What Explains Geographic Variation in Investment?

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Motivation

- Investment is geographically concentrated
  - E.g., Steel City, Motor City, Silicon Valley, Wall Street, etc.

- Understanding the forces behind such clusters is fundamental to understanding the origins of geographic inequality
  - Why are certain areas richer than others?
  - What *(if anything)* can be done to address these differences?

Research Objective

What explains geographic variation in investment?

- Conventional Answers
  - Availability and cost of factors of production
  - Geographic advantages
  - Firm characteristics
  - Self-fulfilling expectations

- This Paper:
  - Can *History* Explain the Geographic Concentration of Investment?
    - ★ What is the channel?

Relationship Between History and Investment

Empirical Challenge

- The central role of history may seem obvious if investment is assumed to follow a path dependent process
  - Ethier (1982), Panagariya (1986), Arthur (1986), and Krugman (1987)

- However, establishing the empirical relationship between history and investment is difficult because:
  - The eventual choice of the equilibrium can either be driven by the history or self-fulfilling expectations (Krugman (1991))
  - Other confounding factors
    - ★ Availability and cost of factors of production ((Marshall, 1920))
    - ★ Geographic advantage (Ellison & Glaeser, 1997)

Our Approach

1. Use within-country geographic variation in historical circumstances to explain the spatial differences in investment
   - Colonial occupation of India provides such an environment
   - During the colonial era, parts of the Indian subcontinent fell under *direct rule* or *indirect rule*
     - ★ Direct ruled areas faced greater exploitation
     - ★ Indirect ruled areas had higher institutional quality (Iyer, 2010)
     - ★ Similar in precolonial characteristics (balanced)
   - All areas, regardless of historical origins, were integrated in a uniform legal and administrative framework post independence

2. Granular data on investment projects

3. Address omitted variable bias & selection issue
   - Local Identification Approach
   - IV: Death of ruler without male heir (Doctrine of Lapse)

Historical Setting: India

Pre-Colonial India

Colonial Rule in India

Indirect Rule

High Institutional Quality (Iyer, 2010)

Pre-colonial elites had administrative power

Direct Rule

Low Institutional Quality (Iyer, 2010)

British took over complete control

- All areas subject to uniform *de-jure* administrative, legal and political structure post independence

This Paper in a Nutshell

1. **Fact:** Investment in India is geographically concentrated
   - Concentration is 20 pp higher than a frictionless benchmark
   - Institutions can explain 13% of total geographic variation in investment

2. **Key Result:** Weak Institutions discourage investment
   - **Intensive Margin**: Projects are 10.8% smaller in size in direct ruled districts relative to indirect ruled districts by the same firm within a district-pair
   - **Extensive Margin**: Projects are 25% less likely to be announced in direct ruled districts relative to indirect ruled districts

3. **Mechanism:** History can have long-run consequences through its effect on:
   - Economic Organization
   - State Capacity

Overview

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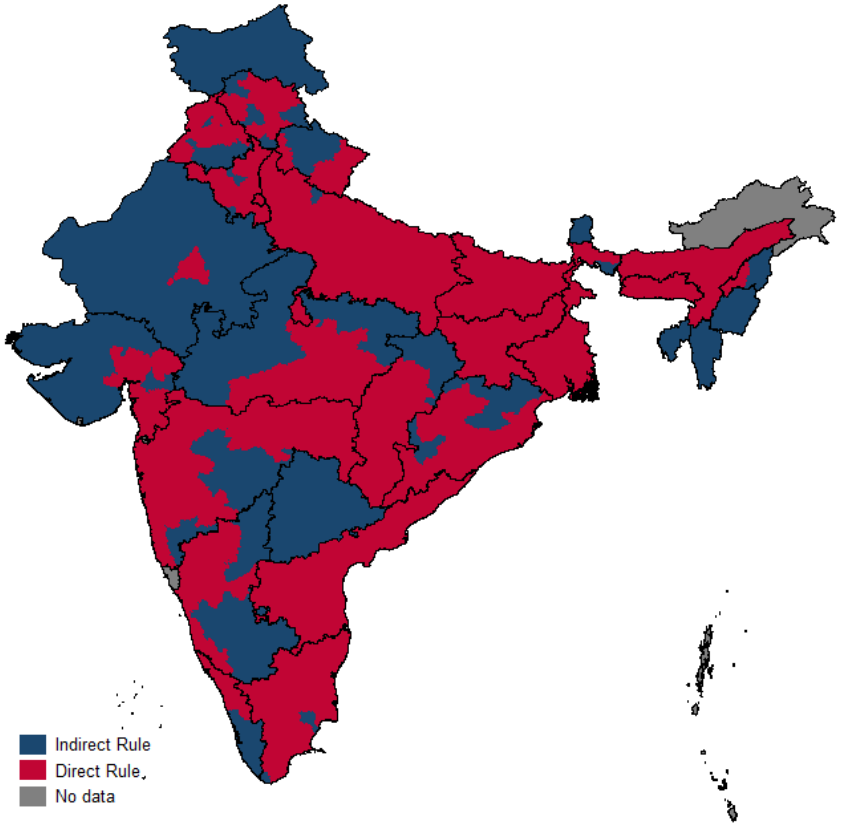
Current and Colonial Boundaries

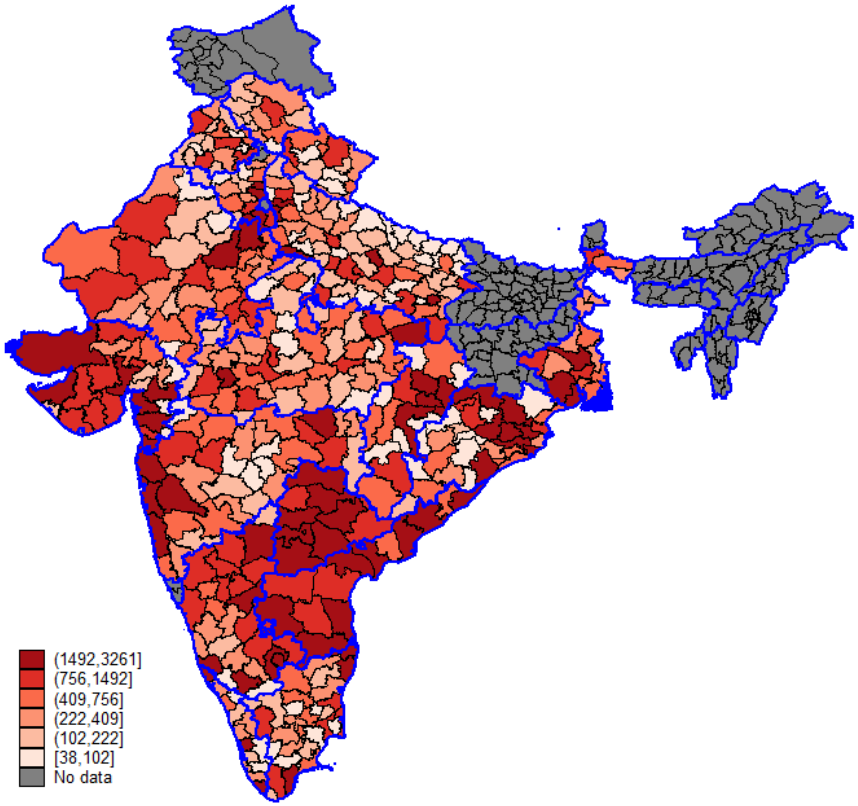


	Ceded	Conquest	Grant	Lapse	Misrule	Total
Initial Settlement	0	6	3	0	0	9
Ring Fence (1765-1818)	58	114	15	0	3	190
Subordinate Isolation (1819-1856)	5	22	0	27	17	71
Post 1857 Revolt	2	0	0	0	0	2
Direct Ruled	65	142	18	27	20	272
Indirect Ruled						152
Total						424

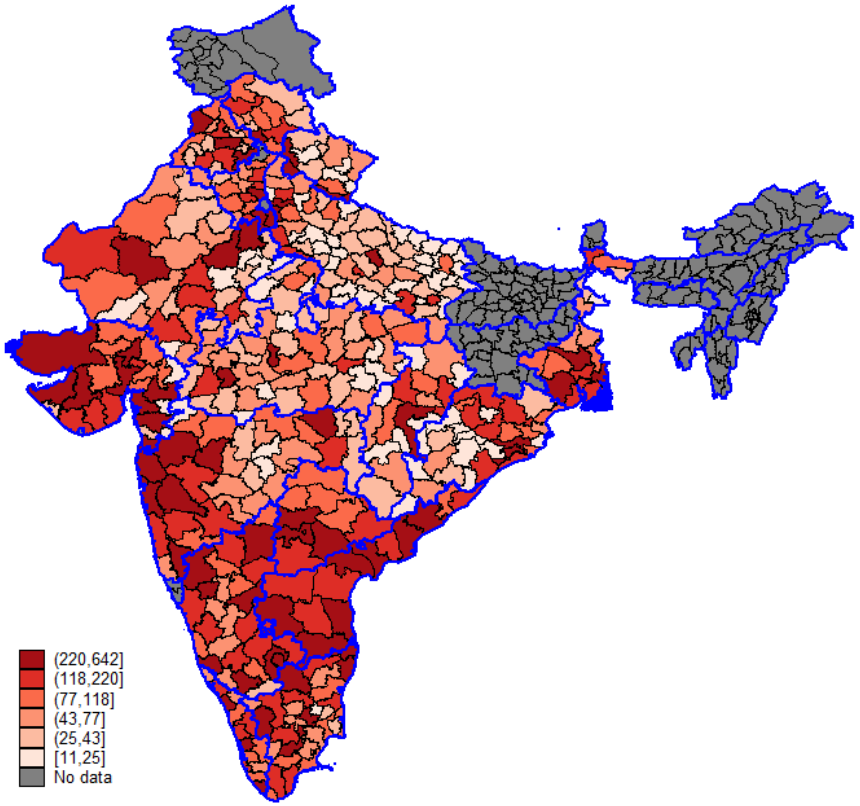
What Predicts Direct British Rule

Dep Var: Direct Rule (=1)	(1)	(2)	(3)	(4)	(5)
Altitude (MSL)	0.0002				0.0002
	(0.0003)				(0.0002)
Coast (=1)	0.1820				0.1720
	(0.1176)				(0.1179)
ln(Area)	-0.0637				-0.0692
	(0.0816)				(0.0799)
Slope	-1.0837				2.6706
	(3.6432)				(2.3314)
Rain (cm)	0.0015				0.0012
	(0.0010)				(0.0009)
Max-Temp	0.0061				-0.0010
	(0.0113)				(0.0113)
Min-Temp	0.0126				0.0028
	(0.0104)				(0.0090)
ln(Distance)		0.0396			0.0707
		(0.0611)			(0.0577)
Maratha Ruler			0.2279		0.2449
			(0.1550)		(0.1524)
Muslim Ruler			0.3853***		0.3319**
			(0.1276)		(0.1420)
Prop Muslim				0.2663	-0.1818
				(0.3447)	(0.2848)
Prop Sikhs				0.6377	-0.2291
				(1.0841)	(0.9907)
Prop Lower Caste				0.5613	0.5439
				(0.3940)	(0.3518)
Prop Elites				-0.3153	-0.1544
				(0.6895)	(0.6948)
Constant	0.5330	0.4275	0.4336***	0.5111***	0.3777
	(0.8825)	(0.3253)	(0.0933)	(0.1445)	(0.9042)
# Obs	294	294	294	294	294
R^2	0.0814	0.0042	0.1257	0.0293	0.1939

Data: Geography of Project Announcements



(a) Total Amount (in ₹ bn)



(b) # Projects

- Source: CMIE CapEx (1995-2018)

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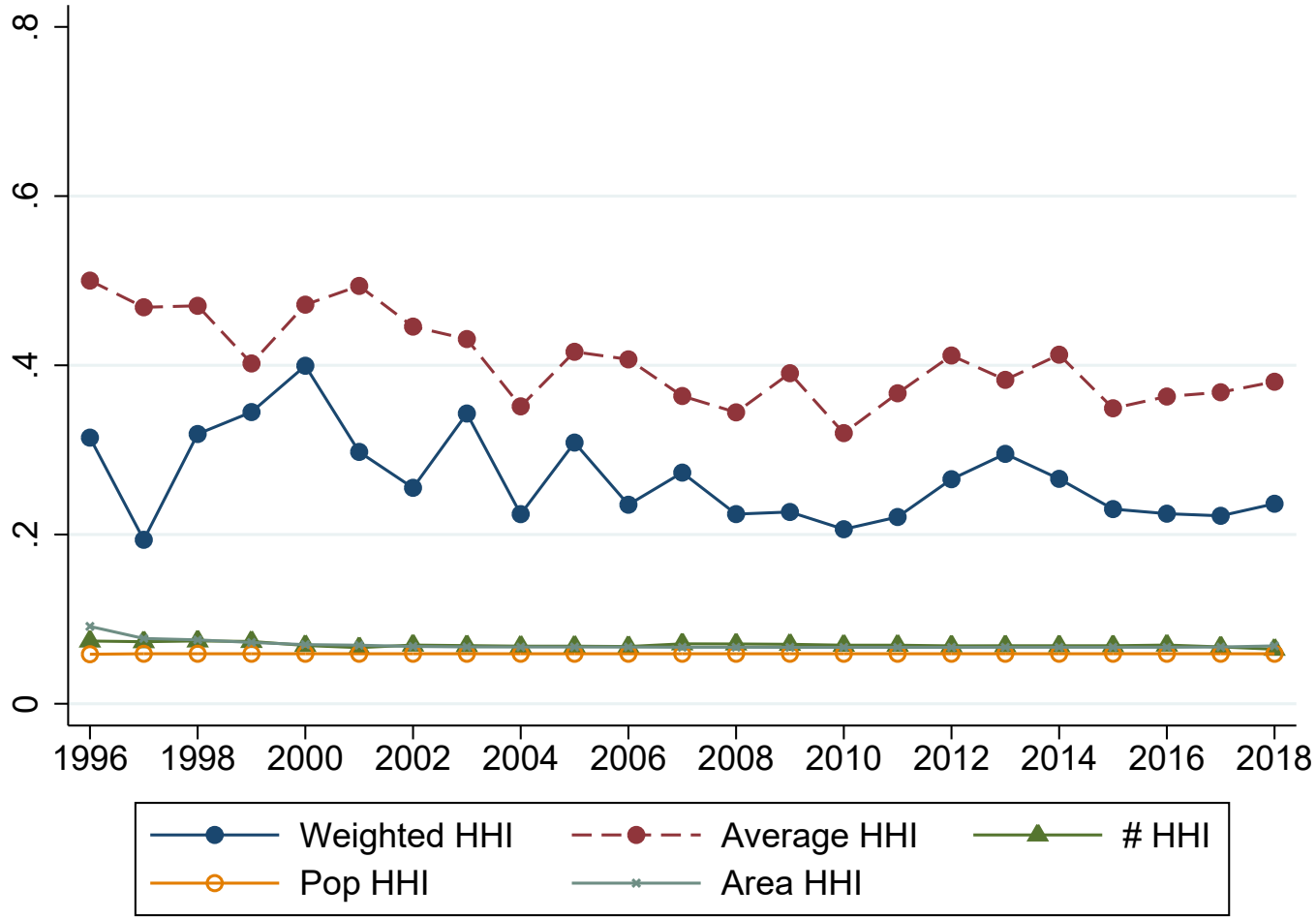
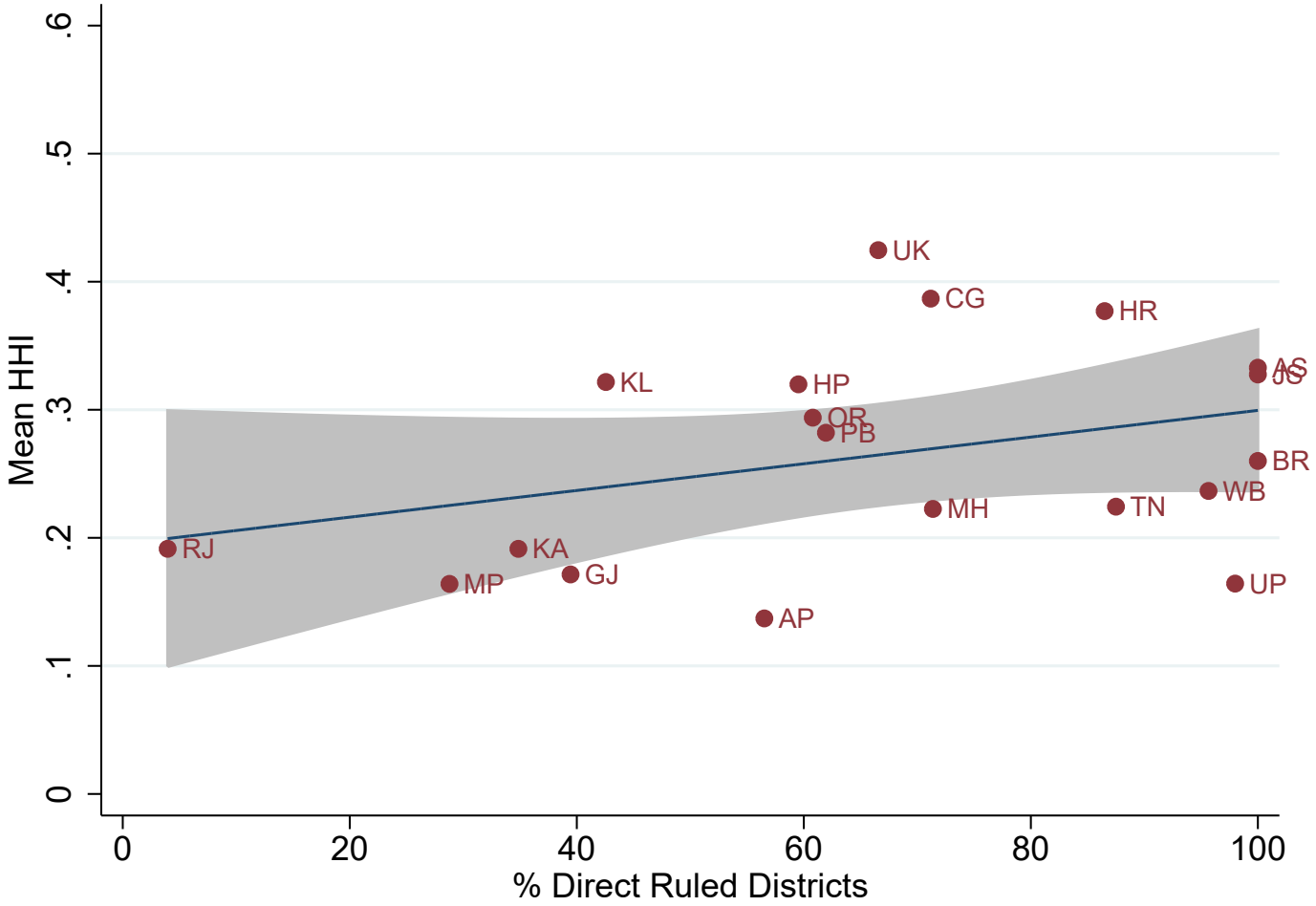
Fact: Investment is Geographically Concentrated



Geographic Concentration of Investment and Direct Rule



Investment Concentration and State Characteristics

$$HHI_s = \beta \cdot \%\ \text{Direct Rule}_s + \Gamma X_s + \varepsilon_s$$

Dep Var: HHI	(1)	(2)	(3)	(4)	(5)	(6)
% Direct Rule	0.1213*	0.1463**	0.1227*	0.1522*	0.1514*	0.1369*
	(0.0661)	(0.0531)	(0.0685)	(0.0793)	(0.0813)	(0.0778)
# Districts		-0.0182***	-0.0188***	-0.0180***	-0.0194***	-0.0183***
		(0.0038)	(0.0039)	(0.0042)	(0.0047)	(0.0053)
Area per District			-0.0582	-0.1081	-0.1354	-0.1090
			(0.1128)	(0.1402)	(0.1391)	(0.1541)
Population Density				-0.8775	-1.2064	-0.8094
				(0.8750)	(0.9068)	(1.0235)
GDP per capita					-0.1159	0.0302
					(0.1124)	(0.2965)
% Urban						-0.0087
						(0.0144)
# Obs	19	19	19	19	19	19
R^2	0.1269	0.5086	0.5227	0.5422	0.5753	0.5933

Baseline: Investment and Direct Rule

Investment is 8% lower in direct ruled areas relative to indirect ruled areas

$$Ln(Y_{i,j,t}) = \beta \cdot \text{Direct Rule}_j + \theta_{i,y} + \theta_{s(j \in s),y} + \theta_t + Latitude_j + Longitude_j + \varepsilon_{i,j,t}$$

Dep Var: Ln(Project Size)	(1)	(2)	(3)	(4)	(5)
Direct Rule (=1)	-0.1755**	-0.1130***	-0.1146**	-0.0864**	-0.0881***
	(0.0836)	(0.0416)	(0.0526)	(0.0348)	(0.0326)
	[0.0548]***	[0.0356]***	[0.0371]***	[0.0332]***	[0.0331]***
State FE	Yes	Yes	Yes	Yes	
Firm FE		Yes	Yes		
Qtr × Year FE			Yes	Yes	Yes
Firm × Year FE				Yes	Yes
State × Year FE					Yes
Lat/Long	Yes	Yes	Yes	Yes	Yes
# Obs	28,820	28,820	28,820	28,820	28,820
R^2	0.0303	0.5067	0.5465	0.7088	0.7160

Balanced Panel Analysis: Investment and Direct Rule

$$I_{j,t} = \beta \cdot \text{Direct Rule}_j + \theta_{s(j \in s),t} + \varepsilon_{j,t}$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Announce=1	$I_{j,t}$	$I_{j,t} \mid I_{j,t} > 0$	$\text{Projects}_{j,t}$	$\text{Projects}_{j,t} \mid \# > 0$	$\frac{I_{j,t}}{\sum_{j \in s} I_{j,t}}$	$\frac{\text{Projects}_{j,t}}{\sum_{j \in s} \text{Projects}_{j,t}}$
Direct Rule (=1)	-0.2534*	-16174.5813**	-28350.1337**	-4.1791**	-6.8549**	-7.0724**	-7.1912*
	(0.1346)	(7910.8774)	(11777.6353)	(2.0257)	(2.7350)	(2.9954)	(3.7650)
State × Qtr × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample Average	0.6453	19861.4928	37851.9045	4.4693	7.7296	8.7459	8.8529
	(0.0931)	(5367.5117)	(7901.4838)	(1.3584)	(1.8328)	(2.0333)	(2.5316)
# Obs	35,256	35,256	17,052	35,256	19,050	35,256	35,256
R^2	0.1854	0.2363	0.3115	0.1800	0.1621	0.0500	0.1070

- **Extensive Margin**: Projects are 25% less likely to be announced in direct ruled districts relative to indirect ruled districts
- Share of investment & share of number of projects are 7% lower in direct ruled districts relative to indirect ruled districts

Robustness of Baseline Results

- Balance Test Assumption ▸ Results ▸ Moran's I statistic
- Controls for Geography ▸ Results
- Controls for Other Covariates ▸ Results
- Placebo Test ▸ Results
- Log Investment Robustness for Balanced Panel Analysis ▸ Results

Local Identification Approach: Investment and Direct Rule

Empirical Strategy

$$Ln(Y_{i,j,t}) = \beta \cdot \text{Direct Rule}_j + \theta_{i,p(j \in p)y} + \theta_t + Latitude_j + Longitude_j + \varepsilon_{i,j,t}$$

- Sample of bordering districts within a state ▸ Sample
- Compare investment projects of the same firm within a contiguous district-pair using firm $\times$ district-pair $\times$ year fixed effects
- Whether a district within a contiguous direct-indirect ruled pair was under direct British rule or not is likely a matter of chance
- **Identifying Assumption:**
  - Adjacent districts are expected to follow similar paths had India not been colonized
  - $\theta_{i,p(j \in p)y}$ implicitly controls for:
    - ★ Costs of moving goods, people, and ideas
    - ★ Geography
    - ★ Shocks to Local Investment Opportunities

Local Identification Approach: Investment and Direct Rule

Empirical Results

$$Ln(Y_{i,j,t}) = \beta \cdot \text{Direct Rule}_j + \theta_{i,p(j \in p)y} + \theta_t + Latitude_j + Longitude_j + \varepsilon_{i,j,t}$$

Dep Var: Ln(Project Size)	(1)	(2)	(3)
Direct Rule (=1)	-0.0974**	-0.1090**	-0.1084**
	(0.0469)	(0.0488)	(0.0457)
Qtr × Year FE	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	
District-Pair × Year FE	Yes	Yes	
Firm × District-Pair FE		Yes	
Firm × District-Pair × Year FE			Yes
Lat/Long	Yes	Yes	Yes
# Obs	11,947	11,947	11,947
R^2	0.7856	0.7940	0.7944

- Projects announced in direct ruled districts are 10.8% smaller in size relative to the projects announced in indirect ruled districts by the same firm within a contiguous district-pair

Local Identification Approach: Falsification

Sample of Hinterland Districts Sample ▸ Sample

Dep Var: Ln(Project Size)	(1)	(2)	(3)
Hinterland (=1)	0.0382	0.0353	0.0355
	(0.0549)	(0.0391)	(0.0353)
Qtr × Year FE	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	
District-Pair × Year FE	Yes	Yes	
Firm × District-Pair FE		Yes	
Firm × District-Pair × Year FE			Yes
Lat/Long	Yes	Yes	Yes
# Obs	4,953	4,953	4,953
R^2	0.8340	0.8431	0.8432

- Results only appear when we cross a boundary separating direct and indirect ruled districts
- Results unlikely to be driven by spatial autocorrelation, as posited by Kelly (2019)

Addressing Selection: IV Strategy

Death of Ruler with No Male Heir

Dep Var: ln(Project Size)	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	IV	2SLS		Falsification	
			Second Stage	First Stage		
Direct Rule (=1)	-0.2236***		-0.2239**			
	(0.0604)		(0.0960)			
Ruler Death, No Heir, Lapse (=1)		-0.1475*		0.6589***		
		(0.0766)		(0.1225)		
Ruler Death, No Heir, No Lapse (=1)					0.0037	
					(0.0568)	
Ruler Death, Yes Heir, Lapse (=1)						0.0072
						(0.0764)
Qtr × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	10,293	10,293	10,293	10,293	8,129	8,129
R^2	0.5692	0.5693	-0.0563	0.6691		
KP LM Statistic				5.9527**		
KP Wald F Statistic				28.9393		

- Under the policy of *Doctrine of Lapse*, Lord Dalhousie took direct control of areas where the incumbent Indian ruler died without a natural heir

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Mechanism

- Direct British rule affects corporate investment in the present
  - **Destruction of existing economic organizations**
  - **Lower State Capacity**

Destruction of Economic Organizations

The Case of Cotton

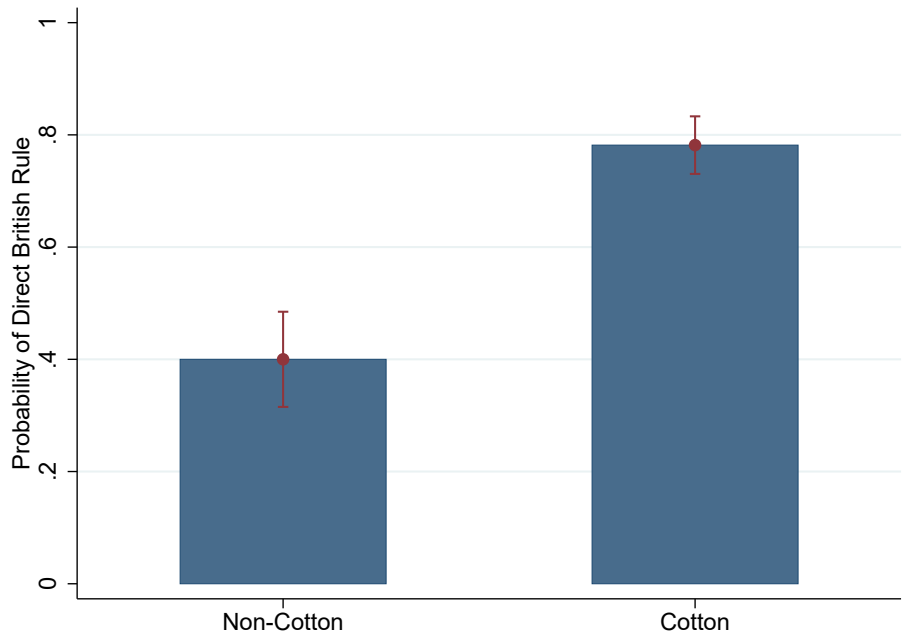
- Cotton-producing districts were more likely to be under direct British rule
- These areas were subject to adverse economic policies, resulting in the destruction of existing economic organizations with long-run detrimental effects

Pre-colonial History of Cotton in India

- India produced about 25% of the world's manufacturing output in 1750, of which, textiles constituted a significant share (Marks, 2019)
- Indian textiles dominated the world textile market in the 18th century, accounting for 25% of the global textile trade (Maddison et al., 1995)
- The Indian cotton textiles were the most important manufactured goods in the 18th century (Parthasarathi, 2011) with India being home to the world's most important cotton textile industry (Robson, 1957)

First Stage: Cotton & Direct British Rule

Cotton-producing districts were more likely to be under direct British rule



- A cotton producing district was 40% more likely to be under direct British rule, relative to indirect rule

Capture of Cotton Industry

Why did the British took direct control of cotton producing areas?

- Cypher, 2008 notes that the Indian textile production was marked by the presence of skilled laborers and large factory towns, which threatened the British textile industry – a leading sector of the British economy
- Direct rule of cotton producing areas allowed British to
  - Directly control the supply of cotton, securing a monopoly on the supply of Indian goods and products (Sahoo (2015))
  - Protect the interests of the British textile industry and increase Britain's share of global trade

"England began with driving the Indian cottons from the European market; it then introduced twist into Hindostan, and in the end inundated the very mother country of cotton with cottons"

- Karl Marx, The British Rule in India, 1853

Colonial Destruction of Cotton Industry

- The negative effect of the destruction of India's textile industry is evidenced by its fall in global textile exports – from 25% in the 17th century to just 2% at the end of British rule in 1947 (Das, 1946).

- The British destroyed the Indian cotton industry through five ways:
  - Protectionism of the British textile industry through tariffs
  - Price fixing through monopsony power
  - Violence against textile producers
  - Deprivation of new technological innovations
  - Neglect of local institutions

"The labour of these artisans was so cruelly suppressed that they were obliged to cut off their own thumbs in order to avoid imprisonment...In my opinion, such cutting off would be less cruel than the terrorism which resulted in self-mutilation"

- Gandhi, 1921, "Notes." Young India

Long Run Effects of Capture of Cotton Industry

IV with Local Identification Approach: Precolonial Cotton Production

Dep Var: ln(Project Size)	(1)	(2)	(3)	(4)
	IV	2SLS		Falsification
		Second Stage	First Stage	
Direct Rule (=1)		-0.2272*		
		(0.1270)		
Precolonial Cotton (=1)	-0.2073*		0.9120***	0.0344
	(0.1166)		(0.1326)	(0.0876)
Qtr × Year FE	Yes	Yes	Yes	Yes
Firm × District-Pair × Year FE	Yes	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes	Yes
# Obs	9,491	9,491	9,491	1,871
R^2	0.7901		0.7786	0.8077
KP LM Statistic			7.3567***	
KP Wald F Statistic			47.3955	

- Results from Full Sample ▸ Results

Why the long-run effect?

- The destruction of strong economic organizations hampers the intergenerational transfer of skills and knowledge
- The destruction of a dominant industry that developed over a long period of time disrupts the natural evolution process of Marshallian forces and renders the comparative advantage of the area and its people futile

Indirect Rule & State Capacity

- Rulers of princely states had greater incentives to provide better governance. Rulers of indirect ruled districts:
  - Faced the threat of British annexation under the pretext of misrule
  - Exhibited longer tenure than their direct ruled counterparts, incentivizing long-term planning and development

- Better governance and higher state efficiency in indirect ruled areas relative to direct ruled areas have persisted to the present
  - State takes longer than estimated to finish public road construction projects in direct ruled districts
  - Systematic delays reflect inefficiency, indicating lower state capacity
  - Impedes firms' access to investment opportunities, especially for more time-sensitive opportunities

Road Construction Delays and Direct British Rule

Construction Delay	(1)	(2)	(3)	(4)
Direct Rule (=1)	0.1016***	0.1218**	0.0855*	0.1335**
	(0.0353)	(0.0554)	(0.0507)	(0.0644)
District-Pair × Year FE	Yes			
District-Pair × Cost Pct. × Year FE		Yes		
District-Pair × Length Pct. × Year FE			Yes	
District-Pair × Cost Pct. × Length Pct. × Year FE				Yes
Lat/Long	Yes	Yes	Yes	Yes
Distance Controls	Yes	Yes	Yes	Yes
# Obs	35,656	35,656	35,656	35,656
R^2	0.3226	0.8677	0.8536	0.9687

- Road construction projects are delayed 10.2% more in direct ruled districts relative to a contiguous indirect ruled districts

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Alternative Explanations

These alternative explanation cannot explain our results

- Provision of Public Goods ▸ Results
- Differences in Law Enforcement ▸ Results
- Trust in the State ▸ Results
- Community Cooperation & Conflict ▸ Results

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Conclusion

1. History can explain investment concentration
   - **Aggregate Result:** Institutions explain 13% of total geographic variation in investment
   - **Micro-level Estimate:** Investment is 8-10% lower in areas with low institutional quality

2. History can have long-run consequences through its effect on:
   - Economic Organizations
   - State Capacity

APPENDIX

Selection on Observable: Direct & Indirect Rule

Back

Dep Var: Direct Rule (=1)	(1)	(2)	(3)	(4)	(5)
Altitude (MSL)	0.0002				0.0002
	(0.0003)				(0.0002)
Coast (=1)	0.1820				0.1720
	(0.1176)				(0.1179)
Ln(Area)	-0.0637				-0.0692
	(0.0816)				(0.0799)
Slope	-1.0837				2.6706
	(3.6432)				(2.3314)
Rain (cm)	0.0015				0.0012
	(0.0010)				(0.0009)
Max-Temp	0.0061				-0.0010
	(0.0113)				(0.0113)
Min-Temp	0.0126				0.0028
	(0.0104)				(0.0090)
Ln(Distance)		0.0396			0.0707
		(0.0611)			(0.0577)
Maratha Ruler			0.2279		0.2449
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Prop Lower Caste				0.5613	0.5439
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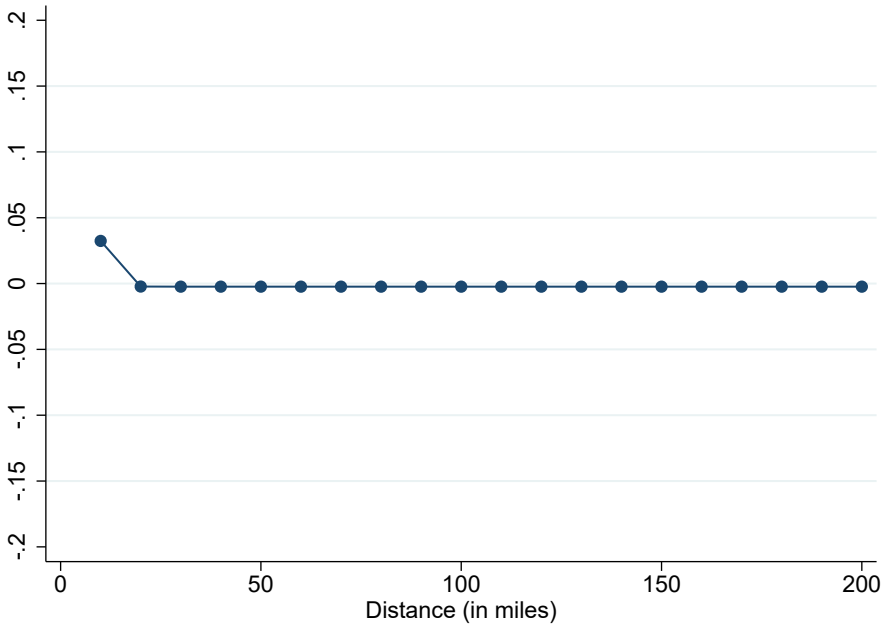
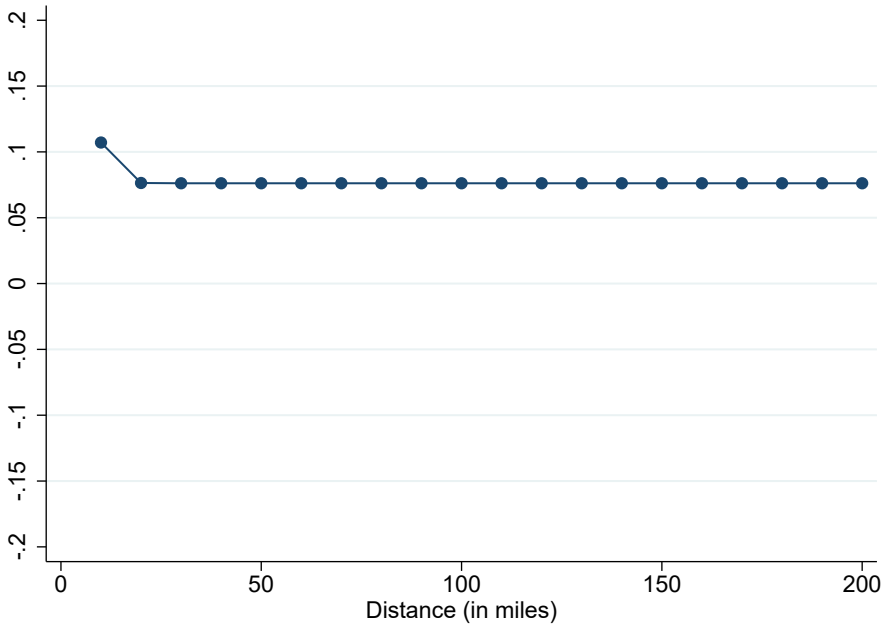
Prop Elites				-0.3153	-0.1544
				(0.6895)	(0.6948)
Constant	0.5330	0.4275	0.4336***	0.5111***	0.3777
	(0.8825)	(0.3253)	(0.0933)	(0.1445)	(0.9042)
# Obs	294	294	294	294	294
R^2	0.0814	0.0042	0.1257	0.0293	0.1939

Spatial Autocorrelation - Moran I statistic

Back



(a) Uniformly Weighted



(b) Inverse Distance Weights

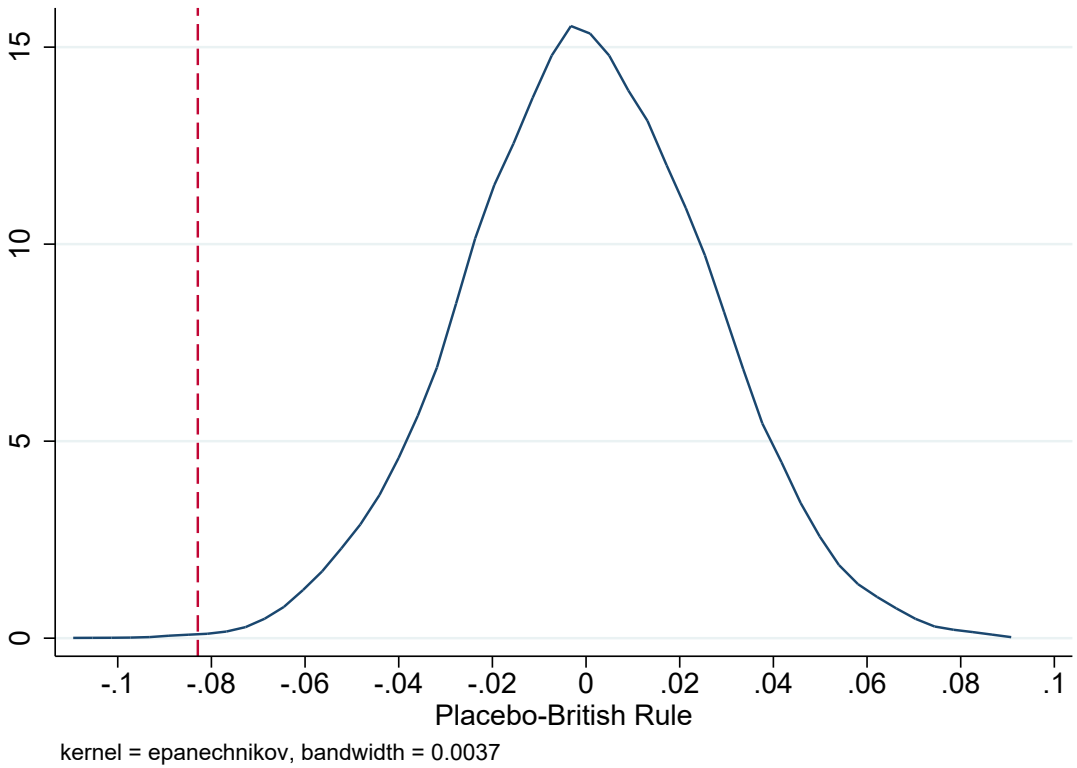
Effect Not Driven by Geography

Back

Dep Var: Ln(Project Size)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Direct Rule (=1)	-0.0692**	-0.0916***	-0.1045***	-0.1025***	-0.0782**	-0.0926**	-0.0846**	-0.0856**
	(0.0317)	(0.0344)	(0.0340)	(0.0348)	(0.0346)	(0.0355)	(0.0323)	(0.0376)
Altitude (MSL)	-0.0001							-0.0001
	(0.0001)							(0.0001)
Coast (=1)		0.0210						0.0050
		(0.0470)						(0.0493)
Ln(Area)			0.0296					0.0423
			(0.0274)					(0.0293)
Slope				0.6204				0.7599
				(0.7148)				(1.1256)
Rain (cm)					-0.0007**			-0.0006*
					(0.0003)			(0.0004)
Max-Temp						0.0042		-0.0004
						(0.0031)		(0.0033)
Min-Temp						0.0026		-0.0008
						(0.0041)		(0.0038)
Ln(Distance)							-0.0217***	-0.0437**
							(0.0065)	(0.0186)
Qtr × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Obs	27,223	28,820	24,470	24,470	28,820	23,499	28,820	21,181
R^2	0.7195	0.7160	0.7318	0.7317	0.7161	0.7302	0.7161	0.7380

Placebo Test

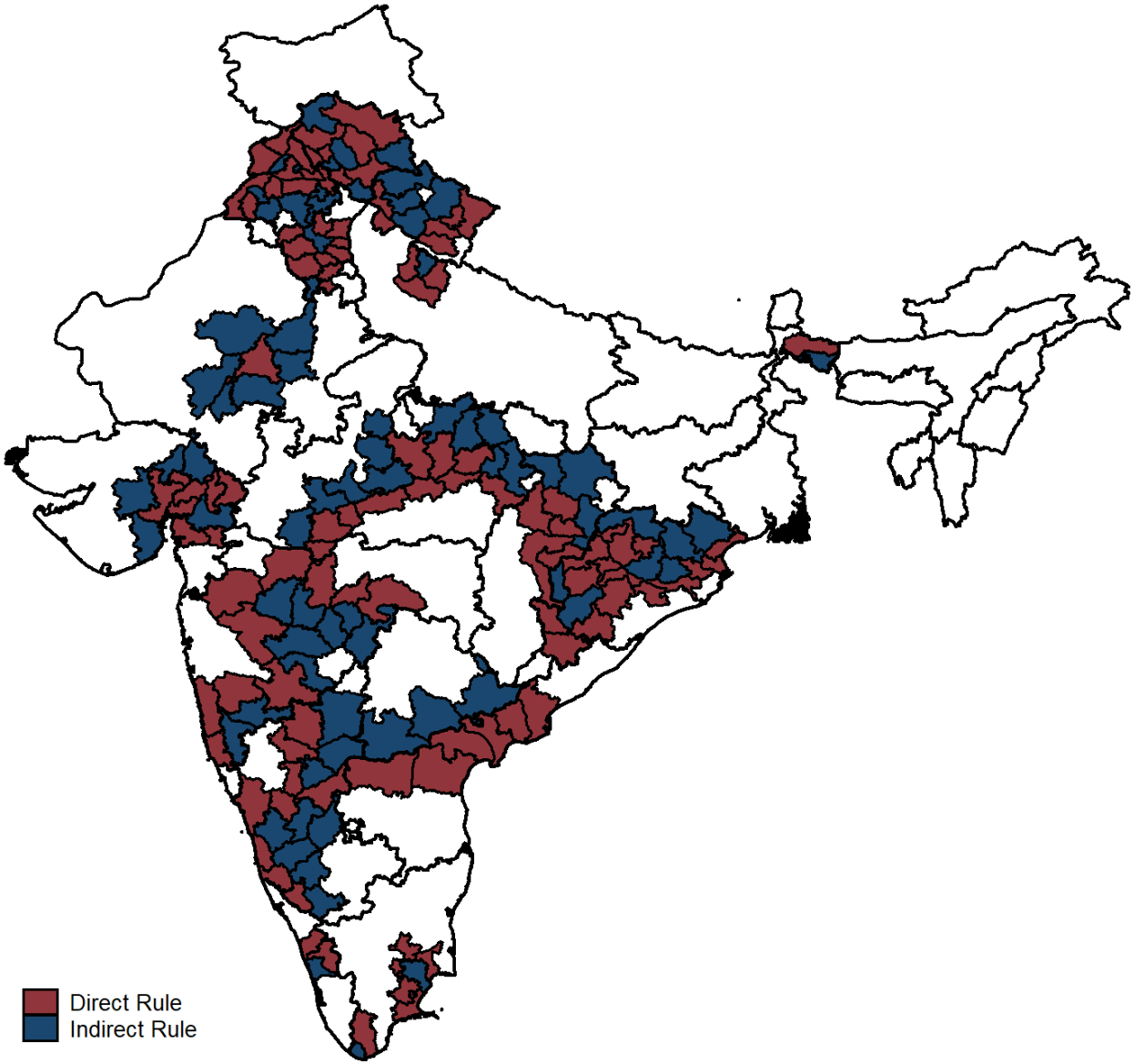
Back



- Randomly assign a district to be direct ruled
- There are 0.1% of points to the left of the red-dashed line

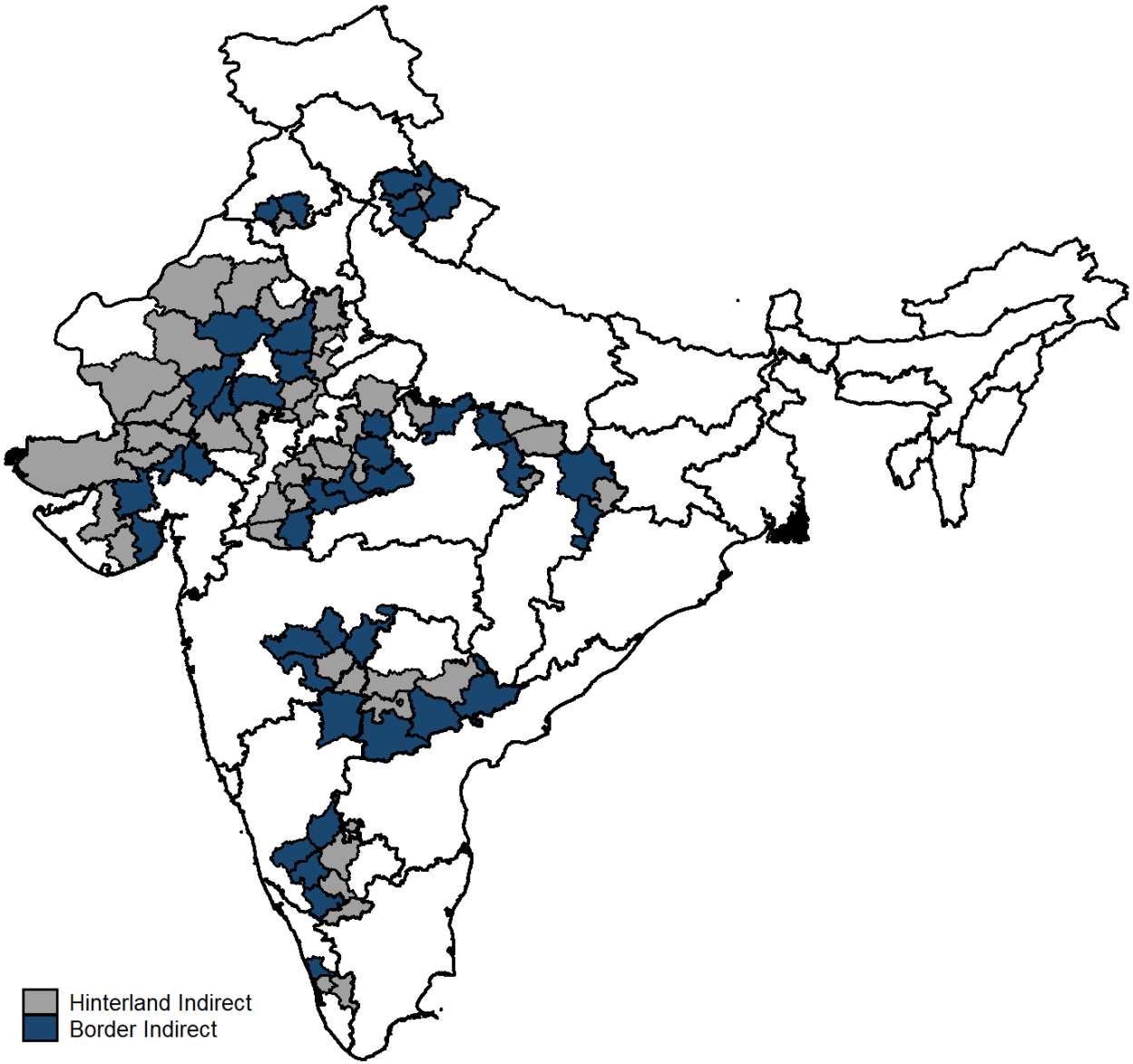
Sample of Bordering Districts

Back



Sample of Bordering Hinterland Districts

Back



Other Covariates

Back

Ruler Religion and Other Population Demographics

Dep Var: ln(Project Size)	(1)	(2)	(3)
Direct Rule (=1)	-0.0831**	-0.1021***	-0.0932**
	(0.0368)	(0.0339)	(0.0356)
Maratha Ruler	-0.0330		-0.0330
	(0.0398)		(0.0415)
Muslim Ruler	-0.0212		-0.0375
	(0.0151)		(0.0302)
Prop Muslim		-0.0249	-0.0083
		(0.2007)	(0.2025)
Prop Sikhs		-0.3338	-0.3783*
		(0.2109)	(0.2225)
Prop Lower Caste		0.0646	0.0634
		(0.1195)	(0.1195)
Prop Elites		-0.0742	-0.0541
		(0.2140)	(0.2145)
Qtr × Year FE	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes
# Obs	19,800	19,800	19,800
R^2	0.7305	0.7305	0.7305

Robustness

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Log Investment for Balanced Panel Analysis

Dep Var: $ln(1 + I_{j,t})$	(1)	(2)
Direct Rule (=1)	-2.6273*	-1.6556**
	(1.3827)	(0.6892)
State-Qtr-Year FE	Yes	Yes
Sample	All Districts	$I_{j,t} > 0$
# Obs	35,256	17,052
R^2	0.2008	0.2656

IV: Precolonial Cotton Production

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Robustness: Full Sample

Dep Var: ln(Project Size)	(1)	(2)	(3)
	IV	2SLS	
		Second Stage	First Stage
Direct Rule (=1)		-0.3119***	
		(0.1078)	
Precolonial Cotton (=1)	-0.1293***		0.4144***
	(0.0372)		(0.1119)
Qtr × Year FE	Yes	Yes	Yes
Firm × Year FE	Yes	Yes	Yes
State × Year FE	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes
# Obs	19,800	19,800	19,800
R^2	0.7305		0.6738
KP LM Statistic			10.0881***
KP Wald F Statistic			13.7112

Provision of Public Goods

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	(1)	(2)	(3)	(4)	(5)
	Total School	Primary School	Middle School	High School	Electricity
Direct Rule (=1)	-0.0844	-0.0536	-0.0248	-0.0059	0.0114
	(0.0887)	(0.0601)	(0.0187)	(0.0128)	(0.0115)
District-Pair × Year FE	Yes	Yes	Yes	Yes	Yes
Lat/Long	Yes	Yes	Yes	Yes	Yes
# Obs	1,026	1,026	1,026	1,026	1,026
R^2	0.7800	0.7568	0.8272	0.8429	0.9317
Mean	1.7380	1.0845	0.3978	0.2557	0.7443
Median	1.5170	0.9248	0.3412	0.2133	0.9763
Std. Dev.	1.0615	0.6872	0.2714	0.1955	0.3278

- No differences in provision of public goods such as schools and electricity

Alternative Explanations: Law Enforcement

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Court Delays & Direct Rule

$$Ln(1 + Delay_{i,j,t}) = \beta \cdot \text{Direct Rule}_j + \theta_{i,p(j \in p)y} + \theta_t + Latitude_j + Longitude_j + \varepsilon_{i,j,t}$$

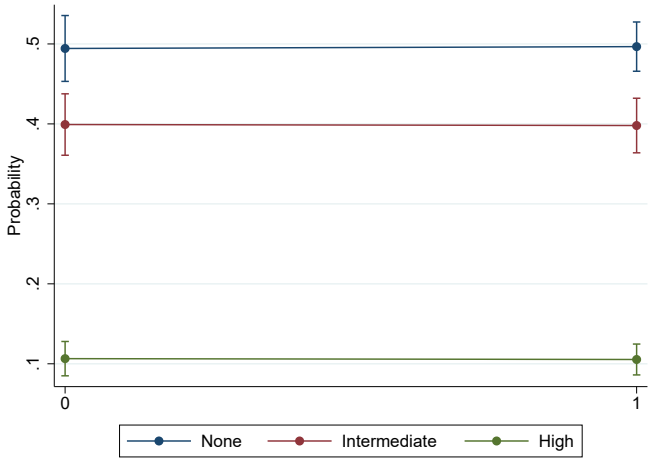
Dep Var: ln(Mean Delay)	(1)	(2)	(3)
Direct Rule (=1)	-0.0025	-0.0025	-0.0025
	(0.0245)	(0.0245)	(0.0243)
Statute × Year FE	Yes	Yes	
District-Pair × Year FE	Yes	Yes	
Statute × District-Pair FE		Yes	
Statute × District-Pair × Year FE			Yes
Lat/Long	Yes	Yes	Yes
# Obs	180,580	180,580	180,580
R^2	0.6155	0.7204	0.8077

- No differences in the enforcement of law

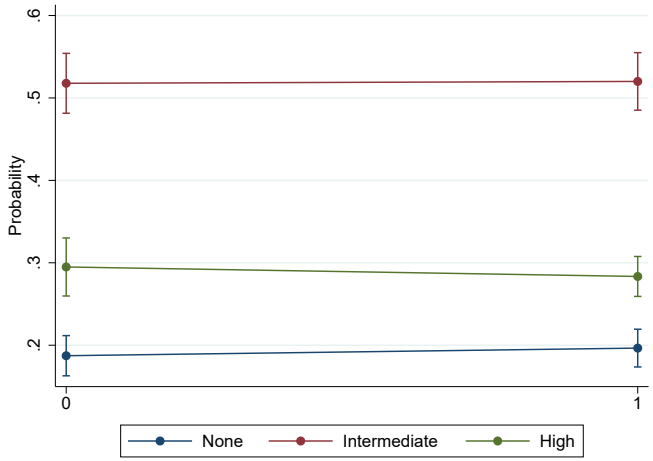
Alternative Explanation

Back

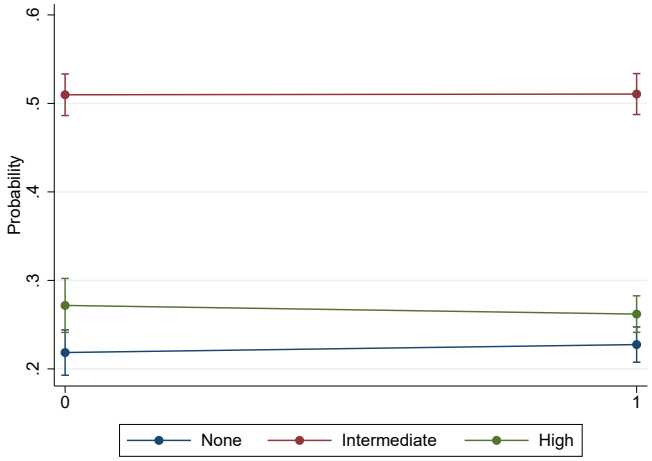
Trust in State Apparatus - Cannot Explain our Results



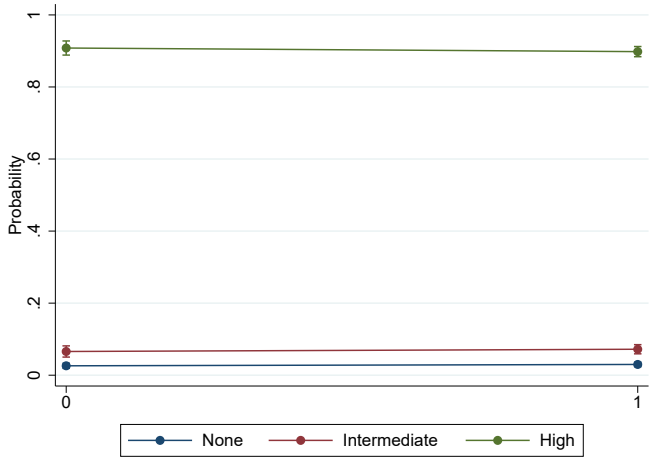
(a) Trust in Politicians



(b) Trust in Panchayats



(c) Trust in Police

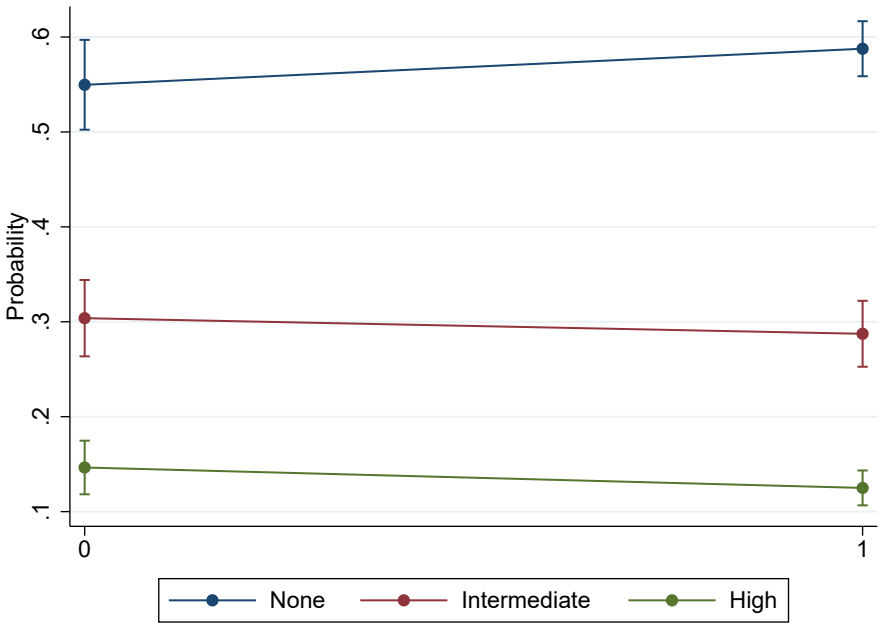


(d) Trust in Banks

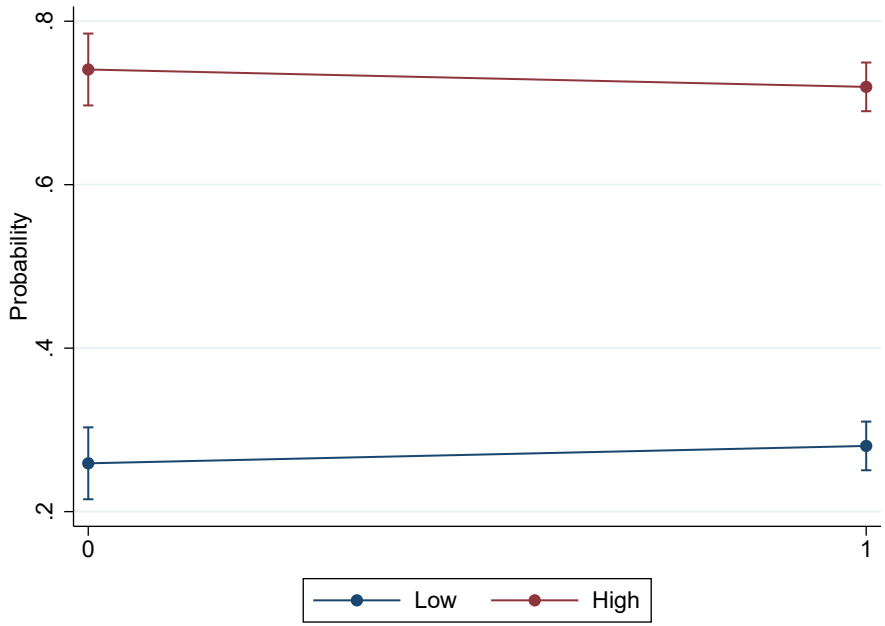
Alternative Explanation

Back

Community Cooperation & Conflict - Cannot Explain our Results



(a) Community Conflict



(b) Community Cooperation

Moran's Spatial Autocorrelation

Moran I statistic measures the interdependency between different regions and ranges from -1 to 1

- Under random distribution, the statistic approaches zero, asymptotically.
- A statistic value above zero reflects positive spatial autocorrelation between districts i and j.
- A statistic value below 0 reflects negative spatial autocorrelation between districts i and j.

Moran's I statistic is computed as follows:

$$I = \frac{\sum_{i=1}^{n} \sum_{j=1}^{n} w_{ij} z_i z_j}{\sum_{i=1}^{n} z_i^2} \tag{1}$$

Construction of Weight Matrix

In the weight matrix, diagonal elements are 0 (the distance between a region and itself is 0).

$$W = \begin{bmatrix} 0 & w_{1,2} & \cdots & w_{1,m-1} & w_{1,m} \\ w_{2,1} & 0 & \cdots & w_{2,m-1} & w_{2,m} \\ \vdots & \vdots & \ddots & \vdots & \vdots \\ w_{m-1,1} & w_{m-1,2} & \cdots & 0 & w_{m-1,m} \\ w_{m,1} & w_{m,2} & \cdots & w_{m,m-1} & 0 \end{bmatrix} \tag{2}$$

In our analysis, we use two types of spatial weight matrices: inverse weighting and uniform weighting. Inverse weights between districts i and j are constructed in the following way.

$$w_{ij} = \begin{cases} \frac{d_i j^{-\delta}}{\sum_{j=1}^{n} d_i j^{-\delta}} & d_{ij} < d, i \neq j, \delta > 0 \\ 0 & otherwise \end{cases} \tag{3}$$