Comparative Advantage and Gains from Trade (Empirics)

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Today's lecture

- Law of comparative advantage (recap)
- How can we test the significance of comparative advantage as a source of trade?
- A primer on the size of the gains from trade

Law of comparative advantage

Basic idea

Recall in lecture 1 we learnt

- **The basic law of comparative advantage:**

$$(p^{Ak} - p) \cdot M^k \geq 0 \text{ for all } k.$$

  In words, countries tend to export goods in which they have a CA, i.e., goods with autarky price relative lower than equilibrium prices under free trade.

- **Principle of comparative advantage:** CA $\rightarrow$ differences in relative autarky prices $\rightarrow$ basis of trade
- With price normalization, we can show that $(p^{Ak} - p) \cdot M^k \geq 0$ imply

$$corr(p^{Ak} - p, M^k) \geq 0.$$

Testing for comparative advantage

- Principle of CA is a fundamental theoretical idea in Economics, yet testing it is hard. Why?
  - Problem 1: 'Principle' version is too weak to test in real world (where more than 2 countries or goods).
  - Problem 2: Latent variable problem: 'Law' version is statement about trading behavior but is based on autarky prices!
  - Problem 3: Periods of autarky rarely observed..
- How to proceed? Two routes:
  - Put a small amount of structure on the problem. Avoids Problem 1. Downside: Problems 2 and 3 remain, and test lacks power (we will discuss this approach next).
  - Put a large amount of structure on the problem: model determinants of autarky prices and substitute this model in. Hard to do, but can in principal avoid Problems 1-3. Downside: tests become joint test of CA and structure (recent advancement in the field, not covered).

Testing for comparative advantage

- Recall GFT gives CA: $(p^{Ak} - p) \cdot M^k \geq 0$ for all k
- Denote t the net *export* vector ($t \equiv -M$)
- Then $p^{Ak} \cdot t^k \leq 0$ for all k (w/o. confusion we drop k)

$\rightarrow$ An economy's net export vector evaluated at autarky prices is negative

$\rightarrow$ Trade has to be in deficit under old prices

- Comments from empirical perspective:
    - Need only data on autarky prices and trade flows
    - Impossible to observe p^A and t at the same time (i.e. 'Problem 2' can never be overcome).
    - Weak prediction. (Compare with coin toss model.)

Bernhofen and Brown (JPE, 2004)

Bernhofen and Brown (2004) exploit a natural experiment: Japan's final years of complete economic and political isolation (1851-53)

- Opening of markets mid-1859
- Compute trade evaluated at autarky prices for the period 1868-1875

"What if" story: comparison between the observed free trade regime (1870s) and an autarky regime at the same time period (1870s) that would have prevailed had Japan not opened its doors to world markets

Bernhofen and Brown (JPE, 2004)

Nice natural experiment because

- Well developed market economy (rich record of price data)
- Two centuries of autarky
- Relative simple production technology in this time period
- Forced by western powers to move to free trade at the end of the 1850s

Japan opening up

Fig. 3.—The development of Japan's external trade, 1860–85. Source: Sugiyama (1988, table 3-4).

Empirical methodology

Bernhofen and Brown (2004)

- 1850's: period 1, autarky price $p_1^{A'}$ observed
- 1870's: period 2, autarky price $p_2^{A'}$ unobserved
- Law of comparative advantage: $p_2^{A'} T \leq 0$

Assume $p_2^{A'} = p_1^{A'} + \varepsilon$ and $\varepsilon T \leq 0$

Use $p_1^{A'} T \leq 0$ as a test

Assumptions required by BB (2004) approach

- Perfect competition under autarky
- Japan is price taker on international markets $\rightarrow$ there still is perfect competition after open to trade
- No export subsidies $\rightarrow$ no pattern of trade reversals
- Japan's underlying technology and tastes haven't changed (a lose condition for $\varepsilon T \leq 0$ to hold)

Results: graphical

NB: y-axis is $p - p^A$, not p^A (but recall that $p \cdot t = 0$ by balanced trade)
The graph effectively showed $corr(p^A - p, M) \geq 0$

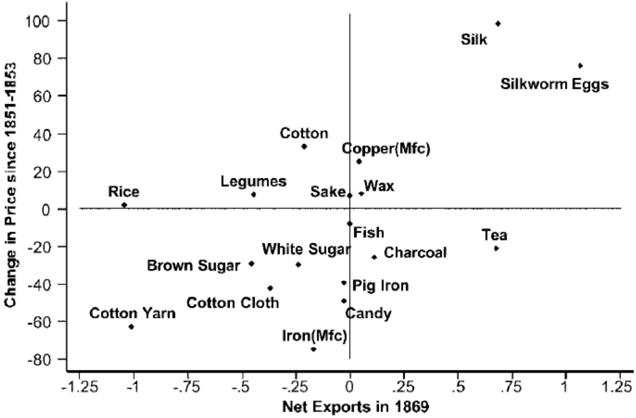


FIG. 4.—Net exports and price changes for 1869. Source: Japan Bureau of Revenue (1893) for trade data and Kinyu Kenkyukai (1937), Miyamoto (1963), Ono (1979), Yamazaki (1983), and Mitsui Bunko (1989) for price data.

Results: by year and product/data Type

TABLE 2
APPROXIMATE INNER PRODUCT IN VARIOUS TEST YEARS (Millions of Ryō)

	YEAR OF NET EXPORT VECTOR							
COMPONENTS	1868	1869	1870	1871	1872	1873	1874	1875
1. Imports with observed autarky prices	−2.24	−4.12	−8.44	−7.00	−5.75	−5.88	−7.15	−7.98
2. Imports of woolen goods	−.98	−.82	−1.29	−1.56	−2.16	−2.50	−1.56	−2.33
3. Imports with approximated autarky prices (Shinbo index)	−1.10	−.95	−.70	−.85	−1.51	−2.08	−1.60	−2.65
4. Exports with observed autarky prices	4.07	3.40	4.04	5.16	4.99	4.08	5.08	4.80
5. Exports with approximated autarky prices (Shinbo index)	.09	.03	.07	.07	.15	.07	.11	.10
Total inner product (sum of rows 1–5)	**−.18**	**−2.47**	**−6.31**	**−4.17**	**−4.28**	**−6.31**	**−5.11**	**−8.06**

SOURCE.—For sources of price data, see Sec. IV*B* and n. 17. For rows 3 and 5, current silver yen values are converted to values of 1851–53 by deflating them with the price indices for exports and imports found in Shinbo (1978, table 5–10).

NOTE.—All values are expressed in terms of millions of ryō. The ryō equaled about $1.00 in 1873 and was equivalent to the yen when it was introduced in 1871. The estimates are of the approximation of the inner product ($\tilde{\mathbf{p}}_1^a\tilde{\mathbf{T}}$) valued at autarky prices prevailing in 1851–53. An explanation of the assumptions underlying the approximation is contained in the text.

Comments

- Theory says nothing about which goods are ‘up’ and which are ‘down’ in Figure 3, only that the scatter plot should be upward-sloping.
- Low power test. Harrigan (2003 Handbook chapter on Empirical Trade): “I think I can speak for many economists who have taught this theory with great fervor when I say ‘thank goodness’.”
- Why is $p^A \cdot t$ growing in magnitude over time?

How large are the gains from trade?

- Many approaches to this question
- Today we will discuss some recent answers employing a 'reduced-form' approach:
  - Bernhofen and Brown (AER, 2005)
  - Frankel and Romer (AER, 1999)
  - Feyrer (2009a, 2009b)
- 'Structural approach' with quantitative trade models is covered in ECON 9401.
- Estimating GT is of fundamental interest in International Trade

Bernhofen and Brown (2005)

- Measure gains (to a representative Japan consumer) of Japan's opening up in 1858
- Consider Slutsky compensation to consumers in 1858 under autarky:

$$\Delta W = e(p^A_{1858}, c_{1958}) - e(p^A_{1858}, c^A_{1958})$$

$\rightarrow$ How much transfer so that the representative consumer can afford her free-trade *consumption bundle* (NB: not *welfare*) under autarky prices?

- By WARP, c_{1958} was not affordable in 1858 or else it would have been chosen

Towards an observable expression

- Rearrange this to get something observable (let y be output)

$$\begin{aligned}
\Delta W &= e(p^A_{1858}, c_{1958}) - e(p^A_{1858}, c^A_{1958}) \\
&= p^A_{1858} \cdot c_{1858} - p^A_{1858} \cdot c^A_{1858} \\
&= p^A_{1858} \cdot (c_{1858} - y_{1858}) + p^A_{1858} \cdot (y_{1858} - y^A_{1858}) \\
&= -p^A_{1858} \cdot t_{1958} - p^A_{1858} \cdot (y^A_{1858} - y_{1858}) \\
&\leq -p^A_{1858} \cdot t_{1858}
\end{aligned}$$

  The last equation follows from profit maximization
- Note that t_{1958} is counterfactual too. BB (2005) makes similar assumption to that in BB (2004).
- Then above statistic puts an upper-bound on GT. Recall page 5: $p^A \cdot t \leq 0$; hence $\Delta W \geq 0$.

Results

These gains in terms of ryo translate into 5.4-9.1 % of GDP

TABLE 2—CALCULATIONS OF THE PER CAPITA GAINS FROM TRADE
(*In gold ryō*)

	$p^a_{1850s}T_i$ (i = 1868 ... 1875)								$p^a_{1850s}\tilde{T}_{1850s}$
Group of goods	1868	1869	1870	1871	1872	1873	1874	1875	
(1) Goods with observed autarky prices	−0.05	0.03	0.16	0.08	−0.01	0.02	0.03	0.05	0.037
(2) Goods with estimated autarky prices	0.02	0.02	0.02	0.02	0.04	0.07	0.05	0.08	0.035
(3) Woolens and muskets	0.08	0.08	0.12	0.15	0.22	0.26	0.17	0.19	0.141
Gains per capita in ryō	0.05	0.13	0.30	0.25	0.24	0.34	0.26	0.32	0.219

Sources: Nakai (1989), Miyamoto (1963), Ono (1979), Kinyu Kenkyukai (1937), Yamazaki (1983), and Great Britain, *Consular Reports,* for the ports of Nagasaki and Kanagawa in 1859 and in 1860; von Scherzer (1872, p. 262) and Lühdorf (1857, pp. 141, 248–249) for price data. See the text for the estimate of the autarky valuation of imports of woolens and imports of muskets, and of goods without observed autarky prices. Crawcour and Yamamura (1970, Table A1) provide the exchange rate used to convert the inner product from momme into ryō.

Notes: The inner product is decomposed into three groups of commodities: the goods for which autarky prices are available from the existing historical sources; woolens; and goods with estimated autarky prices. $p^a_{1850s}\tilde{T}_{1850s}$ is the average of the annual estimates from 1868 through 1875 with the additional assumption that GDP per capita grew by an annual rate 0.4 percent from 1851–1853 to the test period.

Interpretation I

- "Small" (upper-bound) effects in BB (2005) surprising to some
- What potential gains/losses from trade are not being counted in BB (2005) calculation?
- A partial list often mentioned in the literature (and which we will return to throughout this course):
  - Selection of more productive domestic firms
  - New goods available (for consumption and production)
  - Pro-competitive effects of openness to trade.
  - 'Dynamic effects' of openness to trade (typically defined as something, like innovation or learning, that moves the PPF).
  - Institutional change driven by openness to trade.
- Some more pedestrian answers:
  - A few percentage points of GDP is nothing to spit at (i.e. "small" relative to what?)
  - GT depend on how much you trade (and Japan may trade much more in the future than in 1859)

Frankel and Romer (1999)

- Extremely influential paper (one of AER's most highly cited articles in recent decades).
- FR (1999) takes a huge question ('Does trade cause growth?') and answers it with more attention to the endogenous nature of trade than previous work.
  - Key idea: FR instrument for a country's trade (really, its 'openness') by using a measure of distance: how far that country is from large (i.e., rich) potential trade partners.

Empirical methodology (first stage, Part I)

- First-stage regression has two parts.
- First is based on well-known gravity equation.
- We will have much to say about the empirics of gravity equations in a few weeks.
- Key idea: bilateral trade flows fall with bilateral trade costs (and variables like bilateral distance, and whether two countries share a border, appear to be correlated with trade costs).
- Gravity equation estimated is the following (NB: as we shall see later, this isn't really conventional by modern standards):

$$ln(\frac{X_{ij} + M_{ij}}{GDP_i}) = a_0 + a_1 lnD_{ij} + a_2 N_i + a_3 N_j + a_4 B_{ij} + e_{ij}$$

- Where $(X_{ij} + M_{ij})$ is exports plus imports between country i and j, D_{ij} is distance, N is population and B_{ij} is a shared border dummy. FR(1999) also control for each country's area, landlocked status, as well as interactions between these variables and B_{ij}.

First-stage results (Part I)

The gravity equation

TABLE 1—THE BILATERAL TRADE EQUATION

	Variable	Interaction
Constant	−6.38	5.10
	(0.42)	(1.78)
Ln distance	−0.85	0.15
	(0.04)	(0.30)
Ln population	−0.24	−0.29
(country i)	(0.03)	(0.18)
Ln area	−0.12	−0.06
(country i)	(0.02)	(0.15)
Ln population	0.61	−0.14
(country j)	(0.03)	(0.18)
Ln area	−0.19	−0.07
(country j)	(0.02)	(0.15)
Landlocked	−0.36	0.33
	(0.08)	(0.33)
Sample size	3220	
R^2	0.36	
SE of regression	1.64	

Notes: The dependent variable is $\ln(\tau_{ij}/\text{GDP}_i)$. The first column reports the coefficient on the variable listed, and the second column reports the coefficient on the variable's interaction with the common-border dummy. Standard errors are in parentheses.

Empirical methodology (first stage, Part II)

- Now FR (1999) aggregate the previously estimated gravity regression over all of country i 's imports from all of its bilateral partners, j:

$$\hat{T}_i = \sum_{i \neq j} e^{\hat{a} X_{ij}}$$

- This constructed variable $\hat{T}_i$ is then used as an instrument for how much a country is actually trading (which they, somewhat confusingly, denote by T_i). Think of $\hat{T}_i$ as 'gravity predicted trade'.
- That is, the real first-stage regression is to regress T_i (exports plus imports over GDP) on $\hat{T}_i$ and population and area.

First-stage results (Part II)

The real first stage (i.e. regress T_i on $\hat{T}_i$ and controls). SE's corrected for generated regressor (Murphy and Topel, JBES 2002)

TABLE 2—THE RELATION BETWEEN ACTUAL AND CONSTRUCTED OVERALL TRADE

	(1)	(2)	(3)
Constant	46.41	218.58	166.97
	(4.10)	(12.89)	(18.88)
Constructed trade share	0.99		0.45
	(0.10)		(0.12)
Ln population		−6.36	−4.72
		(2.09)	(2.06)
Ln area		−8.93	−6.45
		(1.70)	(1.77)
Sample size	150	150	150
R^2	0.38	0.48	0.52
SE of regression	36.33	33.49	32.19

Notes: The dependent variable is the actual trade share. Standard errors are in parentheses.

Empirical methodology (second stage, Part I)

- Now, finally, FR (1999) run the regression of interest—'Does trade cause growth?':
$$ln\frac{Y_i}{N_i} = a + bT_i + c_1 N_i + c_2 A_i + u_i$$
- Here, $\frac{Y_i}{N_i}$ is GDP per capita and A_i is area.
- FR run this regression using both OLS and IV.
  - The IV for T_i is $\hat{T}_i$.

OLS and IV results

TABLE 3—TRADE AND INCOME

	(1)	(2)	(3)	(4)
Estimation	OLS	IV	OLS	IV
Constant	7.40	4.96	6.95	1.62
	(0.66)	(2.20)	(1.12)	(3.85)
Trade share	0.85	1.97	0.82	2.96
	(0.25)	(0.99)	(0.32)	(1.49)
Ln population	0.12	0.19	0.21	0.35
	(0.06)	(0.09)	(0.10)	(0.15)
Ln area	−0.01	0.09	−0.05	0.20
	(0.06)	(0.10)	(0.08)	(0.19)
Sample size	150	150	98	98
R^2	0.09	0.09	0.11	0.09
SE of regression	1.00	1.06	1.04	1.27
First-stage F on excluded instrument		13.13		8.45

Notes: The dependent variable is log income per person in 1985. The 150-country sample includes all countries for which the data are available; the 98-country sample includes only the countries considered by Mankiw et al. (1992).

Why does trade increase GDP per capita?

Capital deepening, schooling (S_i), or TFP? 1960 levels or 1960-1990 growth?

TABLE 4—TRADE AND THE COMPONENTS OF INCOME

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	$\frac{\alpha}{1-\alpha}\ln(K_i/Y_i)$		$\phi(S_i)$		$\ln A_i$		$\ln(Y/N)_{1960}$		$\Delta \ln(Y/N)$	
Estimation	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
Constant	−0.72	−1.29	0.10	−0.37	7.47	3.05	7.45	4.27	−0.50	−2.65
	(0.34)	(0.93)	(0.30)	(0.81)	(0.74)	(2.84)	(1.03)	(3.07)	(0.39)	(1.66)
Trade share	0.36	0.59	0.18	0.37	0.27	2.04	0.38	1.66	0.45	1.31
	(0.10)	(0.36)	(0.08)	(0.31)	(0.21)	(1.10)	(0.29)	(1.19)	(0.11)	(0.65)
Ln population	0.02	0.04	0.06	0.07	0.21	0.32	0.09	0.17	0.12	0.18
	(0.03)	(0.04)	(0.03)	(0.03)	(0.06)	(0.11)	(0.09)	(0.12)	(0.03)	(0.06)
Ln area	0.04	0.07	−0.01	0.01	−0.13	0.08	−0.02	0.13	−0.03	0.07
	(0.02)	(0.05)	(0.02)	(0.04)	(0.05)	(0.14)	(0.07)	(0.15)	(0.03)	(0.08)
Sample size	98	98	98	98	98	98	98	98	98	98
R^2	0.13	0.13	0.09	0.08	0.14	0.06	0.03	0.02	0.24	0.20
SE of regression	0.32	0.33	0.28	0.29	0.69	0.92	0.96	1.06	0.36	0.47
First-stage F on excluded instrument		8.45		8.45		8.45		8.45		8.45

Note: Standard errors are in parentheses.

Comments I

- These are big effects, that surprised many people. Possible explanations:
    - The IV results are still biased upwards. (A small amount of endogeneity in an IV gets exaggerated by the IV method.) Countries that are close to big countries are rich not just because of trade, but because of spatially correlated true determinants of prosperity (eg, ‘institutions’).
    - ‘Openness’ is proxying for lots of true treatment effects of proximity to neighbors: multinational firms, technology transfer, knowledge spillovers, migration, political spillovers. Not just 'Trade'.
    - The dynamic effects of ‘openness’ accumulated over a long period of time, are larger than the static one-off effects of opening up to trade.
- Effects are many orders of magnitude higher than BB 2005 results. But not clear how to compare them:
    - BB focus on consumption/welfare. FR focus on production.
    - We would expect measured GDP to fall in Japan between 1858 and 1859 (Why?)

Comments II

- It's very surprising that the IV coefficients are larger than the OLS coefficients. Possible explanations:
  - Weak instrument. (But the F-stat on the first stage is reasonably high.)
  - OLS is not biased after all.
  - Sampling variation: OLS and IV coefficients not statistically distinguishable from one another.
  - Measurement error. ("Trade is an [imperfect] proxy for the many ways in which interactions between countries raise income - specialization, spread of ideas, and so on.")

Follow-on work of FR (1999), part I

- Because of importance of question, and surprising findings, FR (1999) generated a lot of controversy and follow-on work.
- Rodrik and Rodriguez (2000) were most critical.
- Fundamental message (that has now also been confirmed for many cross-country studies, in all fields) is that these regressions are not that robust.
  - Inclusion of various controls can change the results a great deal.
  - Different measures of 'openness' yield quite different results.
- RR (2000) also critical of the identification assumption behind FR (1999)'s IV.

Follow-on work of FR (1999), part II

- Lots of work used micro-data and trade liberalization episodes to go beyond the cross-country comparisons in FR (1999):
  - Do individual firms (or industries) become more productive when they open to trade?
  - Hallak, Levinsohn and Dumas (2004) argue the case for micro-studies.
  - Eg: Trefler (2004), Pavcnik (2002), Tybout (various years).
  - We will review this literature later in the course.
  - But note that when studying the productivity responses of individual firms, we're drifting away from theoretical arguments establishing GT in a neoclassical world (in which technologies are held fixed).
- In two recent papers, James Feyrer has revamped interest in the cross-country approach by using panel data and an IV based on a time-varying component of 'distance'.
  - Feyrer (2009) Paper 1: "Trade and Income: Exploiting Time Series in Geography"
  - Feyrer (2009) Paper 2: "Distance, Trade, and Income: The 1967 to 1975 Closing of the Suez Canal as a Natural Experiment"

Additional Slides

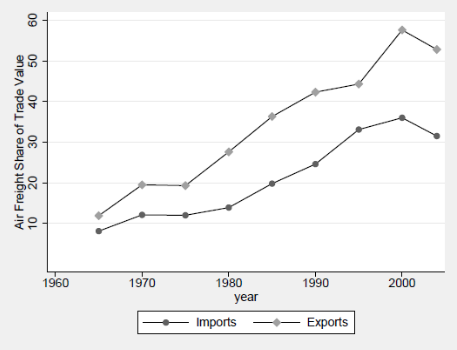
Feyrer (2009) paper 1

- Uses panel of country-level GDP and trade data from 1960-1995
- Exploits fact that marginal cost of shipping via air fell faster over this period than marginal cost of shipping via sea.
- This will make trade costs (or 'distance') fall over time. And importantly, trade costs between country pairs will be affected very differently by this:
  - Germany-Japan sea distance is 12,000 miles, but only 5,000 air miles.('Treatment')
  - Germany-USA sea and air distances are basically the same. ('Control')
- Feyrer uses this variation to get a time-varying instrument for trade openness, and then pursues a FR 1999 approach.

US trade by mode of transport

Consistent with a change in relative cost of using each mode

Figure 1: Air Freight Share of US Trade Value (excluding North America)

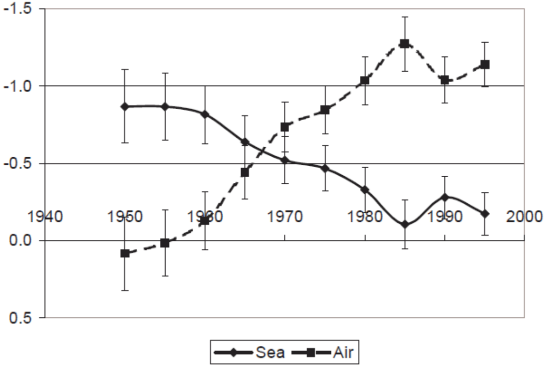


source: Hummels (2007), pp 133.

Coefficients on air and sea distance

$$ln(Trade_{ijt}) = \gamma_i + \gamma_j + \gamma_t + \beta_{sea,t} ln(seadist_{ij}) + \beta_{air,t} ln(airdist_{ij}) + \epsilon_{ijt}$$

Figure 3: The Change in Elasticity of Trade with Respect to Sea and Air Distance over Time



source: Coefficients from regression table 9 column 2.

Each point represents the coefficient on (sea or air) distance over a 5 year interval. Estimates are from a gravity model with country fixed effects.

Error bars represent plus or minus two standard errors for each coefficient.

Feyrer (2009) paper 1: OLS and IV results

IV is predicted trade (aggregated across partners) from gravity equation

Table 5: Panel Estimates of Trade on per capita GDP

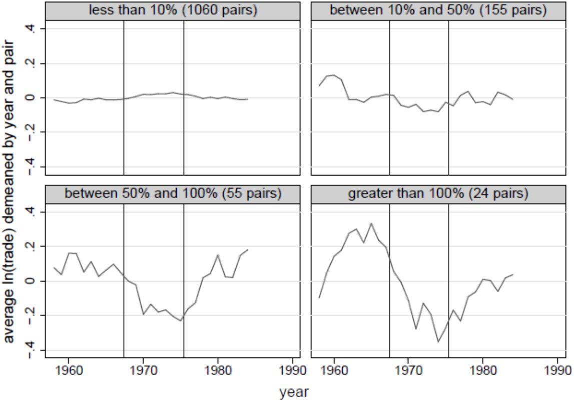
	(1)	(2)	(3)	(4)	(5)	(6)
IV RESULTS						
	ln(Real GDP per Capita)					
ln(trade)	0.578	0.589	0.427	0.429	0.459	0.417
	(0.082)**	(0.090)**	(0.078)**	(0.075)**	(0.097)**	(0.092)**
FIRST STAGE						
	ln(trade)					
ln(predicted trade)	0.993	0.942	2.055	2.033	1.385	1.696
	(0.144)**	(0.145)**	(0.418)**	(0.410)**	(0.251)**	(0.365)**
R^2	0.975	0.975	0.958	0.958	0.973	0.954
F-stat on Instrument	47.6	42.2	24.2	24.6	30.4	21.6
Instrument Partial R^2	0.170	0.163	0.216	0.223	0.100	0.145
REDUCED FORM						
	ln(Real GDP per Capita)					
ln(predicted trade)	0.573	0.555	0.877	0.873	0.636	0.708
	(0.116)**	(0.119)**	(0.242)**	(0.234)**	(0.185)**	(0.226)**
R^2	0.947	0.947	0.958	0.959	0.943	0.956
Observations	774	774	560	560	774	560
Countries	101	101	62	62	101	62
Years	10	10	10	10	10	10
characteristics of predicted trade regressions						
Bilateral Controls	no	yes	no	yes	—	—
Balanced Panel	no	no	yes	yes	no	yes
Country dummies	yes	yes	yes	yes	no	no
Pair Dummies	no	no	no	no	yes	yes

Feyrer (2009) paper 2

- IV coefficient in Feyrer (2009) Paper 1 is still large.
- Perhaps, therefore, omitted variable bias was not as big an issue as previously thought.
- But a fundamental question of interpretation remains:
  - Is 'openness' capturing channels related purely to the trade of goods, or is it possible that this variable is (also) proxying for other elements of international interaction (FDI, migration, knowledge flows) made cheaper by the rise of air travel?
- Feyrer (2009) Paper 2 exploits the closing and re-opening of the Suez Canal between 1967 and 1975 to dig deeper:
  - (Implicit) logic: No one is doing FDI or migration by sea during this period, so only thing a change in sea distance can affect is trade.
  - Short-run shock.
  - Can trace the timing of the impact.
  - Very nice feature that it turns off and on: Should expect symmetric results from static trade models, but asymmetric results if driven purely by (eg) spread of knowledge.

Feyrer (2009) paper 2: trade and sea distance

Figure 1: Average bilateral trade residuals grouped by Suez Distance Increase



Source: IMF direction of trade database, author's calculations.
The vertical lines mark the closing and reopening of the Canal in 1967 and 1975.
Residuals from a regression with country pair and year dummies.

Feyrer (2009) paper 2: trade and sea distance

NB: Gravity equation distance coefficient is much smaller than typically found.

Table 1: Trade Versus Sea Distance with the Closure of Suez 67-75

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Pairwise ln(trade)				
ln(sea dist)	-0.149+	-0.266**	-0.312**	-0.458**				
	(0.084)	(0.091)	(0.074)	(0.083)				
ln(sea dist) (67)					-0.330**	-0.402**	-0.473**	-0.558**
					(0.111)	(0.123)	(0.106)	(0.116)
ln(sea dist) (74)					-0.024	-0.147	-0.155	-0.329**
					(0.114)	(0.119)	(0.104)	(0.108)
Test 67 == 74 (p-value)					0.04	0.11	0.03	0.13
Pairs	2,605	2,605	1,294	1,294	2,605	2,605	1,294	1,294
Observations	60,920	46,726	34,938	27,174	60,920	46,726	34,938	27,174
R-squared	0.871	0.866	0.906	0.902	0.871	0.866	0.906	0.902
Balanced Panel	No	No	Yes	Yes	No	No	Yes	Yes
Omit Transition	No	Yes	No	Yes	No	Yes	No	Yes

** $p<0.01$, * $p<0.05$, + $p<0.1$

Regressions include country pair and year dummies.

Standard errors clustered by country pair

Years 1967-1969 and 1975-1977 are the transition periods.

Feyrer (2009) paper 2: OLS and IV results

Table 5: Output and Trade

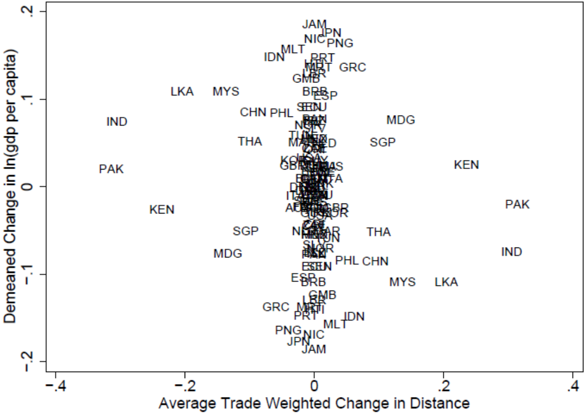
	(1)	(2)	(3)	(4)	(5)	(6)
IV RESULTS						
	ln(GDP per capita)					
ln(trade)	0.228*	0.253**	0.157**	0.170**	0.179**	0.159**
	(0.087)	(0.094)	(0.052)	(0.063)	(0.062)	(0.057)
FIRST STAGE						
	ln(trade)					
Suez Shock	-0.941**			-1.318**		
	(0.245)			(0.263)		
ln(Predicted Trade)		3.301**			4.817**	
		(0.950)			(0.941)	
ln(Predicted Trade) dynamic			3.341**			3.022**
			(0.676)			(0.651)
Instrument R-squared	0.010	0.010	0.023	0.018	0.019	0.020
Instrument F-Stat	14.8	11.9	24.4	25.1	26.1	21.5
REDUCED FORM						
	ln(GDP per capita)					
Suez Shock	-0.215+			-0.224+		
	(0.120)			(0.116)		
ln(Predicted Trade)		0.834+			0.863*	
		(0.472)			(0.423)	
ln(Predicted Trade) dynamic			0.525*			0.480+
			(0.252)			(0.254)
Countries	80	80	80	80	80	80
Observations	1,771	1,771	1,771	1,351	1,351	1,351
Transition Years Included	Yes	Yes	Yes	No	No	No

** $p<0.01$, * $p<0.05$, + $p<0.1$
Years 1967-1969 and 1975-1977 are the transition periods.
All regressions include a set of country and year dummies.
Standard errors clustered by country

Feyrer (2009) paper 2: reduced form

Note how few (and which) country observations are driving the result

Figure 7: Log change in GDP per capita versus Suez Distance Shock



Source: World Development Indicators, author's calculations.
GDP change based on average for three periods, 1960-1966, 1970-1974, 1978-1984.

Conclusion

- CA seems to hold, in one place where tested.
- GT appear to vary considerably across estimates.
  - But GT are hard to measure. There are aspects of welfare (e.g. change in the number of varieties available) that are not captured in the studies we've seen above, but which might be important (or not!).
  - Also very hard to get exogenous change in ability to trade.

Areas for future research

- Are there other ways (or places) in which to test CA?
- Can we find more natural experiments that affect regions' abilities to trade, to shed more light on the size of GT?
- More work is needed on quantifying empirically (ideally as non-parametrically as possible) the different mechanisms behind GT
- Are there ways to formalize the connection (or lack thereof) between reduced-form estimates of GT (that we saw today) and GT predicted by quantitative models of trade? See Donaldson (2015, ARE) for a discussion.

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