The Uncharted Waters of International Trade

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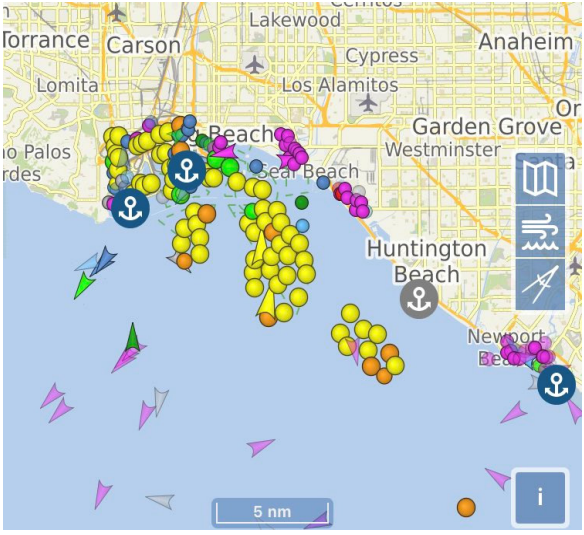
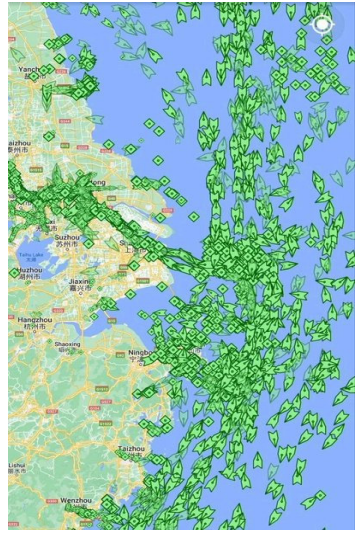
Introduction

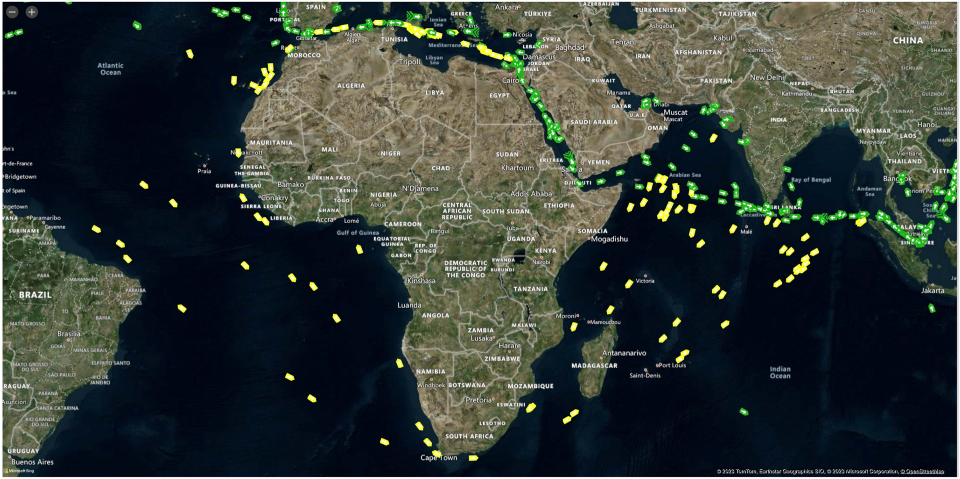
- Recent evidence of congestion in international trade
- Very heavy traffic in just a few routes, aggravated by piracy
- Significant delays in ports

Congestion in the Ports of Long Beach and Shanghai





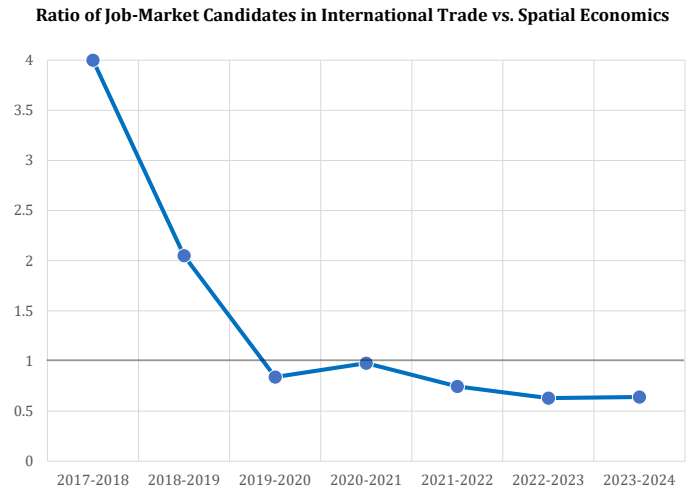
Congestion in the Red Sea



Introduction

- But don't be misled by my title
- I am not here to unveil some uncharted seas that will facilitate the actual conduit of international commerce
- My purpose is much more academic in nature
- My starting premise is that we may be seeing early signs of a sort of 'research congestion' in the field of international trade
- And this 'congestion' may be 'slowing down' scientific progress

A Relative Decline in the Supply of Trade Economists



Source: Jonathan Dingel's tradediversion.net

Introduction

- Why is this happening?
- Might we have too few 'workhorse models'?
- Might we have too few data sources?
- Might we have focused on tackling too few relevant questions for the field?
- The goal of this talk is to outline some potential uncharted (or thinly charted) waters for the field of international trade

Road Map

1. 'The Charted Waters': An Overview
2. Some Uncharted Theoretical Waters
3. Some Uncharted Empirical Waters
4. Some Uncharted Policy Waters

Four Words of Warning

1. Some of these waters are not really uncharted, but they were visited with 'older ships'
   - Charting them with modern vessels might allow us to bring back more valuable treasures
   - Do contact me if I missed important contributions!
2. Precisely because these are (largely) uncharted waters, they may not be navigable!
   - Though I have chosen topics that I believe will prove to be navigable
3. Some of what I have to say is more directed to data gatekeepers and policy makers than to academic researchers
   - Especially when it comes to 'Uncharted Empirical Waters'
4. I will focus on **International** Trade
   - But some of what I have to say may be relevant for our sister field of Spatial Economics

The Charted Waters

The Charted Waters

- Four Major Developments in the International Trade Field in the Last 20 Years

1. Firm-Level Approach to International Trade
2. Quantitative Trade Theory
3. Global Value Chains
4. Empirical Work 'Unshackled'

- Useful to cover them one at a time, but clearly intertwined

Firm-Level Approach to International Trade

Firm-Level Approach to International Trade: Motivating Facts

- It is not countries or industries that trade with each other, but rather **firms**
- Very skewed distribution of exporters and importers:
  - most firms do not export or import

Exporters and Importers are in the Minority

Firm Importing and Exporting

NAICS	Industry	Percent of all firms (1)	Fraction of firms that export (2)	Fraction of firms that import (3)	Fraction of firms that import and export (4)
311	Food manufacturing	6.8	0.23	0.15	0.10
312	Beverage and tobacco product	0.9	0.30	0.18	0.11
313	Textile mills	0.8	0.57	0.44	0.37
314	Textile product mills	2.7	0.19	0.14	0.09
315	Apparel manufacturing	3.6	0.22	0.23	0.15
316	Leather and allied product	0.3	0.56	0.53	0.40
321	Wood product manufacturing	4.8	0.21	0.09	0.06
322	Paper manufacturing	1.5	0.48	0.25	0.21
323	Printing and related support	11.1	0.15	0.05	0.03
324	Petroleum and coal products	0.5	0.34	0.18	0.14
325	Chemical manufacturing	3.3	0.65	0.40	0.36
326	Plastics and rubber products	3.9	0.59	0.34	0.29
327	Nonmetallic mineral product	4.3	0.19	0.15	0.09
331	Primary metal manufacturing	1.5	0.58	0.32	0.29
332	Fabricated metal product	20.6	0.30	0.12	0.10
333	Machinery manufacturing	8.7	0.61	0.30	0.28
334	Computer and electronic product	3.9	0.75	0.50	0.47
335	Electrical equipment, appliance	1.7	0.70	0.46	0.41
336	Transportation equipment	3.4	0.57	0.35	0.31
337	Furniture and related product	6.5	0.16	0.12	0.07
339	Miscellaneous manufacturing	9.3	0.32	0.20	0.17
Aggregate manufacturing		100.0	0.35	0.20	0.16

Notes: Data are for 2007 and are for firms that appear in both the US Census of Manufactures and the LFTTD. Firm exports and imports are measured using customs information from LFTTD. Column 1 summarizes the distribution of manufacturing firms across three-digit NAICS industries. Remaining columns report the percent of firms in each industry that export, import and do both. Percentages in column 1 need not sum exactly to 100 due to rounding.

Source: Bernard et al. (JEL, 2018)

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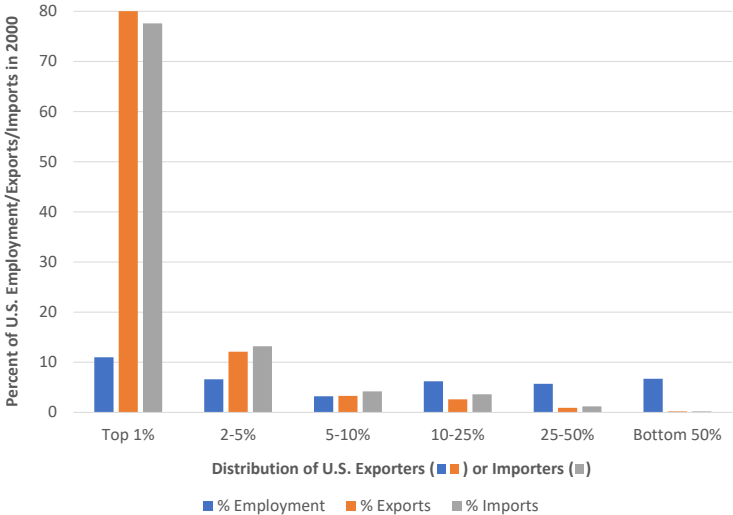
Very Skewed Distribution of Exporters and Importers



Source: Bernard et al. (NBER, 2009)

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  - top 1% of exporters/importers accounts for huge percentage of exports most countries
- Remarkable within-industry heterogeneity in performance correlated with trade participation

Exporters and Importers are **much** better performing firms

Exporter and Importer Premia

	Exporter premia (1)	Importer premia (2)	Exporter and importer premia (3)
log employment	1.11	1.20	1.39
log shipments	0.24	0.32	0.36
log value added per worker	0.21	0.25	0.28
log TFP	0.04	0.03	0.03
log wage	0.10	0.09	0.11
log capital per worker	0.20	0.28	0.34
log skill per worker	0.11	0.16	0.18

Notes: Data are for 2007 and are for firms that appear in both the US Census of Manufactures and the LFTTD. All results are from bivariate OLS regressions of a given firm characteristic on the dummy variable noted at the top of each column as well as industry fixed effects. All specifications except for employment also include firm employment as an additional control. Firm exports and imports are measured using customs information from LFTTD. Total factor productivity (TFP) is computed as in Caves et al. (1982). Capital and skill per worker are capital stock and non-production workers per total employment, respectively. All results are significant at the 1 percent level.

Source: Bernard et al. (JEL, 2018)

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- Very skewed distribution of exporters and importers:
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  - top 1% of exporters/importers accounts for huge percentage of exports most countries
- Remarkable within-industry heterogeneity in performance correlated with trade participation
- Extensive margin of exports and imports (i.e., number of firms; entry/exit) account for most of the cross-country variation in international trade flows

Extensive Margin Dominates Trade Flows: Exports

Gravity and Aggregate U.S. Exports, 2000

	Log of total exports value	*Log of number of exporting firms*	*Log of number of exported products*	*Log of export value per product per firm*
Log of GDP	0.98	0.71	0.52	−0.25
	(0.04)	(0.04)	(0.03)	(0.04)
Log of distance	−1.36	−1.14	−1.06	0.84
	(0.17)	(0.16)	(0.15)	(0.19)
Observations	175	175	175	175
R^2	0.82	0.74	0.64	0.25

Sources: Data are from the 2000 Linked-Longitudinal Firm Trade Transaction Database (LFTTD).
Notes: Each column reports the results of a country-level ordinary least squares regression of the dependent variable noted at the top of each column on the covariates noted in the first column. Results for the constant are suppressed. Standard errors are noted below each coefficient. Products are defined as ten-digit Harmonized System categories. All results are statistically significant at the 1 percent level.

Source: Bernard et al. (JEP, 2007)

Extensive Margin Dominates Trade Flows: Imports

Gravity and Aggregate U.S. Imports, 2000

	Log of total import value	*Log of number of importing firms*	*Log of number of imported products*	*Log of import value per product per firm*
Log of GDP	1.14***	0.82***	0.71***	−0.39***
	(0.06)	(0.03)	(0.03)	(0.05)
Log of Distance	−0.73***	−0.43***	−0.61***	0.31
	(0.27)	(0.15)	(0.15)	(0.24)
Observations	175	175	175	175
R^2	0.69	0.78	0.74	0.25

Sources: Data are from the 2000 Linked-Longitudinal Firm Trade Transaction Database (LFTTD).
Notes: Each column reports the results of a country-level ordinary least squares regression of the dependent variable noted at the top of each column on the covariates listed on the left. Results for constants are suppressed. Standard errors are noted below each coefficient. Products are defined as ten-digit Harmonized System categories.
*, **, and *** represent statistical significance at the 10, 5, and 1 percent levels, respectively.

Source: Bernard et al. (JEP, 2007)

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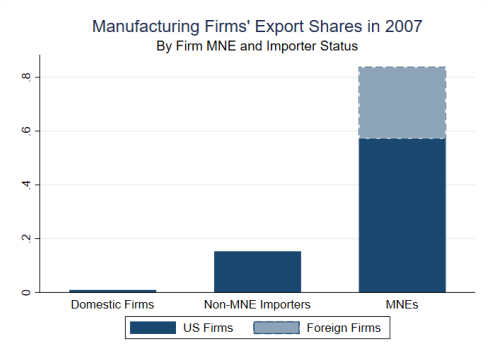
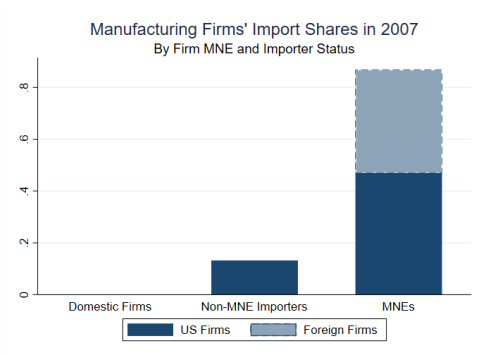
- Multinational firms account for a huge percentage of world trade flows

Importance of MNEs in US Trade



Source: Merged 2007 BEA-Census data



Source: Merged 2007 BEA-Census data

Source: Antràs et al. (REStat, 2024)

- There are 245,750 firms that manufacture in US; 65,000 domestic exporters (27%); 60,000 domestic importers (24%); 2,200 foreign MNEs (0.9%); 1,500 US MNEs (0.6%)

Firm-Level Approach to International Trade: Motivating Facts

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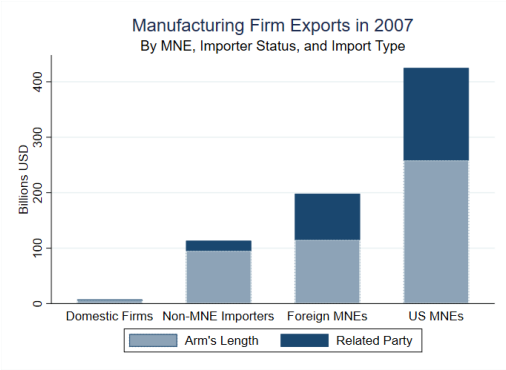
- Extensive margin of exports and imports (i.e., number of firms; entry/exit) account for most of the cross-country variation in international trade flows
- Multinational firms account for a huge percentage of world trade flows
  - And intrafirm trade (within multinationals) constitutes a very significant share of world trade

Importance of Intrafirm Trade in US Trade



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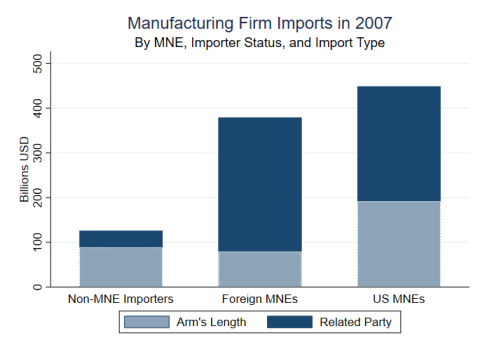


Source: Merged 2007 BEA-Census data

Source: Antràs et al. (REStat, 2024)

Firm-Level Approach to International Trade: Developments

- Product Differentiation + Monopolistic Competition + Scale Economies **+ Intraindustry Heterogeneity** can explain exporting facts
  - **Melitz (2003)** quickly became workhorse model of exporting
- Same features can explain importing facts, but models are much less tractable
  - Key is firms' marginal costs are affected by importing (see Antràs, Fort and Tintelnot, 2017)
- Same features are building blocks of models of multinational firms, but again much harder to solve these models
  - Cannibalization effects (see Tintelnot, 2017, Arkolakis et al., 2018, Antràs et al., 2024)
- To explain multinational firm boundaries, need to depart from complete-contracting environments (see Antràs, 2016, for a survey)

Quantitative Trade Theory

Quantitative Trade Theory

- There is currently huge demand for computing counterfactuals
  - What are the real income implications of the US-China trade war or of Chinese 'decoupling'?
  - How was real income in Germany affected by the war in Ukraine?
- 20th century: computable general-equilibrium (CGE) models (Shoven, Whalley, Kehoe...)
- 21st century: quantifiable general-equilibrium models (Eaton and Kortum, 2002, and follow-up work)
- What are the main differences?
  - Theoretical work has shown that a few sufficient statistics are sufficient to answer certain counterfactual questions
  - Don't need to compute the equilibrium to shed light on certain counterfactuals
  - All you need is data and a (small) vector of trade elasticities that can be 'credibly' estimated

Quantitative Trade Theory: Example

- Consider simplest modern quantitative trade model due to **Eaton and Kortum (2002)**
  - One-sector model, CES preferences, Fréchet distribution of productivity
  - Big plus: microfounds a gravity equation of trade in which extensive margin of trade (at the product level) is dominant

- Real income gains from trade reduce to

$$\frac{\widehat{GDP}}{GDP} = \left(\frac{\widehat{\lambda}}{\lambda}\right)^{1/\varepsilon},$$

  where λ is the share of expenditure on domestic goods and ε is the trade elasticity
  - for 'ex-post evaluation', it suffices to observe λ and $\widehat{\lambda}$, and to estimate ε
  - for computing change in real income of reverting back to autarky, only λ and ε are needed!

- Arkolakis et al. (2012) show that this formula applies to broader set of models

Quantitative Trade Theory: Estimation Approaches

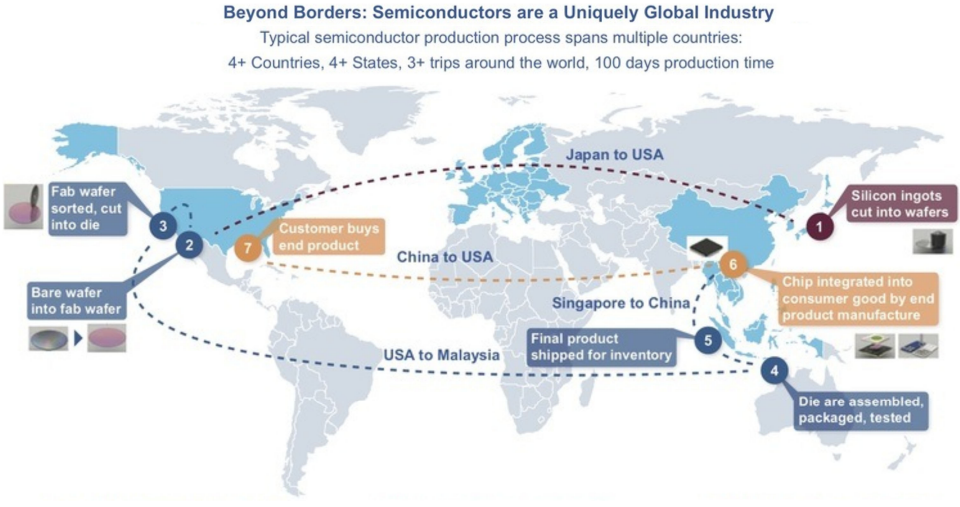
- The dominant quantitative approach today is akin to calibration in Macro, except that parameters (or combination of parameters) are set to ensure a perfect fit to the data
  - Approach is unbeatable in terms of model fit!
- But what if the model is misspecified? Or what if there is measurement error in the data?
- An alternative quantitative literature has followed an estimation approach more similar in spirit to work in Industrial Organization
- Model-based and quantitative, but think hard about the error term when estimating
  - Work on exporting by Jim Tybout & co., and more recently by Eduardo Morales & co.
  - Work on global sourcing and on MNEs by Felix Tintelnot & co.
  - Work on exporting and innovation by Daniel Xu & co.
  - Older 'IOsh' work on specific industries: Penny Goldberg, Rob Feenstra, Jim Levinsohn & co.
- Downsides: approach is typically partial equilibrium and static (or steady state) in nature

Global Value Chains

Global Value Chains: A New Perspective on International Trade Flows

- It's not wine for cloth anymore
- More and more, what we observe in Customs forms are slices of global value chains

A Global Value Chain: Manufacturing of Semiconductors



Global Value Chains: A New Perspective on International Trade Flows

- It's not wine for cloth anymore
- More and more, what we observe in Customs forms are slices of global value chains
- Can we treat these slices as independently determined from other related slices?
  - Not just GE or industry equilibrium interdependencies

Global Value Chains: A Very Active Area of Research

- See my 2022 Handbook Chapter with Davin Chor for a survey
- Much progress on the empirical front
  - Macro measurement: Input-Output Tables; backing out value-added trade; Johnson-Noguera
  - Micro measurement: Firm-Level Studies
  - But still significant challenges/limitations
- Some progress on the theoretical front
  - Macro modeling: Roundabout Models; Input-Output Analysis; Caliendo-Parro
  - Micro modeling: Firm-Level Analyses
  - But still significant challenges/limitations
- Policy analysis still in its infancy

Empirical Work ‘Unshackled’

Empirical Work 'Unshackled'

- Most 20th century empirical work in international trade was heavily disciplined by theory and used a relatively limited set of data sources
  - Empirical Heckscher-Ohlin literature (Leamer, Trefler, Harrigan, Davis, Weinstein, Schott...)
  - Empirical Gravity Equation literature (Anderson, Bergstrand, van Wincoop, Head, Mayer...)

- The 21st century has seen an explosion of empirical work largely 'unshackled' from theory and 'unshackled' from traditional data sources
  - Emergence of creative reduced-form work that can fuel the development of new theories
  - Exploitation of new data sources beyond official trade statistics and systems of national accounts

- Andy Bernard and Brad Jensen's work in the 1990s is a clear precedent
  - Other precedents: Feenstra-Hanson and Kei-Mu Yi & co.'s work on offshoring

Empirical Work 'Unshackled' From Theory

- Explosion of empirical work largely 'unshackled' from theory

1. Randomized Control Trials: D. Atkin, A. Khandelwal, E. Verhoogen & co.'s work in LDCs
2. Quasi-natural experiments:
   - Jim Feyrer's and Luigi Pascali's work on trade and growth
   - Claudia Steinwender's and Reka Juhasz' work on informational frictions and industrial policy
   - Rocco Macchiavello's work on relational contracts and development
3. Differential Regional Effects of Trade Shocks: Autor-Dorn-Hanson, Dix-Carneiro-Kovac
4. Much work on diverse topics of the type 'Trade and X'
   - with X = Child Labor, Educational Attainment, Environment, War, Culture, Lost Cities...

- Recent work combines rich and credible reduced-form evidence with theoretically-grounded quantitative work (e.g., work by Costinot, Donaldson, Fajgelbaum, Redding, etc)

Empirical Work 'Unshackled' From Traditional Data Sources

- Explosion of empirical work 'unshackled' from traditional data sources

1. Transaction-level trade flows merged with:
   - Census data beyond manufacturing census (e.g., Teresa Fort's work)
   - Employer-employee datasets (e.g., David Hummels & co.'s work for Denmark)
   - Domestic firm-to-firm links (for countries with value-added taxes)
   - Surveys of inward and outward MNE activity
   - Banking data on firm-level credit supply
2. Specific industry-level datasets (car industry, hard disk industry, pharmaceuticals, etc.)
3. Satellite data that tracks shipping vessels (Myrto Kalouptsidi & co.'s work)
4. Historical records (e.g., Lloyd's list, clay tablets from the Bronze Age)

Uncharted Theoretical Waters

Uncharted Theoretical Waters: Road Map

- Many things come to mind, but today I will focus on four (more in the paper version)

1. Oligopoly and Strategic Behavior in the Extensive Margin of Trade and MNE Activity
2. Behavioral Economics and Trade Policy
3. International Relations
4. Redistribution and Compensation

Oligopoly and Strategic Behavior

Is Monopolistic Competition a Good Paradigm?

- Workhorse models of firm-level exporting, importing and MNE activity assume monopolistic competition
- Distribution of exporters is not only heavily skewed, but many exporters control huge market shares
  - Freund and Pierola (2015): on average, the largest exporting firm accounts for 17% of total manufacturing exports across 32 countries
  - Gaubert and Itskhoki (2021): French largest exporter accounts for 7% of all manufacturing exports; within 4-digit industries average largest firm accounts for 28% of industry exports
- Many key global industries are heavily concentrated
  - Aircraft industry (essentially a duopoly)
  - Semiconductors industry (TSMC)
- MNEs are in particularly concentrated sectors, and they interact in many markets

Is Oligopoly Really an Uncharted Water? Of Course Not!

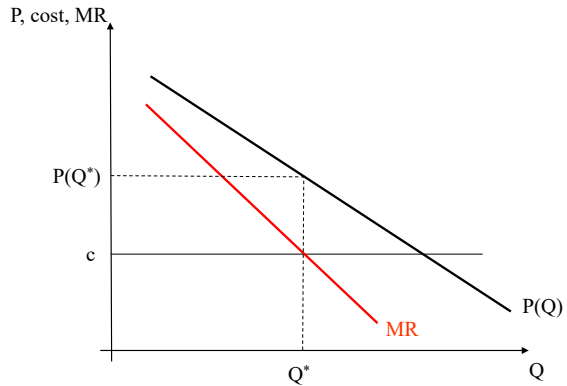
- Extensive work in the 1980s (Brander, Krugman, Spencer, etc)
- Peter Neary's 2003 EEA Presidential Address on General Oligopolistic Equilibrium
- Atkeson and Burstein (2008) on variable markups
- Gaubert and Itskhoki (2021) on granular comparative advantage
- Alviarez et al. (2023) on two-sided market power in firm-to-firm trade
- Breinlich et al. (2020, 2023) on international merger policy and on gravity w/ granularity
- All great work emphasizing strategic effects (on quantity choice or pricing) absent in monopolistic competition models
- But remember that the key driver of international trade flows is the extensive margin of trade, not the intensive one

Oligopoly and Strategic Effects in the Extensive Margin of Trade

- Strategic effects may be quite important in shaping the extensive margin of trade
- Exporting: existing work assumes that firms make entry decisions following a pecking order driven by productivity
  - This is just one of multiple equilibria!
  - Firms have an incentive to move before their competitors (see Ciliberto and Jakel, 2021)
  - Do larger firms always move first?
  - There may be natural alternative equilibrium selection criteria (e.g., local incumbent firms)
- Importing: offshoring by some firms increases the incentives of other firms to offshore (as in Igami, 2018)
- MNE activity: similar strategic effects (Knickerbocker, 1973)

Oligopoly and Strategic Effects: An Example

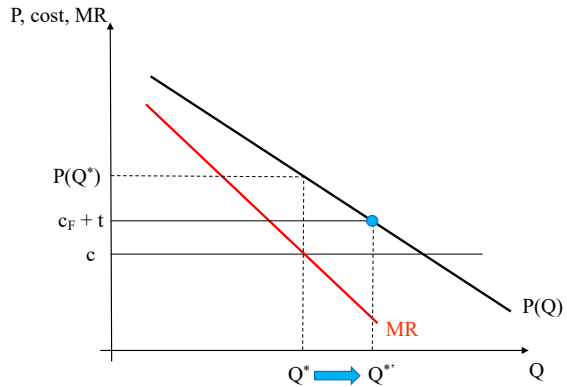
- Consider the following homogeneous-good, Bertrand duopoly case



- Initially prohibitive trade costs, so local monopoly in each market

Oligopoly and Strategic Effects: An Example

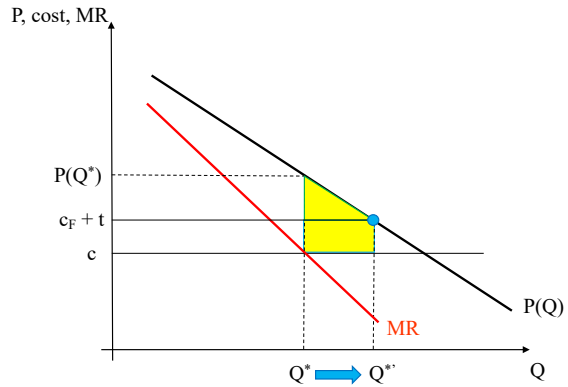
- Trade liberalization brings foreign firm's marginal cost down to $c_F + t$



- Home firm uses limit price to deter entry

Oligopoly and Strategic Effects: An Example

- Gains from trade is yellow area despite the fact that $\lambda = 1$ has not changed



- Arkolakis et al. (2012) formula does not work here!

Behavioral Economics

Behavioral Economics: The Road Not Taken

- Applications of behavioral economics are almost absent in the International Trade field
- Perhaps not surprisingly since theories focus on the supply side (firm behavior), and firms maximizing profits seems a good approximation
  - Particularly given the skewness in the data, so the average exporter stands to lose a lot of money from systematic mistakes
  - Exception: *Ad hoc* behavioral assumptions may be justified/necessary in complex (dynamic) problems where the state space otherwise explodes
- Similarly, it is not too clear that behavioral biases in consumption choices are first-order for explaining international trade flows
- So what role for Behavioral Economics?
- Perhaps it is fine to ignore behavioral biases when considering trade flows conditional on policy environment. But what if trade policies are affected by behavioral biases?

Behavioral Economics: Potential Avenues

- Ample evidence that individuals do not perceive international trade the way our models formalize it
- Perceptions of trade are thus not well captured by our models
- Trade policies naturally respond to individuals' perceptions (e.g., through voting), so they are not irrelevant for our field
- I am of course not the first one to point this out, but these waters are largely uncharted. Some exceptions:
  - Loss aversion and trade policy: Freund and Ozden (2008), Tovar (2009)
  - Identity politics and trade policy: Grossman and Helpman (2021)
- But many potential avenues for further cross-pollination

Behavioral Economics: Lessons from Recent Large-Scale Surveys

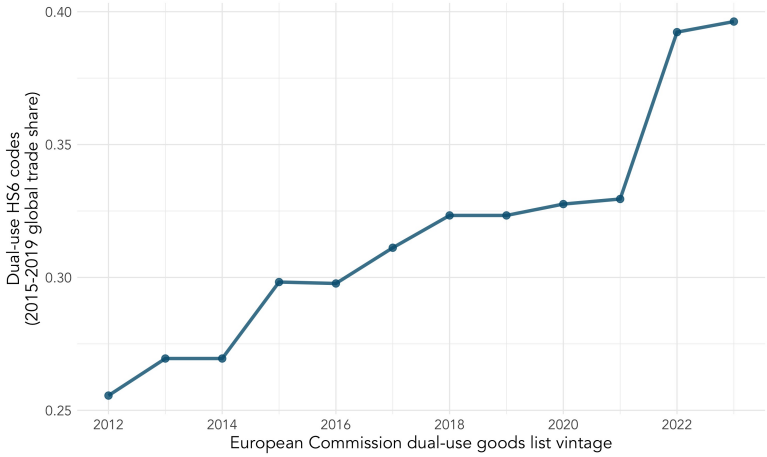
- Hiscox (2006), Rodríguez et al. (2021), Stantcheva (2023), Alfaro et al. (2023)
- Perceived gains from trade as consumers are vague and unclear
  - Why do folks not understand the benefits of trade?
  - Is it money illusion à la Shafir, Diamond & Tversky (1997)?
  - Is it more general economic illiteracy (e.g., lack of understanding of general equilibrium)?
  - How can we better convey the benefits of trade to the public?
- Conversely, perceived potential losses as workers are salient
  - Is it loss aversion à la Kahneman-Tversky (1979)? An endowment effect à la Thaler (1980)? Salience theory à la Bordalo et al. (2013)? Sparse thinking à la Gabaix (2014)?
- Furthermore, individual's perceptions are not just shaped by self-interest (folks care about amount of distribution/compensation, others' job losses)
  - Isn't this problematic for the Hicks-Kaldor criterion at the heart of gains-from-trade result?
  - How should we model this other-regarding preferences?

National Security

National Security

- Geopolitical tensions have flared up in the last few years
  - US-China trade war
  - Russia's invasion of Ukraine
  - Recent turmoil in the Middle East
- This has had a clear impact on world trade (US imports from China back to 2013 level)
- It is also clear that certain goods/sectors are key for national security, so unfettered free trade may not be optimal
- Especially relevant in complex supply chains in which firms do not internalize all effects
- Some folks are starting to document the 'dual-use' nature of some goods and their impact on trade policy (Alekseev and Lin, 2023)
- Geopolitical tensions will not disappear any time soon: important to deepen our understanding

Rising Categorization of Goods as Dual-Use Goods



Source: Alekseev and Lin (2023)

National Security and Trade Policy

- Trade policies are shaped by whatever governments maximize
- Optimal Trade Policy: Benevolent governments maximize social welfare (however defined)
- Political-Economy: Politicians also care about their well-being (e.g., their political career)
  - Some agents exploit this to tilt policies in their favor (e.g., lobbying à la Grossman and Helpman, 1994)
  - If voters have biases (e.g., identity concerns), politicians will respond to them (Trump tariffs)
- But much harder to understand Putin's decision to invade Ukraine; or recent push for 'friendshoring' in the US
- It appears that some policies - and trade policies in particular - are shaped by national security concerns
- At the same time, obvious concern about disguising protectionism as national security

National Security and Trade Policy: Questions in Need of Answers

1. What do governments maximize when considering 'national security'?
2. What is the social marginal rate of substitution between real income and national security?
3. How does optimal trade policy depend on the structure of international political alliances?
4. How are these alliances formed and how are they shaped by international specialization?

- In sum: Desirable cross-pollination with the field of International Relations
  - Some early attempts: Kleinman et al. (2022), Alekseev and Lin (2023), Clayton et al. (2023)
  - Related literature on trade and conflict: Garfinkel, Skaperdas & co; Martin, Mayer & Thoenig

Redistribution and Compensation

Redistribution and Compensation

- Empirical evidence suggests that increased trade integration raises real income but also increases inequality and makes some worse off
- Standard approach to demonstrating and quantifying the gains from trade largely ignores trade-induced inequality
  - Kaldor-Hicks compensation principle: Compute compensation/equivalent variation at the individual level and aggregate to show that everybody **can** be compensated
- Scientifically appealing approach but leaves some open questions (see Antràs et al. 2016):
  - How much compensation/redistribution **actually** takes place?
  - Why is redistribution particularly key for individuals to support free trade (Stantcheva, 2023) and less so for them to support innovation/automation/robots?
  - How should compensation be optimally carried out in the absence of lump-sum transfers?
- Huge need for theoretical and empirical work on this given current backlash against trade

Uncharted Empirical Waters

Uncharted Empirical Waters: Road Map

1. Questions that Cannot Be Accurately Answered with Existing Data

   (Time permitting ↓)

2. Modest Improvements to Official Statistics
3. More Significant Improvements to Official Statistics
4. Major Improvements to Official Statistics
5. New Data Sources

Questions that Cannot Be Accurately Answered with Existing Data

Questions that Cannot Be Accurately Answered with Existing Data

- What is the causal impact of large-scale export promotion or industrial policies on trade and welfare?
- How granular is the structure of GVCs and how important is that for shock transmission?
- How does the geography of physical production shape the creation and diffusion of knowledge as well as national security?
- How far does value added embodied in consumer goods travel on average? And what is the carbon footprint of those flows?
- Do we need new theories to explain the causes and implications of international trade in services?

Modest Improvements to Official Statistics

Modest Improvements to Official Statistics

- This is less of a call for new research and more of a call for facilitating work with existing datasets
  - Still, researchers can and should play an active role in advocating for this (Fort, 2023)
- We need progress on:

1. More systematic digitization and standardization (e.g., industry codes) of customs forms
2. More systematic reporting of information on industry of buyer, not just of the good sold
3. More systematic access to merged customs + census datasets for a larger set of countries
4. More systematic merging to VAT tax forms and employer-employee datasets

- Enhance cross-agency collaboration within countries!

More Significant Improvements to Official Statistics: Trade in Services

More Significant Improvements to Official Statistics: Trade in Services

- Need to improve recording of trade in services
- Customs forms record bilateral trade in goods at a remarkably disaggregated manner
  - HS Code 95030041 = 'Stuffed toys representing animals or non-human creatures'
- "Unlike trade in goods, for trade in services there is no package crossing the customs frontier with an internationally recognized commodity code" (UN, 2002)
- Data on trade in services comes from International Transactions Reporting Systems (ITRS) or from Enterprise Surveys (in turn used to construct BoP stastitics)
- It is not nearly as disaggregated as for goods: 'Communications services', 'Financial Services', 'Royalties and License Fees'

Why Trade in Services is Important

- Service trade has been growing faster than other components of international trade
  - In part due to disproportionate declines in trade costs for services (ICT Revolution)
  - But also due to structural transformation (rise in % of services in world GDP)
- Sources of comparative advantage for services not too well understood (in part due to lack of disaggregation in the data)
- Labor-market impacts of trade in services not well understood (again due to data limitations)
- Certain forms of service trade (e.g., digital trade, trade in 'data') are likely to rise disproportionately in coming years
- Recording of 'Royalties and License Fees' is key aspect of profit-shifting practices by multinational firms (see Santacreu, 2023)

Major Improvements to Official Statistics

Major Improvements to Official Statistics: Cross-Border Collaboration

- Need cross-border agreements to construct better official measures of production networks and of global value chains (GVCs)
- With consistent product classifications and firm identifiers, merging cross-border datasets should be straightforward
- But obvious concerns about the governance of these merged datasets
- International organizations (WTO, IMF, World Bank) could play a leading role, but this seems hopeless under the current geopolitical environment
- Increase collaboration between academic and government researchers

New Data Sources

New Data Sources

- Leaving aside government agencies, researchers should continue to use their ingenuity and (research budgets!) to uncover new sources of data
- Buzz about 'Big Data' has made it clear that data are valuable and many private companies have invested in collecting such data
- More and more, we should observe researchers and government agencies using novel 'non-official' datasets
  - Chetty et al.'s (2023) COVID tracker offers a valuable blueprint
  - Some Concerns: (i) data quality, (ii) sample selection, (iii) cost
- Other high-cost avenues: Randomized Controlled Trials, Large-Scale Surveys
- Data scraping may offer a cheaper alternative to purchasing data from private vendors

Uncharted Policy Waters

Uncharted Policy Waters

- New theoretical and empirical developments will lay groundwork for new work on policy
- Even without new models, there are still lots of open questions
  - How should countries manage the participation of its agents in GVCs?
  - What is the optimal design of Trade Adjustment Assistance? Should we actually have TAA?
  - Which industrial policies have worked and which have not?
- But I want to conclude with a broader and more controversial topic

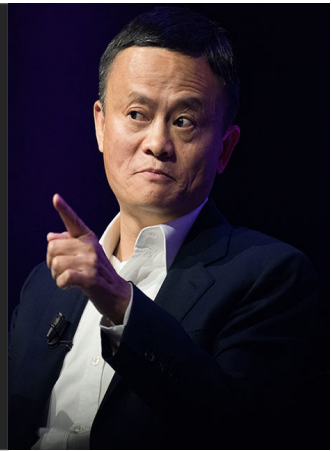
Uncharted Policy Waters: Industrial Policy in the Age of AI

- We have entered the era of big data and artificial intelligence (AI)
- Better information (and better tools to use it) could facilitate the design of better policies
- Critics of industrial policy invoke 'heavy hand' of government & 'unintended consequences'
- Some argue that big data and computational power may permit a more 'surgical' approach to policy

An Oskar Lange Revival?

"Over the past 100 years, we have come to believe that the market economy is the best system, but in my opinion, there will be a significant change in the next three decades, and the planned economy will become increasingly big. Why? Because with access to all kinds of data, **we may be able to find the invisible hand of the market**. [...] In the era of **big data**, the abilities of human beings in obtaining and processing data are greater than you can imagine. With the help of artificial intelligence or multiple intelligence, our perception of the world will be elevated to a new level. As such, big data will make the market smarter and make it possible to plan and predict market forces so as to allow us to **finally achieve a planned economy**."

Jack Ma, executive chair of the Alibaba Group, 2016



Uncharted Policy Waters: Industrial Policy in the Age of AI

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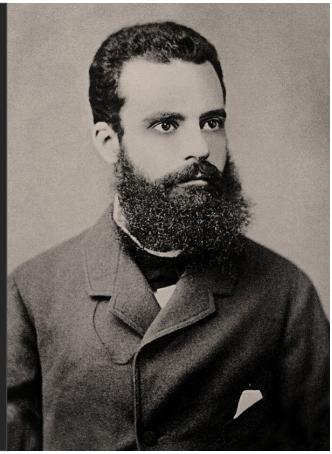
- Some argue that big data and computational power may permit a more 'surgical' approach to policy
- I am less sure that market socialism (à la Oskar Lange) is more feasible with AI
  - Conceptually, Hayek argued that pitfalls of market socialism unrelated to computing power
  - Empirically, big data does not necessarily facilitate causal inference
- Still, AI may well alter the pros and cons of government intervention

Conclusion

Conclusion

"Is it not a most remarkable fact that a system of equations should thus be able to express not only the general character of economic phenomena, but every single detail as far as we may have any knowledge of them. The entire body of economic theory is henceforth bound together in this way and knitted into an integral whole. If our equations are constructed each for a homogeneous group, and several of these groups are considered, we get [...] an effectively complete theory of international trade, together with an adequate scientific interpretation of the theory of comparative cost."

Vilfredo Pareto, *Journal of Political Economy*, 1897



- Despite recent major advances, trade field should evolve, as it has in the last 125 years