Political Economics III

Lecture VII

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Political Transitions I

- Stages:

  - (1.) State is revealed

  - (2.) If there has been a revolution in the past, the poor receive their share of income and consumption takes place. If the society is democratic, the poor set a tax rate. If the society is non-democratic, the rich set a tax rate.

  - (3.) In non-democracy, elites decide whether to extend the franchise; in democracy, whether to mount a coup. If a coup or extension happens, the party coming to power can change the tax rate.

  - (4.) The poor decide whether or not to start a revolution.

  - (5.) Consumption takes place and the period ends.

Political Transitions II

- Equilibrium Definition:

$$\sigma^{r*}, \sigma^{\rho*} \ni \sigma^{r*} = \arg\max_{\sigma^r} U_r\left(\sigma^r, \sigma^{\rho*}\right) \text{ and } \sigma^{\rho*} = \arg\max_{\sigma^\rho} U_\rho\left(\sigma^{r*}, \sigma^\rho\right)$$

- Actions:

$$\sigma^r = (\omega, \phi, \tau^N, \zeta, \tau^N)$$

where ω is the decision to repress, ϕ the decision to extend,

τ^N the tax rate without extension , ζ the decision to throw a coup, and

the second τ^N the tax rate following a coup.

$$\sigma^\rho = (\rho, \tau^D, \tau^D)$$

where ρ is the decision to revolt, τ^D the tax rate under deomcracy ,

and the second τ^D the tax rate following a revolution.

Political Transitions III

- States: $(D, \varphi_H), (D, \varphi_L), (N, \mu_H), (N, \mu_L)$

- Construct Value Fctns for Diff. States/Actions:

$$V^i(D, \varphi_L) = y^i + \tau^\rho(\bar{y} - y^i) - C(\tau^\rho) + \beta\left[sV^i(\varphi_H) + (1-s)V^i(D, \varphi_L)\right]$$

$$V^i(D, \varphi_H, \tau^D) = y^i + \tau^D(\bar{y} - y^i) - C(\tau^D) + \beta\left[sV^i(D, \varphi_H, \tau^D) + (1-s)V^i(D, \varphi_L)\right]$$

$$V^r(\varphi_H) = \max_{\xi \in \{0,1\}}\left\{\xi\left(V^r(N, \mu_L) - \varphi y^r\right) + (1-\xi)V^r\left(D, \varphi_H, \tau^D\right)\right\}$$

- Coup constraint:

$$V^r(N, \mu_L) - \varphi y^r > V^r\left(D, \varphi_H, \tau^D = \tau^\rho\right)$$

Political Transitions IV

- Calculate new critical thresholds:

  - Coups are never credible (binding):

$$\hat{\varphi} = \frac{1}{\theta}\left(\frac{\delta C(\tau^P) - \tau^P(\delta - \theta)}{1 - \beta(1 - q)} \right)$$

  - Coups can be stopped by setting a low enough tax rate under democracy:

$$\varphi^* = \frac{1}{\theta}\left(\frac{\beta(q + s - 1)(\tau^P(\delta - \theta) - \delta C(\tau^P))}{1 - \beta(1 - q)} \right)$$

Political Transitions V

- Theorem Characterization:

- $\mu \geq \mu^*$: Revolution is sufficiently costly that elites can avoid it by redistributing in the low cost of evolution state.

- $\mu < \mu^*, k \geq \bar{k}$: Revolution is credible and repression costly so that redistribution is at its highest and democracy s fully consolidated.

Political Transitions VI

- Theorem Characterization (cont.):

- $\mu < \mu^*, \varphi^* \leq \varphi < \hat{\varphi}, k \geq k(\varphi)$: Revolution is credible, repression is somewhat costly, and a coup is somewhat costly. Then, democracy is semi-consolidated and the poor must set a tax rate that satisfies the rich in the low cost state for coups.

- $\mu < \mu^*, \varphi < \varphi^*, k \geq \tilde{k}$: Revolution is credible and so is a coup, repression is sufficiently costly that it is not used. Thus, politics oscillates between democracy and autocracy. Higher inequality leads to more redistribution in democracy.

Political Transitions VII

- Theorem Characterization (cont.):

- $\mu < \mu^*, \varphi^* \leq \varphi < \hat{\varphi}, k < k(\varphi)$ or $\varphi < \varphi^*$ and $k < \tilde{k}$

Elites maintain power using repression.

Political Transitions VIII

- Four other conclusions:
  - (1.): Inverted U relationship between democracy and inequality (moderately unequal societies most likely to democratize). However, more equal societies are more likely to consolidate democracy (less value of a coup).

  - (2.): Meltzer-Richard puzzle: An increase in inequality can lead to less redistribution. From democracy, eventually inequality increases can lead to non-consolidation and the poor have to lower tax rates to satisfy the no coup constraint. A decrease in inequality from democracy can eventually make revolution non-credible and lead to elite domination with lower redistribution.

  - (3.): Fixing a regime (coup, repression, democracy, straight autocracy), greater inequality leads to greater fiscal volatility.

  - (4.) Societies with lower costs of taxation may find democracy harder to consolidate (i.e. natural resource taxation) because the tax rate is set higher and thus elites don't want to enfranchise.

Hit or Miss

Ben Jones and Ben Olken

Hit or Miss? The Effect of Assassinations on Institutions and War

Table 1: Assassinations of Primary National Leaders Since 1875

Country of Leader	Year of Assassination	Name of Leader	Weapon Used
Afghanistan	1919	Habibullah	gun
Afghanistan	1933	Nadir Shah	gun
Algeria	1992	Boudiaf	gun
Austria	1934	Dollfuss	gun
Bulgaria	1943	Boris III	gun
Burundi	1994	Ntaryamira	other
Congo (Brazzaville)	1977	Ngouabi	gun
Congo (Kinshasa)	2001	Kabila	gun
Dominican Republic	1899	Heureaux	gun
Dominican Republic	1911	Caceres	gun
Dominican Republic	1961	Trujillo	gun
Ecuador	1875	Moreno	other
Egypt	1981	Sadat	gun
Greece	1913	George I	gun
Guatemala	1898	Reina Barrios	unknown
Guatemala	1957	Castillo Armas	gun
Haiti	1912	Leconte	explosive device
India	1984	Indira Gandhi	gun
Iran	1896	Nasir Ad-Din	gun
Ireland	1922	Collins	gun
Israel	1995	Rabin	gun
Japan	1921	Hara	knife
Japan	1932	Inukai	gun
Jordan	1951	Abdullah	gun
Korea	1979	Park	gun
Lebanon	1989	Moawad	explosive device
Madagascar	1975	Ratsimandrava	unknown
Mexico	1920	Carranza	unknown
Nepal	2001	Birendra	gun
Nicaragua	1956	Somoza	gun
Niger	1999	Mainassara	unknown
Pakistan	1951	Khan	gun
Pakistan	1988	Zia	other
Panama	1955	Remon	gun
Paraguay	1877	Gill	unknown
Peru	1933	Sanchez Cerro	gun
Poland	1922	Narutowicz	gun
Portugal	1908	Carlos I	gun
Portugal	1918	Paes	gun
Russia	1881	Alexander II	explosive device
Rwanda	1994	Habyarimana	other
Salvador	1913	Araujo	gun
Saudi Arabia	1975	Faisal	gun
Somalia	1969	Shermarke	gun
South Africa	1966	Verwoerd	knife
Spain	1897	Canovas	gun
Spain	1912	Canalejas	gun
Spain	1921	Dato	gun
Sri Lanka	1959	Bandaranaike	gun
Sri Lanka	1993	Premadasa	explosive device
Sweden	1986	Palme	gun
Togo	1963	Olympio	gun
United States	1881	Garfield	Gun
United States	1901	McKinley	Gun
United States	1963	Kennedy	Gun
Uruguay	1897	Idiarte Borda	Gun
Venezuela	1950	Delgado	Gun
Vietnam	1963	Diem	Gun
North Yemen	1977	Al-Hamdi	Gun
North Yemen	1978	Al-Ghashmi	explosive device
Yugoslavia	1934	Alexander	gun

Table 2: Assassination Attempts: Summary Statistics

	Obs	Percentage	Probability Leader Killed		Bystander Casualties	
			All Attempts	Serious Attempts	Mean Killed	Mean Wounded
Type of Weapon						
Gun	155	52%	28%	32%	1.0	2.6
Explosive device	86	29%	6%	7%	6.9	19.6
Knife	22	7%	9%	15%	0.3	0.5
Other	20	7%	20%	22%	1.1	0.2
Unknown	27	9%	22%	25%	2.2	8.2
Location						
Abroad	16	5%	19%	21%	3.2	5.9
At home	285	95%	20%	24%	2.8	7.7
Number of Attackers						
Solo	126	58%	23%	28%	0.7	2.7
Group	92	42%	24%	28%	5.1	9.9
Total Attempts	301	n/a	20%	24%	2.9	7.7

Notes: There are 301 total assassination attempts observed and 254 serious attempts. Serious attempts are defined as cases where the weapon was actually used. Note that the location of the attack is observed in every case, but the type of weapon is observed in 274 cases and the number of attackers observed in 218 cases. For some attempts, multiple types of weapons were used, so that the weapon observation counts sum to 310. Also note that casualties among bystanders are skewed distributions so that the means are much larger than medians.

Table 3: Are successful and failed attempts similar?

Panel A: Pairwise t-tests of sample balance

Variable	Success	Failure	Difference	Pval on Difference
Democracy dummy	0.350	0.348	0.002	0.98
	(0.062)	(0.035)	(0.071)	
Change in democracy	-0.034	-0.029	-0.006	0.86
dummy	(0.024)	(0.021)	(0.032)	
War dummy	0.271	0.316	-0.044	0.51
	(0.058)	(0.034)	(0.068)	
Change in war	0.035	0.011	0.024	0.72
	(0.056)	(0.035)	(0.066)	
Log energy use per capita	-1.617	-1.724	0.107	0.78
	(0.335)	(0.183)	(0.382)	
Log population	9.047	9.504	-0.457	0.06*
	(0.211)	(0.119)	(0.243)	
Age of leader	55.167	53.164	2.003	0.21
	(1.313)	(0.876)	(1.579)	
Tenure of leader	9.217	7.795	1.422	0.35
	(1.396)	(0.556)	(1.502)	
Num obs	61	190		

Notes: This table reports the means of each listed variable for successes and failures, where each observation is a serious attempt. Standard errors in parentheses. P-values on differences in the mean are from two-sided unpaired t-tests. All variables are examined in the year before the attempt took place. Change variables represent the change from 3 years before the attempt occurred to one year before the attempt occurred. * significant at 10%; ** significant at 5%; *** significant at 1%

Panel B: Multivariate regressions

	(1)	(2)	(3)	(4)
Democracy dummy	0.039	0.039	0.044	0.042
	(0.070)	(0.068)	(0.071)	(0.068)
Change in democracy	0.006	-0.020	0.022	0.015
dummy	(0.099)	(0.104)	(0.102)	(0.117)
War dummy	-0.021	-0.004	-0.021	0.004
	(0.077)	(0.082)	(0.076)	(0.082)
Change in war	0.050	0.054	0.058	0.064
	(0.067)	(0.067)	(0.067)	(0.067)
Log energy use per capita	0.001	0.000	0.010	0.013
	(0.014)	(0.014)	(0.015)	(0.015)
Log population	-0.024	-0.025	-0.031	-0.040*
	(0.021)	(0.021)	(0.022)	(0.020)
Age of leader	0.003	0.003	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Tenure of leader	0.003	0.003	0.004	0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Weapon FE	NO	YES	NO	YES
Region FE	NO	NO	YES	YES
Observations	205	205	205	205
P-val of all listed variables	0.69	0.58	0.57	0.30
P-val of all listed variables and fixed effects	0.69	0.03**	0.55	0.00***

Notes: This table reports marginal effects from a probit regression, where each observation is a serious attempt and the dependent variable equals 1 for successful assassinations. Robust standard errors in parentheses, adjusted for clustering on country. Weapon FE refers to dummies for each weapon type (gun, knife, explosive, poison, other, unknown), and region FE refers to dummies for each region of the world (Africa, Asia, Middle East / North Africa, Latin America, Eastern Europe, Western Europe / OECD).
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Assassinations and Institutional Change

	(1)	(2)	(3)
	Absolute change in POLITY2 dummy (1 = democracy)	Directional change in POLITY2 dummy (1 = democracy)	Percentage of transitions in next 20 years by 'regular' means
Panel A: Average effects			
Success	0.110	0.094	0.110
	(0.045)	(0.048)	(0.055)
Parm p-val	0.02**	0.05*	0.05*
Nonparm p-val	0.01**	0.00***	0.20
Obs	220	220	136
Data source	Polity IV	Polity IV	Archigos
Panel B: Split by regime type in year before attempt			
Success × Autocracy	.	0.151	0.177
	.	(0.055)	(0.085)
Success × Democracy	.	-0.004	0.028
	.	(0.081)	(0.044)
Autoc-Parm p	.	0.01***	0.04**
Autoc-Nonparm p	.	0.00***	0.05**
Democ-Parm p	.	0.96	0.53
Democ-Nonparm p	.	0.10	0.96
Obs	220	220	136
Data source	Polity IV	Polity IV	Archigos

Notes: Success is a dummy for whether the assassination attempt succeeded. The sample in all columns is limited to serious attempts. Standard errors and parametric p-values are computed using robust standard errors, adjusted for clustering at the country level; these specifications all include dummies for weapon type and the number of attempts in that year. Non-parametric p-values are computed using Fisher's exact (1935) p-values in columns (1) and (2) and using a Wilcoxon (1945) rank-sum test in column (3). In Panel B, autocracy / democracy is defined by the POLITY2 dummy in the year before the attempt. The main effect for the lagged autocracy variable is also included in the Panel B regressions. Absolute change in POLITY2 dummy is not shown in Panel B as it is mechanically identical to the directional change in POLITY2 dummy once we split by lagged POLITY2 dummy status. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Tenure of leader and duration of effects

	(1)	(2)	(3)	(4)	(5)	(6)
		All leaders			Autocrats only	
	All	Tenure <= 10	Tenure > 10	All	Tenure <= 10	Tenure > 10
Panel A: Directional change in POLITY2 dummy						
1 year out	0.094	0.083	0.123	0.152	0.122	0.203
	(0.048)	(0.050)	(0.119)	(0.056)	(0.067)	(0.104)
Parm p-val	0.05*	0.10*	0.31	0.01***	0.07*	0.06*
Nonparm p-val	0.00***	0.07**	0.01***	0.00***	0.02**	0.01***
10 years out	0.029	0.022	0.094	0.186	0.211	0.171
	(0.056)	(0.070)	(0.145)	(0.080)	(0.111)	(0.130)
Parm p-val	0.60	0.76	0.52	0.02**	0.06*	0.20
Nonparm p-val	0.01***	0.10*	0.02**	0.05**	0.21	0.04**
20 years out	0.004	0.029	0.000	0.049	0.08	0.008
	(0.084)	(0.099)	(0.146)	(0.091)	(0.122)	(0.149)
Parm p-val	0.97	0.77	1.00	0.59	0.52	0.96
Nonparm p-val	0.85	0.88	0.71	0.58	0.75	0.43
Panel B: Percentage of transitions by 'regular' means						
1-10 years out	0.057	0.059	0.087	0.117	0.111	0.102
	(0.075)	(0.086)	(0.243)	(0.109)	(0.136)	(0.255)
Parm p-val	0.45	0.50	0.73	0.29	0.42	0.70
Nonparm p-val	0.70	0.45	0.53	0.46	0.66	0.28
1-20 years out	0.110	0.105	0.26	0.145	0.124	0.277
	(0.055)	(0.062)	(0.156)	(0.093)	(0.116)	(0.188)
Parm p-val	0.05*	0.10*	0.12	0.13	0.29	0.16
Nonparm p-val	0.20	0.28	0.02**	0.05**	0.18	0.02**
11-20 years out	0.123	0.102	0.35	0.216	0.18	0.385
	(0.068)	(0.074)	(0.223)	(0.113)	(0.113)	(0.243)
Parm p-val	0.08*	0.18	0.14	0.06*	0.12	0.14
Nonparm p-val	0.20	0.56	0.03**	0.02**	0.14	0.04**

Notes: Each cell reports the coefficient on "success" result from a separate regression. Columns (1) and (4) reports results for all leaders, columns (2) and (5) for those with tenure <= 10 years in year before assassination, and columns (3) and (6) for those with tenure > 10 years in year before year of attempt. For POLITY2 dummy, 1 year out compares the change in polity score 1 year after attempt to 1 year before attempt; 5 years out compares the change in polity score 5 years after attempt to 1 year before attempt, etc. For regular transitions, 1-10 years out calculates the average percentage of leadership transitions that are regular in years 1-10 after the attempt; etc. Standard errors and p-values are as in Table 4. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 6: Assassinations and Conflict: Change 1 Year After Attempt

	(1)	(2)	(3)	(4)	(5)	(6)
	Gleditsch-COW Dataset 1875-2002		Gleditsch-COW Dataset 1946-2002		PRIO/Uppsala Dataset 1946-2002	
	All wars	Civil wars	All wars	Civil wars	All wars	Civil wars
Panel A: Average effects						
Success	-0.070	-0.020	0.034	0.010	0.161	0.110
	(0.065)	(0.049)	(0.092)	(0.077)	(0.067)	(0.045)
Parm p-val	0.29	0.69	0.71	0.90	0.02**	0.02**
Nonparm p-val	0.57	0.50	0.84	0.15	0.03**	0.12
Obs	222	222	117	117	117	117
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO
Panel B: Split by war status in year before attempt						
Success × At War	-0.202	-0.239	0.009	-0.161	0.259	0.351
	(0.143)	(0.175)	(0.231)	(0.221)	(0.148)	(0.158)
Success × Not At War	-0.015	0.030	0.020	0.070	0.050	0.012
	(0.064)	(0.041)	(0.083)	(0.072)	(0.052)	(0.035)
At War-Parm p	0.16	0.18	0.97	0.47	0.08*	0.03**
At War-Nonparm p	0.16	0.25	1.00	0.61	0.07*	0.06*
Not At War-Parm p	0.82	0.46	0.81	0.33	0.34	0.74
Not At War –Nonparm p	0.80	0.70	0.71	0.12	0.28	0.72
Obs	222	222	117	117	117	117
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO

Notes: See notes to Table 4. Non-parametric p-values are computed using Fisher's exact tests. In Panel B, at war / not at war is defined by whether the relevant war concept (i.e., the concept used in the dependent variable) is positive in the year before the attempt. The main effect for the lagged war variable is also included in the regression in Panel B. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 7: Assassinations and Conflict: Change 5 Years After Attempt

	(1)	(2)	(3)	(4)	(5)	(6)
	Gleditsch-COW Dataset 1875-2002		Gleditsch-COW Dataset 1946-2002		PRIO/Uppsala Dataset 1946-2002	
	All wars	Civil wars	All wars	Civil wars	All wars	Civil wars
Panel A: Average effects						
Success	-0.025	-0.038	-0.036	-0.117	0.159	0.154
	(0.074)	(0.068)	(0.118)	(0.115)	(0.084)	(0.056)
Parm p-val	0.73	0.57	0.76	0.31	0.06*	0.01***
Nonparm p-val	0.27	0.74	0.21	0.75	0.09*	0.04**
Obs	211	211	108	108	108	108
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO
Panel B: Split by war status in year before attempt						
Success × At War	0.172	0.051	0.255	0.009	0.369	0.479
	(0.116)	(0.184)	(0.243)	(0.264)	(0.154)	(0.157)
Success × Not At War	-0.094	-0.041	-0.165	-0.104	-0.027	0.037
	(0.064)	(0.049)	(0.101)	(0.091)	(0.064)	(0.042)
At War-Parm p	0.14	0.78	0.30	0.97	0.02**	0.00***
At War-Nonparm p	0.35	1.00	0.61	1.00	0.09*	0.23
Not At War-Parm p	0.14	0.40	0.11	0.25	0.68	0.38
Not At War –Nonparm p	0.22	0.41	0.16	0.54	0.54	0.03**
Obs	211	211	108	108	108	108
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO

Notes: See notes to Table 6.

Table 8: Alternative specifications

	(1)	(2)	(3)	(4)	(5)
	Absolute change in POLITY2 dummy 1 year out	Directional change in POLITY2 dummy 1 year out		Percentage regular leader transitions 1-20 years out	
	All	All	Autocrats only	All	Autocrats only
Baseline specification	0.110	0.094	0.151	0.110	0.177
(Serious attempts)	(0.045)	(0.048)	(0.055)	(0.055)	(0.085)
Parm p-val	0.02**	0.05*	0.01***	0.05*	0.04**
Nonparm p-val	0.01***	0.00***	0.00***	0.20	0.05**
Obs	220	220	142	136	72
Control group: Bystanders	0.081	0.073	0.130	0.123	0.231
Or target wounded	(0.047)	(0.050)	(0.057)	(0.073)	(0.101)
Parm p-val	0.09*	0.15	0.02**	0.10*	0.03**
Nonparm p-val	0.04**	0.03**	0.01***	0.27	0.02**
Obs	159	159	104	96	49
Control group: Target	0.074	0.053	0.121	0.135	0.227
Wounded	(0.050)	(0.053)	(0.056)	(0.091)	(0.130)
Parm p-val	0.15	0.32	0.04**	0.15	0.09*
Nonparm p-val	0.11	0.16	0.12	0.52	0.08*
Obs	105	105	67	67	37
Control group: Any attempt	0.110	0.082	0.148	0.121	0.170
	(0.045)	(0.048)	(0.056)	(0.048)	(0.075)
Parm p-val	0.02**	0.10*	0.01**	0.01**	0.03**
Nonparm p-val	0.00***	0.00***	0.00***	0.34	0.10*
Obs	260	260	167	171	93
First attempt on leader	0.115	0.070	0.128	0.107	0.159
Serious attempts only	(0.057)	(0.064)	(0.068)	(0.063)	(0.088)
Parm p-val	0.05**	0.27	0.06*	0.10*	0.08*
Nonparm p-val	0.05**	0.02**	0.01**	0.44	0.14
Obs	171	171	102	108	52
Adding all Table 3 controls					
quarter-century FE , and	0.115	0.119	0.207	0.183	0.218
region FE (Serious attempts)	(0.052)	(0.053)	(0.078)	(0.059)	(0.104)
Parm p-val	0.03**	0.03**	0.01***	0.00***	0.04**
Nonparm p-val	0.01**	0.00***	0.00***	0.20	0.05**
Obs	188	188	115	110	55
Natural deaths	0.012	-0.001	0.013	-0.022	-0.000
	(0.018)	(0.021)	(0.024)	(0.020)	(0.037)
Parm p-val	0.49	0.98	0.60	0.28	0.99
Nonparm p-val	0.64	0.82	0.62	0.03**	0.77

Notes: See text. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 9: What predicts attempts?

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Democracy dummy	-0.007*						-0.001
	(0.004)						(0.003)
War dummy		0.026***					0.017***
		(0.006)					(0.005)
Log energy use per			-0.003***				-0.002***
Capita			(0.001)				(0.001)
Log population				0.004***			0.005***
				(0.001)			(0.001)
Age of leader					-0.00019		-0.00029**
					(0.00012)		(0.00015)
Tenure of leader						-0.00007	-0.00005
						(0.00020)	(0.00023)
Observations	11171	11671	9664	10607	12019	12133	9185
P-value of regression	0.07*	0.00***	0.00***	0.00***	0.11	0.73	0.00***

Notes: Results are marginal effects from a probit specification. Robust standard errors in parentheses, adjusted for clustering at the country level. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 10: Impacts of failures on institutional change

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Absolute change in POLITY2 dummy			Directional change in POLITY2 dummy			Percent regular leader transitions 1-20 years out		
	No controls	Adding controls	Adding controls and propensity score stratification	No controls	Adding controls	Adding controls and propensity score stratification	No controls	Adding controls	Adding controls and propensity score stratification
Panel A: Average effects									
Success	0.110	0.112	0.111	0.080	0.076	0.077	0.072	0.110	0.107
	(0.043)	(0.043)	(0.043)	(0.048)	(0.045)	(0.045)	(0.040)	(0.044)	(0.043)
Failure	0.001	0.000	-0.001	-0.023	-0.025	-0.025	-0.058	-0.036	-0.038
	(0.017)	(0.016)	(0.016)	(0.019)	(0.019)	(0.018)	(0.043)	(0.027)	(0.027)
Success p-val	0.01**	0.01***	0.01***	0.10*	0.09*	0.09*	0.08*	0.01**	0.01**
Failure p-val	0.95	0.99	0.97	0.22	0.18	0.17	0.17	0.18	0.16
Obs	10932	10932	10932	10932	10932	10932	5979	5979	5979
Data source	Polity IV	Polity IV	Polity IV	Polity IV	Polity IV	Polity IV	Archigos	Archigos	Archigos
Panel B: Split by regime type in year before attempt									
Success × Autocracy	.	.	.	0.143	0.144	0.144	0.155	0.210	0.208
	.	.	.	(0.058)	(0.057)	(0.057)	(0.059)	(0.056)	(0.055)
Failure × Autocracy	.	.	.	-0.022	-0.016	-0.017	-0.054	-0.041	-0.041
	.	.	.	(0.013)	(0.014)	(0.014)	(0.058)	(0.046)	(0.046)
Success × Democracy	.	.	.	-0.051	-0.048	-0.045	0.023	0.003	-0.002
	.	.	.	(0.066)	(0.063)	(0.063)	(0.034)	(0.044)	(0.043)
Failure × Democracy	.	.	.	-0.044	-0.043	-0.041	-0.025	-0.029	-0.034
	.	.	.	(0.043)	(0.042)	(0.042)	(0.038)	(0.033)	(0.033)
Autoc P-val– Success	.	.	.	0.01**	0.01**	0.01**	0.01***	0.00***	0.00***
Autoc P-val– Failure	.	.	.	0.10*	0.26	0.22	0.36	0.38	0.37
Democ P-val– Success	.	.	.	0.44	0.45	0.47	0.50	0.94	0.97
Democ P-val– Failure	.	.	.	0.31	0.31	0.33	0.51	0.38	0.30
Obs				10932	10932	10932	5573	5573	5573
Data source				Polity IV	Polity IV	Polity IV	Archigos	Archigos	Archigos

Notes: Controls includes lagged values of polity, leader's tenure, war status, population, and energy; quarter-century fixed effects; and region fixed effects.
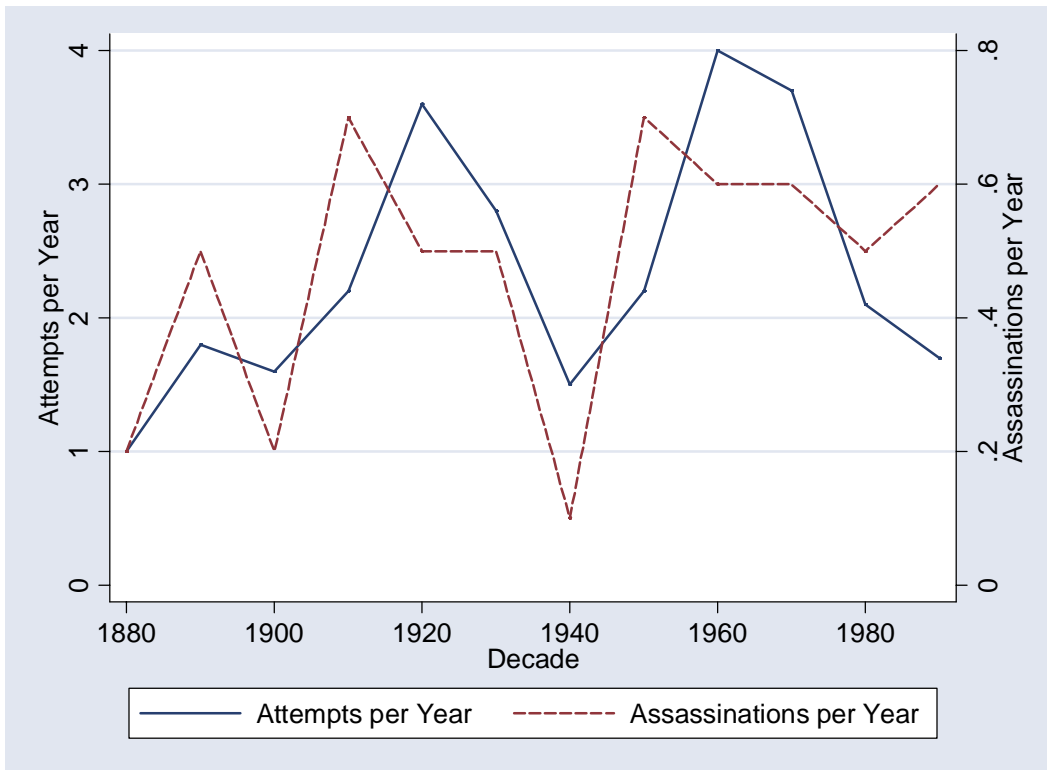* significant at 10%; ** significant at 5%; *** significant at 1%

Table 11: Impacts of failures on conflict

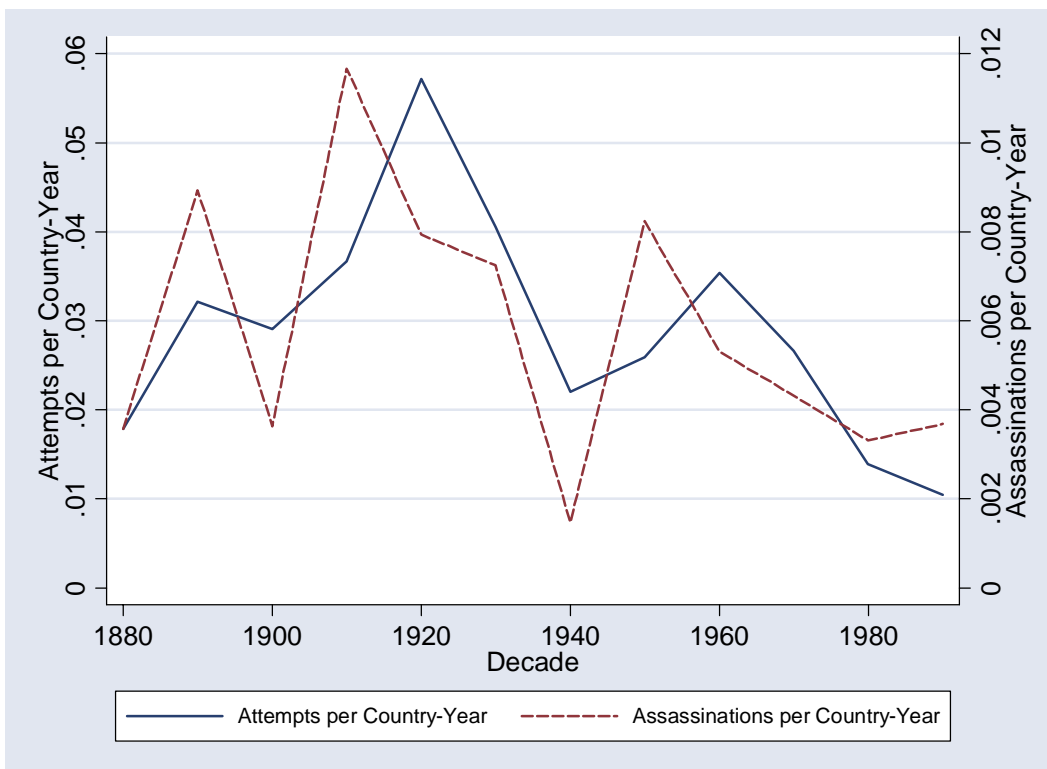|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Gleditsch-COW Dataset 1875-2002 All wars			Gleditsch-COW Dataset 1946-2002 All wars			PRIO/Uppsala Dataset 1946-2002		
	No controls	Adding controls	Adding controls and propensity score stratification	No controls	Adding controls	Adding controls and propensity score stratification	No controls	Adding controls	Adding controls and propensity score stratification
Panel A: Average effects									
Success	-0.067	-0.015	-0.019	0.033	0.032	0.031	0.074	0.076	0.076
	(0.058)	(0.048)	(0.048)	(0.070)	(0.063)	(0.062)	(0.058)	(0.057)	(0.056)
Failure	0.001	0.051	0.049	-0.022	-0.003	-0.002	-0.074	-0.067	-0.066
	(0.035)	(0.035)	(0.035)	(0.048)	(0.045)	(0.045)	(0.038)	(0.040)	(0.040)
Success p-val	0.25	0.76	0.69	0.64	0.61	0.62	0.20	0.18	0.18
Failure p-val	0.98	0.15	0.16	0.65	0.95	0.97	0.05*	0.09*	0.10*
Obs	11286	11286	11286	7183	7183	7183	7183	7183	7183
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO	PRIO
Panel B: Split by regime type in year before attempt									
Success × At war	-0.211	-0.213	-0.220	-0.028	-0.031	-0.023	0.049	0.034	0.036
	(0.120)	(0.119)	(0.118)	(0.191)	(0.194)	(0.190)	(0.121)	(0.122)	(0.121)
Failure × At war	-0.002	-0.007	-0.005	-0.076	-0.081	-0.071	-0.190	-0.203	-0.201
	(0.063)	(0.060)	(0.060)	(0.092)	(0.092)	(0.093)	(0.057)	(0.058)	(0.058)
Success × Not at war	0.063	0.058	0.055	0.070	0.047	0.044	0.101	0.098	0.096
	(0.050)	(0.048)	(0.049)	(0.064)	(0.063)	(0.063)	(0.056)	(0.056)	(0.056)
Failure × Not at war	0.094	0.074	0.070	0.048	0.022	0.021	0.075	0.066	0.065
	(0.039)	(0.038)	(0.038)	(0.041)	(0.042)	(0.042)	(0.038)	(0.038)	(0.038)
At war P-val– Success	0.08*	0.07*	0.06*	0.88	0.87	0.90	0.69	0.78	0.77
At war P-val– Failure	0.97	0.90	0.93	0.41	0.38	0.45	0.00***	0.00***	0.00***
No war P-val– Success	0.21	0.23	0.26	0.28	0.46	0.49	0.07*	0.08*	0.09*
No war P-val– Failure	0.02**	0.05*	0.06*	0.24	0.59	0.62	0.05**	0.09*	0.09*
Obs	11286	11286	11286	7183	7183	7183	7183	7183	7183
Data source	Gleditsch	Gleditsch	Gleditsch	Gleditsch	Gleditsch	Gleditsch	PRIO	PRIO	PRIO

Notes: Controls includes lagged values of polity, leader's tenure, war status, population, and energy; quarter-century fixed effects; and region fixed effects.
* significant at 10%; ** significant at 5%; *** significant at 1%

Figure 1: Trends in the Frequency of Assassinations and Assassination Attempts

Panel A: Annual Attempts and Assassinations Worldwide

Panel B: Annual Attempts and Assassinations per Country

Colonialism and Modern Income

James Feyerer and Bruce Sacerdote

Colonialism and Modern Income: Islands as Natural Experiments

Table I
Summary Statistics

These are summary statistics for the variables in the islands database. See the text for details on variable sources and construction. Islands still without an elected legislature are coded as getting a legislature in 2004.

Variable	Obs	Mean	Std. Dev.	Min	Max
Island's GDP per Capita 2000	80	7,953.38	8,909.50	264.00	53,735.00
Log (GDP Capita)	80	8.42	1.12	5.57	10.89
Infant Mortality 2002	80	18.68	15.21	4.00	79.00
Number of Centuries as a Colony	80	2.18	1.54	0.00	5.11
Northerly Vector of Prevailing Wind	80	0.18	1.28	-1.55	4.20
Easterly Vector of Prevailing Wind	80	-4.20	2.02	-6.88	4.42
No Historical (1500-1820) Off Island Trade Except Fish or Coconuts (0-1)	80	0.48	0.50	0.00	1.00
Agriculture Used Imported Slaves	80	0.40	0.49	0.00	1.00
Year of First Elected Legislature	80	1939	69	1639	2004
Had Legislature by 1800	80	0.08	0.27	0.00	1.00
Had Legislature by 1900	80	0.14	0.35	0.00	1.00
Percent Current Pop Native	77	49.07	45.06	0.00	100.00
Percent Current Pop White	77	7.86	16.06	0.00	95.88
Percent Current Pop Black	77	23.65	36.98	0.00	95.00
Percent Current Pop Mixed	77	12.60	24.05	0.00	93.20
Number of Centuries British	80	0.86	1.23	0.00	3.95
Number of Centuries French	80	0.40	0.82	0.00	3.69
Number of Centuries Spanish	80	0.38	0.95	0.00	4.05
Ever British	80	0.68	0.47	0.00	1.00
Ever French	80	0.31	0.47	0.00	1.00
Ever Spanish	80	0.25	0.44	0.00	1.00
Absolute Value of Latitude	80	15.66	7.71	0.50	51.92
Island Area (1000s sq km)	80	5.92	20.5	0.003	110.0
Island Population	70	302,720	1,394,832	102	11,000,000
Island is in Pacific	80	0.49	0.50	0.00	1.00
Island is in Atlantic	80	0.44	0.50	0.00	1.00
Island is in Indian	80	0.07	0.27	0.00	1.00

Table II
Outcomes Regressed on Years of Colonization

We regress Log GDP per capita and infant mortality on the number of years the island spent as a colony of a European power. Columns (1), (2), (4), (6) and (7) are OLS. Columns (3), (5) and (8) are two stage least squares where we instrument for centuries of colonial rule or the first year as a colony using the 12 month average and standard deviation of the east-west wind speed for each island.

	(1) Log GDP Capita	(2) Log GDP Capita	(3) Log GDP Capita - IV	(4) Log GDP Capita	(5) Log GDP Capita- IV	(6) Infant Mortality Per 1000	(7) Infant Mortality Per 1000	(8) Infant Mortality Per 1000 - IV
Number of Centuries a Colony	0.413	0.450	0.441			-2.801	-2.611	-10.244
	(0.065)**	(0.083)**	(0.157)**			(1.156)*	(1.259)*	(4.344)*
First Year a Colony				-0.396	-0.545			
				(0.101)**	(0.232)*			
Final Year A Colony				0.014	0.007			
				(0.014)	(0.017)			
Remained A Colony in 2000				0.800	0.732			
				(0.149)**	(0.206)**			
Abs(Latitude)		0.048	0.048	0.039	0.042		-0.763	-0.771
		(0.011)**	(0.011)**	(0.011)**	(0.013)**		(0.211)**	(0.221)**
Area in millions of sq km		-21.046	-20.984	-20.429	-23.791		263.524	321.185
		(3.937)**	(3.961)**	(4.707)**	(6.169)**		(149.986)+	(143.722)*
Island is in Pacific		0.779	0.767	0.747	0.944		-7.427	-18.724
		(0.457)+	(0.522)	(0.470)	(0.569)		(9.498)	(13.608)
Island is in Atlantic		0.615	0.622	0.427	0.298		-7.349	-1.117
		(0.400)	(0.410)	(0.367)	(0.403)		(8.581)	(8.555)
Constant	7.524	6.172	6.192	13.673	16.356	24.771	41.579	60.751
	(0.166)**	(0.526)**	(0.659)**	(1.942)**	(4.173)**	(3.677)**	(10.898)**	(18.551)**
Observations	80	80	80	80	80	80	80	80
R-squared	0.320	0.578	0.578	0.642	0.630	0.080	0.353	0.082

Robust standard errors in parentheses. We cluster at the island group level since several of the islands (e.g. the Cook Islands and the Federated States of Micronesia) are used as separate observations from a cluster of politically related yet geographically distinct islands.

+ significant at 10%; * significant at 5%; ** significant at 1%

Table III
Comparison of different Samples

Column (1) is the base sample used in the rest of the paper. Column (2) uses only GDP figures obtained from the UN, but includes disaggregation of islands that are part of a group. Column (3) uses only the raw UN GDP data. Columns (4) and (5) limit the sample to the Pacific and Atlantic Oceans. Columns (6) and (7) are two stage least squares for each ocean where we instrument for centuries of colonial rule using the 12 month average and standard deviation of the east-west wind vector for each island.

	(1) Log GDP per Capita	(2) Log GDP per Capita	(3) Log GDP per Capita	(4) Log GDP per Capita	(5) Log GDP per Capita	(6) Log GDP per Capita	(7) Log GDP per Capita
Sample	Base	UN data - disaggregated groups	UN data	Pacific	Atlantic	Pacific - IV	Atlantic-IV
Number of centuries a colony	0.450	0.557	0.426	0.522	0.293	0.470	0.600
	(0.083)**	(0.112)**	(0.110)**	(0.084)**	(0.146)+	(0.192)*	(0.235)*
Abs(Latitude)	0.048	0.058	0.064	0.063	0.040	0.064	0.045
	(0.011)**	(0.013)**	(0.017)**	(0.015)**	(0.017)*	(0.015)**	(0.015)**
Area in millions of sq km	-21.046	-21.621	-22.265	-20.698	-21.685	-19.806	-22.192
	(3.937)**	(3.902)**	(3.802)**	(1.802)**	(6.647)**	(4.016)**	(6.292)**
Island is in Pacific	0.779	0.995	1.090				
	(0.457)+	(0.690)	(0.576)+				
Island is in Atlantic	0.615	0.499	0.415				
	(0.400)	(0.581)	(0.527)				
Constant	6.172	5.701	5.708	6.670	7.465	6.710	6.337
	(0.526)**	(0.755)**	(0.630)**	(0.284)**	(0.501)**	(0.300)**	(0.924)**
Observations	80	61	61	39	35	39	35
R-squared	0.578	0.625	0.538	0.553	0.431	0.549	0.332

Robust standard errors in parentheses. Standard errors are clustered at the island group level.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table IV
Possible Mechanisms for GDP – Colonialism Relationship

	(1) Log GDP Per Capita	(2) Log GDP Per Capita	(3) Log GDP Per Capita	(4) Log GDP Per Capita
Number Of Centuries A Colony	0.393	0.387	0.378	0.313
	(0.100)**	(0.104)**	(0.103)**	(0.091)**
No Complex Trade Goods During Colonial Period	-0.435		-0.464	-0.497
	(0.279)		(0.282)	(0.291)+
Mining During Colonial Period		0.492		
		(0.323)		
Organized Agriculture During Colonial Period		0.298		
		(0.295)		
Livestock During Colonial Period		0.094		
		(0.398)		
Agriculture Used Imported Slaves	0.115		0.218	
	(0.369)		(0.388)	
Year Of First Elected Legislature	0.000			0.000
	(0.001)			(0.001)
Had Elected Legislature By 1800			0.288	
			(0.462)	
Had Elected Legislature By 1900			-0.470	
			(0.399)	
Percent White				0.016
				(0.008)*
Percent Black				0.008
				(0.007)
Percent Mixed				0.018
				(0.005)**
Abs(Latitude)	0.044	0.047	0.045	0.042
	(0.011)**	(0.014)**	(0.011)**	(0.013)**
Area in millions of sq km	-22.389	-23.420	-22.125	-25.058
	(3.985)**	(4.658)**	(3.154)**	(3.755)**
Island is in Pacific	0.921	0.792	0.820	1.286
	(0.430)*	(0.470)+	(0.455)+	(0.412)**
Island is in Atlantic	0.578	0.635	0.425	0.306
	(0.404)	(0.384)	(0.410)	(0.400)
Constant	5.549	6.145	6.621	5.696
	(2.351)*	(0.517)**	(0.583)**	(2.214)*
Observations	80	80	80	77
R-Squared	0.600	0.598	0.608	0.686

Robust standard errors in parentheses. Standard errors are clustered at the island group level.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table V
The Effect of Colonialism by Colonizing Countries

	(1) Log GDP per Capita	(2) Log GDP per Capita
Centuries US	1.498	
	(0.346)**	
Centuries Dutch	0.516	
	(0.083)**	
Centuries British	0.411	
	(0.112)**	
Centuries French	0.410	
	(0.124)**	
Centuries Spanish	0.274	
	(0.089)**	
Centuries Portuguese	-0.894	
	(0.157)**	
Centuries German	0.734	
	(1.036)	
Centuries Japanese	-1.097	
	(0.743)	
Centuries British Legal		0.319
		(0.145)*
Centuries French Legal		0.391
		(0.108)**
Centuries German Legal		0.276
		(0.544)
Abs(Latitude)	0.048	0.048
	(0.014)**	(0.014)**
Area in millions of sq km	-18.410	-21.985
	(4.957)**	(3.983)**
Island is in Pacific	0.672	0.695
	(0.543)	(0.515)
Island is in Atlantic	0.643	0.797
	(0.473)	(0.458)+
Constant	6.264	6.369
	(0.609)**	(0.586)**
Observations	80	80
R-squared	0.629	0.544

Robust standard errors in parentheses. Standard errors are clustered at the island group level.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table VI
The Timing of Colonialism

	(1) Log GDP per Capita	(2) Log GDP per Capita	(3) Log GDP per Capita
Centuries a Colony before 1700	0.110	-0.001	-0.032
	(0.169)	(0.201)	(0.207)
Centuries a Colony after 1700	0.640		
	(0.112)**		
Centuries a Colony 1700-1900		0.930	0.854
		(0.221)**	(0.198)**
Centuries a Colony after 1900		0.208	-0.454
		(0.317)	(0.452)
Remained a Colony in 2000			0.839
			(0.251)**
Abs(Latitude)	0.049	0.047	0.030
	(0.012)**	(0.011)**	(0.013)*
Area in millions of sq km	-19.691	-22.493	-20.067
	(4.886)**	(5.086)**	(4.692)**
Island is in Pacific	0.946	1.086	0.915
	(0.436)*	(0.422)*	(0.382)*
Island is in Atlantic	0.622	0.580	0.493
	(0.363)+	(0.351)	(0.317)
Constant	5.842	5.881	6.456
	(0.528)**	(0.500)**	(0.529)**
Observations	80	80	80
R-squared	0.605	0.623	0.670

Robust standard errors in parentheses. Standard errors are clustered at the island group level.
+ significant at 10%; * significant at 5%; ** significant at 1%

Table VII
GDP and Colonialism within Non-island Developing Countries

We started with the Acemoglu-Robinson-Johnson [2001] database and added our own measure of length of colonial period. We dropped the three island countries that were in AJR and our islands database.

	(1) Log GDP Per Capita	(2) Log GDP Per Capita	(3) Log GDP Per Capita	(4) Log GDP Per Capita
Number of Centuries a Colony	0.401	0.358	0.287	0.232
	[0.097]**	[0.090]**	[0.072]**	[0.084]**
Abs(Latitude)		2.952	1.406	1.825
		[0.883]**	[0.746]+	[0.822]*
Mean Temperature		-0.023	-0.013	0.005
		[0.023]	[0.019]	[0.021]
Expropriation Risk			0.404	
			[0.067]**	
Log Settler Mortality (AJR)				-0.403
				[0.093]**
Constant	7.276	7.344	4.873	9.034
	[0.215]**	[0.686]**	[0.682]**	[0.728]**
Observations	64	64	64	60
R-squared	0.22	0.40	0.63	0.56

Robust standard errors in parentheses. + significant at 10%; * significant at 5%; ** significant at 1%

Appendix I
IV First Stage Regression and Reduced Form Regression

Columns (1) and (2) are OLS. Column (1) is the first stage regression using our preferred set of instruments. We regress the islands' number of centuries as a colony on the northerly and easterly vectors of the island's prevailing wind. Column (2) is a reduced form in which we show the direct effect of wind on modern day GDP.

	(1) Number Of Centuries A Colony	(3) Log GDP Per Capita
East-West Vector Of Wind	-0.265	-0.139
	(0.081)**	(0.066)*
Monthly StDev of East-West Vector	0.885	0.260
	(0.302)**	(0.255)
Area in millions of sq km	10.983	-16.278
	(4.417)*	(4.810)**
Abs(Latitude)	0.020	0.060
	(0.016)	(0.014)**
Island is in Pacific	-1.684	-0.059
	(0.387)**	(0.514)
Island is in Atlantic	0.760	0.768
	(0.379)*	(0.544)
Constant	-0.013	6.342
	(0.964)	(0.892)**
Observations	80	80
R-Squared	0.624	0.440
F Statistic for Instruments	5.96	
Prob > F =	.005	

Robust standard errors in parentheses. Standard errors are clustered at the island group level.
+ significant at 10%; * significant at 5%; ** significant at 1%

Appendix II
IV Results Using Alternative Sets of Wind Based Instruments

In addition to specifying the prevailing wind as two vectors per island, we also tried several other measures of wind speed and direction and used these to instrument for an islands' years of colonization. Below are the second stage results and F-statistics for three different types of wind related instruments. Column (1) takes eight compass headings and measures the knots of prevailing wind along each heading and each month. The instrument is the sum of knots*months that the prevailing wind blew on that heading. We use knot*months along headings 2,4,6,8 as the set of instruments. In column (2) we use simply the knot*months of wind of blowing towards the South West. Wind on this compass heading is the single strongest predictor of an island being discovered and colonized early. In column (3) we perform a similar exercise but limit ourselves to four compass headings and measure the wind as negative if it blew away from a compass heading instead of towards it. In other words, we have only 4 headings but the wind speed can be positive or negative. We use all four points as instruments.

	(1) Log GDP Capita (2SLS)	(2) Log GDP Capita (2SLS)	(3) Log GDP Capita (2SLS)
Number Centuries a Colony	1.038	0.827	0.703
	(0.309)**	(0.499)	(0.302)*
Area in 1000s Sq Miles	-25.488	-23.900	-22.959
	(4.886)**	(5.220)**	(4.153)**
Abs(Latitude)	0.048	0.048	0.048
	(0.013)**	(0.011)**	(0.011)**
Island is in Pacific	1.649	1.338	1.154
	(0.715)*	(0.876)	(0.650)+
Island is in Atlantic	0.135	0.307	0.408
	(0.532)	(0.612)	(0.467)
Constant	4.695	5.223	5.536
	(0.998)**	(1.375)**	(0.918)**
Observations	80	80	80
R-squared	0.282	0.456	0.523
F Statistic for Instruments in First Stage	4.48	2.52	1.81
Prob > F =	0.0032	0.118	0.139

Robust standard errors in parentheses
+ significant at 10%; * significant at 5%; ** significant at 1%

Appendix III
List of Islands in Our Dataset

Island	Group/Country	Other Country	Year First Sighted	Number of Years Colonized	GDP per Capita
Aitutaki	Cook Islands		1789	13	2,814
Andros, North	Bahamas		1492	479	14,296
Anguilla	Anguilla		1493	354	9,617
Antigua	Antigua and Barbuda		1493	349	7,653
Ascension	Ascension	United Kingdom	1501	82	24,514
Atiu	Cook Islands		1777	13	1,930
Barbados	Barbados		1510	384	9,739
Bermuda	Bermuda		1503	395	53,735
Bonaire	Netherlands Antilles	Netherlands	1499	478	15,931
Cuba	Cuba		1492	389	2,535
Curacao	Netherlands Antilles	Netherlands	1499	492	15,931
Dominica	Dominica		1493	246	3,484
East Falkland	East Falkland	United Kingdom	1592	231	24,514
Efate	Vanuatu		1606	186	1,164
Fefan	Federated States of Micronesia		1687	101	1,335
Funafuti	Tuvalu		1819	62	1,204
Futuna	Futuna	France	1616	117	21,776
Grand Cayman	Grand Cayman		1503	369	34,173
Grande Comore	Comoros		1505	88	264
Grande Terre	Guadeloupe		1493	376	7,900
Grenada	Grenada		1498	344	3,440
Guam	Guam	United States	1521	443	34,364
Hispaniola DOM	Dominican Republic		1492	313	3,029
Hispaniola HTI	Haiti		1492	331	485
Huvadu	Huvadu		1558	335	2,151
Jamaica	Jamaica		1494	168	3,056
Kadavu	Fiji		1789	95	2,031
Kosrae	Federated States of Micronesia		1688	101	2,751
Lifou	Loyalty Islands	New Caldonia	1774	231	12,455
Luzon	Philippines		1521	297	1,002
Mahe	Seychelles		1502	220	7,764
Majuro	Marshall Islands		1526	100	1,896
Malaita	Solomon Islands		1568	86	791
Mangaia	Cook Islands		1777	13	2,171
Mangareva	Gambier Is	French Polynesia	1687	124	13,955
Manihiki	Cook Islands		1822	13	2,895
Martinique	Martinique	France	1502	226	21,776
Mauke	Cook Islands		1823	13	2,493
Mauritius	Mauritius		1507	359	3,839
Mayotte	Mayotte	France	1529	161	21,776

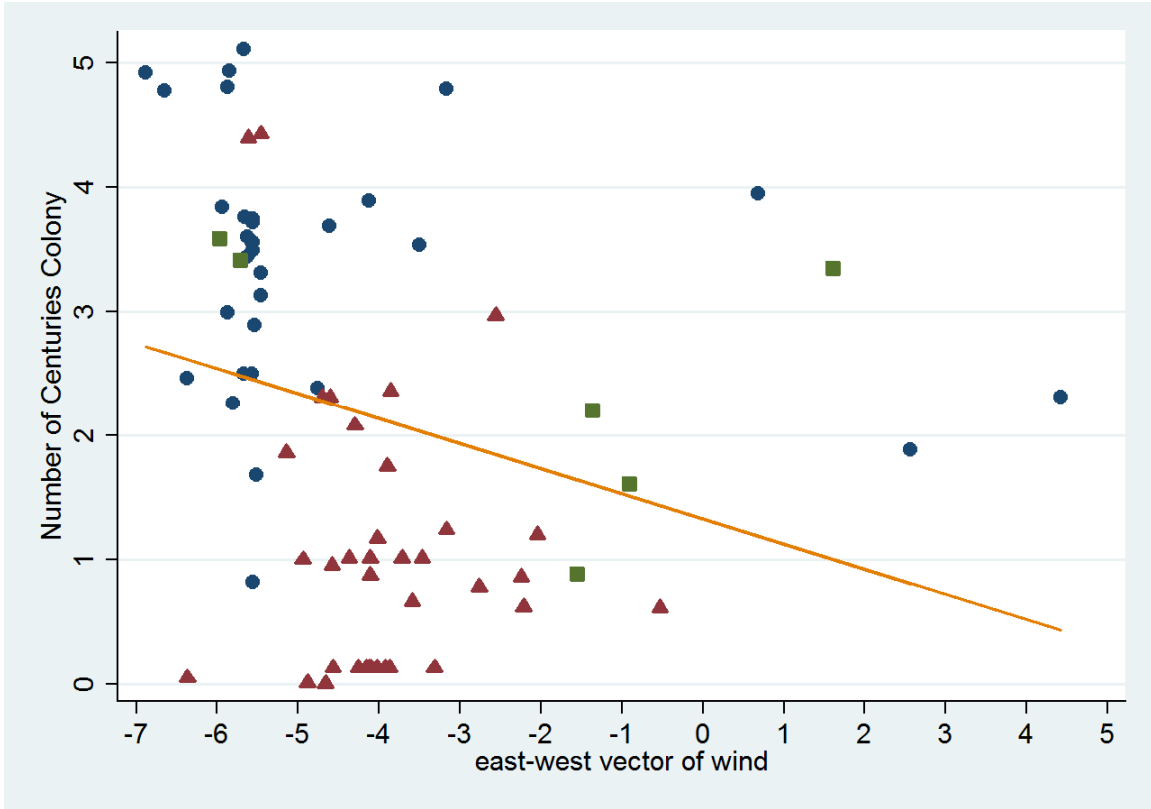| Island	Group	Other Country	Year First Sighted	Number of Years Colonized	GDP per Capita
Mitiaro	Cook Islands		1823	13	2,734
Moen	Federated States of Micronesia		1528	87	1,335
Montserrat	Montserrat		1493	372	8,919
Nauru	Nauru		1798	78	2,702
New Britain	Bismarck Archipelago	Papua New Guinea	1616	61	729
New Caledonia	New Caledonia		1774	231	12,455
Niue	Niue		1774	1	3,600
North Caicos	Turks and Caicos Islands	United Kingdom	1512	238	24,514
Oreor	Palau		1710	120	6,076
Palmerston	Cook Islands		1774	13	2,493
Penrhyn	Cook Islands		1788	13	989
Pohnpei	Federated States of Micronesia		1689	101	2,711
Puerto Rico	Puerto Rico		1493	511	18,047
Pukapuka	Cook Islands		1595	13	724
Rakahanga	Cook Islands		1606	13	1,528
Rarotonga	Cook Islands		1789	13	6,433
Reunion	Reunion		1513	341	6,200
Rurutu	Austral Islands	French Polynesia	1769	236	13,955
Saba	Netherlands Antilles	Netherlands	1493	372	15,931
Saipan	Northern Mariana Islands	United States	1521	440	12,500
Sint Maarten	Netherlands Antilles	France	1493	356	16,000
St Croix	US Virgin Islands	United States	1493	250	11,868
St Eustatius	Netherlands Antilles	Netherlands	1493	375	15,931
St Helena	St Helena	United Kingdom	1502	494	24,514
St John	US Virgin Islands	United States	1493	250	18,012
St Kitts	St. Kitts and Nevis		1493	360	8,132
St Lucia	St Lucia		1500	481	4,424
St Martin	Netherlands Antilles	Netherlands	1493	356	21,776
St Thomas	US Virgin Islands	United States	1493	250	14,061
St Vincent	St Vincent and the Grenadines		1498	299	2,891
Tahiti	Society Islands	French Polynesia	1767	208	13,955
Tahuata	Marquesas	French Polynesia	1595	5	13,955
Tarawa	Kiribati - Line Islands		1788	66	538
Tol	Federated States of Micronesia		1528	101	1,335
Tongatapu	Tonga		1643	0	1,430
Tortola	British Virgin Islands	United Kingdom	1493	356	33,671
Trinidad	Trinidad and Tobago		1498	289	6,347
Tristan da Cunha	Tristan da Cunha & Gouh	United Kingdom	1506	188	24,514
Tutuila	American Samoa	United States	1787	175	34,364
Yap	Federated States of Micronesia		1686	101	2,751

Appendix IV
GDP by Sector

This is for a subsample of islands in the database. Source is CIA World Factbook 2002, which in turn uses both UN Data and national government statistics from the relevant countries.

island	ocean	GDP	Agriculture	Industry	Services
Bermuda	Atlantic	36 B	1%	10%	89%
Grand Cayman	Atlantic	1.27 B.	1%	3%	95%
Jamaica	Atlantic	10.21 B.	6%	24%	70%
Anguilla	Atlantic	104 Mill	4%	18%	78%
New Britain	Pacific	11.4 B.	32%	36%	32%
Majuro	Pacific	115 Mill	14%	16%	70%
Mauritius	Indian	13.85 B.	6%	33%	61%
US Virgin Islands	Atlantic	2.4 B.	1%	19%	80%
Tongatapu	Pacific	236 Mill	26%	12%	62%
Pohnpei	Pacific	277 Mill	50%	4%	46%
Montserrat	Atlantic	29 Mill	5%	14%	81%
New Caledonia	Pacific	3.158 B.	5%	30%	65%
Guam	Pacific	3.2 B.	7%	15%	78%
Cuba	Atlantic	31.59 B.	8%	35%	58%
British Virgin Islands	Atlantic	320 Mill	2%	6%	92%
St Vincent	Atlantic	339 Mill	10%	26%	64%
Dominica	Atlantic	380 Mill	18%	24%	58%
Barbados	Atlantic	4.496 B.	6%	16%	78%
Grenada	Atlantic	440 Mill	8%	24%	68%
Kadavu	Pacific	5.007 B.	17%	22%	61%
Martinique	Atlantic	6.117 B.	6%	11%	83%
Puerto Rico	Atlantic	65.28 B.	1%	42%	57%
Antigua	Atlantic	750 Mill	4%	19%	77%
Tarawa	Pacific	79 Mill	30%	7%	63%
Malaita	Pacific	800 Mill	42%	11%	47%
St Lucia	Atlantic	866 Mill	7%	20%	73%
Reunion	Indian	9.387 B.	8%	19%	73%

Figure 1
GDP Per Capita versus Years of Colonialism

Circles represent islands in the Atlantic, triangles are islands in the Pacific and squares are islands in the Indian Ocean.

Figure 2
Years of Colonialism Versus Easterly Vector of Wind

Circles represent islands in the Atlantic, triangles are islands in the Pacific and squares are islands in the Indian Ocean.

Colonialism and Modern Income

James Feyerer and Bruce Sacerdote

Colonialism and Modern Income: Islands as
   Natural Experiments

Colonial Rule

Lakshmi Iyer

The Long-Term Impact of Colonial Rule: Evidence from India

TABLE 1
GROWTH OF THE BRITISH EMPIRE IN INDIA

Period	Number of districts annexed due to				
	Conquest	Ceded or granted	Misrule	Lapse	Total
1757-1790	60	19	0	0	79
1791-1805	46	37	1	0	84
1806-1818	29	0	0	0	29
1819-1835	20	0	1	0	21
1836-1847	19	0	1	1	21
1848-1856	2	4	12	16	34
1857-1947	0	1	0	0	1
Total	176	61	15	17	269

Notes:

Number of districts refers to 1991 districts. The total number of districts is 415, of which 269 were classified as belonging to British India.

The states of Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura are excluded from the study.

Number of districts in subsequent regressions will be less than 415, due to missing data and because some districts were split into two or more new districts over time, and some datasets use older un-split districts.

TABLE 2
DIFFERENCES IN GEOGRAPHY AND DEMOGRAPHICS

Variable	# districts	# native states	Mean		Difference
			British empire	Native states	(s.e.)
Geography					
Latitude (degrees North)	407	98	23.29	22.79	0.509
					(1.813)
Altitude (metres above sea level)	359	92	392.63	413.27	-20.64
					(58.73)
Mean annual rainfall (mm)	414	98	1503.41	1079.16	424.35***
					(151.08)
Coastal district (dummy)	415	98	0.1264	0.0822	0.0442
					(0.0597)
Proportion sandy	378	96	0.0079	0.0117	-0.0038
					(0.0074)
Proportion barren/rocky	378	96	0.0050	0.0121	-0.0070**
					(0.0028)
Top two soil types					
Black soil (dummy)	362	93	0.1568	0.2937	-0.1369
					(0.1075)
Alluvial soil (dummy)	362	93	0.5254	0.4921	0.0334
					(0.1301)
Red soil (dummy)	362	93	0.2203	0.0952	0.1251
					(0.0776)
Demographic variables					
Log (population)	323	93	14.42	13.83	0.591***
					(0.155)
Population density (persons/sq.km)	322	93	279.47	169.20	110.27**
					(41.66)
Proportion rural	323	93	0.8210	0.8182	0.0028
					(0.0154)
Proportion of working population in farming	323	93	0.6961	0.7072	-0.0111
					(0.0239)
Proportion Scheduled Caste	323	93	0.1567	0.1512	0.0055
					(0.0148)
Proportion Scheduled Tribe	323	93	0.0859	0.0973	-0.0114
					(0.0271)
Proportion literate	323	93	0.3234	0.2867	0.0367
					(0.0283)

Robust standard errors in parentheses, corrected for clustering within native states.
* significant at 10%; ** significant at 5%; *** significant at 1%
Data is at 1991 district level for geographic variables, and 1961 district level for demographic variables.
Demographic data is computed as the mean from the censuses of 1961,1971,1981,1991. Population density
figures exclude 1991 data.
Data sources listed in Appendix Table 2.

TABLE 3
DIFFERENCES IN AGRICULTURAL INVESTMENTS AND PRODUCTIVITY: OLS ESTIMATES

	Coefficient on									
	British dummy		British dummy interacted with date of annexation		British dummy interacted with mode of annexation				Years of direct British rule (*1/100)
	(1) no controls	(2) Geography controls	(3) Annexed before 1818	Annexed after 1818	(4) Conquest	Ceded	Misrule	Lapse	(5)
Dependent variables (1956-87 mean)									
Proportion of area irrigated	0.111***	0.099***	0.104**	0.085**	0.069	0.152***	0.113**	0.062	0.079***
	(0.039)	(0.037)	(0.041)	(0.042)	(0.051)	(0.043)	(0.047)	(0.046)	(0.024)
Fertilizer usage (kg/hectare)	8.428**	7.014**	6.879**	7.379	4.943	10.542***	13.731**	-1.485	5.563***
	(3.541)	(3.073)	(3.315)	(4.465)	(4.308)	(2.803)	(5.741)	(2.717)	(1.910)
Proportion of cereal area sown with high-yielding varieties	0.074**	0.066**	0.061*	0.078**	0.046	0.103***	0.073**	0.041*	0.053***
	(0.034)	(0.028)	(0.032)	(0.031)	(0.039)	(0.033)	(0.035)	(0.022)	(0.019)
Log total yield (15 major crops)	0.381***	0.213***	0.245***	0.128	0.210**	0.236**	0.282***	0.076	0.194***
	(0.121)	(0.080)	(0.087)	(0.110)	(0.103)	(0.112)	(0.077)	(0.092)	(0.051)
Log rice yield	0.135	0.151*	0.174**	0.090	0.220**	0.106	0.128*	-0.023	0.135**
	(0.112)	(0.083)	(0.085)	(0.107)	(0.106)	(0.096)	(0.077)	(0.090)	(0.056)
Log wheat yield	-0.002	-0.064	-0.046	-0.109	-0.017	-0.076	-0.133*	-0.185	-0.006
	(0.170)	(0.088)	(0.089)	(0.119)	(0.091)	(0.104)	(0.072)	(0.204)	(0.057)
Controls									
Latitude, rainfall, coast	no	yes	yes		yes				yes
Proportion sandy/barren	no	yes	yes		yes				yes
Soil type dummies	no	yes	yes		yes				yes
# districts	271	271	271		271				271
# native states	83	83	83		83				83

Robust standard errors in parentheses, corrected for clustering within native states. * significant at 10%; ** significant at 5%; *** significant at 1%

Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable, which is a dummy for direct British rule in (1) and (2), the dummy interacted with other variables in (3) and (4) and number of years of direct British rule in (5).

Data is missing for the states of Kerala, Assam, Jammu & Kashmir and Himachal Pradesh. All data are at 1961 district level.

TABLE 4
DIFFERENCES IN PUBLIC GOODS LEVELS : OLS ESTIMATES

	British dummy			Coefficient on British dummy interacted with date of annexation (4)		British dummy interacted with mode of annexation (5)				Years of direct British rule (*1/100) (6)
	(1) no controls	(2) Geography controls	(3) Geography + soil controls	Annexed before 1818	Annexed after 1818	Conquest	Ceded	Misrule	Lapse	
Dependent variables: Proportion of villages having public goods (mean of 1981 and 1991 data)										
Primary school	-0.035	-0.016	-0.007	-0.032	0.029	0.035	-0.121***	-0.062**	-0.007	-0.027
	(0.039)	(0.032)	(0.032)	(0.038)	(0.036)	(0.037)	(0.042)	(0.028)	(0.029)	(0.022)
Middle school	-0.035	-0.046	-0.033	-0.049	-0.037	-0.008	-0.106***	-0.077***	-0.085***	-0.050**
	(0.046)	(0.034)	(0.035)	(0.039)	(0.039)	(0.043)	(0.038)	(0.027)	(0.031)	(0.023)
High school	-0.045	-0.068*	-0.059	-0.074*	-0.050	-0.041	-0.112**	-0.096***	-0.081**	-0.061**
	(0.049)	(0.040)	(0.038)	(0.044)	(0.040)	(0.045)	(0.043)	(0.034)	(0.037)	(0.026)
Primary health center	-0.010	-0.024*	-0.019	-0.025	-0.020	-0.018	-0.036**	-0.023*	-0.029**	-0.022**
	(0.017)	(0.014)	(0.013)	(0.016)	(0.014)	(0.016)	(0.017)	(0.013)	(0.012)	(0.010)
Primary health subcenter	0.006	-0.002	0.005	0.004	-0.015	0.017	-0.033*	0.005	-0.037**	-0.002
	(0.017)	(0.017)	(0.017)	(0.020)	(0.015)	(0.021)	(0.018)	(0.013)	(0.015)	(0.012)
Canals	-0.028	-0.010	-0.011	-0.006	-0.021	-0.001	-0.021	-0.029**	-0.022*	-0.005
	(0.021)	(0.014)	(0.014)	(0.020)	(0.015)	(0.016)	(0.014)	(0.013)	(0.013)	(0.010)
Roads	0.028	0.043	0.077	0.032	0.075	0.066	0.033	0.097*	-0.113**	-0.007
	(0.072)	(0.065)	(0.064)	(0.079)	(0.087)	(0.095)	(0.051)	(0.055)	(0.044)	(0.053)
Combined public goods	-0.017	-0.017	-0.006	-0.021	-0.005	0.008	-0.057**	-0.026	-0.055***	-0.024
	(0.029)	(0.025)	(0.025)	(0.029)	(0.028)	(0.033)	(0.023)	(0.018)	(0.018)	(0.017)
Controls										
Latitude, rainfall, coast	no	yes	yes	yes		yes				yes
Proportion sandy/barren	no	yes	yes	yes		yes				yes
Soil type dummies	no	no	yes	no		no				no
# districts	404	377	340	377		377				377
# native states	97	96	92	96		96				96

Robust standard errors in parentheses, corrected for clustering within native states. * significant at 10%; ** significant at 5%; *** significant at 1%

Each cell represents the coefficient from an OLS regression of the dependent variable on the independent variable, which is a dummy for British rule in (1)-(3), the dummy interacted with other variables in (4)-(5) and number of years of direct British rule in (6).

Data is missing for middle schools in Gujarat, high schools in Madhya Pradesh and primary health subcenters in Karnataka.

Data is missing for Assam in 1981 and Jammu & Kashmir in 1991.

TABLE 5
DEATHS OF INDIAN RULERS WITHOUT NATURAL HEIRS

Period	Governor-General (s)	Ruler died without an heir		Annexed due to lapse		Annexed due to other reasons	
		#native states	#districts	#native states	#districts	#native states	#districts
1819-1827	Hastings, Amherst	5	14	0	0	3	17
1828-1835	Bentinck, Metcalfe	6	9	0	0	2	4
1836-1847	Auckland, Ellenborough, Hardinge	15	31	1	1	4	19
1848-1856	**Dalhousie**	**8**	**20**	**4**	**16**	**3**	**18**
1857-1863	Canning, Elgin	6	10	0	0	1	1
1864-1875	Lawrence, Mayo, Northbrook	7	20	0	0	0	0
1876-1884	Lytton, Ripon	3	5	0	0	0	0

TABLE 6
FIRST STAGE OF IV STRATEGY

Dependent variable: British dummy

	Post-1847 sample				
	no controls (1)	geography (2)	soils (3)	main effects (4)	Exclude Punjab, Berar, Oudh (5)
Ruler died without natural heir in 1848-1856 (Instrument)	0.682*** (0.159)	0.673*** (0.155)	0.669*** (0.162)	0.953*** (0.176)	0.771*** (0.140)
Main effects					
Ruler died without heir				-0.231* (0.126)	0.027 (0.021)
Ruler died in 1848-56				-0.161 (0.101)	0.013 (0.023)
Geography controls					
Latitude		0.012 (0.011)	0.016 (0.011)	0.015 (0.012)	-0.002 (0.002)
Mean annual rainfall		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
Coastal dummy		-0.120 (0.082)	-0.096 (0.100)	-0.067 (0.089)	-0.016 (0.024)
Proportion sandy		-0.289 (0.242)	-0.119 (0.241)	-0.085 (0.113)	-0.033 (0.061)
Proportion barren/rocky		-2.791 (1.773)	-2.744 (1.774)	-2.188 (1.839)	-1.279 (1.171)
Altitude (*1/1000)			-0.000 (0.000)		
Black soil dummy			0.091 (0.091)		
Alluvial soil dummy			0.027 (0.085)		
Red soil dummy			-0.030 (0.071)		
No. of districts	181	163	152	163	145
No. of native states	73	71	67	71	68
R-squared	0.29	0.35	0.37	0.42	0.73

Robust standard errors in parentheses, corrected for clustering within native states.
* significant at 10%; ** significant at 5%; *** significant at 1%
Post-1847 sample refers to areas which were not annexed in or before 1847.
All results are from linear regressions.
Main effect "Ruler died without heir" is a dummy which equals one if the native state had a ruler die without an heir at any time after 1818.
Main effect "Ruler died in 1848-56" is a dummy which equals one if the ruler of the native state died in the period 1848-1856.

TABLE 7
DIFFERENCES IN AGRICULTURAL INVESTMENTS AND PRODUCTIVITY: IV ESTIMATES

				Coefficient on		
	Mean of dep. var.	British dummy Full sample	British dummy Post-1847 sample	Lapse dummy Post-1847 sample	British dummy Post-1847 sample	British dummy Post-1847 sample (excluding Punjab, Oudh, Berar)
		OLS	OLS	Reduced form	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables (1956-87 mean)						
Proportion of area irrigated	0.228	0.099***	0.063	0.037	0.059	0.058
		(0.037)	(0.046)	(0.039)	(0.065)	(0.053)
Fertilizer usage (kg/hectare)	20.04	7.014**	3.770	-1.948	-3.145	-2.054
		(3.073)	(4.251)	(2.323)	(3.765)	(2.669)
Proportion of cereal area sown with high-yielding varieties	0.330	0.066**	0.083**	0.031	0.051	0.061*
		(0.028)	(0.037)	(0.028)	(0.038)	(0.033)
Log total yield (15 major crops)	-0.161	0.213***	0.117	0.054	0.087	0.082
		(0.080)	(0.119)	(0.079)	(0.127)	(0.105)
Log rice yield	-0.077	0.151*	0.046	-0.064	-0.107	-0.090
		(0.083)	(0.120)	(0.120)	(0.215)	(0.166)
Log wheat yield	-0.114	-0.064	-0.089	-0.114	-0.184	-0.164
		(0.088)	(0.113)	(0.160)	(0.243)	(0.219)
Controls						
Latitude, rainfall, coast		yes	yes	yes	yes	yes
Proportion sandy/barren		yes	yes	yes	yes	yes
Soil type dummies		yes	yes	yes	yes	yes
# districts		271	136	136	136	118
# native states		83	58	58	58	55

Robust standard errors in parentheses, corrected for clustering within native states.

* significant at 10%; ** significant at 5%; *** significant at 1%

IV estimates computed using the *Lapse* dummy as an instrument for British rule. *Lapse* =1 if ruler died without a natural heir in the period 1848 to 1856.

Post-1847 sample refers to areas which were not annexed in or before 1847.

Data is missing for the states of Kerala, Assam, Jammu & Kashmir and Himachal Pradesh. All data are at 1961 district level.

TABLE 8
DIFFERENCES IN PUBLIC GOODS LEVELS : IV ESTIMATES

	Mean of dep. var.	Coefficient on				
		British dummy Full sample	British dummy Post-1847 sample	Lapse dummy Post-1847 sample	British dummy Post-1847 sample	British dummy Post-1847 sample (excluding Punjab, Oudh, Berar)
		OLS	OLS	Reduced form	IV	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variables: Proportion of villages having public goods (mean of 1981 and 1991 data)						
Primary school	0.7720	-0.016	-0.007	-0.007	-0.011	-0.012
		(0.032)	(0.039)	(0.028)	(0.041)	(0.036)
Middle school	0.2485	-0.046	-0.047	-0.061**	-0.091**	-0.083**
		(0.034)	(0.031)	(0.025)	(0.037)	(0.032)
High school	0.1260	-0.068*	-0.061*	-0.049	-0.065	-0.064*
		(0.040)	(0.033)	(0.032)	(0.042)	(0.037)
Primary health center	0.0415	-0.024*	-0.015*	-0.021***	-0.031**	-0.028**
		(0.014)	(0.008)	(0.008)	(0.013)	(0.011)
Primary health subcenter	0.0753	-0.002	-0.007	-0.036***	-0.053**	-0.043***
		(0.017)	(0.017)	(0.011)	(0.021)	(0.016)
Canals	0.0477	-0.010	-0.024*	-0.029**	-0.043	-0.041*
		(0.014)	(0.014)	(0.015)	(0.028)	(0.024)
Roads	0.4344	0.043	-0.010	-0.134***	-0.198***	-0.157***
		(0.065)	(0.067)	(0.032)	(0.066)	(0.050)
Combined public goods	0.2535	-0.017	-0.026	-0.051***	-0.075***	-0.065***
		(0.025)	(0.021)	(0.012)	(0.023)	(0.019)
Controls						
Latitude, rainfall, coast		yes	yes	yes	yes	yes
Proportion sandy/barren		yes	yes	yes	yes	yes
# districts		377	163	163	163	145
# native states		96	71	71	71	68

Robust standard errors in parentheses, corrected for clustering within native states. * significant at 10%; ** significant at 5%; *** significant at 1%

IV estimates computed using the *Lapse* dummy as an instrument for British rule. *Lapse* =1 if ruler died without a natural heir in the period 1848 to 1856.

Post-1847 sample refers to areas which were not annexed in or before 1847.

Data is missing for middle schools in Gujarat, high schools in Madhya Pradesh and primary health subcenters in Karnataka.

Data is missing for Assam in 1981 and Jammu & Kashmir in 1991.

TABLE 9
REDUCED FORM REGRESSIONS FOR PUBLIC GOODS: ROBUSTNESS CHECKS

	Coefficient on			
	Lapse dummy Reduced form Post-1847 sample Base specification (1)	Lapse dummy Reduced form Post-1847 sample With "main effects" (2)	Fake instrument Reduced form Native states sample Falsification test (3)	Lapse dummy Reduced form Post-1847 sample Exact *p*-values (4)
Dependent variables: Proportion of villages having public goods (mean of 1981 and 1991 data)				
Primary school	-0.007	-0.032	-0.094**	-0.007
	(0.028)	(0.050)	(0.039)	[0.48]
Middle school	-0.061**	-0.100*	0.006	-0.061
	(0.025)	(0.052)	(0.034)	[0.14]
High school	-0.049	-0.048	-0.067	-0.049
	(0.032)	(0.059)	(0.047)	[0.24]
Primary health center	-0.021***	-0.015	-0.012	-0.021
	(0.008)	(0.020)	(0.016)	[0.14]
Primary health subcenter	-0.036***	-0.062**	-0.011	-0.036
	(0.011)	(0.025)	(0.016)	[0.05]
Canals	-0.029**	-0.128**	0.017	-0.029
	(0.015)	(0.050)	(0.041)	[0.11]
Roads	-0.134***	-0.142*	-0.023	-0.134
	(0.032)	(0.083)	(0.050)	[0.06]
Combined public goods	-0.051***	-0.079**	-0.023	-0.051
	(0.012)	(0.030)	(0.022)	[0.05]
Controls				
Latitude, rainfall, coast	yes	yes	yes	yes
Proportion sandy/barren	yes	yes	yes	yes
Ruler died in 1848-1856	no	yes	no	no
Ruler died without heir	no	yes	no	no
# districts	163		128	163
# native states	71		63	71

Robust standard errors in parentheses, corrected for clustering within native states.
* significant at 10%; ** significant at 5%; *** significant at 1%
Post-1847 sample refers to areas which were not annexed in or before 1847.
 Lapse dummy equals one if ruler died without a natural heir in the period 1848 to 1856.
Main effect "Ruler died without heir" is a dummy which equals one if the native state had a ruler die
without an heir at any time after 1818.
Main effect "Ruler died in 1848-56" is a dummy which equals one if the ruler of the native state died in the
period 1848-1856.
"Fake instrument" is a dummy for whether the ruler died without an heir in the period 1858-1884.
Column (4) shows p-values [in square brackets] constructed by the randomization inference
 procedure, to adjust for possible small-sample bias in clustering. See Bertrand et.al. (2001) for details.
Data is missing for middle schools in Gujarat, high schools in Madhya Pradesh and primary health subcenters in
Karnataka. Data is missing for Assam in 1981 and Jammu & Kashmir in 1991.

TABLE 10
 DIFFERENCES IN PUBLIC GOODS LEVELS IN 1961

	Mean of dep. var.	No. of districts (no. of native states)	Coefficient on		
			British dummy OLS Full sample	British dummy IV Post-1847 sample	British dummy IV Post-1847 sample Excluding Punjab, Oudh, Berar
Dependent variables: Proportion of villages having public goods (1961 data)					
Primary school	0.5126	234 (81)	0.024	-0.127*	-0.106*
			(0.041)	(0.067)	(0.062)
Middle school	0.0972	219 (78)	-0.040	-0.068*	-0.058*
			(0.035)	(0.035)	(0.030)
High school	0.0303	286 (88)	-0.032	-0.037	-0.031*
			(0.020)	(0.022)	(0.018)
Dispensaries	0.0733	234 (81)	-0.075*	-0.069*	-0.062*
			(0.043)	(0.039)	(0.036)
Rural health center	0.0244	159 (54)	-0.007	-0.007	-0.005
			(0.010)	(0.008)	(0.007)
Canals	0.0017	134 (49)	0.003	-0.000	-0.000
			(0.003)	(0.000)	(0.000)
Roads	0.2124	234 (68)	0.052	-0.077	-0.047
			(0.055)	(0.092)	(0.069)
Controls					
Latitude, rainfall, coast			yes	yes	yes
Proportion sandy/barren			yes	yes	yes

Robust standard errors in parentheses, corrected for clustering within native states.
 * significant at 10%; ** significant at 5%; *** significant at 1%
Post-1847 sample refers to areas which were not annexed in or before 1847.
Instrument is a dummy for whether the ruler died without an heir in the period 1848-1856.
Data on rural health centers and canals is missing for UP, Tamil Nadu, Rajasthan, Orissa and Maharashtra.
Data on primary schools, middle schools and dispensaries is missing for Uttar Pradesh.
Data on middle schools, canals and roads is missing for West Bengal.
Data on roads is missing for Punjab and Rajasthan.

TABLE 11
EDUCATION AND HEALTH OUTCOMES: DATA FROM EARLIER PERIODS

Panel A : Province-level literacy rates 1901

Province/ Region	Literacy rates (%)	
	Male	Female
Native States		
Travancore	21.5	3.1
Baroda	16.3	0.8
Mysore	9.3	0.8
Rajputana	6.2	0.2
Central India	5.5	0.3
Hyderabad	5.5	0.3
Kashmir	3.8	0.1
British Empire		
Madras	11.9	0.9
Bombay	11.6	0.9
Bengal	10.4	0.5
Berar	8.5	0.3
Assam	6.7	0.4
Punjab	6.4	0.3
United Provinces	5.7	0.2
Central Provinces	5.4	0.2

Source: Hunter et.al. (1908)

Panel B : District-level literacy rates (Gujarat, Kerala, Madhya Pradesh)

Years	British empire	Native states	Difference
1921, 1931, 1941	7.16	10.01	-2.67
			(1.50)
1951, 1961, 1971	26.09	24.52	0.95
			(2.10)

Standard errors in parantheses, correcting for year fixed effects.
Data are from District gazetteers of Gujarat, Kerala and Madhya Pradesh states.
Data available for 12, 14 and 10 districts for 1921, 1931 and 1941 respectively.
Data available for 52 districts in 1951 and 74 districts in 1961 and 1971.

Panel C : Infant mortality rates (Madhya Pradesh districts)

Year	British empire	Native states	Difference
1965	114.01	60.96	53.05
			(19.89)
1970	122.98	67.91	55.07
			(5.73)
1981	157.38	146.66	10.71
			(6.55)
1991	126.06	115.72	10.34
			(5.48)

Standard errors in parantheses, corrected for clustering within native states.
Data for 1965 and 1970 are from District gazetteers of Gujarat and Madhya Pradesh states.
Data available for 21 districts in 1965, 22 in 1970 and 45 in 1981 and 1991, corresponding to
11, 12 and 17 native states respectively. Differences do not control for any covariates.

APPENDIX TABLE 1: MAJOR NATIVE STATES IN 1947

Native state	No. of guns in salute	Date of treaty with British	Area (sq.miles)	Population (1896)	Religion of ruler	No. of modern districts
Baroda	21	1802	8570	2185005	Hindu	3
Gwalior	21	1781	29046	3115857	Hindu	9
Hyderabad	21	1759	98000	9845594	Muslim	20
Kashmir	21	1846	80000	1534972	Hindu	14
Mysore	21	1799	24723	4186188	Hindu	10
Bhopal	19	1817	6873	954901	Muslim	3
Indore	19	1805	8400	1054237	Hindu	3
Kolhapur	19	1766	2816	800189	Hindu	1
Travancore	19	1723	6730	2401158	Hindu	6
Udaipur	19	1818	12670	1494220	Hindu	3
Bharatpur	17	1803	1974	645540	Hindu	1
Bikaner	17	1818	22340	509021	Hindu	3
Bundi	17	1818	2300	254701	Hindu	1
Cochin	17	1791	1361	600278	Hindu	3
Jaipur	17	1818	14465	2534357	Hindu	3
Jodhpur	17	1818	37000	1750403	Hindu	5
Karauli	17	1817	1208	148670	Hindu	1
Kota	17	1817	3797	517275	Hindu	1
Kutch	17	1809	6500	512084	Hindu	1
Patiala	17	1809	5887	1467433	Sikh	5
Rewa	17	1812	1000	1305124	Hindu	4
Tonk	17	1817	2509	338029	Muslim	1
Alwar	15	1803	3024	682926	Hindu	1
Banswara	15	1818	1300	152045	Hindu	1
Datia	15	1804	836	182598	Hindu	1
Dewas	15	1818	2566	142162	Hindu	1
Dhar	15	1819	1740	149244	Hindu	1
Dholpur	15	1779	1200	249657	Hindu	1
Dungarpur	15	1818	1000	153381	Hindu	1
Idar	15	1812	4966	258429	Hindu	1
Jaisalmer	15	1818	16447	108143	Hindu	1
Kishangarh	15	1818	724	112633	Hindu	1
Orchha	15	1812	2000	311514	Hindu	1
Partabgarh	15	1818	1460	79568	Hindu	1
Rampur	15	1794	899	541914	Muslim	1
Sirohi	15	1823	3020	142903	Hindu	1
Bhavnagar	13	1807	2860	400323	Hindu	1
Cooch Behar	13	1773	1307	602624	Hindu	1
Dhrangadhra	13	1807	1142	99686	Hindu	1
Jaora	13	1818	872	108434	Muslim	2
Jhalawar	13	1838	2694	340488	Hindu	1
Jind	13	1809	1323	294862	Sikh	1
Junagadh	13	1807	3283	387499	Muslim	2
Kapurthala	13	1846	620	252617	Sikh	1
Nabha	13	1809	928	261824	Sikh	1
Nawanagar	13	1807	1379	316147	Hindu	1
Palanpur	13	1809	3150	234402	Muslim	1

Native state	No. of guns in salute	Date of treaty with British	Area (sq.miles)	Population (1896)	Religion of ruler	No. of modern districts
Porbandar	13	1807	636	71072	Hindu	1
Rajpipla	13	1821	1514	59834	Hindu	1
Ratlam	13	1819	729	87314	Hindu	1
Ajaigarh	11	1807	802	81454	Hindu	1
Ali Rajpur	11	1818	836	56287	Hindu	1
Barwani	11	1818	1362	56445	Hindu	1
Bijawar	11	1811	973	113285	Hindu	1
Bilaspur	11	1846			Hindu	1
Cambay	11	1771	350	86074	Muslim	1
Chamba	11	1846	3180	115773	Hindu	1
Charkhari	11	1804	787.5	143015	Hindu	1
Chhatarpur	11	1806	1169	164376	Hindu	1
Faridkot	11	1809	612	97034	Hindu	1
Gondal	11	1807	687	135604	Hindu	1
Jhabua	11	1821	1336	147100	Hindu	1
Mandi	11	1846	1000	147017	Hindu	1
Morvi	11	1807	821	90016	Hindu	1
Narsinghgarh	11	1818	623	112427	Hindu	1
Panna	11	1807	2568	227306	Hindu	1
Pudukkottai	11	1803	1101	302127	Hindu	1
Radhanpur	11	1813	1150	98129	Muslim	1
Rajgarh	11	1818	655	117533	Hindu	1
Sailana	11	1819	114	29723	Hindu	1
Sirmur	11	1815	1077	112371	Hindu	1
Tehri Garhwal	11	1820	4180	199836	Hindu	3
Wankaner	11	1807	376	30491	Hindu	1
Balasinor	9		189	46328	Muslim	1
Bansda	9	1802	384	34122	Hindu	1
Chhota Udepur	9	1822	873	71218	Hindu	1
Dharampur	9		794	101289	Hindu	1
Dhrol	9		400	21177	Hindu	1
Kalahandi	9	1829				1
Khilchipur	9	1818	273	36125	Hindu	1
Limbdi	9		344	40186	Hindu	1
Maihar	9		400	71709	Hindu	1
Mayurbhanj	9	1829	4243	385737	Hindu	2
Nagod	9	1809	450	79629	Hindu	1
Rajkot	9	1807	283	46540	Hindu	1
Sangli	9		896	196832	Hindu	1
Savantwadi	9	1730	900	174433	Hindu	1
Bashahr	9	1815	3320	64345	Hindu	1
Dhenkanal		1829	1463	208316		1
Keunjhar		1829	3096	215612	Hindu	1
Raigarh			1486	128943		1
Sarguja		1817	6055	270311	Hindu	1

Native states listed in decreasing order of the number of guns in ceremonial salute.

Number of modern districts refers to the number of districts containing areas from the native state.

Several modern districts contain areas from more than one native state.

Native state boundaries may or may not coincide with modern district boundaries.

APPENDIX TABLE 2 : DATA SOURCES

Post-Independence data
Data on district geography, crop areas, yields, irrigation, fertilizer use, adoption of
high-yielding varieties: India Agriculture and Climate Data Set (World Bank)
http://www-esd.worldbank.org/indian/home.cfm

Public goods at village-level 1961, 1981, 1991: Census reports

District level data on population, literacy, occupation classes, proportion of scheduled castes etc:
Indian Database Project Vanneman, Reeve and Douglas Barnes (2000)
Indian District Data, 1961-1991: Machine-readable data file and codebook, Center on Population,
Gender, and Social Inequality, College Park, Maryland.
URL: http://www.bsos.umd.edu/socy/vanneman/districts/index.html

Matching post-Independence districts with British districts and native states
Districts and maps of British India: Baden-Powell (1892)
Districts and maps of modern India: http://www.mapsofindia.com
District Gazetteers (various issues)
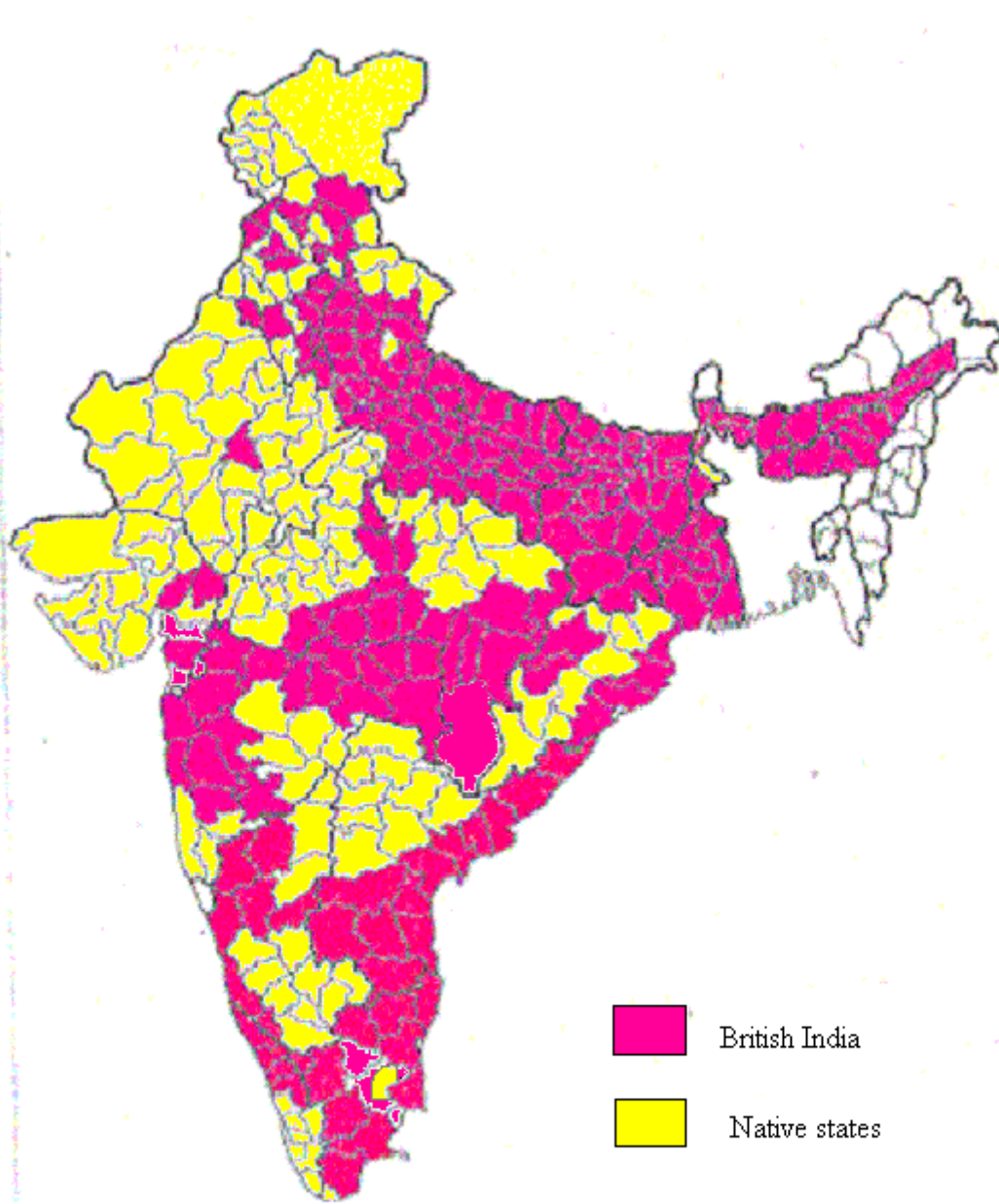
Historical data
Area and revenue of Native States: Chakrabarti (1896), Hunter et.al. (1908)

Details of death of kings in Native States: District Gazetteers; Lee-Warner (1904);
http://www.dreamwater.net/regiment/RoyalArk/India/India.htm;
http://www.uq.net.au/~zzhsoszy/ips

Literacy and infant mortality in earlier periods : District Gazetteers

APPENDIX TABLE 3 : DETAILS OF NATIVE STATES WHERE RULERS DIED WITHOUT NATURAL HEIR IN 1848-56

Native state	Year of death of ruler	Details
Major kingdoms annexed by Lord Dalhousie		
Satara	1848	State created in 1818 for defeated Maratha ruler; ruler deposed in favor of his brother in 1842; state annexed by lapse in 1848.
Sambalpur	1849	Part of Bhonsla kingdom originally; handed over to a local ruler Maharaja Sahi in 1818 and to his queen on his death in 1827. Kingdom given to relative Narayan Singh in 1833 after local insurrection. Annexed by Doctrine of Lapse in 1849 when ruler died without heir.
Jhansi	1853	First treaty of protection with British in 1804; ruler died without heir in 1835 and in 1838 but successors installed by British and state not annexed; state annexed by Lord Dalhousie due to lapse in 1853.
Nagpur	1854	Bhonsla ruler defeated in 1818 and kingdom put under British administration till 1830; Taken over by Doctrine of Lapse in 1854 after death of ruler in December 1853.
Major kingdoms where rulers died without heir in 1848-56 but which were not annexed		
Orchha	1852	Lord Dalhousie did not annex on grounds of Orchha being a non-tributary state; also the British had a prior agreement with the queen (made in 1841) which allowed her to adopt an heir.
Karauli	1853	Ruler died without heir in 1853; Lord Dalhousie recommended annexation but was disallowed by the East India Company's Court of Directors.
Chhatarpur	1854	Ruler died without heir in 1854, and was succeeded by his nephew.
Ajaigarh	1855	Ruler died without heir in 1855 and the state was annexed by Lord Dalhousie. Royal family remained loyal to the British during the 1857 revolt and the state was returned to an adopted heir by Lord Canning in 1857.

Figure 1 : British India and Native States