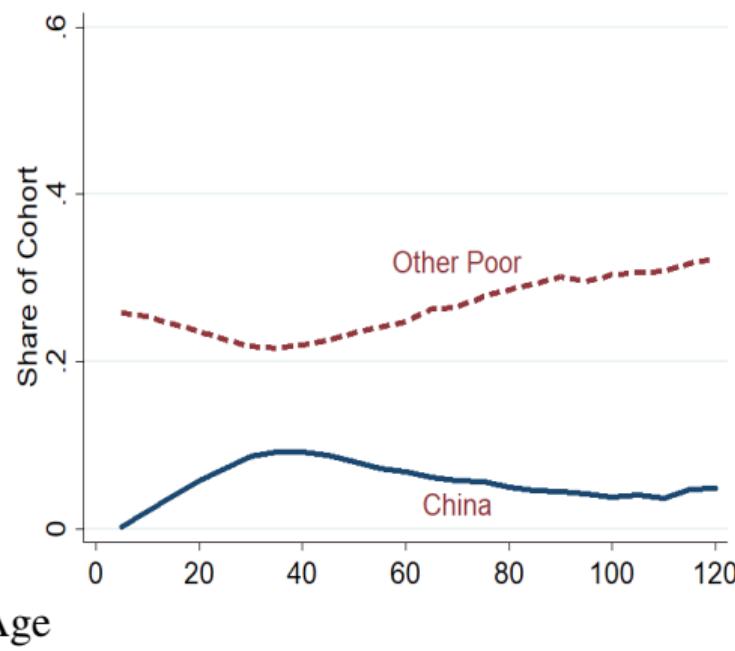
Products are "More Ricardian" with age
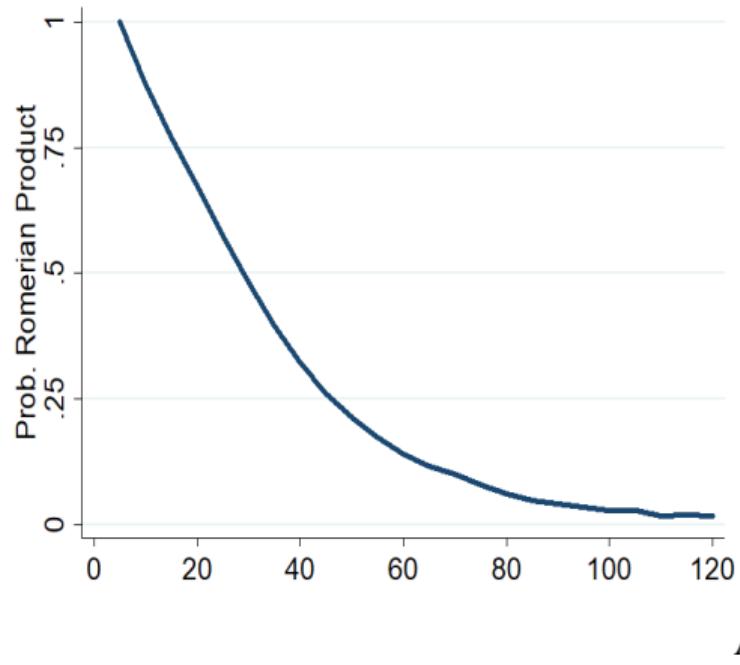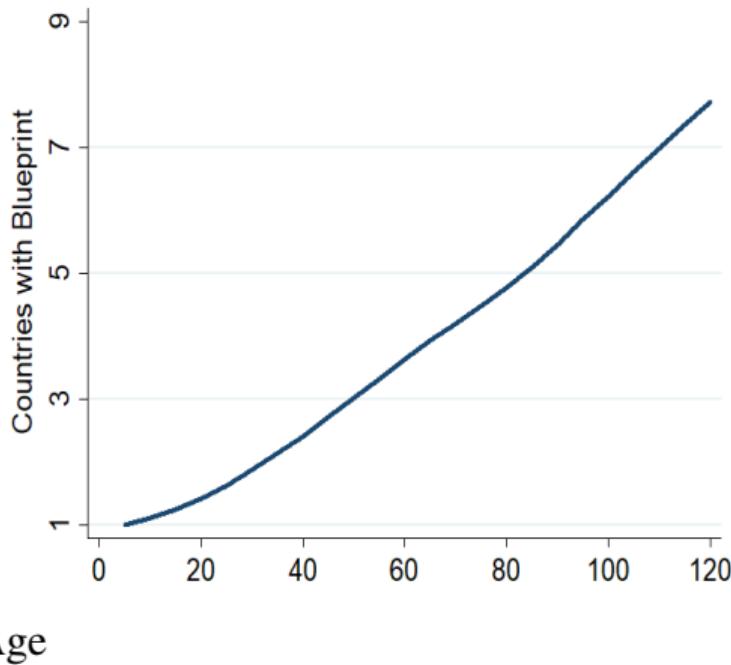
Exports diffuse to smaller countries with age
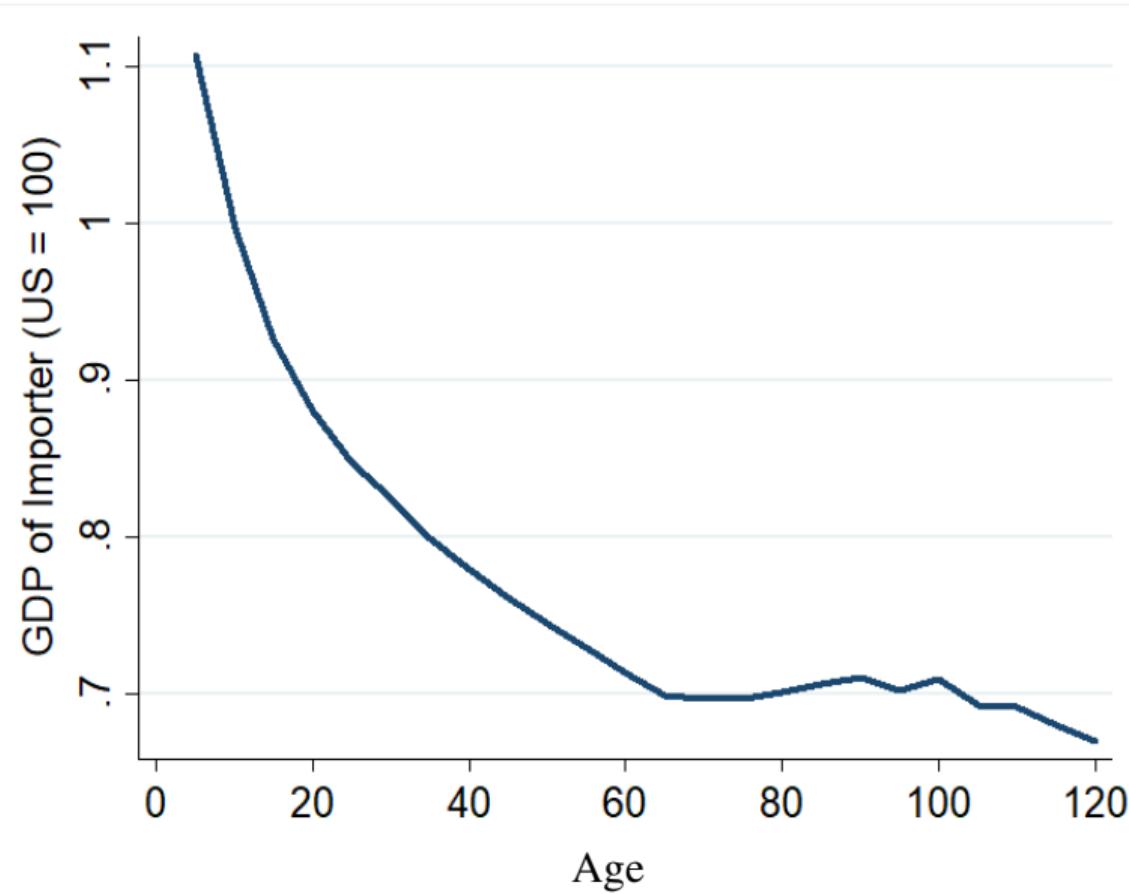
Recap of our findings

- Growth accounting

  - ▶ 43% of growth is Romerian
  - ▶ 44% of growth is from foreign innovation
  - ▶ U.S. is an outlier: 64% Romerian, 26% from foreign

- Trade accounting

  - ▶ Romerian share: 32% for the World, 87% for U.S., 1% for China

- Global product life cycle

  - ▶ U.S. share falls, and "other rich" share rises as products age