The Economic Consequences of the Opium War

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Foreign Influence in China: The Treaty Port Era (1842-1943)

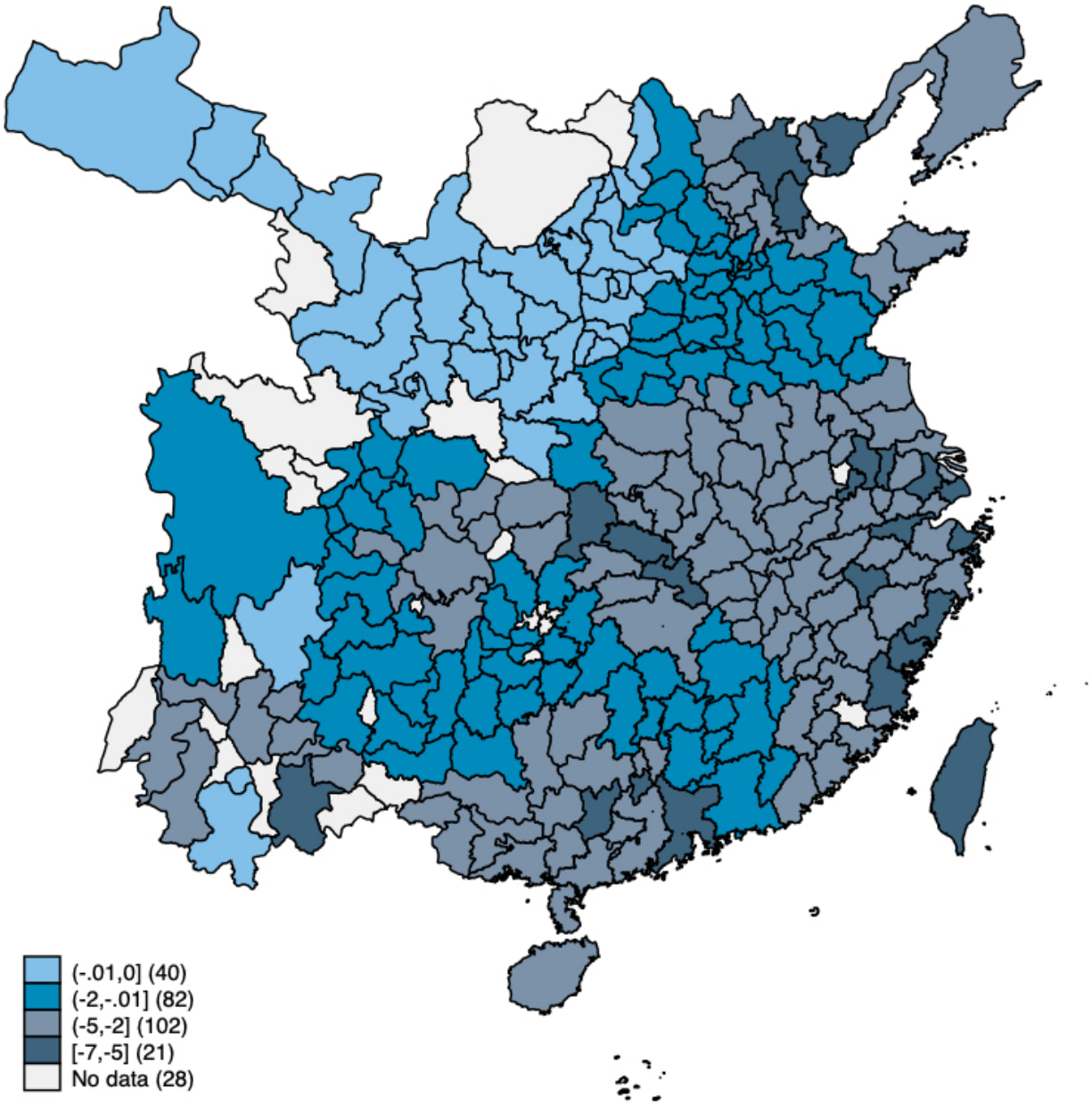
This Paper in the Literature

1. **Impact of colonialism**: Negative (Exploitation) vs Positive (Modernization)
   - Quantitative economic impact for **major Asian country**, vs Acemoglu, Johnson, Robinson on the Americas

2. Benefits of 19th c Western influence (i) in post-1982 period (Jia 2014) (ii) via Protestant missionaries (Bai-Kung 2015)
   - **19th century** positive impact of Western **state institutions**

3. **Extent** of Western influence limited b/o few dozens of ports, $< 10\%$ of China (Rawski, Murphey, Fairbank, Feuerwerker, So-Myers)
   - Document a **major impact on much of China**

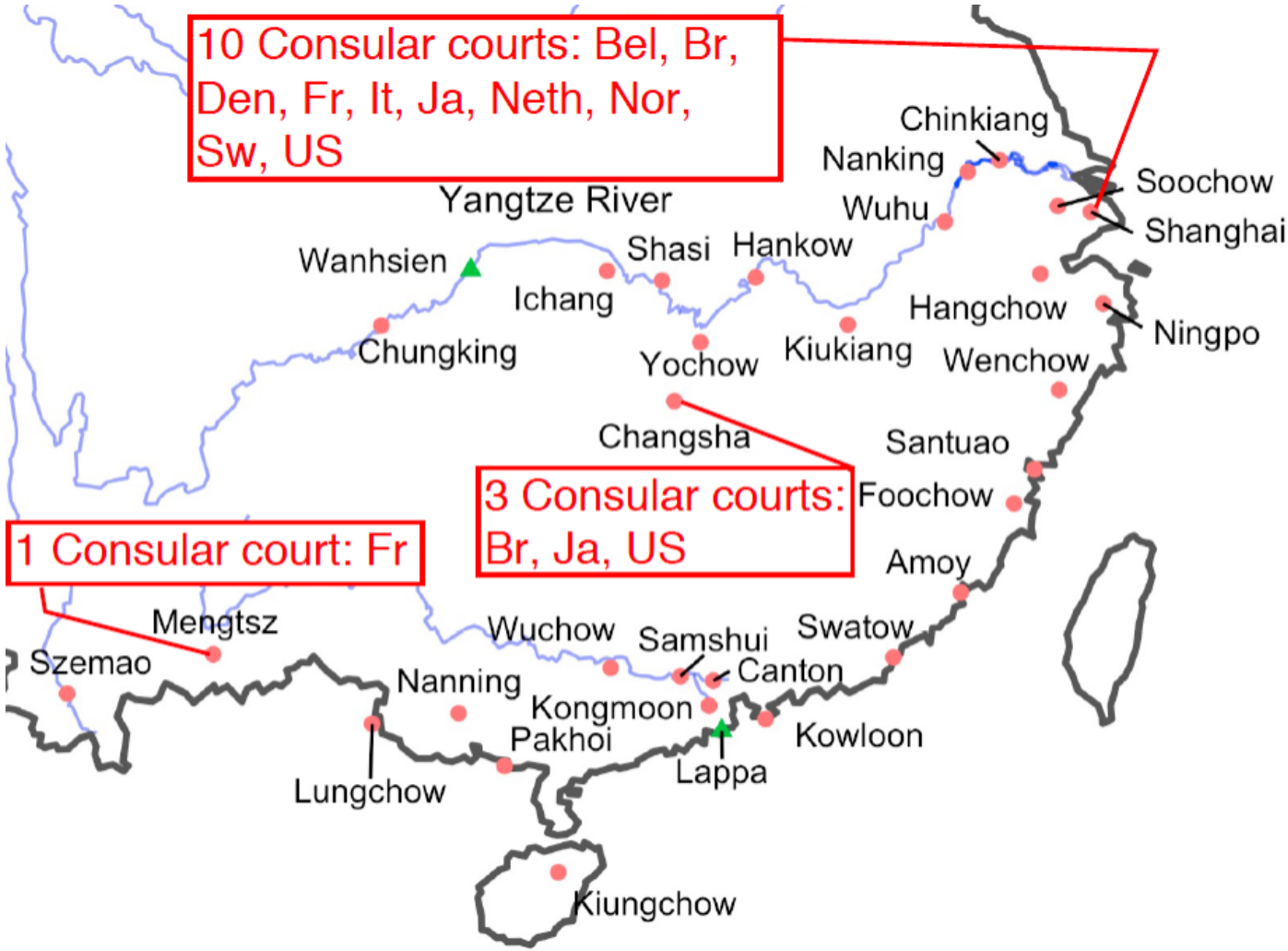
Result Preview: Foreign Influence Impacted Most of China



Measures of Foreign Institutional Influence

- **Trade Institutions**
  - **Treaty port**: Foreign trade and settlements permitted in 48 ports by treaty
    - Locations and dates, 1842 onwards (1842 Treaty of Nanjing: 5 ports)
  - **Customs Stations**: Consistent tariff collection, postal system, lighthouses, policing of trade routes
    - Location and dates, trade volumes by foreign country
- **Legal Institutions:** Foreigners not subject to Chinese law (extraterritoriality)
  - Foreign **Consulates** host their courts
    - Location and dates, legal rules by foreign country

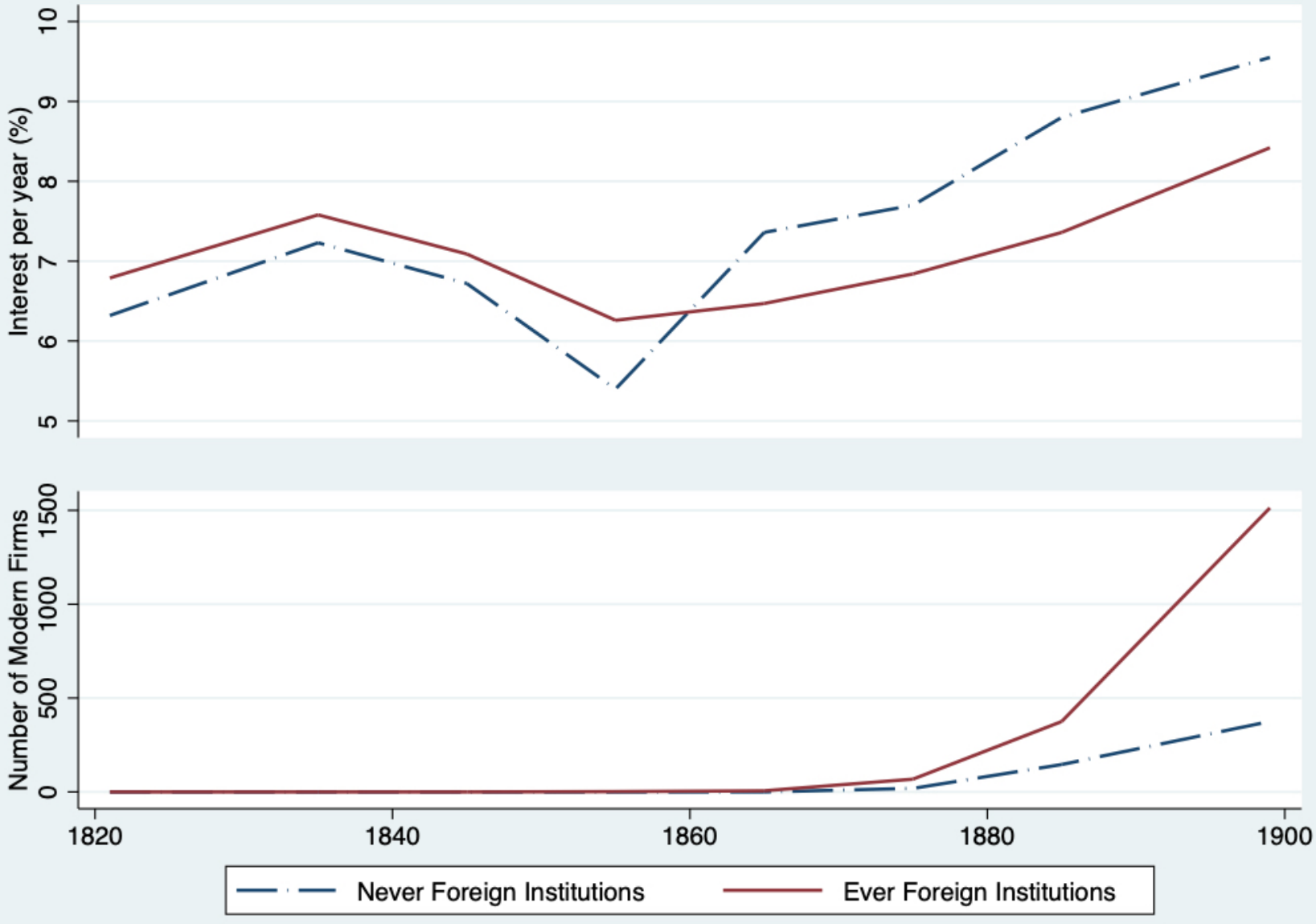
Regional Variation in Foreign Legal Influence



Economic Impact: Outcome Measures

- **Interest rates**
  - Interest rates backed out from monthly prefectural **grain prices**: **interest is part of storage cost**
    - Theory: Deaton-Laroque 1996 , Williams-Wright 1990
    - Validation & application: Keller, Shiue, Wang (2020, 2021)
- **Number of modern banks**
- **Number of modern firms**
  - Also: firm investment, steam engines, advanced machinery
- Annual measures for 1821 - 1900 for 245 prefectures

Interest Rates and Modern Firms by Treatment



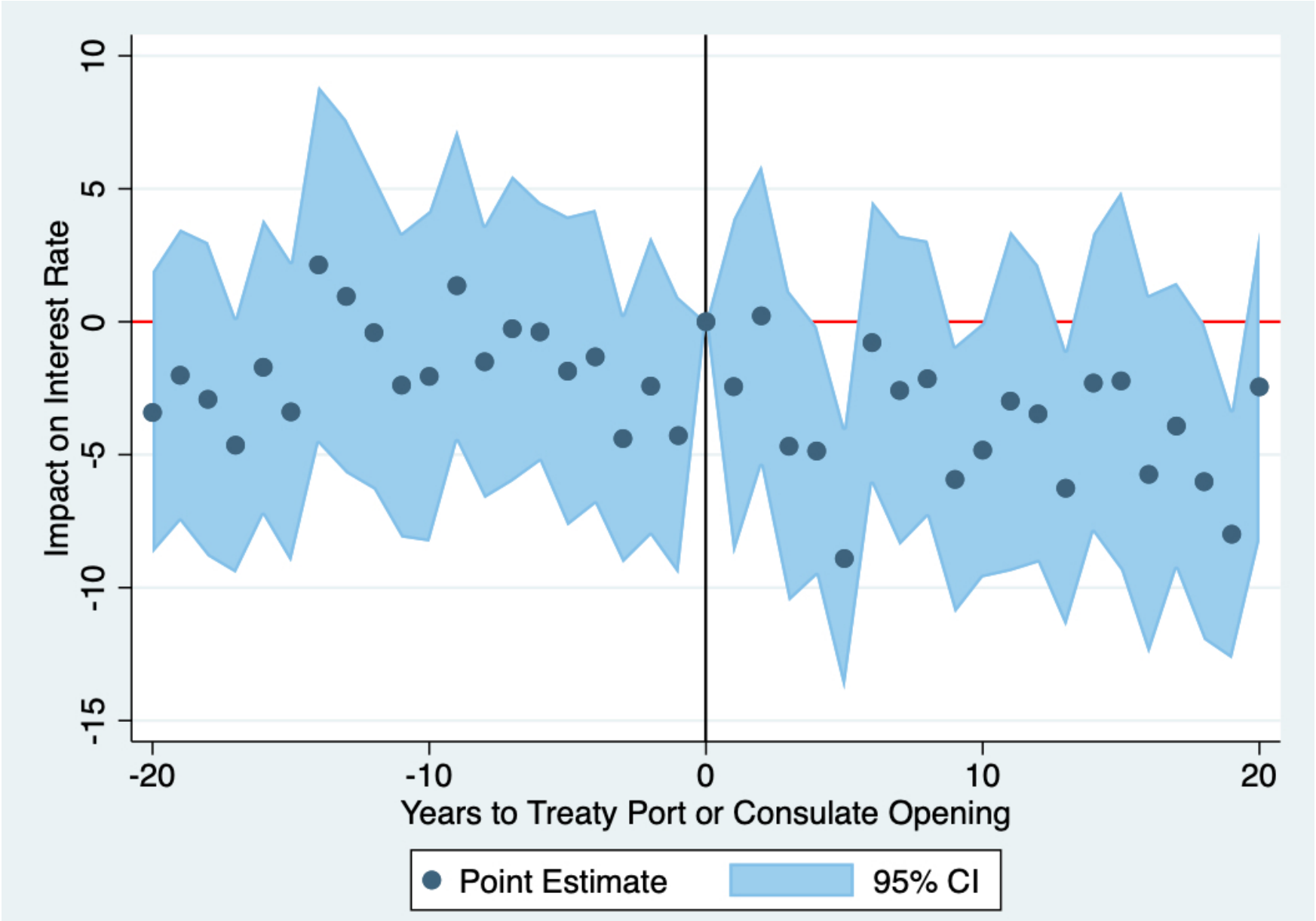
Estimation: Difference-in-differences

$$y_{it} = \beta_1 INST_{it} + \beta' X + \mu_i + \eta_t + \varepsilon_{it}$$

- y_{it} : Interest rate, # of firms, # of banks, technology, investments; subscript i prefecture, t year
  - Multiple interest rates per prefecture-year (different grains)
- $INST_{it}$: **Consulate**, **Treaty Port**, and **Customs** indicators
- Identification condition: No differential pre-trends

	Interest Rate 1821-42	Popul'n Growth 1776-1820
Treated (Consulate)	6.41	0.27
Control	6.55	0.29
Difference [p-val]	-0.14 **[0.61]**	**-0.02** [0.01]

Event Study: Impact on Local Interest Rates



Foreign Institutions Impact on Interest Rates

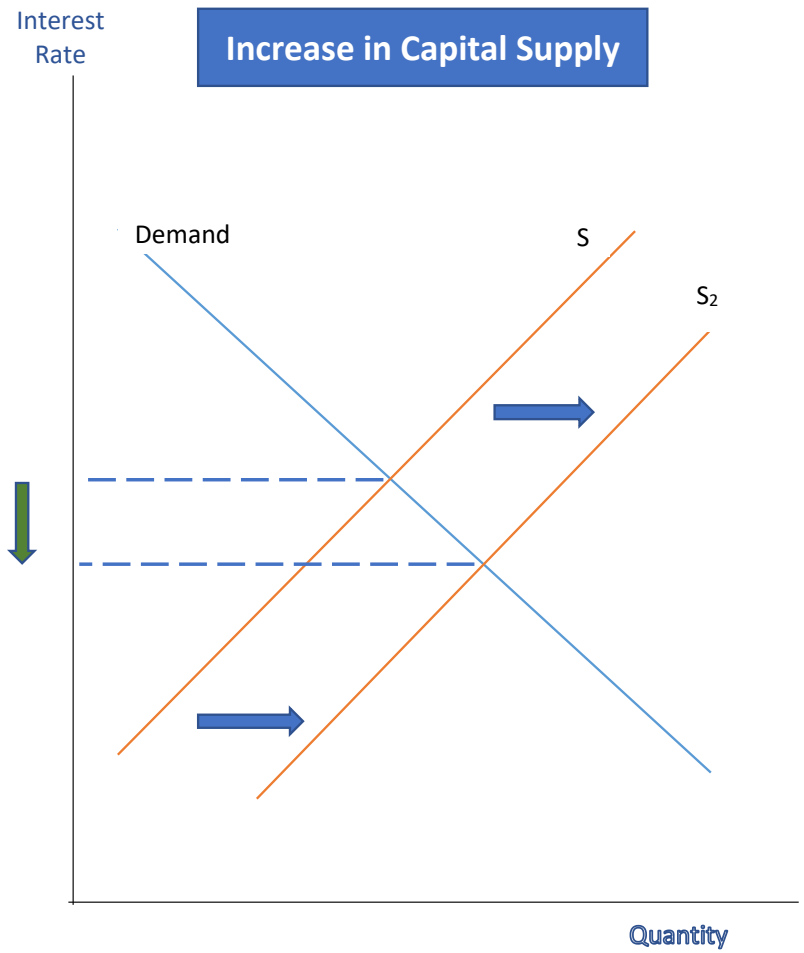
$$y_{igt} = \beta_1 TP\_CONS_{it} + \mu_{ig} + \eta_t + \varepsilon_{igt}$$

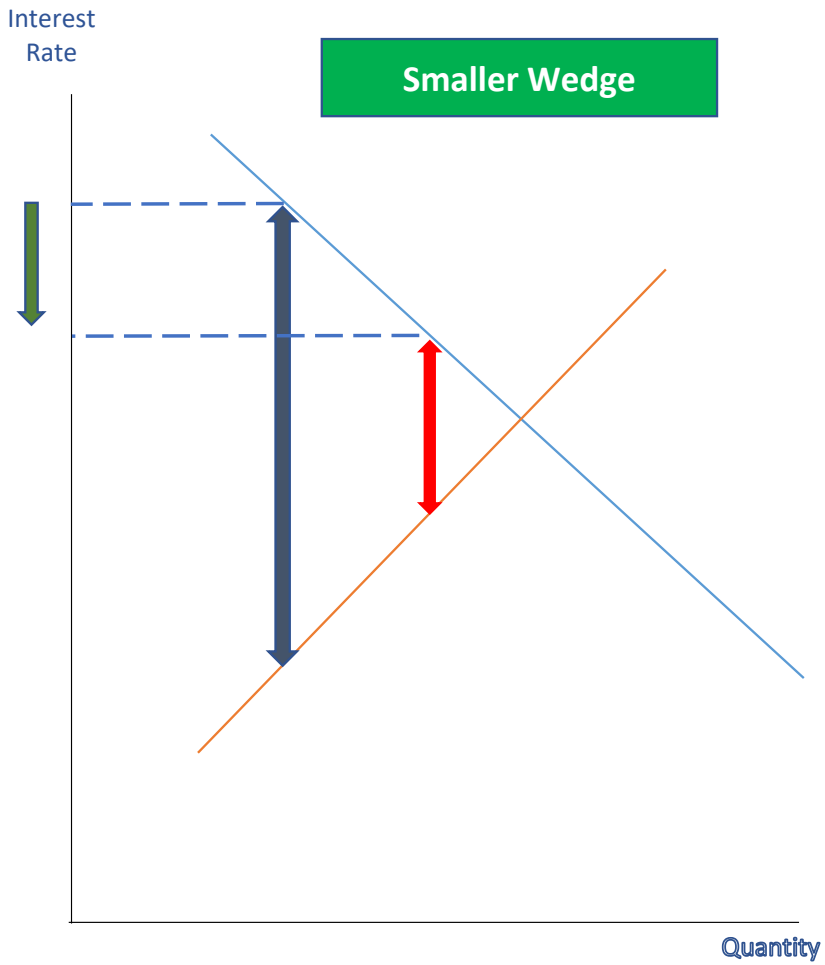
	(1)	(2)	(3)	(4)
Treaty Port or Consulate	-2.197^{**}			
	(0.382)			
FDI				
Foreign Banks				

Notes: S.e. clustered at prefecture-grain in (...); N = 64,627

- On average, Treaty Port or Consulate lowers interest rate **by more than 25%** (-2.197 relative to mean of 8 percent)

Interest rates lower b/o increased capital supply?





Lower wedge rather than increased capital supply

- **Foreign Banks** and **FDI** as measures of foreign capital supply

$$y_{igt} = \beta_1 TP\_CONS_{it} + \beta_2 FDI + \beta_3 ForBank + \mu_{ig} + \eta_t + \varepsilon_{igt}$$

	(1)	(2)	(3)	(4)
Treaty Port or Consulate	−2.197**			−2.707**
	(0.382)			(0.443)
FDI		−0.326*		0.229
		(0.155)		(0.369)
Foreign Banks			−0.414	0.473
			(0.369)	(0.467)

Notes: Robust s.e. clustered at prefecture-grain in parentheses; N = 64,627

Robustness: Inference, Foreigner's Choice of Locations

		Geo-Trends	Spatial GMM	IPWRA	Aggregate
Treaty Port or Consulate	−2.197** (0.382)	−1.637** (0.380)	−1.637** (0.405)	−2.195** (0.467)	−2.291** (0.824)
Area-Decade FE		Y	Y	Y	Y
IPWRA				Y	Y
N	64,627	64,627	64,627	64,627	15,327

- Spatial GMM: Standard errors adjusted for **spatial correlation (Conley)**
- Inverse-probability weighted regression adjustment (IPWRA)
  - Predict **chosen by Foreigners** w/ pop. 1776, pop. growth 1776-1820, Yangzi, Pearl River, coast, Yangzi delta, latitude, longitude
- Aggregate: **Average** of all interest rates of prefecture-year

Impact on Chinese Banks and Firms

	Banks	Firms	Investment	Steam Eng's	Adv. Mach'y
Treaty Port or Consulate	**0.252**	**0.218**	**0.156**	**0.085**	**0.168**
N	15,442	15,442	15,442	15,442	15,442

Notes: Bold red coeff if sig. at $< 5\%$ level w/ robust s.e. clustered on prefecture

- Foreign institutions led to **growth of modern banks and firms**
  - As well as firms' investments into new technologies

Which Foreign Institution is Most Important?

	Dep. Var. Local Interest Rate			
Customs	**-1.548**			**1.856**
Treaty Port		**-1.674**		
Consulate			**-3.149**	**-4.555**
Prot. Missionaries			-0.286	

Notes: Bold red coeff sig. at $< 1\%$ w/ s.e. clustering @ prefecture-grain

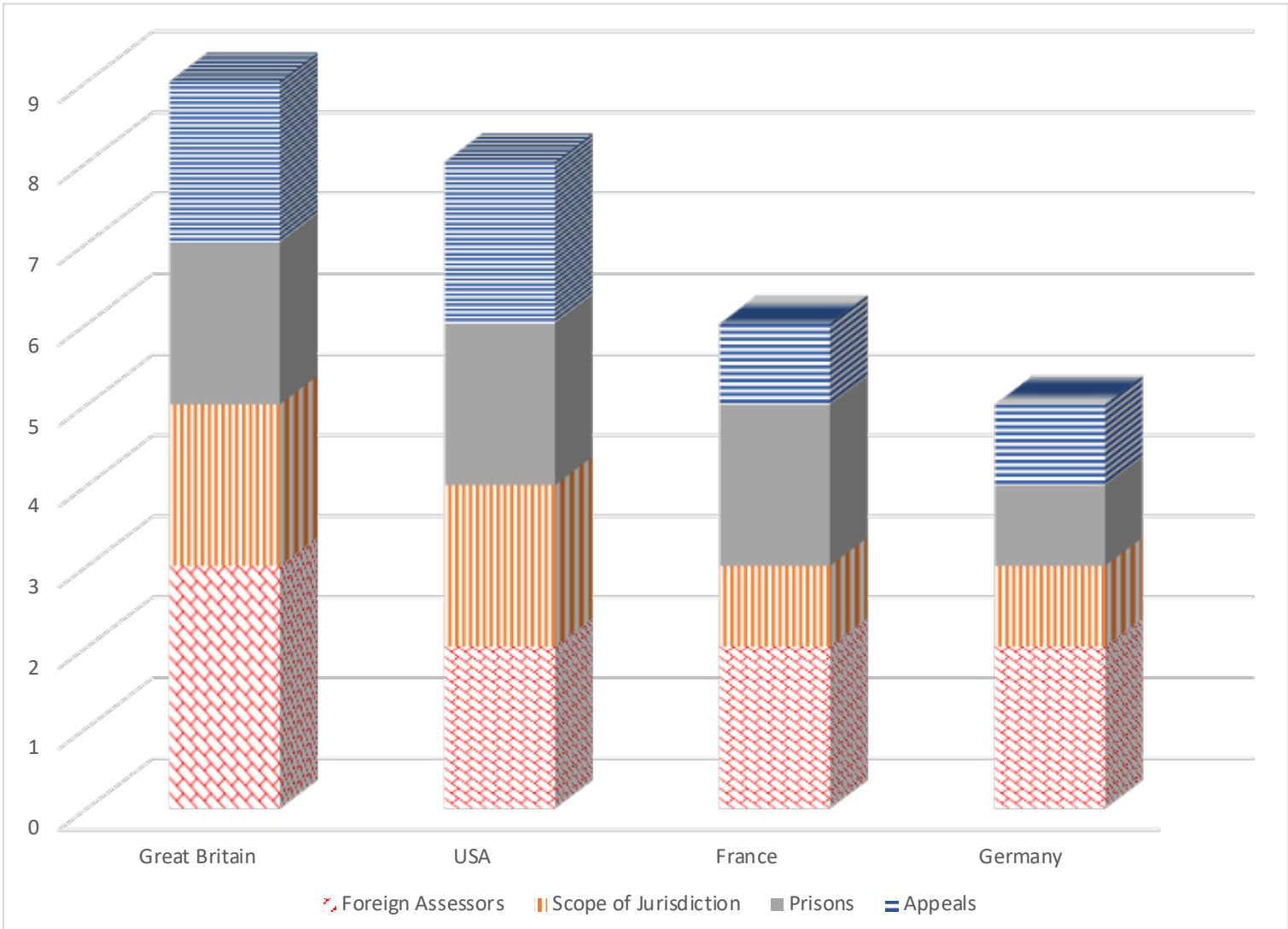
- Impact on firms and their investments **mostly from trade institutions**

Dimensions of Extraterritoriality

- Quantifying the **foreign legal footprint** in China in four dimensions

Dimension	Strong <==========> Weak		
Scope of jurisdiction	*No Limits* (*E.g. Sweden*)	$\Longleftrightarrow$	*Limited* (*Portugal*)
Appeal process	*Yes* (*Great Britain*)	$\Longleftrightarrow$	*No Or Not In China* (*Netherlands*)
Assessor in trial	*Yes* (*USA*)	$\Longleftrightarrow$	*No* (*Japan*)
Prisons in China	*Yes* (*France*)	$\Longleftrightarrow$	*No* (*Germany*)

Differences across Western Countries



4 Dimensions of Extraterritorialty Explain Consulate Effect

	(1)	(2)
Legal Influence	**-1.855**	**-0.943**
Consulate	1.922	

- Legal Influence = (def) # of **maximum values** of legal dimensions
  - Variable ranges from 0 to 4
  - Countries w/ max values: Britain, Sweden, Japan, US, Japan, and France
- Positive impact **larger, the stronger** is extraterritoriality

Extent of Foreign Influence in Terms of Geography

$$int_{igt} = \beta_1 INST_{it} + \sum_d \beta^d INST_{it}^d + \beta' X + \varepsilon_{igt}$$

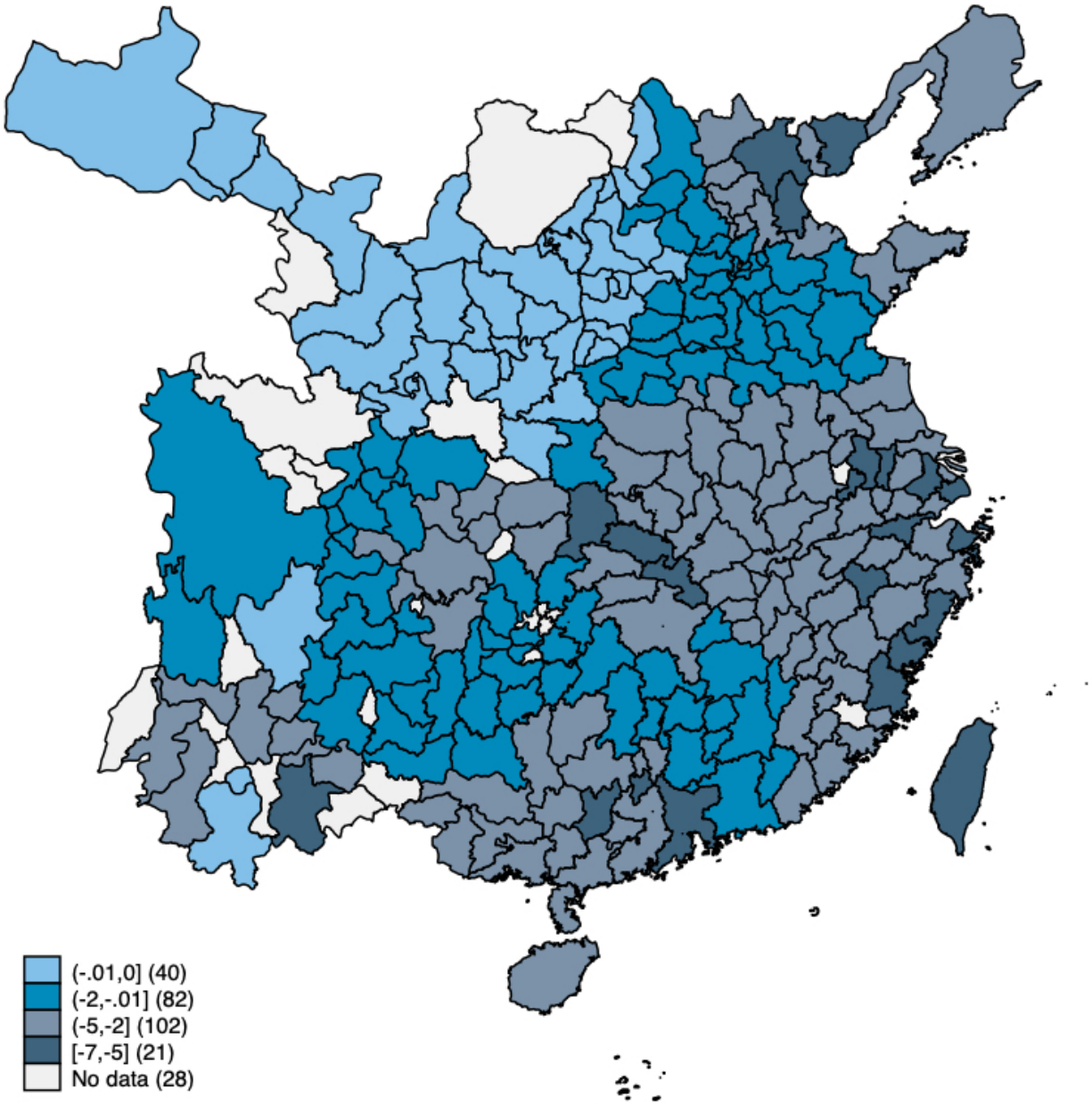
- Foreign influence ***at distance d*** on prefecture i
  - Think **sequence of 'donuts'** at distance d from prefecture i centroid
- If $\beta^d \neq 0$, previous estimates are **not total effect**

Spatial Spillovers of Foreign Influence

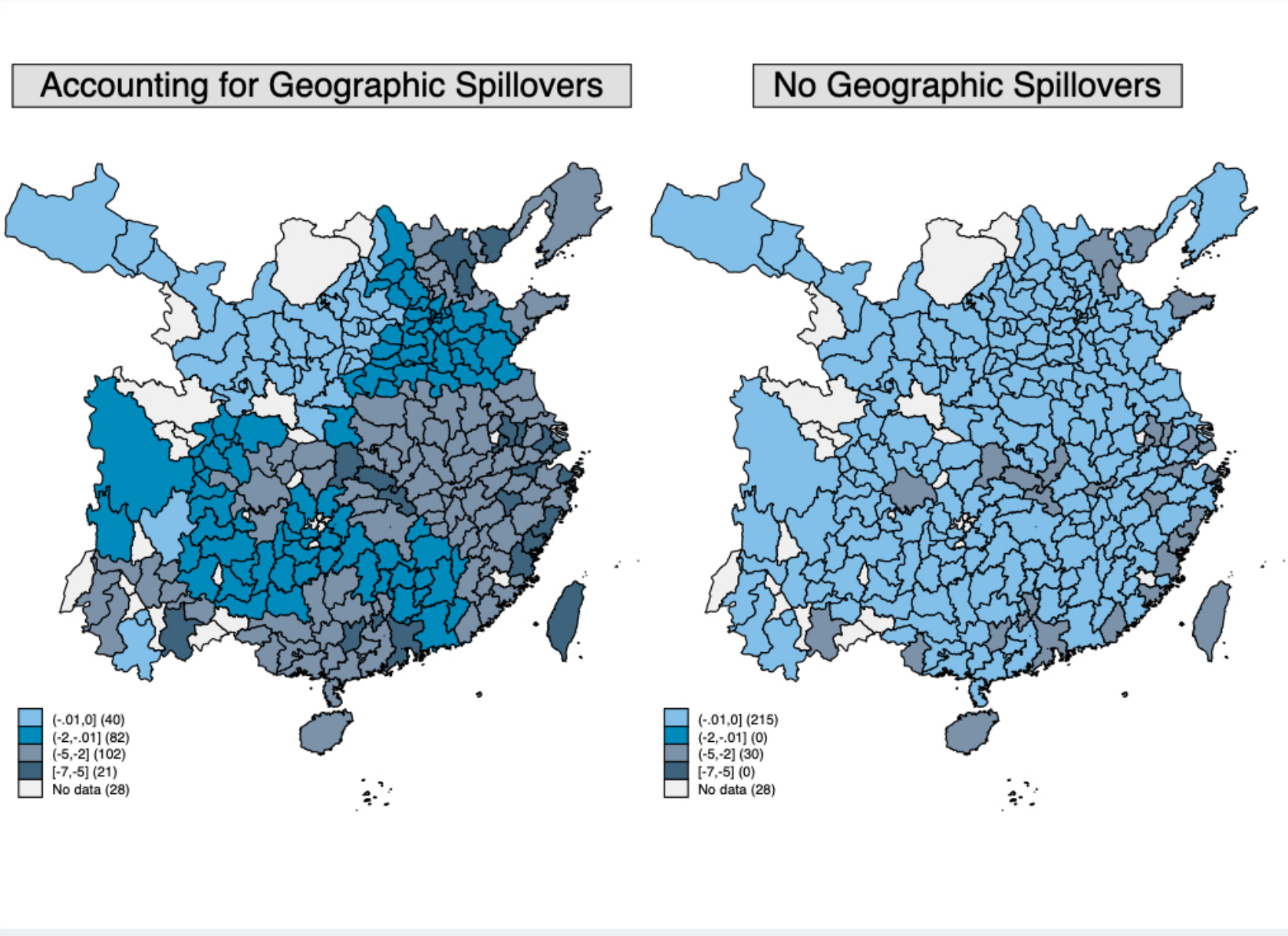
	(1)	(2)
Treaty Port or Consulate	**-2.508**	**-2.365**
Consulate (0, 200km]	**-2.216**	
Treaty Port (0, 200km]	**-1.001**	
Consulate (200, 400km]	-0.243	
Treaty Port (200, 400km]	**-0.836**	
Treaty Port or Consulate (0, 200km]		**-2.987**
Treaty Port or Consulate (200, 400km]		**-0.969**

Notes: Bold red coeffs sig $< 5\%$ w/ clustered s.e. at pref-grain; N = 64,627

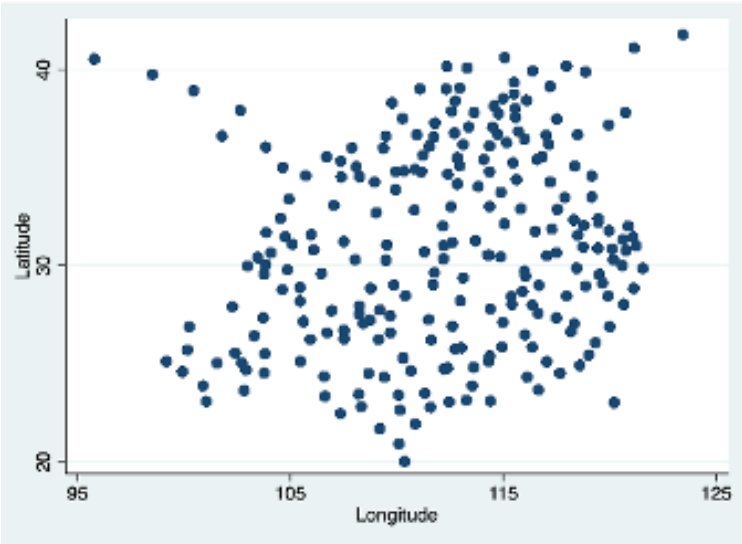
Foreign Institutions Impacted Interest Rates in Most of China

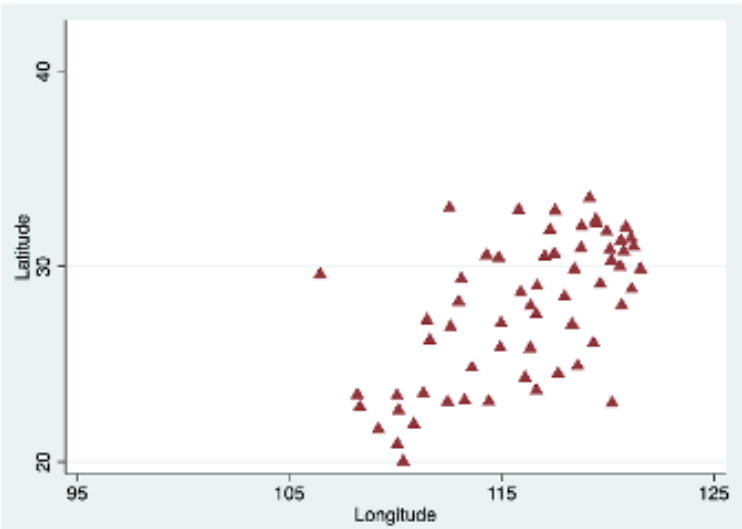


Spillovers are Key to Finding



Choice of Foreign Locations - Restricting to top 25%





	Full Sample	*Limited Sample*
Treaty P or Consulate	**-2.508**	**-1.847**
Consulate $[0, 200km]$	**-2.216**	**2.898**
Treaty Port $[0, 200km]$	**-1.001**	**-2.876**
Consulate $[200, 400km]$	-0.243	**-1.174**
Treaty Port $[200, 400km]$	**-0.836**	**-2.500**

Notes: Red coeff sign $<$ 5% s.e. clustered prefecture-grain

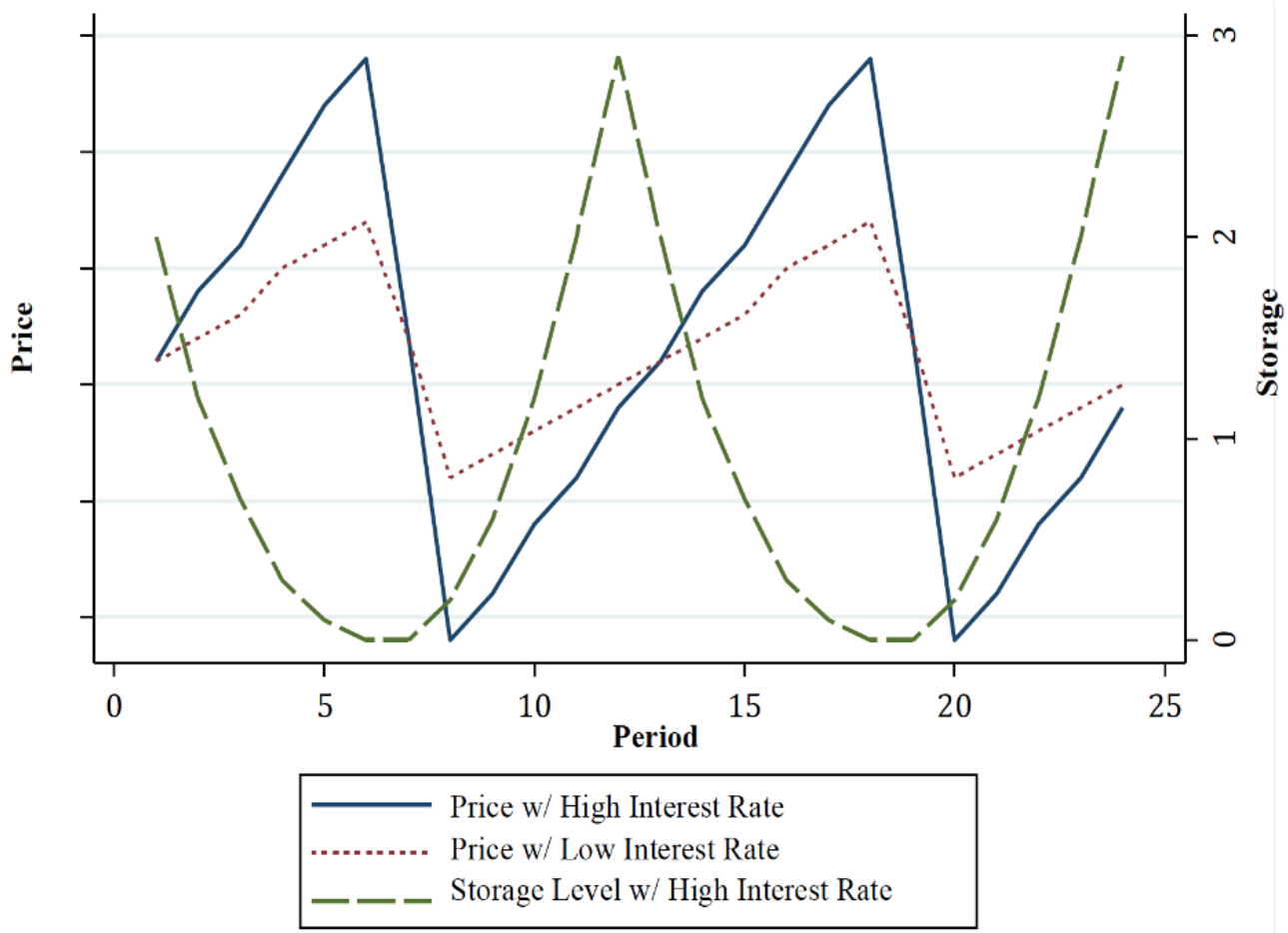
Summary of Findings

1. **Positive Effect**: Western foreign institutions
   - Lowered interest rates
     - Lower risk/more commitment: No evidence for supply increase/reallocation
   - Increased modern firm growth & technology investment

2. Both **legal and trade institutions** play a role
   - **Unpacking** institutions effect:
     - **Benefits** for China **are increasing** in strength of extraterritoriality

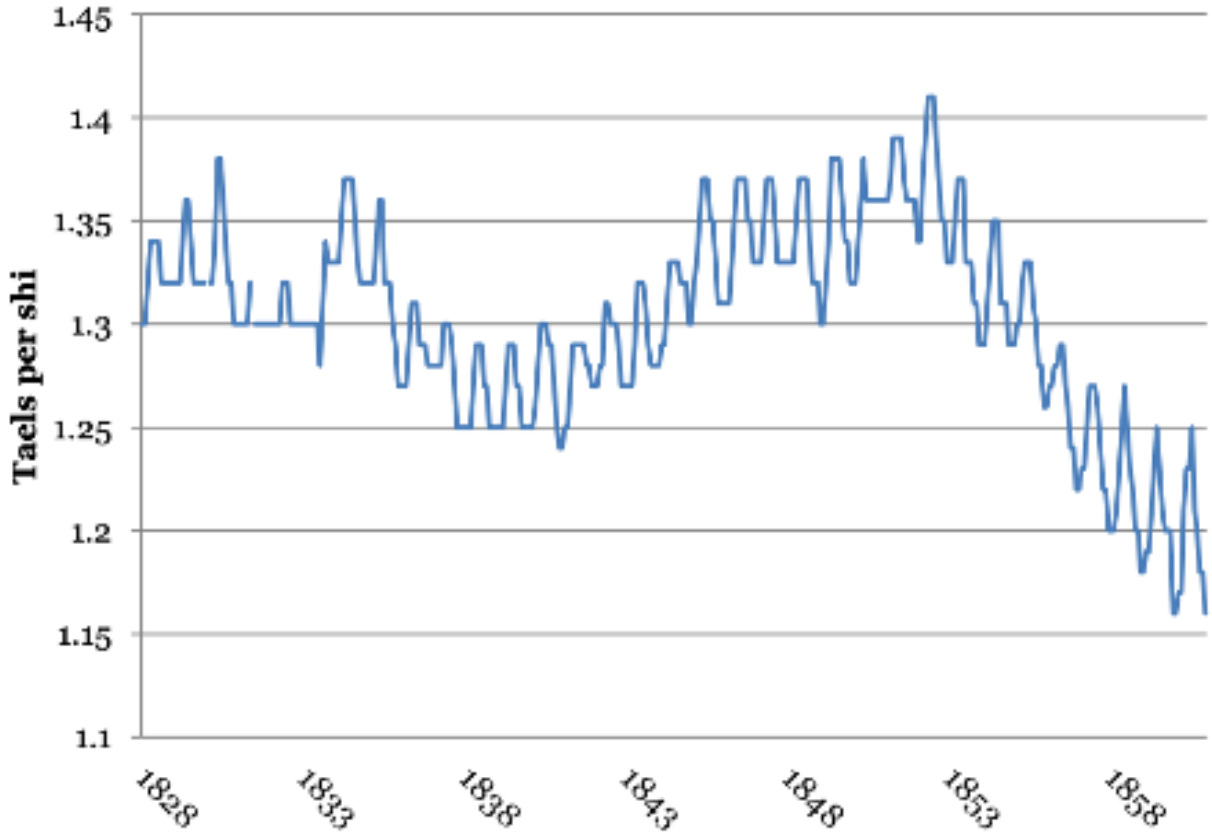
3. Western influence substantially affected **most** of China
   - Accounting for **geographic spillovers**

Price Behavior in Commodity Storage Model



- Estimating **interest rate** w/ monthly **grain price gradient**
  - Williams-Wright 1990, Deaton-Laroque 1996

Monthly Grain Prices in the Data - Guilin Prefecture



- Validation: **grain-price based interest rates and bank interest rates correlation of 0.8** (Keller, Shiue, and Wang Cliometrica 2020)
- Application to capital markets **China vs Britain** 2021 AEJ: Applied Economics

Accounting for Physical Storage Costs using Weather Data

Grain storage costs vary with weather

Weather	Mean Carry Cost
Very Wet	7.37
Wet	7.07
Normal	6.83
Dry	7.23
Very Dry	8.52

Notes: Table shows mean carry cost for different weather conditions. N = 88,937. Source of weather data is State Meteorological Society (1981). Carry costs adjusted for year, prefecture x grain, and area-by-decade fixed effects.

Foreign Firms in China, 1891

	US	AUS	BEL	BRI	DEN	FRA	GER	ITA	JP	POR	RUS	SPA	SWE	Total
Newchang				4	1									5
Tientsin	3			16	1	5	15		3		3			46
Chefoo				5			2		1					8
Chunking	1			4										5
Ichang	1			4										5
Hankow	4			12		1	6		1		4			27
Kiukiang				4							2			6
Wuhu				4					2					6
Chinkiang	1			7										8
Shanghai	12	4	1	175	1	15	40	4	21	3	1	2	1	280
Ningpo	2			3		1	1							7
Foochow	2			33			2		2	1	2			42
Amoy	1			22			3		1	1		1		29
Swatow				4			1							5
Canton	1			35		2	8			1		2		47
Samshui				12	1		2			1				18
Kiungchow				1			1							2
Pakhoi				0			1							1
Total	27	4	1	345	4	24	82	4	31	7	12	5	1	547