INTERNATIONAL ECONOMICS

Lecture 4 — November 22, 2022

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Last week

- Trade costs
- Head-Ries Index
- Estimating gravity

This week

- Tom Friedman: “The World is Flat” ..... Leamer (2009): It’s not.
  - → Distance puzzle: Why is the distance elasticity of trade not decreasing?
  - → Border puzzle: Why do countries trade so much more with themselves?

THE WORLD IS (NOT) FLAT

“From the telegraph to the Internet, every new communication technology has promised to shrink the distance between people, to increase access to information and to bring us ever closer to the dream of a perfectly efficient, frictionless global market.”

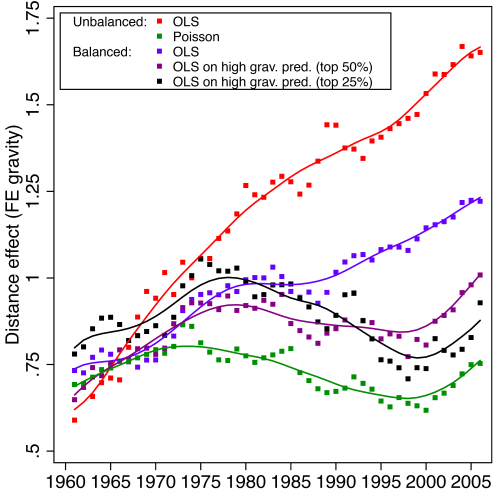
— Friedman (2005, p. 204)

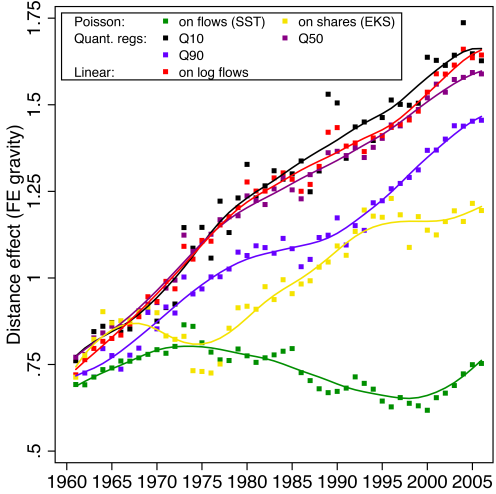
Why isn’t the world becoming “flatter”?

1. Containerization: Dramatic reduction of transport costs and transport time.
2. Cargo flights: Air transportation costs dropped by 90% from 1955 to 2004
3. Telephone connections: Cost of international long-distance calls down 95% from 1988 to 2010
4. Internet: Today, information exchange between almost any point on earth close to free of charge

DISTANCE PUZZLE

Distance puzzle





Relative trade costs

- Gravity model captures only relative trade costs

  $\rightarrow$ comparison of different trade flows.

- Idea of Yotov (2012): Comparison with *intra*national trade.

  $\rightarrow$ relative decrease of international distance elasticity

	(1) *OLS*	(2) *PPML*	(3) *INTRA*	(4) *BRDR*	(5) *FEs*
Log distance 1986	−1.168	−0.859	−0.980	−0.857	−0.910
	(0.044)**	(0.037)**	(0.072)**	(0.063)**	(0.032)**
Log distance 1990	−1.155	−0.834	−0.940	−0.819	−0.879
	(0.042)**	(0.038)**	(0.073)**	(0.063)**	(0.032)**
Log distance 1994	−1.211	−0.835	−0.915	−0.796	−0.860
	(0.046)**	(0.035)**	(0.072)**	(0.063)**	(0.032)**
Log distance 1998	−1.248	−0.847	−0.887	−0.770	−0.833
	(0.043)**	(0.035)**	(0.071)**	(0.063)**	(0.032)**
Log distance 2002	−1.241	−0.848	−0.884	−0.767	−0.829
	(0.044)**	(0.032)**	(0.071)**	(0.063)**	(0.032)**
Log distance 2006	−1.261	−0.836	−0.872	−0.754	−0.811
	(0.044)**	(0.031)**	(0.071)**	(0.062)**	(0.032)**
Contiguity	0.223	0.437	0.371	0.574	0.442
	(0.203)	(0.083)**	(0.140)**	(0.155)**	(0.082)**
Common language	0.661	0.248	0.337	0.352	0.241
	(0.082)**	(0.077)**	(0.168)*	(0.137)*	(0.076)**
Colony	0.670	−0.222	0.019	0.027	−0.220
	(0.149)**	(0.116)+	(0.156)	(0.125)	(0.117)+
Log intra-national distance			−0.488	−0.602	
			(0.101)**	(0.109)**	
Intra-national trade dummy				1.689	
				(0.574)**	
Observations	25689	28152	28566	28566	28566
Percent change in log distance between 1986 and 2006	7.950	−2.750	−10.965	−11.969	−10.931
	(3.759)*	(3.004)	(1.058)**	(1.173)**	(0.769)**
Intra-national trade	No	No	Yes	Yes	Yes
Country-specific *intra-national* fixed effects	No	No	No	No	Yes

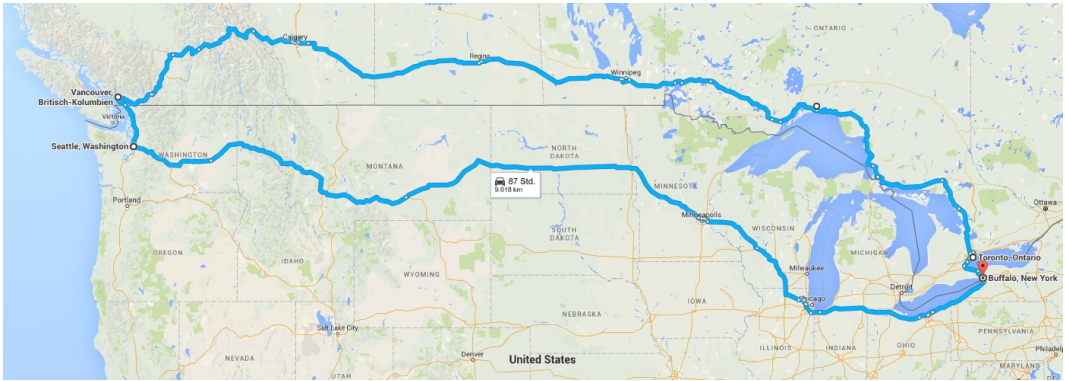
BORDER PUZZLE

Trade effects of international borders

Simple example: USA and Canada

- Intra- and international trade between 2 American states and 2 Canadian provinces

  $\rightarrow$ New York and Washington, Ontario and British Columbia


Calgary
Regina
Winnipeg
ONTARIO
Vancouver
Britisch-Kolumbien
Victoria
Seattle, Washington
WASHINGTON
MONTANA
NORTH DAKOTA
87 Std.
9.018 km
MINNESOTA
Minneapolis
Ottawa
Portland
SOUTH DAKOTA
WISCONSIN
MICHIGAN
Toronto, Ontario
OREGON
IDAHO
WYOMING
Milwaukee
Detroit
Buffalo, New York
Chicago
IOWA
NEBRASKA
Salt Lake City
PENNSYLVANIA
NEVADA
Denver
United States
ILLINOIS
INDIANA
OHIO
Philadelp
MARYLAND
UTAH

Trade effects of international borders

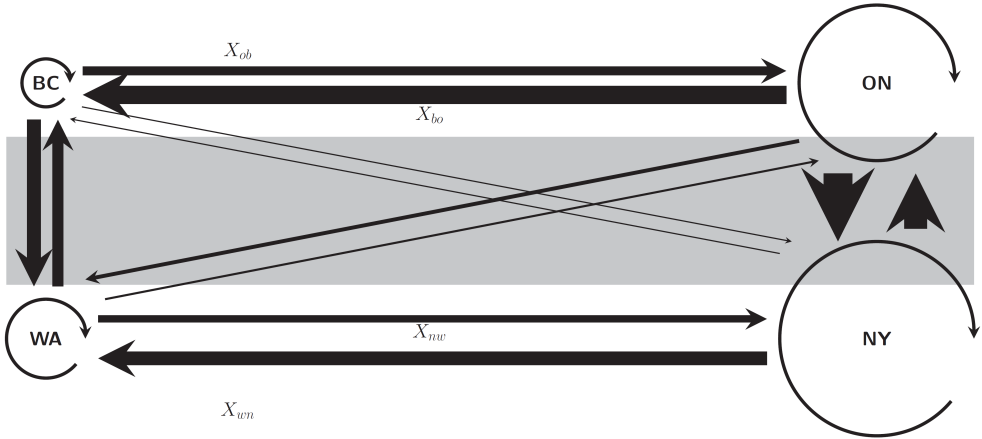
- Similar transport distances and comparable other trade costs

  $\rightarrow$ Vancouver – Toronto 4372km, Vancouver – Buffalo 4392km, Seattle – Toronto 4156km, Seattle – Buffalo 4176km.

  $\rightarrow$ same language, similar culture, very integrated societies

  $\rightarrow$ free trade agreement

- Idea: analyze 8 trade flows between East and West coasts


X_{ob}
BC
ON
X_{bo}
WA
X_{nw}
NY
X_{wn}

trade effects of international borders

- Bilateral trade volume proportional to the strength of the arrow
- *Intra*national trade much larger than *inter*national trade
- border between US and Canada reduces trade by 86.3 %

Quantification of the trade-reducing border effect

$$X_{ij} = S_i \, M_j \, \phi_{ij}, \quad \text{with} \quad \phi_{ij} = \beta_{ij} \cdot g(\text{distance}_{ij})$$

where

- Trading cost $g(\text{distance}_{ij})$ as a function of $\text{distance}_{ij} > 0$
- Discontinuity in trade costs at the frontier: $\beta_{ij} \geq 1$

Quantification of the trade-reducing border effect

Annahmen:

- Symmetric transportation cost function: $g(\text{distance}_{ij}) = g(\text{distance}_{ij})$
- *Intra*national trade:

$$\beta_{\text{BC}\to\text{ON}} = \beta_{\text{ON}\to\text{BC}} = \beta_{\text{WA}\to\text{NY}} = \beta_{\text{NY}\to\text{WA}} = 1$$

- *Inter*national trade:

$$\beta_{\text{ON}\to\text{WA}} = \beta_{\text{BC}\to\text{NY}} = \beta_{\text{CA}\to\text{US}} \geq 1, \quad \beta_{\text{WA}\to\text{ON}} = \beta_{\text{NY}\to\text{BC}} = \beta_{\text{US}\to\text{CA}} \geq 1$$

Quantification of the trade-reducing border effect

$$\sqrt[4]{\frac{X_{\text{BC}\to\text{ON}}\, X_{\text{ON}\to\text{BC}}\, X_{\text{WA}\to\text{NY}}\, X_{\text{NY}\to\text{WA}}}{X_{\text{BC}\to\text{NY}}\, X_{\text{NY}\to\text{BC}}\, X_{\text{WA}\to\text{ON}}\, X_{\text{ON}\to\text{WA}}}}$$

$$= \sqrt[4]{\frac{\phi_{\text{BC}\to\text{ON}}\, \phi_{\text{ON}\to\text{BC}}\, \phi_{\text{WA}\to\text{NY}}\, \phi_{\text{NY}\to\text{WA}}}{\phi_{\text{BC}\to\text{NY}}\, \phi_{\text{NY}\to\text{BC}}\, \phi_{\text{WA}\to\text{ON}}\, \phi_{\text{ON}\to\text{WA}}}}$$

$$= \sqrt{\beta_{\text{US}\to\text{CA}}\, \beta_{\text{CA}\to\text{US}}} \underbrace{\sqrt{\frac{g(\text{Distanz}_{\text{BC}\to\text{NY}})\, g(\text{Distanz}_{\text{WA}\to\text{ON}})}{g(\text{Distanz}_{\text{BC}\to\text{ON}})\, g(\text{Distanz}_{\text{WA}\to\text{NY}})}}}_{\approx 1}$$

$$= 7,3$$

Quantification of the trade-reducing border effect

- Intranational trade $= 7.3 \times$ International trade

  $\rightarrow$ U.S.-Canada border reduces trade by 86.3%

- Tariffs explain about 4 percentage points of the border effect

  $\rightarrow$ the remaining 82% of the border effect cannot be trivially explained

Effect of an international boundary — Naive estimate

Naive gravity equation

$$\log X_{ij} = \alpha + \beta_1 Y_i + \beta_2 E_j + \gamma_1 CA_{ij} + \gamma_2 US_{ij} + \delta \log \text{distance}_{ij} + \varepsilon_{ij},$$

with indicator variable (analogous for US_{ij}):

$$CA_{ij} = \begin{cases} 1 & \text{if} \quad i \in \text{CA} \} \quad \wedge \quad j \in \{\text{CA}\}, \\ .0 & \text{other} \end{cases}$$

$\rightarrow$ multilateral resistance ignored

Effect of an international boundary — fixed effect estimate

Structural gravity equation

$$\log X_{ij} = \mathbf{D}_i + \mathbf{D}_j + \gamma B_{ij} + \delta \log \text{distance}_{ij} + \varepsilon_{ij},$$

with fixed effects vectors $\mathbf{D}_i$ and $\mathbf{D}_j$ and

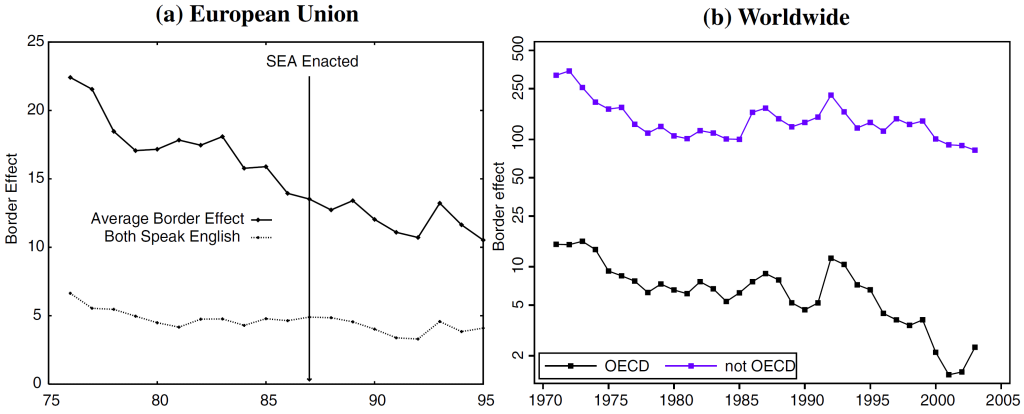
$$B_{ij} = \begin{cases} 1 & \text{if } i,j \in \text{CA, US}\} \quad \wedge \quad i = j, \\ 0 & \text{if } i,j \in \text{CA, US}\} \quad \wedge \quad i \neq j \end{cases}$$

$\rightarrow$ multilateral resistance captured!

Dependent Variable: value of Exports for Province/State Pair					
	McCallum (1995) and other samples			A. v. W. (2003)	Fixed Effects
	(1)	(2)	(3)	(4)	(5)
Regions included:	CA-CA CA-US	CA-CA CA-US	US-US CA-CA CA-US	US-US CA-CA CA-US	US-US CA-CA CA-US
Year of data:	1988	1993	1993	1993	1993
...					
Indicator Canada	3.09 (0.13)	2.80 (0.12)	2.75 (0.11)		
Indicator US			0.4 (0.05)		
Indicator Border				-1.65 (0.08)	-1.55 (0.06)
Border effect Canada	22.0 (2.9)	16.4 (2.0)	15.7 (1.9)	10.5 (1.2)	
Border effect US			1.5 (0.1)	2.6 (0.1)	
Border effect Average			4.8 (0.3)	5.2 (0.4)	4.7 (0.3)
R^2	0.81	0.76	0.85	n.a.	0.66
Observations	683	679	1511	1511	1511

Quelle: Feenstra, R. C. (2015). Advanced International Trade: Theory and Evidence. Princeton University Press.

Persistence of the border effect

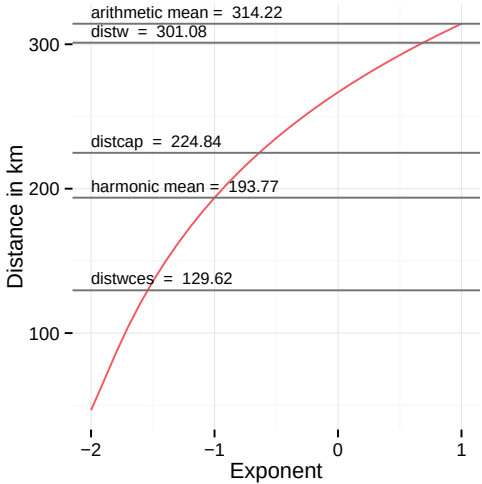


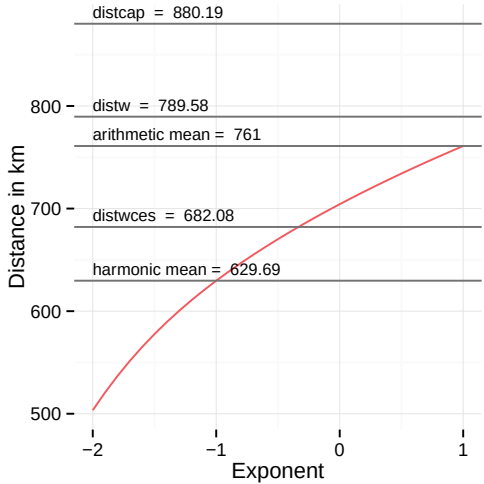
Border effect — State of research

Study	Border	Trade reduction	Year
International borders:			
McCallum (1995, AER)	USA vs. Kanada	95.4% – 95.8%	1993
Anderson & Van Wincoop (2003, AER)	USA vs. Kanada	79.6% – 80.8%	1993
Chen (2004, JIE)	Intra-EU	73.3% – 96.0%	1996
Intranational borders:			
Wolf (2000, RES)	USA	68.0% – 77.1%	1993
Hillberry & Hummels (2003, RES)	USA	35.6% – 62.8%	1997
Combes, Lafourcade & Mayer (2005, JIE)	Frankreich	62.4% – 85.5%	1993
Millimet & Osang (2007, CJE)	USA	83.1% – 88.1%	1997
Yilmazkuday (2012, JIE)	USA	-4.2% – 86.7%	2007
Historical borders:			
Nitsch & Wolf (2013, CJE)	Ost- vs. West-Deutschland	20.5% – 27.8%	2004
Felbermayr & Gröschl (2014, EI)	Union vs. Konföderation	7.6% – 14.1%	1993

Causes

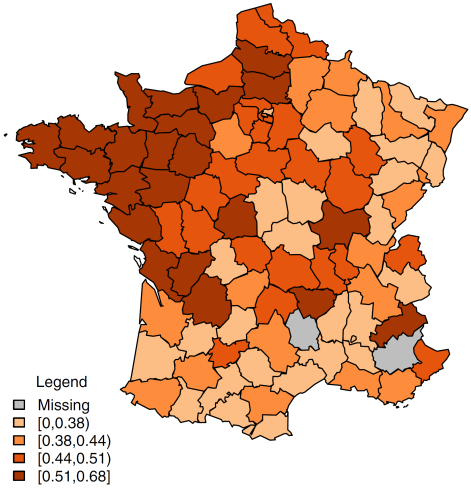
- Measurement error and misspecification of trade values and control variables
- Information asymmetries
- Local preferences
- Network structures





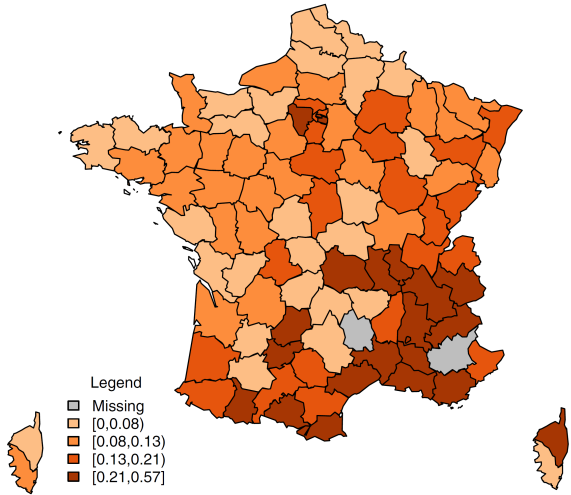
Internal distance of Germany (left) and distance between Germany and France (right). Source: Hinz (2017).

(a) Butter



Note: 10 240 households – 2005–06

(b) Olive oil



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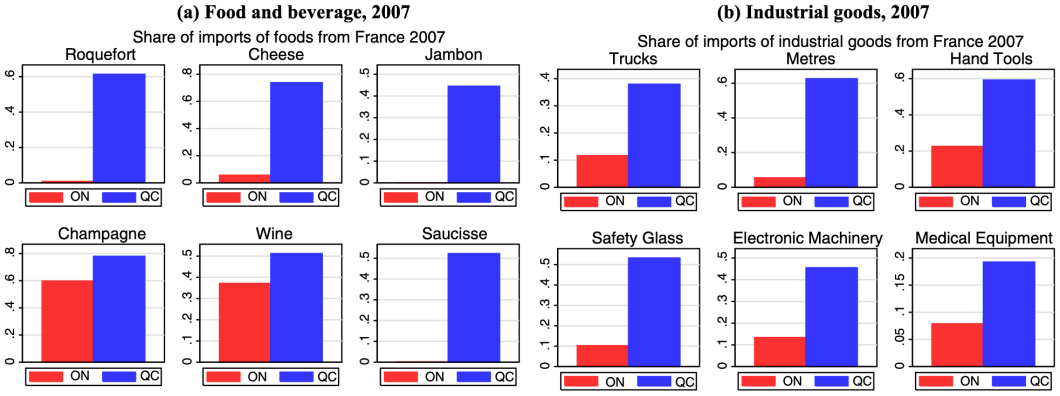
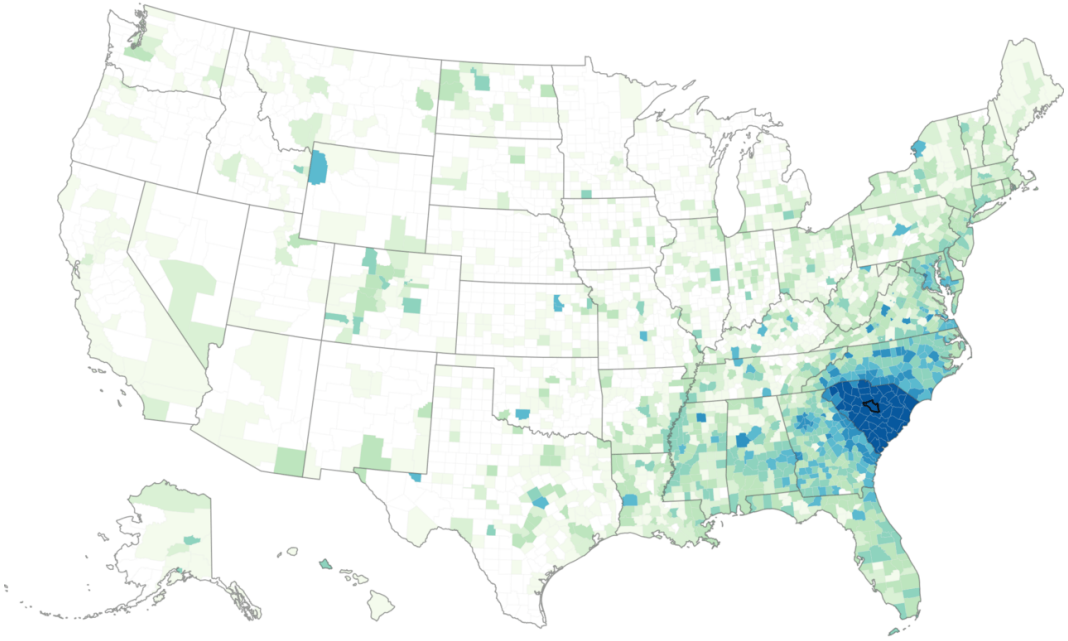
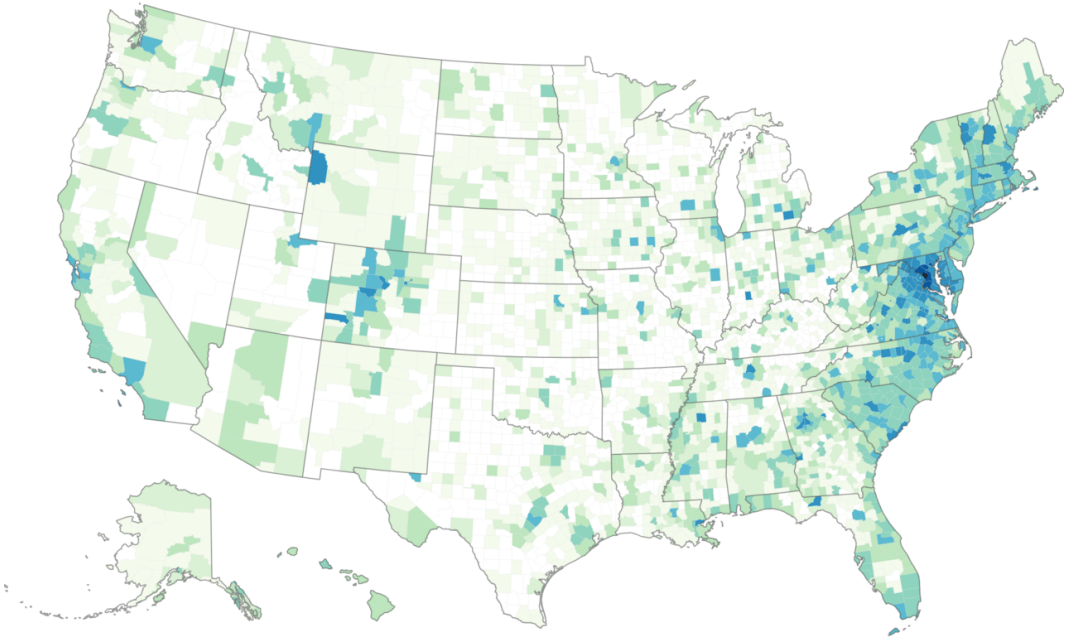
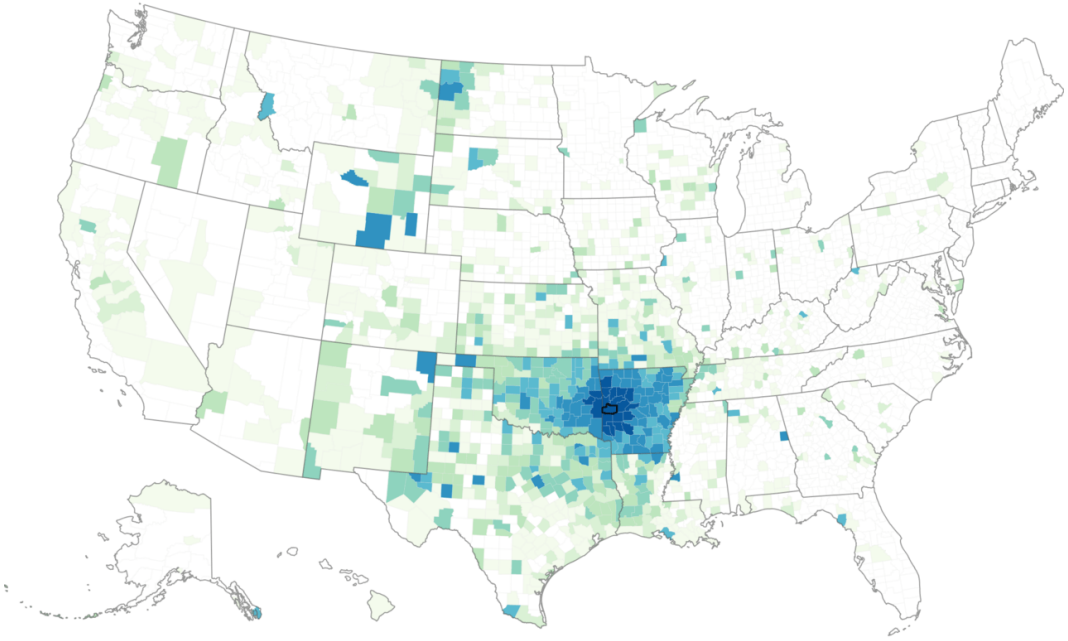

(a) Food and beverage, 2007
Share of imports of foods from France 2007
Roquefort
Cheese
Jambon
Champagne
Wine
Saucisse
(b) Industrial goods, 2007
Share of imports of industrial goods from France 2007
Trucks
Metres
Hand Tools
Safety Glass
Electronic Machinery
Medical Equipment
ON
QC







Conclusion

- Inter- and intra-national borders continue to have trade-reducing effect
- Absolute distance elasticity — if at all — hardly decreased, only relative to internal trade
- Possible explanations: Information asymmetries, local preferences and network structures

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