Real Iceberg Transport Costs

The Effects of the North Atlantic Iceberg Drift on Trade and Inequality

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Motivation
- How do naturally variant transport costs shape trade and inequality?
- Overcome the endogeneity of mass-market transport infrastructure through naturally variant barriers
- Exploit influence of Atlantic iceberg drift on cotton trade using millions of ship locations and 92 years of cotton trade data
- Observe exogenous variation in maritime transport routes between North America and Europe
- Investigate the spatial diffusion of trade costs across the cotton supply chain and its spillovers on local economic conditions

Related Literature
- Regional inequality and trade: Rodríguez-Pose (2012), Autor et al. (2013)

The Transatlantic Cotton Trade
- The cotton industry was a driving force of industrialization and the first wave of globalization ("King Cotton")
- One-way supply chain:
  - US: largest cotton producer until today
  - UK: important cotton manufacturing sector up to the first half of the 20th century
- New York most important cotton exporting US port, followed by New Orleans and Mobile
- Nearly all cotton destined for the UK was imported via Liverpool: Liverpool essentially set the world price (Steinwender 2018)

North Atlantic Iceberg Drift
- Iceberg Season: February to September
- Icebergs break free ("calve") from Greenland glaciers
- Labrador current pushes the icebergs into the major shipping route between North America and Europe south of Newfoundland ("Iceberg Alley")
- Icebergs are extremely dangerous as they consist of fresh water
- In sea water only 13% of an iceberg’s mass float above sea level (Bigg & Billings 2014)
- Since 1913, the International Ice Patrol (IIP) patrols this area throughout the year to prevent another disaster like the sinking of the RMS Titanic on April 15, 1912
- On average around 475 icebergs reach the area controlled by the IIP each year (see red rectangle in Figure 1)

Data

Cotton
- Monthly cotton prices from Liverpool Cotton Exchange January 1850 to December 1931, available from "The Economist"
- Monthly US cotton prices and quantities from 1850 to 1941 based on Bureau of Agricultural Economics (1951)

Ships
- Global ship data based on ICOADS database from 1662 to 2014 with more than 450 million marine reports
- Reassembled ship routes from Carella et al. (2017) to identify ship routes between Europe and the US
- Figure 2 shows that the icebergs intersect directly with the major shipping route between North America and Europe

Results

Estimation Strategy
- Dependent variables: monthly cotton prices, quantity, trade volume 1850 to 1941
- Independent variable: trade costs proxied by the average monthly latitude of ships passing the IIP-controlled sector from 1850 to October 1914

Table 1: Regression Results

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Notes: Liverpool cotton price is demanded by one month. All specifications include a constant. Robust standard errors in parentheses.

Estimation equation

\[ \ln(\text{Trade}_{\text{US-US}}) = \beta \text{Latitude}_{\text{US-US}} + \alpha + \epsilon_{\text{US-US}} \]

- \( \text{Trade}_{\text{US-US}} \) is a set of trade variables, incl. prices, quantities and trade volume
- \( \text{Latitude}_{\text{US-US}} \) is the average latitude at which ships pass the iceberg region in year \( t \), quarter \( q \) and month \( m \)
- \( \alpha \) denotes quarter-year fixed effects

Conclusion

Our preliminary findings report a significant effect of exogenous changes in distance on trade caused by the iceberg drift

Outlook

- Analyze spillovers of exogenous barriers to trade on US inequality using data on sectoral wages and employment
- Estimate the marginal value of the elasticity of trade volume with respect to distance for historical US data

References