Supporting Information

Elite Competition and State Capacity Development: Theory and Evidence from Post-Revolutionary Mexico

Contents

A Mechanism of Persistence: Political Development of the PRI

One explanation for the observed persistence in capacity can be traced to the process of political development of the PRI regime. In places where the path to political consolidation was cleared by the large negative shock brought about by the Great Depression, local political leaders would have been better able to bargain with the emerging national regime to their advantage.

These local bosses were attractive to the regime because of the control they exerted in their regions. The PRI needed these alliances as it consolidated, because they provided political order in the regions. To those local leaders that were able to provide local order, the national regime could offer ample leeway to continue local extraction—reaping the benefits of local investments in capacity—and access to higher office to the local leader's clique. This was part of a broader strategy pursued by the national PRI. As Gil-Mendieta and Schmidt (1996) note,

> [t]he network established by the generals in power, originated in the aftermath of the Mexican revolution, created the main political institution which helped recruit politicians for government and expanded the economic and political resources available to the network. This supported Mexico's corporatist political structure and political stability because it expanded the connections between politicians who belong to a wide array of institutions. In order to maintain a unique political power system, the network members developed a system of loyalties extended also to political institutions which created a transmission band with the society at large. (357)

In exchange for their support to the national ruling coalition, consolidated bosses could have secured local extraction over the long term—using locally developed capacity—but also increased their ability to place themselves (or their allies) in high profile national positions.

To assess the conjecture of consolidation and increased access to national political influence, I

Table A.1: Commodity Shocks and Future National-Level Politicians

	(1) Federal government cabinet members (1940-1970)	(2) Federal government cabinet members (1940-1970)	(3) National-level legislators (1940-1970)	(4) National-level legislators (1940-1970)
Commodity potential 1920s (log)	-0.033	-0.042	-0.073	-0.071
	(0.038)	(0.038)	(0.17)	(0.16)
% shock to commodity potential	-2.17***	-2.28**	-6.43**	-4.13
	(0.82)	(1.12)	(2.71)	(3.45)
Population, 1930 (log)	1.08***	0.77***	4.26***	2.92***
	(0.19)	(0.15)	(0.65)	(0.58)
Bureaucrats per 1000 people, 1930		0.13***		0.31***
		(0.043)		(0.064)
Municipal surface area, Ha. (log)		-0.32***		-0.85*
		(0.11)		(0.44)
Localities per Ha., 1930		-142.4		-640.5*
		(95.0)		(385.7)
Pop. in agriculture 1930 (%)		-0.0088		-0.030*
		(0.0057)		(0.016)
Pop. in cities 1930 (%)		0.034***		0.16***
		(0.0098)		(0.032)
Mean of DV	0.57	0.60	2.52	2.67
SD of DV	3.35	3.44	9.85	10.1
R sq.	0.099	0.26	0.18	0.36
Number of municipios	1557	1462	1557	1462

OLS estimations. See equation (2) for the econometric specification. The unit-of-analysis is the *municipio*, and the dependent variable measures the total years served by politicians born in each *municipio*. Municipios with *haciendas*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

analyze the access to national-level political office associated with each *municipio* for the period 1940-1976. This period spans from immediately after I measure state capacity outcomes, following the commodity shocks, to the end of president Luis Echeverría's term in 1976. Past analyses of the Mexican national political network suggest that a military-based sub-network (akin to a *camarilla*) ruled from the revolution until Echeverría's term, replaced later by a finance-based sub-network (Gil-Mendieta and Schmidt 1996).[1] This military-based sub-network had a regional approach to bringing the country's economic regions under the regime's control, by integrating local strongmen to expand its influence geographically.

I construct a geographic political access measure using Roderic Camp's political biographies, and focus on members of Congress and appointed high-ranking officials (members of the national cabinet, the attorney general, and Justices of the Supreme Court). I assign each politician to their place of birth, under the assumption that geographical origin is a reasonable indication of having close ties with the local political leadership. Finally, I add the number of years served in the Chamber of Deputies and the Senate (or in high-ranking appointments), aggregating to the *municipio* level.

Table A.1 presents the estimates of the cross-sectional model, equation (2), using the *municipio* aggregate number of years in national-level political offices as the dependent variable. Negative shocks following the Great Depression are associated with higher representation of a *municipio* in both appointed and elective high-ranking positions (albeit the latter is less precisely estimated). The results provide evidence for one channel of persistence of the documented shorter-term effects of temporary landed elite weakness on state capacity. They also suggest the relevance of political geography as a determinant of the patterns of political recruitment during the PRI regime, beyond the social characteristics of individual politicians (e.g., Smith 1979; Camp 1995).

[1]While the military-based ruling coalition was not characterized by direct intervention of the military in national politics, its civilian leadership did rely on the support of the military for presidential bids (Camp 1992).

B Descriptives

B.1 Crop Prices Before and After the Great Depression

Table B.1: Average Spot Prices (USD per metric tonne), Before and After the Great Depression

Commodity	1920-29	1930-39	% Change
Banana	$472.65	$593.60	+25.6%
Barley	$91.11	$110.00	+20.7%
Cacao	$1,220.89	$853.86	-30.1%
Coffee	$1,708.03	$1,135.70	-33.5%
Cotton	$2,647.34	$1,541.33	-41.8%
Maize	$35.17	$25.27	-28.2%
Rice	$591.97	$537.43	-9.2%
Sugar	$613.42	$489.22	-20.3%
Wheat	$302.88	$231.50	-23.6%

Source: Global Financial Data, from various primary sources.

B.2 Descriptive Statistics

Table B.2: Descriptive Statistics

	count	mean	sd	min	p25	p50	p75	max
Bureaucrats per 1000 people	4516	3.66	7.16	0	0.76	1.90	3.86	190.1
Number of bureaucrats (log)	4516	2.18	1.56	0	1.10	2.08	3.14	8.59
Local bureaucrats per 1000 people	2327	0.54	0.81	0	0	0.23	0.80	8.11
Number of local bureaucrats, 1940 (log)	2327	1.02	1.16	0	0	0.69	1.79	6.28
Irrigated Land Redistribution (grants)	4516	1.04	3.72	0	0	0	0	93
Irrigated Land Redistribution (% of municipio)	4516	0.61	2.66	0	0	0	0	40.6
Hacienda in 1930	2189	0.67	0.47	0	0	1	1	1
Commodity potential (log)	4516	8.17	1.34	0.48	7.35	8.38	9.08	11.2
Placebo commodity potential (log)	4516	8.03	1.43	0.48	7.12	8.21	9.06	11.3
Population, 1930 (log)	2189	8.18	1.05	5.21	7.39	8.21	8.90	12.1
Pop. in agriculture 1930 (%)	2189	30.2	10.5	1.63	25.7	29.0	32.8	100
Localities per Ha., 1930	2189	0.00072	0.00083	0.0000044	0.00023	0.00049	0.00095	0.016
Municipal surface area, Ha. (log)	2189	10.1	1.51	5.46	9.06	10.0	11.1	14.8
Pop. in cities 1930 (%)	2189	5.66	17.3	0	0	0	0	100
Local taxes (% of mun. GDP) Avg. 1989-2013	2189	0.43	0.50	0	0.16	0.28	0.50	7.55
Bureaucrats per 1000 people (2000)	2159	9.19	7.02	0.22	4.96	7.62	11.2	82.4
Municipal GDP 2005 (log)	2189	19.8	1.77	14.9	18.6	19.8	20.9	25.8
Federal transfers (log) Avg. 1989-2013	2189	16.5	1.73	0	15.8	16.6	17.4	21.3
Federal government cabinet member-years (1940-1970)	4516	0.24	2.13	0	0	0	0	58
National-level legislator-years (1940-1970)	4516	1.12	6.17	0	0	0	0	190

B.3 Crop Suitability and Present-Day Production

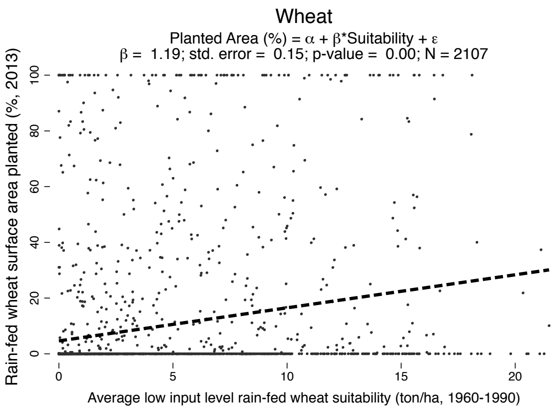
Crop suitability, available from FAO's Global Agro-Ecological Zones, is calculated using information about local climate, soil types, slope, and rainfall. This measure is constructed in several steps.

First, historical climate geo-spatial data are processed to create climatic indicators relevant for plant production, such as the duration of plant-growing periods, and the rate of water loss in different soil types. In a second step, maximum yields for each crop are estimated as a function of different agro-climatic regimes. These calculations are made using different assumptions about inputs in agricultural production. I use the low-input-level rain-fed crop suitability because it best reflects baseline suitability; that is, it measures production potential without considering endogenous production conditions related to irrigation investment decisions, and selection of varieties and input intensity.

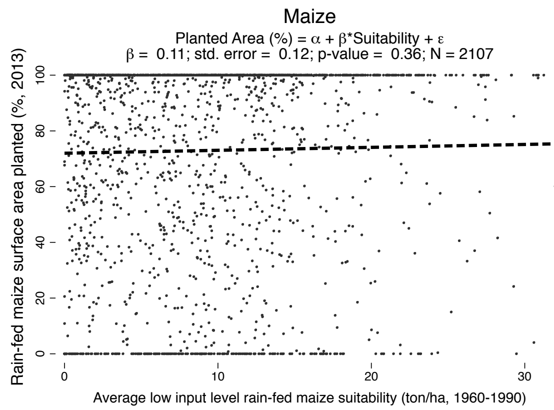
In a third and fourth steps, potential yields for each crop are adjusted to climatic, soil, and slope constraints that reduce production. Finally, in a fifth step, all these elements are integrated and computed for each grid-cell with available information (local climate, soil types, slope, and rainfall).

The resulting crop suitability measure is, as expected, highly correlated with observed, present-day planted area shares and production volume (data from SIAP 2013), as shown in figures B.1 and B.2, as well as in tables B.3 and B.4. The partial correlation between historic suitability and present-day planted shares/production is strongly positive, and significant in most cases.

Figure B.1: Share of Planted Area (2013) and Crop Suitability (1961-1990)
(Wheat, Maize, Sugarcane, Rice, Banana)



(a)



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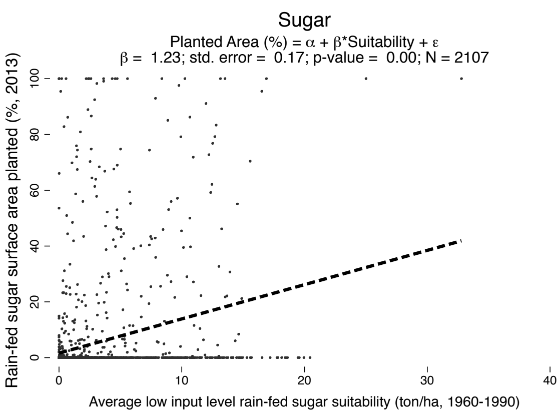

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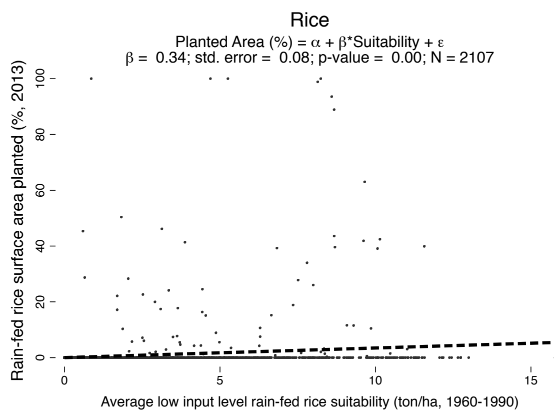

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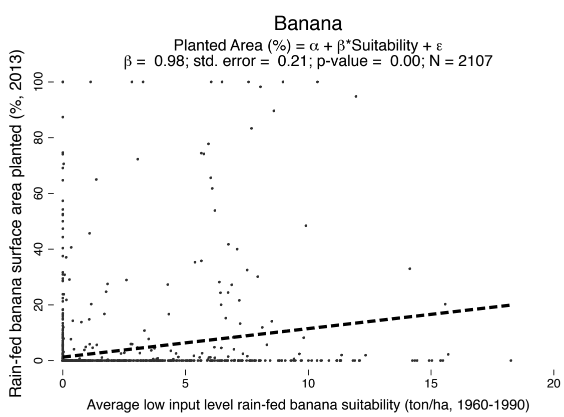
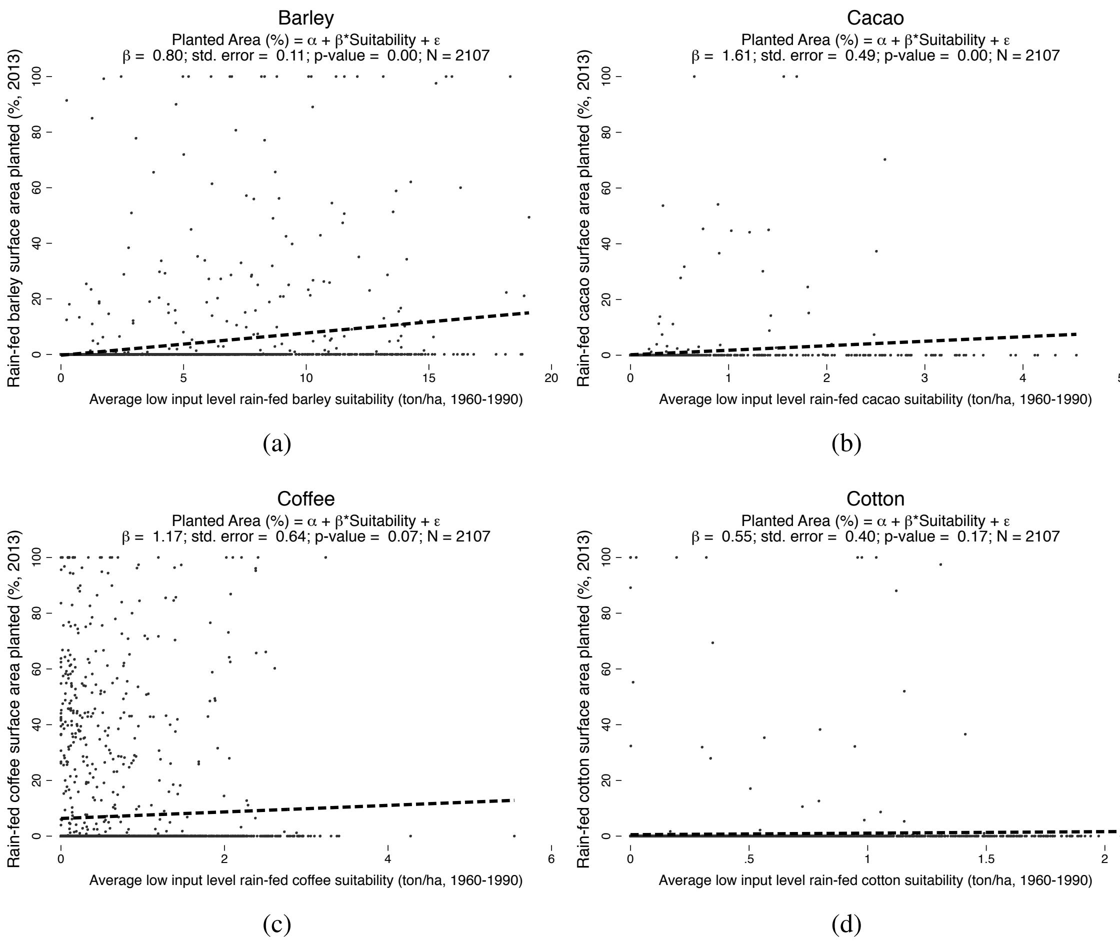


(e)

Share of planted area among the selected crops: Wheat, maize, sugarcane, rice, and banana. Data from SIAP and GAEZ.

Figure B.2: Share of Planted Area (2013) and Crop Suitability (1961-1990)
(Barley, Cacao, Coffee, Cotton)



Share of planted area among the selected crops: Barley, cacao, coffee, and cotton. Data from SIAP and GAEZ.

Table B.3: Crop Suitability (1961-1990) and Present-Day Production (2013)

	Production (log tonnes)									
	(1) Wheat	(2) Wheat	(3) Maize	(4) Maize	(5) Rice	(6) Rice	(7) Sugar	(8) Sugar	(9) Banana	(10) Banana
Surface Area (log)		0.17***		-0.36***		0.055***		0.043**		0.15***
		(0.029)		(0.041)		(0.017)		(0.018)		(0.022)
Wheat Suitabilty	0.12***	0.18		-0.49		-0.17**		0.30**		-0.41***
	(0.011)	(0.26)		(0.34)		(0.085)		(0.15)		(0.13)
Maize Suitabilty		-0.020*	-0.0083	0.065***		0.027***		0.0060		0.027***
		(0.011)	(0.0083)	(0.016)		(0.0063)		(0.0055)		(0.0068)
Rice Suitabilty		-0.24***		0.014	0.050***	0.045***		-0.043		0.14***
		(0.061)		(0.077)	(0.0093)	(0.016)		(0.042)		(0.034)
Sugarcane Suitabilty		-0.054***		0.036		0.036***	0.017*	0.035		0.072**
		(0.019)		(0.042)		(0.012)	(0.0091)	(0.025)		(0.029)
Banana Suitabilty		-0.0083		-0.030		-0.045***		0.011	0.12***	0.021
		(0.017)		(0.043)		(0.014)		(0.023)	(0.021)	(0.034)
Barley Suitabilty		-0.065		0.37		0.16*		-0.37**		0.38***
		(0.29)		(0.38)		(0.092)		(0.17)		(0.14)
Cacao Suitabilty		0.17**		-0.43**		0.21***		-0.28***		-0.20
		(0.069)		(0.18)		(0.079)		(0.093)		(0.14)
Coffee Suitabilty		0.27***		-0.36***		-0.13***		0.086		-0.013
		(0.093)		(0.13)		(0.038)		(0.053)		(0.063)
Cotton Suitabilty		1.21***		-0.57		-0.41***		0.074		-1.04***
		(0.31)		(0.36)		(0.086)		(0.17)		(0.14)
Mean of DV	0.85	0.85	4.34	4.34	0.15	0.15	0.24	0.24	0.40	0.40
SD of DV	1.88	1.88	2.62	2.62	0.90	0.90	1.14	1.14	1.43	1.43
R sq.	0.073	0.16	0.00044	0.083	0.027	0.079	0.0029	0.021	0.041	0.10
Number of municipios	2107	2107	2107	2107	2107	2107	2107	2107	2107	2107

OLS estimations. The unit-of-analysis is the *municipio*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$. Data from SIAP and GAEZ.

Table B.4: Crop Suitability (1961-1990) and Present-Day Production (2013)

	Production (log tonnes)							
	(1) Barley	(2) Barley	(3) Cacao	(4) Cacao	(5) Coffee	(6) Coffee	(7) Cotton	(8) Cotton
Surface Area (log)		0.091***		0.030***		-0.15***		0.030**
		(0.018)		(0.0091)		(0.030)		(0.012)
Wheat Suitabilty		0.25*		-0.14***		-0.12		-0.21
		(0.13)		(0.051)		(0.15)		(0.17)
Maize Suitabilty		0.0058		0.000050		-0.0092		0.00081
		(0.0069)		(0.0031)		(0.0073)		(0.0022)
Rice Suitabilty		0.051**		0.040***		0.070*		-0.079***
		(0.025)		(0.015)		(0.036)		(0.028)
Sugarcane Suitabilty		-0.026***		0.016		-0.053**		0.020***
		(0.0096)		(0.011)		(0.027)		(0.0067)
Banana Suitabilty		-0.0048		-0.023		0.12***		-0.0026
		(0.0085)		(0.019)		(0.034)		(0.0062)
Barley Suitabilty	0.090***	-0.19		0.15***		0.030		0.23
	(0.0095)	(0.15)		(0.057)		(0.16)		(0.19)
Cacao Suitabilty		0.15***	0.30***	0.24***		-0.015		-0.043
		(0.044)	(0.063)	(0.064)		(0.12)		(0.028)
Coffee Suitabilty		-0.095		-0.020	-0.00090	0.015		0.017
		(0.072)		(0.029)	(0.047)	(0.065)		(0.013)
Cotton Suitabilty		-0.60***		-0.32***		-0.54***	0.072***	0.47***
		(0.10)		(0.061)		(0.15)	(0.025)	(0.15)
Mean of DV	0.32	0.32	0.087	0.087	0.69	0.69	0.052	0.052
SD of DV	1.25	1.25	0.64	0.64	1.83	1.83	0.53	0.53
R sq.	0.081	0.11	0.065	0.079	0.00000013	0.089	0.0040	0.081
Number of municipios	2107	2107	2107	2107	2107	2107	2107	2107

OLS estimations. The unit-of-analysis is the *municipio*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$. Data from SIAP and GAEZ.

B.4 Commodity Potential Over Time

Commodity potential is defined as:

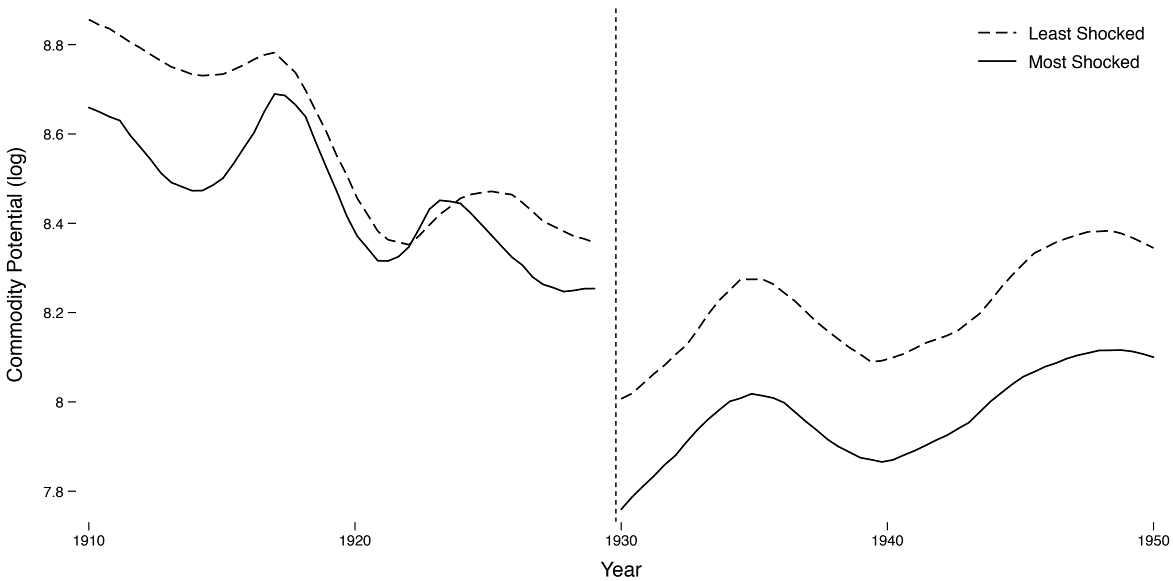
$$\bar{V}_{it} = \sum_{g=1}^{G} \frac{\bar{P}_{gt} \times Suitability_{ig}}{Avg.\ Suitability_{g}}$$

where $\bar{P}_{gt}$ is the average price of crop g in time $t \in \{1920s, 1930s\}$; $Suitability_{ig}$ is a *municipio*-specific crop suitability measure (in metric tonnes) determined by agro-climatic conditions; and $Avg.\ Suitability_{g} = \frac{1}{N}\sum_{i=1}^{N} Suitability_{ig}$ is a national average.

Commodity potential can vary between *municipios* at any given point in time because of differences in their crop suitability—their ability to grow certain crops given the local agro-climatic conditions. Higher suitability to grow crops, relative to the national average, will lead to higher commodity potential. These characteristics are exogenous, and do not vary over time (see section B.3 for a detailed description of crop suitability). Prices do change, which makes it possible that commodity potential vary over time for a given *municipio*. Increasing prices for the basket of crops leads to higher values of $\bar{V}_{it}$.

In short, commodity potential aggregates the value of the potential production of a *municipio* at a given point in time relative to the rest of the country. This measure is directly related to the availability of resources for the landed elite, who produce commodities for the market. A high commodity potential suggests abundant available resources in a *municipio*, relative to others. These resources can be transformed by the elite into political power, which enables them to challenge the local political leaders. A large, temporary decline in economic resources reduces the elite's political power, and with it their ability to defeat the ruler. This temporary shock, according to the theory, has two related effects: first, rulers seize upon this opportunity to eliminate the source of power of the elite—by expropriating their land; second, they have enhanced incentives to invest in

Figure B.3: Commodity Potential, 1910-1950



Nadaraya-Watson regressions. Bandwidths selected using the Rule of Thumb estimator. The unit-of-analysis is the *municipio*-year. Most and least shocked groups consist of *municipios* exposed to a below- and above-average percentage change in commodity potential from 1930 to 1940, respectively.

state capacity, which they will likely enjoy in the future now that they are relatively more secure in power.

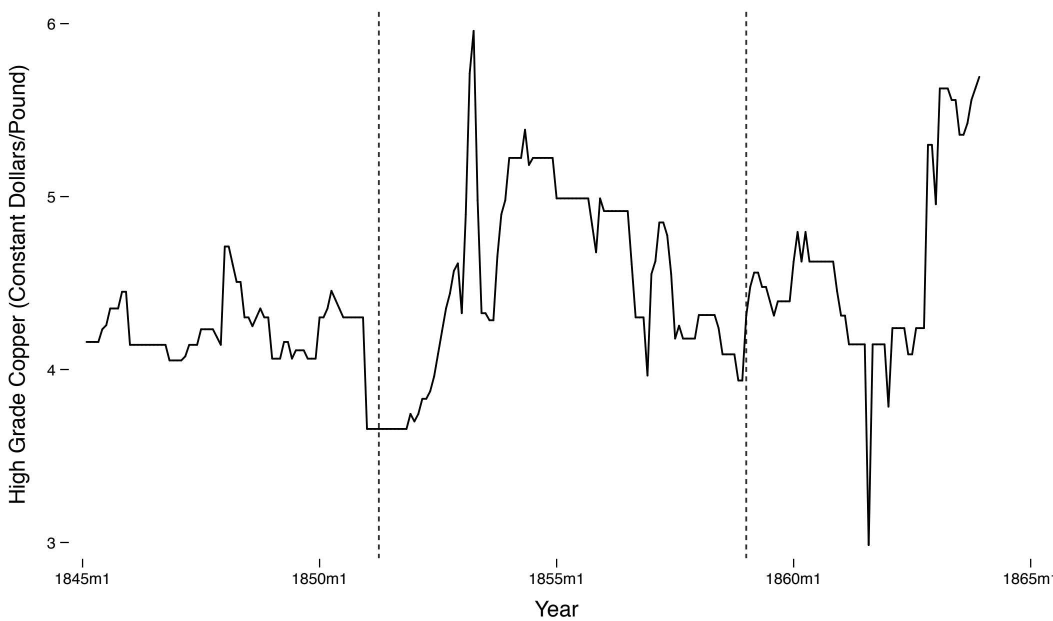
Figure B.3 illustrates how the commodity potential measure captures changes in prices over time, for two groups of *miunicipios*: those that were most- and least- shocked by the Great Depression. The lines show how commodity potential aggregates the production potential (via suitability) and prices for all crops, and how it shifts over time as prices change.

B.5 *Municipios* with *Haciendas* in 1930

Figure B.4: *Municipios* with *Haciendas* in 1930

B.6 Copper Prices in the XIX Century

Figure B.5: Copper Prices, 1845-1864



Wholesale prices in Philadelphia. The dashed lines indicate the onset of the Chilean civil wars of 1851 and 1859. Source: *Global Financial Data* (2014).

C Additional Empirical Analysis

C.1 Alternative Measures: Difference-in-differences Design

Table C.1: Commodity Shocks, Bureaucrats, and Land Redistribution
Alternative Measures

	(1) Bureaucrats (log) (Haciendas)	(2) Bureaucrats (log) (Haciendas)	(3) Bureaucrats (log) (No haciendas)	(4) Land reform (% of mun.) (Haciendas)	(5) Land reform (% of mun.) (Haciendas)	(6) Land reform (% of mun.) (No haciendas)
Commodity potential (log)	-0.79**	-1.03***	-0.26	0.89	-3.07***	3.54**
	(0.32)	(0.36)	(0.60)	(1.26)	(0.98)	(1.74)
Population in 1930 (log) × 1940		0.10**	0.16**		0.80***	0.37*
		(0.048)	(0.078)		(0.21)	(0.22)
Municipal surface area, Ha. (log) × 1940		0.0010	-0.036		-0.46***	0.016
		(0.034)	(0.058)		(0.17)	(0.17)
Localities per Ha. in 1930 × 1940		51.8	-5.61		650.8	-144.2
		(38.3)	(87.3)		(479.7)	(219.7)
Population in agriculture in 1930 (%) × 1940		-0.0032	-0.0016		-0.0045	0.0014
		(0.0039)	(0.0055)		(0.012)	(0.0055)
Population in cities in 1930 (%) × 1940		-0.0032	0.0041		-0.0058	0.0033
		(0.0020)	(0.0033)		(0.0075)	(0.013)
Commodity potential (log) in 1930 × 1940		-0.0048	-0.038		0.021	0.28***
		(0.024)	(0.041)		(0.074)	(0.11)
Land reform by 1930 (% of municipio) × 1940					-0.81***	-1.01***
					(0.19)	(0.021)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	2.57	2.57	1.39	0.68	0.68	0.46
Within-*Municipio* SD of DV	0.58	0.58	0.53	0.84	0.84	0.62
R sq.	0.91	0.91	0.88	0.56	0.62	0.71
Observations	3019	3019	1489	3114	3114	1524
Number of municipios	1557	1557	762	1557	1557	762

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (clustered at the *municipio* level) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.2: Commodity Shocks and Land Redistribution
Alternative Land Redistribution per Capita Measure

	(1) Land reform, grants per 1000 people (Haciendas)	(2) Land reform, grants per 1000 people (Haciendas)	(3) Land reform, grants per 1000 people (No haciendas)	(4) Land reform, grants per 1000 people (Haciendas)
Commodity potential (log)	-0.43***	-0.55***	0.86***	
	(0.13)	(0.15)	(0.32)	
Placebo commodity potential (log)				0.032
				(0.033)
Population in 1930 (log) × 1940		0.047*	0.019	0.030
		(0.024)	(0.040)	(0.023)
Municipal surface area, Ha. (log) × 1940		-0.0019	0.074***	0.0098
		(0.017)	(0.026)	(0.018)
Localities per Ha. in 1930 × 1940		20.7	-12.9	15.2
		(29.0)	(30.8)	(28.5)
Population in agriculture in 1930 (%) × 1940		0.00040	0.00078	0.00012
		(0.0014)	(0.0015)	(0.0014)
Population in cities in 1930 (%) × 1940		-0.0012	0.00027	-0.00086
		(0.00079)	(0.0022)	(0.00078)
Commodity potential (log) in 1930 × 1940		0.028***	0.059**	0.030***
		(0.010)	(0.025)	(0.010)
Land reform by 1930 (grants) × 1940		-0.017	-0.18***	-0.013
		(0.021)	(0.048)	(0.021)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	0.14	0.14	0.077	0.14
Within-*Municipio* SD of DV	0.17	0.17	0.10	0.17
R sq.	0.61	0.62	0.57	0.61
Observations	3114	3114	1524	3114
Number of municipios	1557	1557	762	1557

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (clustered at the *municipio* level) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.2 Alternative Measures: Cross-sectional Design

Table C.3: Commodity Shocks and Local Bureaucrats (1940)
Alternative Measures

	(1) Number of local bureaucrats (log)	(2) Number of local bureaucrats (log)	(3) Number of bureaucrats (log)	(4) Number of bureaucrats (log)	(5) Land reform (% of mun.)	(6) Land reform (% of mun.)
Commodity potential 1920s (log)	0.019	-0.021	0.039	-0.015	0.14***	0.019
	(0.021)	(0.014)	(0.029)	(0.015)	(0.046)	(0.052)
% shock to commodity potential	-1.61***	-1.01***	-2.61***	-1.84***	1.51	-4.25***
	(0.40)	(0.30)	(0.52)	(0.32)	(1.04)	(0.96)
Population, 1930 (log)		0.61***		0.87***		0.79***
		(0.030)		(0.034)		(0.15)
Bureaucrats per 1000 people, 1930		0.015***		0.036***		
		(0.0026)		(0.0047)		
Municipal surface area, Ha. (log)		0.12***		0.18***		-0.46***
		(0.021)		(0.025)		(0.12)
Localities per Ha., 1930		88.8**		171.5***		654.5*
		(36.5)		(51.0)		(339.0)
Pop. in agriculture 1930 (%)		-0.0048**		-0.0027		-0.0046
		(0.0021)		(0.0022)		(0.0084)
Pop. in cities 1930 (%)		0.016***		0.014***		-0.0057
		(0.0014)		(0.0014)		(0.0053)
Land reform by 1930 (% of municipio)					0.28*	0.19
					(0.15)	(0.13)
Mean of DV	1.28	1.36	2.72	2.85	1.14	1.17
SD of DV	1.18	1.18	1.54	1.48	3.36	3.39
R sq.	0.010	0.61	0.016	0.72	0.018	0.11
Number of municipios	1587	1462	1587	1462	1596	1557

OLS estimations. See equation (2) for the econometric specification. The unit-of-analysis is the *municipio*. *Municipios* with *haciendas*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.4: Commodity Shocks and Long Term Local State Capacity
Alternative Measures

	(1)	(2)	(3)	(4)	(5)	(6)
	Bureaucrats (log) (2000)	Bureaucrats (log) (2000)	Bureaucrats (log) (2000)	Local taxes (log) Avg. 1989-2013	Local taxes (log) Avg. 1989-2013	Local taxes (log) Avg. 1989-2013
Commodity potential 1920s (log)	-0.018	-0.012	0.014	0.078***	0.088***	0.063***
	(0.011)	(0.011)	(0.0094)	(0.022)	(0.022)	(0.021)
% shock to commodity potential	-1.86***	-1.50***	0.083	-1.84***	-0.48	-3.32***
	(0.20)	(0.22)	(0.19)	(0.35)	(0.83)	(0.40)
Population, 1930 (log)		-0.11***	0.0015		0.22***	0.064
		(0.029)	(0.024)		(0.063)	(0.045)
Bureaucrats per 1000 people, 1930		0.021***	0.013***		-0.0026	0.0060*
		(0.0020)	(0.0017)		(0.0064)	(0.0032)
Municipal surface area, Ha. (log)		0.047***	0.063***		0.11*	-0.033
		(0.017)	(0.014)		(0.063)	(0.027)
Localities per Ha., 1930		88.3***	44.5*		-47.5	96.5**
		(31.3)	(24.7)		(191.8)	(44.6)
Pop. in agriculture 1930 (%)		-0.0064***	-0.00034		0.0035	-0.0092***
		(0.0016)	(0.0014)		(0.0038)	(0.0026)
Pop. in cities 1930 (%)		0.0039***	0.0015**		0.012***	0.0025*
		(0.00083)	(0.00072)		(0.0043)	(0.0014)
Municipal GDP 2005 (log)			0.82***	0.87***	0.69***	0.37***
			(0.033)	(0.054)	(0.083)	(0.035)
Federal transfers (log) Avg. 1989-2013			-0.014			0.85***
			(0.013)			(0.044)
Population, 2000 (log)	1.05***	1.02***	0.047			
	(0.013)	(0.019)	(0.044)			
Mean of DV	9.71	9.71	9.71	0.42	0.42	0.42
SD of DV	6.69	6.69	6.69	0.46	0.46	0.46
R sq.	0.86	0.88	0.92	0.49	0.51	0.78
Number of municipios	1455	1455	1455	1462	1462	1462

OLS estimations. See equation (2) for the econometric specification. The unit-of-analysis is the *municipio*. Municipios with *haciendas*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.3 Evidence of Pre-Depression Parallel Trends

An important assumption for a causal interpretation of the effect of shocks to commodity potential is that, in the absence of the shock, affected and unaffected places would have followed parallel trends in terms of bureaucrats and land redistribution. This assumption, while untestable, implies that, prior to the shock, trends should be parallel between relatively affected and unaffected *municipios*.

In table C.5, I directly assess whether the shock to commodity potential (from 1930 to 1940) predicts pre-Depression changes in bureaucrats (from 1900 to 1930) and land redistribution (from 1920 to 1930). If this were the case, then the parallel trends assumption would be violated in the pre-Depression period.

The results confirm the pattern illustrated by the figure 4. In no case is commodity potential significantly associated with the pre-Depression outcomes. Furthermore, the estimated conditional correlations are much smaller than the actual effects (presented in columns 1-2 and 5-6 for reference), and close to zero.

Table C.5: Pre-Depression Parallel Trends

	Bureaucrats per 1000 people (1930-1940)		Bureaucrats per 1000 people (Pre-Depression, 1900-1930)		Land reform, grants (1930-1940)		Land reform, grants (Pre-Depression, 1920-1930)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Commodity potential (log)	-9.19*	-11.1**	-1.76	3.49	-3.31**	-4.69***	-0.046	0.066
	(4.86)	(4.59)	(4.05)	(4.50)	(1.65)	(1.73)	(0.30)	(0.075)
Population in 1930 (log) $\times$ 1940		0.092		-0.58		2.12***		-0.0066
		(0.52)		(0.48)		(0.37)		(0.0067)
Municipal surface area, Ha. (log) $\times$ 1940		-0.011		0.55		0.0090		0.00011
		(0.35)		(0.36)		(0.15)		(0.0048)
Localities per Ha. in 1930 $\times$ 1940		390.5		349.4		40.9		-1.45
		(357.4)		(418.3)		(197.7)		(6.32)
Population in agriculture in 1930 (%) $\times$ 1940		0.0065		-0.070		0.017		-0.00051
		(0.035)		(0.048)		(0.013)		(0.00060)
Population in cities in 1930 (%) $\times$ 1940		-4.03		15.3***		0.015		0.000098
		(3.55)		(4.07)		(0.014)		(0.00031)
Commodity potential (log) in 1930 $\times$ 1940		0.0093		-0.11		-0.028		0.0086
		(0.20)		(0.20)		(0.11)		(0.011)
Land reform by 1930 (grants) $\times$ 1940						0.28		0.97***
						(0.38)		(0.016)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	4.40	4.40	2.54	2.54	1.35	1.35	1.35	1.35
Within-*Municipio* SD of DV	2.31	2.31	2.15	2.15	1.62	1.62	1.62	1.62
R sq.	0.73	0.73	0.60	0.67	0.58	0.65	0.52	0.98
Observations	2396	2396	2396	2396	3114	3114	3114	3114
Number of municipios	1216	1216	1216	1216	1557	1557	1557	1557

OLS estimations. See equation (1) for the econometric specification. Jurisdictions or *municipios* with *haciendas*. In models 1-4, the yearly unit-of-analysis is the smallest jurisdiction in which the *municipios* of 1900 and 1940 completely overlap. This spatial aggregation results in 1,547 artificial jurisdictions, of which 1,235 had at least an *hacienda* in 1930. In models 5-8, the unit-of-analysis is the *municipio*-year. Standard errors (clustered at the jurisdiction level in models 1-4 and at the *municipio* level in models 5-8) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

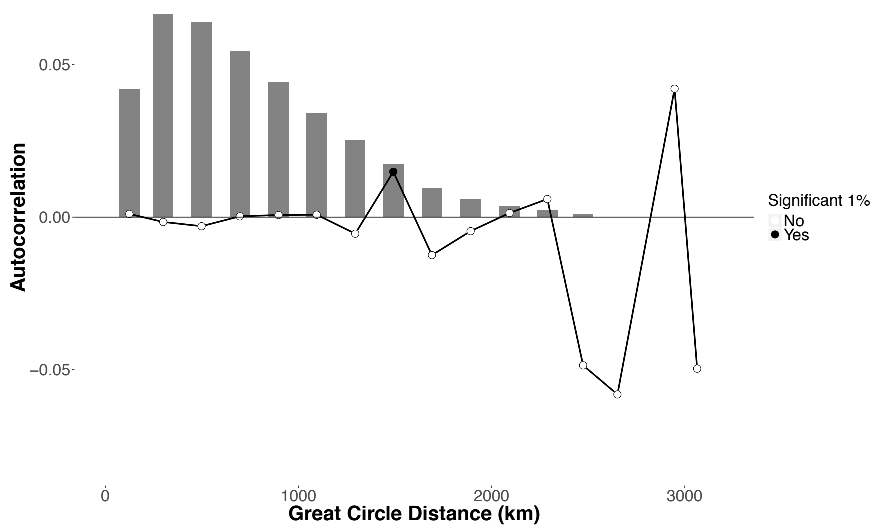
C.4 Spatial Correlation of Errors

Given the nature of crop suitabilities, spatial clustering may affect the validity of the results. The Moran's I statistics for the residuals of the estimated models from equation (1) suggest some evidence of spatial autocorrelation for land redistribution. Taking column 2 of table 2, for example, the estimated Moran's I is 0.0293, and the null of no spatial autocorrelation is rejected at the 1% level. For the case of the number of bureacrats, in contrast, I find no evidence of spatial autocorrelation. From the model in column 2 of table 1, Moran's I is 0.0007, and the null of no spatial autocorrelation cannot be rejected at standard levels (the p-value is 0.35).

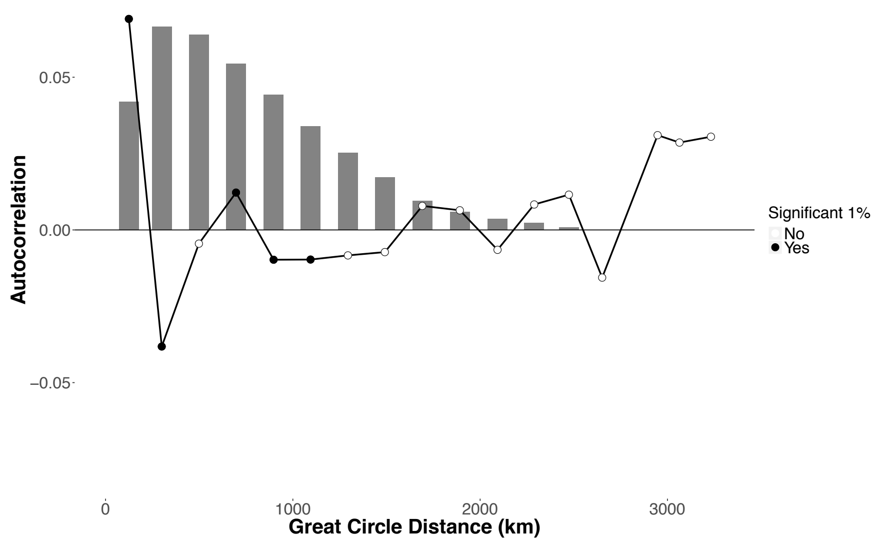
To further explore the nature of the spatial autocorrelation of the residuals, I present in figure C.1 the spatial correlograms of the residuals for both outcomes. The figure presents the spatial correlation of residuals as distance between *municipio* dyads increases up to roughly 3,300km, the maximum distance between *municipio* dyads in Mexico. These correlations suggest a similar conclusion as the global Moran's I above: there is no discernible pattern of spatial correlation in residuals from the model on bureaucrats, and a small but visible one for the model on land redistribution. Specifically, the residuals of *municipios* that are close are positively correlated, a pattern that is reversed at around the 400km mark. After 1,200km, the spatial autocorrelation is no longer significant.

I use these insights to re-estimate tables 1 and 2, assuming serial correlation within *municipio*—equivalent to clustering at the *municipio* level—as well as spatial correlation in equation (1)'s errors between *municipios* that are within 1,200 km of one another. The variance-covariance matrix is estimated using an approach described in Conley (2008) and Hsiang (2010). These estimations are presented in tables C.6 and C.7 below. The main results are unchanged by making these alternative assumptions about the distribution of the errors in equation (1).

Figure C.1: Spatial Correlation of Errors: Spatial Correlograms
The Correlograms Reveal Some Spatial Autocorrelation in Land Redistribution.



(a) Bureaucrats



(b) Land Redistribution

The figures present the spatial correlation between residuals as distance between *municipios* increases up to the maximum distance in Mexico. The **upper** panel uses the residuals of the fully specified model for the number of bureaucrats (column 2 in table 1) and the **lower** panel uses the residuals from a model for land redistribution (column 2 in table 2). The histogram presents the distribution of the number of *municipio* dyads by distance.

Table C.6: Commodity Shocks and Bureaucrats
Spatial Clustering of Errors

	(1) Bureaucrats per 1000 people (Haciendas)	(2) Bureaucrats per 1000 people (Haciendas)	(3) Bureaucrats per 1000 people (No haciendas)	(4) Bureaucrats per 1000 people (Haciendas)
Commodity potential (log)	-7.92***	-9.39***	2.14	
	(2.55)	(2.50)	(2.17)	
Placebo commodity potential (log)				-0.34
				(0.37)
Population in 1930 (log) × 1940		0.12	0.97***	-0.29
		(0.26)	(0.24)	(0.32)
Municipal surface area, Ha. (log) × 1940		0.090	0.15	0.49**
		(0.18)	(0.26)	(0.22)
Localities per Ha. in 1930 × 1940		474.0**	437.0*	418.7**
		(188.1)	(249.2)	(200.3)
Population in agriculture in 1930 (%) × 1940		-0.022	-0.019	-0.034
		(0.021)	(0.015)	(0.022)
Population in cities in 1930 (%) × 1940		-0.042**	0.036**	-0.035*
		(0.019)	(0.015)	(0.019)
Commodity potential (log) in 1930 × 1940		0.011	0.013	0.050
		(0.11)	(0.13)	(0.16)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	4.23	4.23	4.23	4.23
Within-*Municipio* SD of DV	2.34	2.34	2.34	2.34
R sq.	0.0092	0.019	0.073	0.0092
Observations	3019	3019	1489	3019
Number of municipios	1557	1557	1557	1557

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (that assume serial correlation within *municipios* and spatial correlation between *municipios* within 1,200 km from each other) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.7: Commodity Shocks and Land Redistribution
Spatial Clustering of Errors

	(1) Land reform, grants (Haciendas)	(2) Land reform, grants (Haciendas)	(3) Land reform, grants (No haciendas)	(4) Land reform, grants (Haciendas)
Commodity potential (log)	-3.31*	-4.69***	3.78***	
	(1.71)	(1.11)	(1.27)	
Placebo commodity potential (log)				0.056
				(0.20)
Population in 1930 (log) × 1940		2.12***	0.43*	1.96***
		(0.44)	(0.22)	(0.41)
Municipal surface area, Ha. (log) × 1940		0.0090	0.41***	0.15
		(0.11)	(0.11)	(0.11)
Localities per Ha. in 1930 × 1940		40.9	17.6	2.25
		(121.5)	(75.9)	(117.9)
Population in agriculture in 1930 (%) × 1940		0.017**	0.0011	0.015*
		(0.0078)	(0.0028)	(0.0079)
Population in cities in 1930 (%) × 1940		0.015*	0.0032	0.018**
		(0.0080)	(0.0062)	(0.0081)
Commodity potential (log) in 1930 × 1940		-0.028	0.17***	-0.0087
		(0.095)	(0.053)	(0.089)
Land reform by 1930 (grants) × 1940		0.28	-0.74***	0.31
		(0.21)	(0.25)	(0.21)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	1.35	1.35	1.35	1.35
Within-*Municipio* SD of DV	1.62	1.62	1.62	1.62
R sq.	0.0036	0.17	0.17	0.17
Observations	3114	3114	1524	3114
Number of municipios	1557	1557	1557	1557

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (that assume serial correlation within *municipios* and spatial correlation between *municipios* within 1,200 km from each other) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.5 Alternative Estimation Strategies

To further assess the robustness of the results, in tables C.8 and C.9 I implement two alternative estimation strategies to the main difference-in-differences approach.

First, I follow an estimation strategy based on selection on observables, presented in columns 1-4 of both tables. To be able to match between two groups (i.e., treatment and control), I first identify *municipios* that were negatively shocked above average between 1930 and 1940, and *municipios* that were negatively shocked below average over the same period. I then find weights that match the mean of predetermined observables between these two groups. I find these weights using a method described in Hainmueller (2012), matching on pre-Great Depression covariates: commodity potential in 1930, the *municipio*'s surface area, log of 1930 population, localities per Ha. in 1930, the proportion of the population in agriculture and in cities in 1930, and land redistribution by 1930. With these weights, I re-estimate equation (1) (columns 1 and 2), as well as a modified difference-in-differences that uses the dichotomous treatment described above instead of the continuous commodity shock (columns 3 and 4).

I also follow O'Neill et al. (2016) and estimate a Lagged Dependent Variable model, using only the 1940 cross-section (columns 5 and 6 of tables C.8 and C.9.) Specifically, the estimating equation is

$$y_{i,1940} = \alpha + \phi y_{i,1930} + \beta ln\bar{V}_{i,1940} + \delta X_{i,1930} + \varepsilon_i. \tag{A3}$$

As tables C.8 and C.9 show, the results are largely robust to these estimation strategies. The coefficients for commodity potential are negative and of comparable magnitude to the baseline difference-in-difference estimation for both bureaucrats and land redistribution (though the estimate for bureaucrats in a model without controls is not precisely estimated). A shock variable that indicates whether a *municipio* was hit by the Great Depression harder than average also reveals a qualitatively similar negative effect. Finally the lagged dependent variable model reveals similar results with the inclusion of the pre-determined controls (but no effect of the shock in the specification without controls).

Table C.8: Commodity Shocks and Bureaucrats
Alternative Estimation Strategies

	Entropy Balance				Lagged DV	
	(1) Bureaucrats per 1K p.	(2) Bureaucrats per 1K p.	(3) Bureaucrats per 1K p.	(4) Bureaucrats per 1K p.	(5) Bureaucrats per 1K p.	(6) Bureaucrats per 1K p.
Commodity potential (log)	-6.34	-7.01*			-0.015	-7.39***
	(3.98)	(3.88)			(0.089)	(2.17)
% Shock to Commodity Potential (Dichotomous: Above Avg.)			-1.04	-1.04*		
			(0.65)	(0.62)		
Bureaucrats per 1000 people (Lagged)					0.47***	0.37***
					(0.044)	(0.044)
Population in 1930 (log) × 1940		0.32		0.23		-0.29
		(0.55)		(0.55)		(0.27)
Municipal surface area, Ha. (log) × 1940		0.085		0.20		0.64***
		(0.36)		(0.37)		(0.20)
Localities per Ha. in 1930 × 1940		410.8		404.9		967.7**
		(355.3)		(347.8)		(400.2)
Population in agriculture in 1930 (%) × 1940		-0.035		-0.037		-0.046***
		(0.033)		(0.032)		(0.017)
Population in cities in 1930 (%) × 1940		-0.092		-0.091		0.075***
		(0.059)		(0.059)		(0.015)
Commodity potential (log) in 1930 × 1940		0.010		0.052		7.38***
		(0.19)		(0.19)		(2.20)
Entropy Balance Weights	Yes	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes	No	No
Municipality FE	Yes	Yes	Yes	Yes	No	No
Within-*Municipio* Mean of DV	4.29	4.29	4.29	4.29		
Within-*Municipio* SD of DV	2.34	2.34	2.34	2.34		
Mean of DV					4.79	4.79
SD of DV					8.03	8.03
R sq.	0.78	0.79	0.78	0.79	0.21	0.26
Observations	2924	2924	2924	2924	1462	1462
Number of municipios	1462	1462	1462	1462	1462	1462

OLS estimations. See equation (1) for the econometric specification of columns 1-4, and equation (A3) for the estimating equation of columns 5-6. The unit-of-analysis is the *municipio*-year. *Municipios* with *haciendas*. Standard errors (clustered at the *municipio* level in columns 1-4, and robust in columns 5-6) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.9: Commodity Shocks and Land Redistribution
Alternative Estimation Strategies

	Entropy Balance				Lagged DV	
	(1)	(2)	(3)	(4)	(5)	(6)
	Land reform, grants	Land reform, grants	Land reform, grants	Land reform, grants	Land reform, grants	Land reform, grants
Commodity potential (log)	-5.07***	-4.93**			0.13	-4.63***
	(1.96)	(1.93)			(0.087)	(1.22)
% Shock to Commodity Potential (Dichotomous: Above Avg.)			-1.10**	-1.10**		
			(0.48)	(0.45)		
Land reform, grants (Lagged)					1.88***	-0.70
					(0.32)	(2.19)
Population in 1930 (log) × 1940		2.34***		2.27***		2.11***
		(0.53)		(0.52)		(0.26)
Municipal surface area, Ha. (log) × 1940		-0.070		0.014		0.0091
		(0.22)		(0.22)		(0.10)
Localities per Ha. in 1930 × 1940		-275.8		-282.6		39.7
		(347.1)		(350.1)		(139.5)
Population in agriculture in 1930 (%) × 1940		0.043**		0.042**		0.016*
		(0.021)		(0.021)		(0.0094)
Population in cities in 1930 (%) × 1940		0.012		0.012		0.015
		(0.016)		(0.016)		(0.010)
Commodity potential (log) in 1930 × 1940		0.021		0.051		4.61***
		(0.10)		(0.11)		(1.21)
Land reform by 1930 (grants) × 1940		0.35		0.37		1.96
		(0.46)		(0.46)		(2.17)
Entropy Balance Weights	Yes	Yes	Yes	Yes	No	No
Year FE	Yes	Yes	Yes	Yes	No	No
Municipality FE	Yes	Yes	Yes	Yes	No	No
Within-*Municipio* Mean of DV	1.37	1.37	1.37	1.37		
Within-*Municipio* SD of DV	1.65	1.65	1.65	1.65		
Mean of DV					2.44	2.44
SD of DV					5.74	5.74
R sq.	0.57	0.63	0.57	0.63	0.086	0.23
Observations	2924	2924	2924	2924	1557	1557
Number of municipios	1462	1462	1462	1462	1557	1557

OLS estimations. See equation (1) for the econometric specification of columns 1-4, and equation (A3) for the estimating equation of columns 5-6. The unit-of-analysis is the *municipio*-year. *Municipios* with *haciendas*. Standard errors (clustered at the *municipio* level in columns 1-4, and robust in columns 5-6) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.6 Exclusion of Commodity Potential in Cross-sectional Design

Initial commodity potential, in levels ($ln\bar{V}_i^{1920s}$), can be plausibly correlated with unobservables, which themselves may be associated with any of the outcomes that I consider (local bureaucrats and land redistribution by 1940, or long-term outcomes). That alone would bias the estimate of initial commodity potential ($\hat{\beta}_0$ from equation 2). However, if initial commodity potential is additionally correlated with the commodity shock ($S_i^{1920s-30s}$), then the main estimate of interest, $\hat{\beta}_1$, will be biased as well.

The commodity shock, however, is driven by exogenous changes in international commodity prices, and is not correlated with initial (1920s) commodity potential (the correlation coefficient is 0.0056 in places with *haciendas*, and statistically indistinguishable from zero.) This suggests that the inclusion/exclusion of initial commodity potential should not affect the results. I verify that this is the case by re-estimating the cross-sectional models in tables C.10 and C.11, which exclude initial commodity potential, both for contemporary changes in local bureaucrats and for long term outcomes. In both the short- and long-term models, the results are substantively unchanged by the exclusion of initial commodity potential.

Table C.10: Commodity Shocks and Local Bureaucrats (1940)
Excluding Commodity Potential (1920s)

	(1) Local bureaucrats per 1000 people	(2) Local bureaucrats per 1000 people	(3) Bureaucrats per 1000 people	(4) Bureaucrats per 1000 people	(5) Land redistribution (grants)	(6) Land redistribution (grants)
% shock to commodity potential	-2.08***	-0.96***	-14.3***	-9.65***	-4.63***	-6.29***
	(0.34)	(0.30)	(3.51)	(2.81)	(1.51)	(1.63)
Population, 1930 (log)		-0.052		-0.33		2.10***
		(0.036)		(0.27)		(0.26)
Bureaucrats per 1000 people, 1930		0.017***		0.37***		
		(0.0048)		(0.044)		
Municipal surface area, Ha. (log)		0.14***		0.67***		0.021
		(0.025)		(0.20)		(0.10)
Localities per Ha., 1930		85.2**		971.9**		41.1
		(36.7)		(397.2)		(138.9)
Pop. in agriculture 1930 (%)		-0.0083***		-0.047***		0.016*
		(0.0024)		(0.016)		(0.0092)
Pop. in cities 1930 (%)		0.013***		0.076***		0.015
		(0.0018)		(0.015)		(0.0100)
Land reform by 1930 (grants)					2.85***	2.25***
					(0.31)	(0.27)
Mean of DV	0.66	0.69	4.64	4.79	2.63	2.69
SD of DV	0.85	0.85	7.94	8.03	6.00	6.06
R sq.	0.031	0.24	0.017	0.26	0.19	0.31
Number of municipios	1565	1462	1565	1462	1596	1557

OLS estimations. See equation (2) for the econometric specification. The unit-of-analysis is the *municipio*. Municipios with *haciendas*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.11: Commodity Shocks and Long Term Local State Capacity
Excluding Commodity Potential (1920s)

	(1) Bureaucrats per 1000 people (2000)	(2) Bureaucrats per 1000 people (2000)	(3) Local taxes (% of mun. GDP) Avg. 1989-2013	(4) Local taxes (% of mun. GDP) Avg. 1989-2013
% shock to commodity potential	-14.1***	-13.3***	-1.00***	-0.96***
	(2.37)	(2.31)	(0.15)	(0.15)
Population, 1930 (log)	-1.32***	-2.66***	-0.028	0.071***
	(0.30)	(0.32)	(0.022)	(0.020)
Bureaucrats per 1000 people, 1930	0.33***	0.28***	0.00049	0.0034**
	(0.032)	(0.032)	(0.0014)	(0.0016)
Municipal surface area, Ha. (log)	0.14	0.29	0.0095	0.0050
	(0.21)	(0.19)	(0.013)	(0.013)
Localities per Ha., 1930	628.6**	395.0	63.3***	74.2***
	(294.8)	(258.0)	(23.2)	(23.9)
Pop. in agriculture 1930 (%)	-0.075***	-0.069***	-0.0024	-0.0023
	(0.020)	(0.020)	(0.0017)	(0.0016)
Pop. in cities 1930 (%)	0.035***	0.032***	-0.00039	0.00014
	(0.011)	(0.010)	(0.00059)	(0.00064)
Municipal GDP 2005 (log)		1.51***		-0.093***
		(0.21)		(0.017)
Federal transfers (log) Avg. 1989-2013		-0.60***		0.012*
		(0.10)		(0.0068)
Mean of DV	9.71	9.71	0.42	0.42
SD of DV	6.69	6.69	0.46	0.46
R sq.	0.23	0.28	0.033	0.072
Number of municipios	1455	1455	1462	1462

OLS estimations. See equation (2) for the econometric specification. The unit-of-analysis is the *municipio*. Municipios with *haciendas*. Robust standard errors in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.7 State-Level Covariate: Access to Land

Table C.12: Access to Land and Rural Population in 1930

State	Households with access to rural land	Number of households	Households with access to rural land (%)	Population	Rural population	Rural population (%)
Aguascalientes	4 264	27 240	15.7%	132 900	60 165	45.3%
Baja California Norte	1 994	8 736	22.8%	48 327	22 059	45.6%
Baja California Sur	1 943	7 857	24.7%	47 089	30 110	63.9%
Campeche	5 032	16 276	30.9%	84 630	46 475	54.9%
Coahuila						
Colima	3 222	13 058	24.7%	61 923	34 521	55.7%
Chiapas	53 398	106 085	50.3%	529 983	437 356	82.5%
Chihuahua	35 459	94 936	37.4%	491 792	329 693	67.0%
Distrito Federal	18 218	238 565	7.6%	1 229 576	94 453	7.7%
Durango	23 481	80 062	29.3%	404 364	310 116	76.7%
Guanajuato	39 358	205 502	19.2%	987 801	651 138	65.9%
Guerrero	90 796	129 112	70.3%	641 690	544 354	84.8%
Hidalgo	83 165	134 999	61.6%	677 772	562 839	83.0%
Jalisco	65 098	254 958	25.5%	1 255 346	760 894	60.6%
México	128 056	199 096	64.3%	990 112	787 156	79.5%
Michoacán	75 195	213 612	35.2%	1 048 381	773 051	73.7%
Morelos	15 584	28 109	55.4%	132 068	98 849	74.8%
Nayarit	9 781	34 666	28.2%	167 724	109 021	65.0%
Nuevo León	23 673	81 547	29.0%	417 491	245 316	58.8%
Oaxaca	160 994	225 865	71.3%	1 084 549	888 648	81.9%
Puebla	134 343	238 944	56.2%	1 150 425	830 901	72.2%
Querétaro	13 382	48 965	27.3%	234 058	187 782	80.2%
Quintana Roo	1 139	1 829	62.3%	10 620	7 830	73.7%
San Luis Potosí	40 156	117 281	34.2%	579 831	421 119	72.6%
Sinaloa	35 486	74 509	47.6%	395 618	304 967	77.1%
Sonora	19 000	57 443	33.1%	316 271	200 046	63.3%
Tabasco	19 775	39 617	49.9%	224 023	185 233	82.7%
Tamaulipas	17 369	67 943	25.6%	344 039	196 672	57.2%
Tlaxcala	25 850	41 218	62.7%	205 458	148 826	72.4%
Veracruz	130 863	272 084	48.1%	1 377 293	984 367	71.5%
Yucatán	24 744	77 916	31.8%	386 096	200 229	51.9%
Zacatecas	33 272	94 828	35.1%	459 047	348 756	76.0%

Data from the 1930 Population Census.

Table C.13: Commodity Shocks and Bureaucrats
Conditioning on State-Level Access to Land

	(1) Bureaucrats per 1000 people (Haciendas)	(2) Bureaucrats per 1000 people (Haciendas)	(3) Bureaucrats per 1000 people (No haciendas)	(4) Bureaucrats per 1000 people (Haciendas)
Commodity potential (log)	-7.92*	-7.68*	1.10	
	(4.33)	(4.47)	(2.92)	
Placebo commodity potential (log)				-0.58
				(0.53)
Population in 1930 (log) × 1940		0.14	0.96**	-0.21
		(0.46)	(0.43)	(0.53)
Municipal surface area, Ha. (log) × 1940		0.15	0.070	0.45
		(0.33)	(0.36)	(0.41)
Localities per Ha. in 1930 × 1940		424.9	364.0	346.5
		(379.0)	(495.0)	(360.4)
Population in agriculture in 1930 (%) × 1940		-0.017	-0.020	-0.023
		(0.035)	(0.028)	(0.034)
Population in cities in 1930 (%) × 1940		-0.046	0.036	-0.040
		(0.037)	(0.029)	(0.036)
Commodity potential (log) in 1930 × 1940		0.14	-0.029	0.22
		(0.20)	(0.18)	(0.20)
State rural population 1930 (%) × 1940		-0.077*	0.059	-0.094**
		(0.045)	(0.11)	(0.045)
State-level families w/rural land in 1930 (%) × 1940		0.023	-0.047	0.015
		(0.031)	(0.067)	(0.030)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	4.23	4.19	2.49	4.19
Within-*Municipio* SD of DV	2.34	2.33	1.75	2.33
R sq.	0.74	0.74	0.75	0.74
Observations	3019	2950	1487	2950
Number of municipios	1557	1522	761	1522

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (clustered at the *municipio* level) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table C.14: Commodity Shocks and Land Redistribution Conditioning on State-Level Access to Land

	(1) Land reform, grants (Haciendas)	(2) Land reform, grants (Haciendas)	(3) Land reform, grants (No haciendas)	(4) Land reform, grants (Haciendas)
Commodity potential (log)	-3.31**	-3.89**	2.17**	
	(1.65)	(1.68)	(1.03)	
Placebo commodity potential (log)				-0.25
				(0.31)
Population in 1930 (log) $\times$ 1940		1.99***	0.51**	1.84***
		(0.35)	(0.22)	(0.34)
Municipal surface area, Ha. (log) $\times$ 1940		-0.37**	0.21*	-0.23
		(0.18)	(0.12)	(0.18)
Localities per Ha. in 1930 $\times$ 1940		-87.8	-115.3	-131.3
		(184.4)	(161.9)	(190.6)
Population in agriculture in 1930 (%) $\times$ 1940		0.013	-0.0015	0.012
		(0.010)	(0.0058)	(0.010)
Population in cities in 1930 (%) $\times$ 1940		0.015	0.0033	0.018
		(0.014)	(0.012)	(0.013)
Commodity potential (log) in 1930 $\times$ 1940		0.029	0.099	0.071
		(0.091)	(0.087)	(0.093)
Land reform by 1930 (grants) $\times$ 1940		0.26	-0.76**	0.28
		(0.38)	(0.38)	(0.37)
State rural population 1930 (%) $\times$ 1940		0.100***	0.15**	0.090***
		(0.024)	(0.067)	(0.023)
State-level families w/rural land in 1930 (%) $\times$ 1940		-0.089***	-0.093**	-0.092***
		(0.019)	(0.044)	(0.020)
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Within-*Municipio* Mean of DV	1.35	1.31	0.34	1.31
Within-*Municipio* SD of DV	1.62	1.57	0.42	1.57
R sq.	0.58	0.66	0.63	0.66
Observations	3114	3044	1522	3044
Number of municipios	1557	1522	761	1522

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (clustered at the *municipio* level) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

C.8 Alternative Explanation: Federal Government-led Land Redistribution

Table C.15: Rate of Positive Land Reform Presidential Resolutions

	(1) Positive Land Grant Resolutions (%) (Haciendas)	(2) Positive Land Grant Resolutions (%) (Haciendas)	(3) Positive Land Grant Resolutions (%) (No Haciendas)
Commodity potential (log)	-0.13	-0.0075	0.82
	(0.16)	(0.19)	(0.52)
Population in 1930 (log) $\times$ 1940		0.0037	-0.054
		(0.030)	(0.077)
Municipal surface area, Ha. (log) $\times$ 1940		0.015	-0.0019
		(0.020)	(0.065)
Localities per Ha. in 1930 $\times$ 1940		-10.1	-89.4
		(32.9)	(100.3)
Population in agriculture in 1930 (%) $\times$ 1940		0.0017	0.0021
		(0.0020)	(0.0033)
Population in cities in 1930 (%) $\times$ 1940		0.00071	0.0013
		(0.0011)	(0.0023)
Commodity potential (log) in 1930 $\times$ 1940		0.0053	0.056
		(0.011)	(0.046)
Land reform by 1930 (grants) $\times$ 1940		-0.027**	-0.0076
		(0.011)	(0.032)
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Within-*Municipio* Mean of DV	0.85	0.85	0.81
Within-*Municipio* SD of DV	0.15	0.15	0.17
R sq.	0.68	0.68	0.82
Observations	2144	2128	507
Number of municipios	1318	1308	365

OLS estimations. See equation (1) for the econometric specification. The unit-of-analysis is the *municipio*-year. Standard errors (clustered at the *municipio* level) in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$.

D A Model of Elite Conflict and State Capacity

D.1 Actors and Timing of the Game

Consider two agents interacting for two periods $s = 1,2$, a ruler, R_1, and a non-ruling economic elite, E. In each period, the ruler and the economic elite generate income as a function of exogenous prices, p_s. The ruler gets $\omega(p_s) = \omega_s$, and the economic elite $p_s L$, where L is a fixed asset (e.g., land). The ruler can tax a fraction t of the income generated in the economy, up to the maximum fiscal capacity of the state, $\tau \in [0,1]$ (such that $t \in [0,\tau]$), and either appropriate everything for himself or transfer part of it to the elite. This constraint on taxation captures the limited capacity of a government to perform one of its most essential tasks: raising resources. It can reflect, for instance, the absence of information about taxpayers, or of the necessary officials to collect taxes.

For simplicity, in the first period this maximum capacity, τ, is set to zero, but can be increased for the second period through a costly investment $k > 0$.[2] The ruler's decision to invest in capacity, denoted by $K \in \{0,1\}$, determines whether the ability to tax in the second period is high ($\tau^{K=1} = \tau^H$), or low ($\tau^{K=0} = \tau^L$). Starting from a very low capacity, these investments could take the form of basic staffing of a bureaucracy that gathers information and enforces policy (here, tax collection).

In addition to investing in capacity, the ruler can also decide whether to expropriate part of the economic elite's asset, L, and redistribute it in exchange for political support (e.g., expropriated land redistributed to peasants). The ruler's expropriation decision is denoted by $D \in \{0,1\}$. Expropriation reduces the economic elite's asset to $L - L^D$ in the second period, and, with the support of beneficiaries of redistribution (e.g., landless peasants), increases the ruler's political power, q, from a baseline of low support $q^{D=0} = q^L$ to high support $q^{D=1} = q^H$, with $q^H > q^L > 0$. For

[2] Allowing for a positive τ in the first period, or a common time discount factor does not modify the results of the model.

simplicity, the level of expropriation is assumed to be exogenous and fixed up to the total amount of the original asset, $L^{D=1} \in (0, L)$ (so that with no expropriation $L^{D=0} = 0$).[3] It is also assumed that expropriation can be attempted even with low capacity and at no direct cost to the ruler.[4] The economic elite, subject to the taxation and expropriation decisions of the ruler in the first period, can choose to invest a fraction $r \in [0, 1]$ of their exogenous income to increase their resistance (for example, by hiring private gunmen), and enhance their ability to seize power from the ruler.

The probability that the ruler in period 1 is deposed and replaced by the economic elite in period 2 depends on the political power that both agents are able and willing to marshal. Specifically, the probability that the ruler is toppled is given by a standard ratio contest function of the form $\gamma = \frac{rp_1L}{rp_1L+q^D}$ (Skaperdas 1996). The ruler can decrease the probability of losing power by mobilizing support through expropriation (by increasing q^D), while the economic elite can increase their own chances by spending part of their first period income in resisting the ruler (by increasing r). If successful in overthrowing the ruler, the economic elite can roll back any intended asset expropriation, as well as take control of the state's taxing capacity and redistributive ability.

Both agents, ruler and economic elite, have linear utilities. For the ruler, the period 1 payoff is $u_1 = \omega_1 - \mathbb{1}(K = 1)k$, where k is the exogenous cost of investing in capacity. In period 2, his payoff is $u_2 = (1-t_2)\omega_2 + T_2^{R_1}$, where t_2 is the level of taxation and $T_2^{R_1}$ is a transfer to the first-period ruler from the collected revenue. For the economic elite, the period 1 payoff is $u_1 = (1-r)p_1L$, where r is the fraction of period 1 income that the elite invest in resisting. In period 2, $u_2 = (1-t_2)p_2(L-L^D) + T_2^E$, where L^D is the expropriated land, if any, and T_2^E is a

[3] Keeping the ruler's choices discrete simplifies the exposition of the model and keeps the algebra simple. However, similar results emerge when allowing the ruler to choose the intensity of expropriation and the level of investment in capacity. In section D.7, I present a version of the model where the ruler has such a continuous action space.

[4] The main results of the model hold for reasonable parameter values when there is a fixed cost to expropriation, or when the expropriated assets—for instance, redistributed land—cannot be taxed in the second period. In section D.6 I present an extension that integrates the latter idea into the baseline model.

transfer to the economic elite from the collected revenue.

To draw attention to how the strategic interaction between a ruler and an enemy elite is shaped by their relative balance of power, and ultimately by a shock to this balance, I model their behavior in an environment of perfect and complete information.

To sum up, in period 1, the ruler makes two simultaneous choices: whether to expropriate a portion L^D of the economic elite's asset, L (decision D), and whether to pay the cost k of the investment in future fiscal capacity (decision K). Upon observing this, the economic elite chooses, in period 1, the level of investment in political power, r. In period 2, whoever takes over political power sets the level of taxation, t_2, and chooses transfers $T_2^{R_1}$ and T_2^E.

The timing of the game is:

1. The parameters k, q^D, L, L^D, p_1, and p_2 are given; period 1 incomes $p_1 L$ and ω_1 are realized.
2. Period 1 ruler, R_1, chooses whether to expropriate (D), and whether to invest in period 2 capacity (K).
3. The economic elite, E, chooses the proportion of first-period income used to topple the ruler, r.
4. With probability $\gamma(\cdot)$, the ruler in period 1 is replaced in power by the economic elite, and with $\big(1-\gamma(\cdot)\big)$ he remains in power; a successful replacement allows the economic elite to roll back expropriation.
5. The second-period incomes $p_2(L-L^D)$, and ω_2 are realized, and the second-period ruler, $R_2 \in \{R_1, E\}$, chooses policies $\{t_2, T_2^{R_2}, T_2^E\}$. Payoffs are realized.

D.2 Equilibrium

I use subgame perfection as a solution concept. Given period 1 decisions of the ruler and the economic elite, whoever retains power in period 2 ($R_2 \in \{R_1, E\}$) taxes to maximum capacity (i.e., $t_2 = \tau_2^K$), and redistributes all revenues to itself ($\tau_2^K(p_2L + \omega_2) = T_2^{R_2}$). Additionally, if the economic elite successfully seizes power, any expropriation chosen by the ruler in period 1 is rolled back.

Given these second-period outcomes, what is the choice of resistance, r, that the economic elite selects? The problem for the elite in the first period is

$$\begin{aligned} max_{\{r\}} u^E &= u_1^E + E(u_2^E) \\ &= \underbrace{(1-r)p_1L}_{u_1^E} + \underbrace{\gamma(\cdot)\big(p_2L + \omega_2\tau_2\big) + [1-\gamma(\cdot)]p_2(L-L^D)(1-\tau_2)}_{E(u_2^E)}. \end{aligned}$$

The problem faced by the economic elite is how much consumption to forego during the first period in exchange for an increased probability of seizing power in period 2. That is, taking a larger slice of their income—which they could otherwise consume—to raise their chances of capturing the state in the future (recall that the elite's probability of seizing power increases with their resistance: $\gamma(\cdot) = \frac{rp_1L}{rp_1L+q^D}$.)

The resulting optimal level of resistance is

$$r^* = \frac{1}{p_1L}\left[\sqrt{q^D\left[(\omega_2 + p_2L)\tau_2^K + p_2L^D(1-\tau_2^K)\right]} - q^D\right]. \tag{T1}$$

I first focus on the interior solution for the optimal level of resistance. This rules out a situation in which the ruler is extremely strong, which occurs when the ruler's political power, q^D, is big relative to future total after-tax income.[5]

D.3 The Low-Capacity Trap

Under these conditions, the economic elite's best response—as captured in (T1)—is to increase its resistance in order to offset changes in the balance of power induced by the ruler. These changes come about when the ruler decides to expropriate, and thus increase his own political resources through peasant support. Similarly, the elite resists more intensely when the expected future extractive capacity is higher—when the ruler decides to invest in capacity—and thus taking control of the state in the future is more attractive.

Given the economic elite's best response, as well as the anticipated period 2 redistributive decisions of whoever takes power ($R_2 \in \{R_1, E\}$), the ruler decides how to act. The ruler's problem is:

$$max_{\{D\in\{0,1\},K\in\{0,1\}\}} \underbrace{\omega_1 - \mathbb{1}(K=1)k}_{u_1^{R_1}} + \underbrace{\gamma(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma(\cdot)][p_2 L\tau_2^K + \omega_2]}_{E(u_2^{R_1})}.$$

The ruler has two decisions to make: whether to expropriate, and whether to invest in future capacity. Consider the expropriation choice first ($D \in \{0,1\}$). For notational ease, denote $\gamma_{D=1}(\cdot) \equiv \frac{r^*_{D=1}p_1 L}{r^*_{D=1}p_1 L + q^D}$ as the probability that the ruler is toppled given that he decides to expropriate (i.e., $D = 1$), and given the economic elite's best response to expropriation (i.e., $r^*_{D=1}$, evaluated in equation (T1)). The ruler decides to expropriate L^D from the economic elite if doing so increases his expected payoff. Define the difference in the ruler's payoff between expropriating and not expropriating as

$$\Gamma(D) \equiv \gamma_{D=1}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=1}(\cdot)][p_2 L\tau_2^K + \omega_2] -$$
$$\left[\gamma_{D=0}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=0}(\cdot)][p_2 L\tau_2^K + \omega_2]\right].$$

[5] It also implies the technical assumption $q^D \geq \frac{p_2 L^D}{\omega_2 + p_2 L}$.

When the *expropriation condition* $\Gamma(D) \geq 0$ holds, the ruler expropriates. For this condition to be met, it is sufficient that $\gamma_{D=1}(\cdot) \leq \gamma_{D=0}(\cdot)$; that is, that expropriation enhances the ruler's chances of survival. Note, however, that this is not always the case. On the one hand, expropriation increases the rulers chance of survival by increasing his political power; on the other hand, the economic elite strategically responds to the threat of expropriation by increasing their own political power, r, potentially offsetting any advantage for the ruler.

What about the decision to invest in future state capacity ($K \in \{0,1\}$)? The ruler chooses to forego present consumption and pay the cost of the capacity investment, k, in exchange for a higher future capacity if it improves his expected payoff. This comparison is again easier to see by defining $\gamma_{K=1}(\cdot) \equiv \frac{r^*_{K=1} p_1 L}{r^*_{K=1} p_1 L + q^D}$ as the probability that the ruler is toppled given that he decides to invest in future capacity (i.e., $K = 1$), and given the economic elite's best response to that choice ($r^*_{K=1}$, evaluated in equation (T1)). Now define the difference between the local ruler's payoff from investing in capacity and his payoff without investing as

$$\Delta(K) \equiv \big\{ \gamma_{K=1}(\cdot)\omega_2(1-\tau_2^H) + [1-\gamma_{K=1}(\cdot)][p_2 L \tau_2^H + \omega_2] - \\ \big[\gamma_{K=0}(\cdot)\omega_2(1-\tau_2^L) + [1-\gamma_{K=0}(\cdot)][p_2 L \tau_2^L + \omega_2]\big] \big\}.$$

The ruler invests in future state capacity if $\Delta(K) \geq k$. This is the *capacity-building condition*. It simply states that when the expected benefit of investing outweighs the investment cost, future capacity is increased. The condition again depends on the economic elite's reaction to a capacity investment decision, through its effect on the probability of survival of the ruler. That is, when the ruler decides to invest in capacity, the economic elite responds by increasing their resistance, which in turn reduces the likelihood that the ruler survives in power to reap the benefits of future capacity (i.e., $\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot)$). Hence, the ruler needs to weigh the increased risk of being deposed against the potential benefits of higher future taxation capacity.

What happens to the likelihood that the ruler expropriates and invests in capacity when period 1 prices, p_1, decrease? Under the assumptions above, marginal changes in p_1 do not have any effect on either decision. This is the case because the economic elite's best response resistance, r^*, adjusts with period 1 prices to offset any changes in the balance of political power that determines the probability of the ruler's survival. For notational convenience, define $\underline{k} \equiv \Delta(K)$ as the threshold investment cost that leaves the ruler indifferent about whether to invest, such that for costs higher than $\underline{k}$, no investment occurs. Then:

Proposition 1. *When the ruler is not overpowering and the elite has enough resources:*

1. The ruler's decision to expropriate L^D from the economic elite's asset, L, is unaffected by marginal changes in first-period prices, p_1.

2. The ruler's threshold investment cost, $\underline{k}$, is unaffected by marginal changes in first-period prices, p_1.

(Proof in section E.1)

Together, these results characterize a low-capacity trap. A sufficiently strong economic elite, through their efforts to seize political power, can deter both expropriation attempts and investments in capacity by the ruler. Furthermore, marginal changes in the elite's resources are not enough to escape a low-capacity trap. Using this basic model, I now show that only a sufficiently large *negative* shock to period 1 prices, p_1, can provide a way out of this trap. The ruler, facing a weakened economic elite, can enhance his chances of survival by expropriating, and can invest in capacity in the absence of effective deterrence by the economic elite.

D.4 Negative Price Shock

In a low-capacity trap, marginal changes in period 1 prices, p_1, do not affect the equilibrium outcomes. However, for a large enough drop in period 1 prices, the best the economic elite can do is to set $r^* = 1$; that is, to use all of their available resources to increase their resistance. This happens because, from the perspective of the economic elite, the value of period 1 consumption decreases (since the prices that determine their income are lower) with respect to future potential payoffs, at the same time as the balance of political power tips in favor of the ruler. They consequently pull all their first-period resources into capturing the state, which in the future would allow them to both enjoy the entirety of their production (by rolling back any expropriation decision), and to tax the resources of the ousted leader for themselves.

To explore the ruler's behavior in the presence of very low prices, define $\underline{p_1}$ as the highest period 1 price such that $r^* = 1$. A "low enough price," then, is one in which $p_1 \leq \underline{p_1}$. In this case, the probability that the ruler is replaced in the second period remains unchanged, regardless of the economic elite's reaction $\left(\text{it becomes } \gamma_{r^*=1}(\cdot) = \frac{p_1 L}{p_1 L + q^D}.\right)$ The ruler knows that by expropriating, his power increases (because $q^H \geq q^L$), along with his chances of survival. Hence, expropriation becomes unambiguously preferable.

The same occurs with the elite's reaction to investments in future state capacity. Since the elite are already making their best effort to capture power ($r^* = 1$), the ruler's survival probability is the same regardless of his decision to invest in capacity (i.e., $\gamma_{K=1}(\cdot) = \gamma_{K=0}(\cdot) = \gamma_{r^*=1}(\cdot)$). Given the elite's inability to further react against the ruler, the *capacity-building condition* ($k \leq \Delta(K, p_1 \leq \underline{p_1})$) that drives the decision to invest reduces to:

$$k \leq \left\{ (\tau_2^H - \tau_2^L) \left[p_2 L - \gamma_{r^*=1}(\cdot) [p_2 L + \omega_2)] \right] \right\}.$$

For a given threshold cost of investing in capacity $\underline{k}$, the *capacity-building condition* is more likely to be satisfied with low enough prices. This is the case because the elite—as attractive as capturing a more capable state in the future might be—are not capable of reacting by increasing their political power r, since they are already doing as much as possible. Thus:

Proposition 2. *When $p_1 \leq \underline{p_1}$, the economic elite invests as much as possible to replace the ruler* $(r^* = 1)$*. The ruler, in turn, always chooses to expropriate* $(D = 1)$*, and decides to invest in state capacity for comparatively higher investment costs, k. Furthermore, when $p_1 \leq \underline{p_1}$, a marginal decline in first-period prices increase the investment cost threshold, $\underline{k}$, at which investment in capacity is chosen by the ruler.*

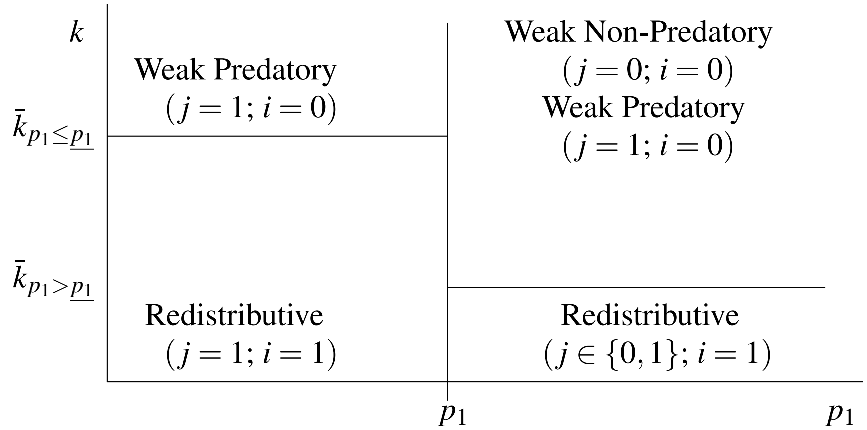
(Proof in section E.2)

This final result summarizes the effects of a sufficiently large negative price shock. With the ability of the economic elite to challenge temporarily diminished, the ruler now unambiguously prefers to call on the external support of the beneficiaries of redistribution, and thus he always chooses to expropriate. Furthermore, the reaction of the economic elite to any investment in future capacity by the ruler is now neutralized. This makes investments in capacity preferable, when previously they were prohibitively costly because of the elite's reaction they triggered.

To illustrate the different possible outcomes in the characterized equilibrium, let $\bar{k}_{p_1 \leq \underline{p_1}}$ be the maximum cost of investing in future state capacity that satisfies the *capacity-building condition* when prices are low enough ($p_1 \leq \underline{p_1}$); and $\bar{k}_{p_1 > \underline{p_1}}$ when they are at normal levels ($p_1 > \underline{p_1}$). Figure D.1 maps the possible expropriation ($D \in \{0,1\}$) and capacity investment ($K \in \{0,1\}$) decisions predicted by the model, for different values of investment cost, k, and period 1 prices, p_1, while fixing the value of the rest of the parameters.

Three types of states emerge from figure D.1, depending on the expropriation and capacity investment outcomes. To the right of $\underline{p_1}$, the ruler chooses whether to expropriate based on the political support he can get through redistribution. The decision to invest in state capacity, on the other hand, changes at some threshold investment cost $\bar{k}_{p_1 > \underline{p_1}}$, creating two regions. For costs lower than $\bar{k}_{p_1 > \underline{p_1}}$, the ruler chooses to invest, whereas for those above that threshold he does not. I call *weak non-predatory* states the set of equilibrium outcomes where neither expropriation nor invest-

Figure D.1: Equilibria of Expropriation and Capacity Investment Decisions



ments in capacity are selected by the ruler, because of effective deterrence by the elite. In these cases the strategic cost of investing in capacity is high, and redistribution does not provide the ruler with effective political support. When, on the other hand, redistribution of the elite's assets can generate considerable support for the ruler, while the investment cost is still prohibitive, a *weak predatory* state that expropriates but does not develop capacity emerges.

The region left of $\underline{p_1}$ only becomes possible with a price shock that generates low enough prices. Here, expropriation always happens (as characterized in Proposition 2), ruling out a *weak non-predatory* state outcome. A threshold investment cost $\bar{k}_{p_1 \leq \underline{p_1}}$ that cuts through the ruler's decision to invest in future state capacity also separates two types of states. Investment costs above this threshold result in a *weak predatory* state, while costs below it lead to a *redistributive* one. As illustrated in the figure, however, the threshold cost is larger in this region, so that investments in capacity occur even at higher costs, as compared to cases where the period 1 price is at a normal level (i.e., $p_1 > \underline{p_1}$). With low enough prices, *redistributive* states are more likely to emerge than *weak* states for a given cost of capacity-enhancing investments.

D.5 Extension: Punishment for the Defeated Actor

One possibility that is not considered in the baseline model is the likely punishment for the actor that loses the struggle for power. When either the first-period ruler or the elite are defeated, it is reasonable to expect that they incur additional punishment, beyond being taxed. In this section, I introduce a punishment cost, $C > 0$, which the loser of the contest for power has to pay. Incorporating a punishment cost modifies equilibrium behavior, but does not change the main insights of the model.

When the loser of the political struggle is punished, payoffs change. The elite now maximizes

$$max_{\{r\}} u^E = (1-r)p_1L + \gamma(\cdot)\big(p_2L + \omega_2\tau_2\big) + [1-\gamma(\cdot)]p_2(L-L^D)(1-\tau_2) - C).$$

The inclusion of a punishment modifies the elite's best response, which becomes

$$r^* = \frac{1}{p_1L}\left[\sqrt{q^D\left[(\omega_2 + p_2L)\tau_2^K + p_2L^D(1-\tau_2^K) + C\right]} - q^D\right].$$

In turn, the ruler's problem becomes

$$max_{\{D\in\{0,1\},K\in\{0,1\}\}} \omega_1 - \mathbb{1}(K=1)k + \gamma(\cdot)\left[\omega_2(1-\tau_2^K) - C\right] + [1-\gamma(\cdot)][p_2L\tau_2^K + \omega_2].$$

As a result of this modified maximization problem, the ruler's *expropriation* and *capacity-building* conditions change as well. However, propositions 1 and 2 hold without any changes. (Proof in section E.3)

D.6 Extension: Expropriation that Reduces the Tax Base

When the ruler expropriates the elite's assets in the baseline model, those assets can still be taxed in the future in their entirety. This simplifies the strategic behavior of the ruler, and reflects the empirical setting where the theory's implications are tested.[6] The main insights that emerge from the model persist if this possibility is allowed, though the equilibrium behavior of the ruler changes.

From the perspective of the elite, the problem remains the same—they revert any expropriation implemented by the first-period ruler if they capture power, and set the level of resistance that maximizes their expected payoff, which remains unchanged. For the ruler, however, the inability to tax the expropriated asset introduces an additional trade-off. Now, he needs to balance the increase in political power brought about by expropriation—which rallies beneficiaries of redistribution—with higher resistance by the elite and a reduction in the second-period taxable base.

The ruler's problem is now

$$max_{\{e,c\}} \omega_1 - c + \gamma(\cdot)\omega_2(1-\tau(c)) + [1-\gamma(\cdot)][p_2(L-L^D)\tau(c)+\omega_2],$$

which is similar to the original problem, with the exception of a reduced tax base in the second period in the event of expropriation.

The *expropriation condition* ($\Gamma(D) \geq 0$) changes as well:

$$\Gamma(D) \equiv \gamma_{D=1}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=1}(\cdot)][p_2(L-L^D)\tau_2^K+\omega_2] - \left[\gamma_{D=0}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=0}(\cdot)][p_2L\tau_2^K+\omega_2]\right]$$

which reduces to

$$\Gamma(D) \equiv [\gamma_{D=0}(\cdot) - \gamma_{D=1}(\cdot)]\,\tau_2^K(p_2L+\omega_2) - [1-\gamma_{D=1}(\cdot)]p_2L^D\tau_2^K.$$

In the baseline model, a sufficient condition for the *expropriation condition* to be met was that

[6] During the period of analysis, redistributed land was taxed; this changed in the 1950s, when *ejido* land was exempted from land taxes (Aboites 2003).

expropriating led to a lower probability of deposal (i.e., $\gamma_{D=0}(\cdot) \geq \gamma_{D=1}(\cdot)$). Here, however, that is a necessary but not a sufficient condition, given the additional trade-off that comes with expropriation. Specifically, the *expropriation condition* is met when

$$\frac{\gamma_{D=0}(\cdot) - \gamma_{D=1}(\cdot)}{\gamma_{D=1}(\cdot)} \geq \frac{p_2 L^D}{p_2 L + \omega_2}.$$

The ruler expropriates when the relative gain in political power outweighs the expected reduction in the future taxable base.

The *capacity-building condition* ($\Delta(K) \geq k$) also changes:

$$\Delta(K) \equiv \gamma_{K=1}(\cdot)\omega_2(1-\tau_2^H) + [1-\gamma_{K=1}(\cdot)][p_2(L-L^D)\tau_2^H + \omega_2] - \\ \left[\gamma_{K=0}(\cdot)\omega_2(1-\tau_2^L) + [1-\gamma_{K=0}(\cdot)][p_2(L-L^D)\tau_2^L + \omega_2]\right]$$

which reduces to

$$\Delta(K) \equiv (\tau_2^H - \tau_2^L)p_2(L-L^D) - [p_2(L-L^D) + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L].$$

The *capacity-building condition* is also less likely to hold for higher values of L^D, the amount of expropriated land on which no taxes can be levied in the future.

These changes on the ruler's equilibrium behavior, however, do not modify the main results of the model. Proposition 1 is unchanged, and proposition 2 holds with a minor amendment:

Proposition 3. *When $p_1 \leq \underline{p_1}$, the economic elite invests as much as possible to replace the ruler ($r^* = 1$). The ruler, in turn, is more likely to choose to expropriate ($D = 1$), and decides to invest in state capacity for comparatively higher investment costs, k. Furthermore, when $p_1 \leq \underline{p_1}$, a marginal decline in first-period prices increase the investment cost threshold, $\underline{k}$, at which* *investment in capacity is chosen by the ruler.*

(Proof in section E.4)

D.7 Extension: Continuous Action Space for the Ruler

In the baseline model, the action space for the elite is continuous: an optimal fraction of their income can be chosen to resist the ruler and attempt to replace him in power (i.e., $r \in [0,1]$). The ruler, however, only has discrete choices. He can choose whether to expropriate the elite ($D \in \{0,1\}$), and whether to make a costly investment to increase fiscal capacity in the second period ($K \in \{0,1\}$). The main insights from the model, however, also arise when the ruler's action space is allowed to be continuous.

Consider a case in which, instead of choosing whether to expropriate or not, the ruler can choose the intensity of expropriation $e \in [0,L]$. The resulting level of expropriation continuously increases the ruler's support from the beneficiaries of the redistribution of the expropriated assets, captured by the concave function $q(e)$ $\left(\text{with } \frac{\delta}{\delta e}q(e) > 0,\ \frac{\delta^2}{\delta e^2}q(e) < 0\right)$. This alternative set of choices for the ruler also modifies the contest function that determines who will rule in the second period: $\gamma = \frac{p_1 L}{p_1 L + q(e)}$.

In addition, the ruler can now choose the level of investment in capacity, instead of facing an exogenous investment cost and choosing whether or not to invest. He selects the costly investment to increase future capacity, $c \geq 0$, which has to be paid out of the ruler's first-period income, ω_1, and increases fiscal capacity in the second period to $\tau(c) \in [0,1]$, with $\frac{\delta}{\delta c}\tau(c) > 0$ and $\frac{\delta^2}{\delta c^2}\tau(c) < 0$.

First, note that the elite's problem remains very similar:

$$max_{\{r\}} u^E = \underbrace{(1-r)p_1 L}_{u_1^E} + \underbrace{\gamma(\cdot)\big(p_2 L + \omega_2 \tau(c)\big) + [1-\gamma(\cdot)]p_2(L-e)(1-\tau(c))}_{E(u_2^E)},$$

which results in the optimal level of resistance

$$r^* = \frac{1}{p_1 L}\left[\sqrt{q(e)\left[(\omega_2 + p_2 L)\tau(c) + p_2 e(1-\tau(c))\right]} - q(e)\right].$$

The ruler anticipates the elite's behavior and solves the problem

$$max_{\{e,c\}} \underbrace{\omega_1 - c}_{u_1^{R_1}} + \underbrace{\gamma(\cdot)\omega_2(1-\tau(c)) + [1-\gamma(\cdot)][p_2 L\tau(c) + \omega_2]}_{E(u_2^{R_1})}.$$

Under the same conditions as in the baseline model, this modified version leads to a result analogous to proposition 1:

Proposition 4. *When the ruler is not overpowering and the elite has enough resources:*
1. The ruler's optimal level of expropriation e^* from the economic elite's asset, L, is unaffected by marginal changes in first-period prices, p_1.
2. The ruler's optimal investment in capacity, c^*, is unaffected by marginal changes in first-period prices, p_1.

(Proof in section E.5)

With a negative first-period price shock that drives the elite to set $r^* = 1$, the ruler faces incentives to increase his investment in capacity and to expropriate, just like in the baseline model.

Proposition 5. *When $p_1 \leq \underline{p_1}$, the economic elite invests as much as possible to replace the ruler ($r^* = 1$). The ruler, in turn, always chooses the maximum level of expropriation, $e^* = L$, and is more likely to select a higher investment in capacity, c than when $p_1 > \underline{p_1}$ as first-period prices decrease. Furthermore, when $p_1 \leq \underline{p_1}$, a marginal decline in first-period prices increases the optimal level of investment in capacity.*

(Proof in section E.5)

As propositions 4 and 5 indicate, results that are similar to the baseline model remain in place when allowing the ruler to have a continuous action space.

E Proofs

E.1 Proof of Proposition 1

Proof. E's optimization problem is

$$max_{\{r\}}(1-r)p_1L+\left[\gamma(\cdot)\left(p_2L+\omega_2\tau_2^K\right)+[1-\gamma(\cdot)]p_2(L-L^D)(1-\tau_2^K)\right]).$$

This payoff is continuous and strictly concave in $r\in(0,1)$, since the contest function $\gamma(\cdot)$ is strictly concave in r: $\frac{\partial}{\partial r}\gamma(\cdot)=\frac{Lp_1q^D}{(Lp_1r+q^D)^2}>0$, and $\frac{\partial^2}{\partial r^2}\gamma(\cdot)=-\frac{2L^2p_1^2q^D}{(Lp_1r+q^D)^3}<0$. Hence the solution of the optimization problem yields a unique interior solution that corresponds to the maximum. This is given by the first order condition:

$$\frac{\partial}{\partial r}u^E(r)=0,$$

with $u^E(r)=(1-r)p_1L+\left[\gamma(\cdot)\left(p_2L+\omega_2\tau_2^K\right)+[1-\gamma(\cdot)]p_2(L-L^D)(1-\tau_2^K)\right]$. The first order condition can be written as

$$p_1L=\left(\frac{Lp_1q^D}{(Lp_1r+q^D)^2}(p_2L+\omega_2\tau_2^K)-\frac{Lp_1q^D}{(Lp_1r+q^D)^2}[p_2(L-L^D)(1-\tau_2^K)]\right),$$

which, after some algebra simplifies to:

$$r^*=\frac{1}{p_1L}\left[\sqrt{q^D\left[(\omega_2+p_2L)\tau_2^K+p_2L^D(1-\tau_2^K)\right]}-q^D\right].$$

Note that r is bounded by assumption between $[0,1]$. Hence, it takes a value of 0 when $\sqrt{q^D\left[(\omega_2+p_2L)\tau_2^K+p_2L^D(1-\tau_2^K)\right]}\leq q^D$. I ignore the set of equilibria that arise from this set of parameter values.

The ruler takes the elite's best response as given. Recall that, after trivially choosing the maximum level of taxation possible and transferring all to himself, R_1's problem becomes

$$max_{\{D\in\{0,1\},K\in\{0,1\}\}}\omega_1 + p_1 L\tau_1 - k^K + \left[\gamma(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma(\cdot)][p_2 L\tau_2^K + \omega_2]\right].$$

The *expropriation condition* $\Gamma(D) \geq 0$ guarantees that the decision to expropriate yields a higher expected payoff for the ruler. This follows from the fact that expropriation only affects the probability of ruler replacement, and period 2 payoffs. It can be written as:

$$\begin{aligned}0 \leq \gamma_{D=1}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=1}(\cdot)][p_2 L\tau_2^K + \omega_2] - \\ \left[\gamma_{D=0}(\cdot)\omega_2(1-\tau_2^K) + [1-\gamma_{D=0}(\cdot)][p_2 L\tau_2^K + \omega_2]\right],\end{aligned}$$

which, after some algebra, becomes:

$$0 \leq [\gamma_{D=0}(\cdot) - \gamma_{D=1}(\cdot)]\,\tau_2^K(p_2 L + \omega_2).$$

Since $\tau_2^K \geq 0$ and $p_2 L + \omega_2 > 0$, a sufficient condition to satisfy the *expropriation condition* is that $\gamma_{D=0}(\cdot) \geq \gamma_{D=1}(\cdot)$; i.e., that expropriating leads to a lower probability of deposal.

This condition is more likely to be met for higher values of q_H. To see this, the inequality can be expressed in terms of the parameters by substituting r^* into $\gamma(\cdot)$ for $D = 0$ and for $D = 1$ and solving for q^D:

$$\begin{aligned}\gamma_{D=0}(\cdot) &\geq \gamma_{D=1}(\cdot) \\ \frac{r^*_{D=0}p_1 L}{r^*_{D=0}p_1 L + q^{D=0}} &\geq \frac{r^*_{D=1}p_1 L}{r^*_{D=1}p_1 L + q^{D=1}},\end{aligned}$$

which, after some algebra simplifies to

$$\frac{q^H(q^H - q^L)}{q^L} \geq \frac{p_2 L^D (1-\tau_2^K)}{(\omega_2 + p_2 L)\tau_2^K}.$$

It is clear from this expression that increasing q^H makes it more likely that the inequality holds, as does increasing period 2 income $(\omega_2 + p_2 L)$.

What is the effect of marginally changing p_1? Note that when substituting r^* into $\gamma(\cdot)$, p_1 cancels out and leaves the *expropriation condition* unaffected.

With respect to the *capacity-building condition*, first note that, when $0 < r^* < 1$, E's best response to R_1's investment in capacity increases the probability that R_1 is deposed:

$$\begin{gathered}\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot) \\ \frac{r^*_{K=1} p_1 L}{r^*_{K=1} p_1 L + q^D} > \frac{r^*_{K=0} p_1 L}{r^*_{K=0} p_1 L + q^D}.\end{gathered}$$

After substituting for r^* and some algebra, this expression simplifies to

$$(\tau_2^H - \tau_2^L)[\omega_2 + p_2(L - L^D)] > 0,$$

which is satisfied when $\tau_2^H \geq \tau_2^L$ (true by assumption). That is, choosing to enhance capacity always leads to a lower probability that the ruler survives.

When marginally changing p_1, the *capacity-building condition* is also unaffected, for the same reason it does not change the *expropriation condition*; i.e., when substituting r^* into $\gamma(\cdot)$, p_1 cancels out, leaving $\Delta(K)$ unchanged. $\square$

E.2 Proof of Proposition 2

Proof. Define $\underline{p_1} \in \mathbb{R}^+$ as the value of p_1 that solves r^* when $r^* = 1$:

$$\underline{p_1} = \frac{1}{L}\Big[\sqrt{q^D\left[(\omega_2 + p_2 L)\tau_2^K + p_2 L^D(1-\tau_2^K)\right]} - q^D\Big].$$

For any value of p_1 such that $p_1 \leq \underline{p_1}$, the best E can do is to use all of their available resources to resist R_1, by setting $r^* = 1$.

As a consequence of this, $\gamma_{D=0}(\cdot) = \frac{Lp_1}{Lp_1+q^L}$, and $\gamma_{D=1}(\cdot) = \frac{Lp_1}{Lp_1+q^H}$. Since, by assumption $q^H > q^L$, it follows that $\gamma_{D=0}(\cdot) > \gamma_{D=1}(\cdot)$. This leaves the local ruler better off expropriating ($D = 1$) whenever $p_1 \leq \underline{p_1}$.

The investment in capacity decision depends on satisfying the *capacity-building condition* ($k \leq \Delta(K)$):

$$\begin{aligned} k \leq \big\{\gamma_{K=1}(\cdot)\omega_2(1-\tau_2^H) + [1-\gamma_{K=1}(\cdot)][p_2 L\tau_2^H + \omega_2] - \\ \big[\gamma_{K=0}(\cdot)\omega_2(1-\tau_2^L) + [1-\gamma_{K=0}(\cdot)][p_2 L\tau_2^L + \omega_2]\big]\big\}, \end{aligned}$$

which simplifies to

$$k \leq \big\{(\tau_2^H - \tau_2^L)p_2 L - [p_2 L + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L]\big\}. \tag{A1}$$

When $p_1 \leq \underline{p_1}$, it has been shown that $r^* = 1$. E cannot further increase resistance, and thus $\gamma_{K=0}(r^* = 1) = \gamma_{K=1}(r^* = 1) = \frac{p_1 L}{p_1 L + q^H}$. Hence, when $p_1 \leq \underline{p_1}$, the right hand side of the *capacity-building condition* reduces to $\Delta(K, r^* = 1)$:

$$k \leq \big\{(\tau_2^H - \tau_2^L)[p_2 L - \gamma(r^* = 1)(p_2 L + \omega_2)]\big\}. \tag{A2}$$

How does equation (A2) compare to (A1)? In other words, when do rulers choose to invest in capacity at larger values of k? Investment in capacity is chosen for larger investment costs k when $p_1 \leq \underline{p_1}$ if:

$$\big\{(\tau_2^H - \tau_2^L)p_2L - [p_2L+\omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L]\big\} < \\ \big\{(\tau_2^H - \tau_2^L)[p_2L - \gamma(r^*=1)(p_2L+\omega_2)]\big\},$$

which, after some algebra reduces to

$$\tau_2^H[\gamma_{K=1}(\cdot) - \gamma(r^*=1)] > \tau_2^L[\gamma_{K=0}(\cdot) - \gamma(r^*=1)].$$

This condition is always true, because $\tau_2^H > \tau_2^L$ and $\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot)$.

Given $p_1 \leq \underline{p_1}$, how does the threshold investment cost, $\underline{k} \equiv \Delta(K, r^*=1)$, change with first-period prices, p_1? The partial derivative of $\underline{k}$ with respect to p_1 leads to

$$-\Big[\frac{Lq^H}{(p_1L+q^H)^2}\Big](\tau_2^H - \tau_2^L)(p_2L+\omega_2) < 0.$$

□

E.3 Proofs of Section D.5

Proof. Proposition 1 with punishment. Note that, as in the baseline model, changing p_1 marginally does not affect the *capacity-building* nor the *expropriation* conditions; when substituting r^* into $\gamma(\cdot)$, p_1 cancels out, leaving $\Delta(K)$ and $\Gamma(D)$ unchanged. $\square$

Proof. Proposition 2 with punishment. Every result used to construct proposition 2 also holds, as I show next. The *expropriation condition* $\Gamma(D) \geq 0$ can now be written as:

$$0 \leq \gamma_{D=1}(\cdot)\left[\omega_2(1-\tau_2^K)-C\right]+[1-\gamma_{D=1}(\cdot)][p_2L\tau_2^K+\omega_2]-$$
$$\left[\gamma_{D=0}(\cdot)\left[\omega_2(1-\tau_2^K)-C\right]+[1-\gamma_{D=0}(\cdot)][p_2L\tau_2^K+\omega_2]\right],$$

which, after some algebra, becomes:

$$0 \leq [\gamma_{D=0}(\cdot)-\gamma_{D=1}(\cdot)]\left[\tau_2^K(p_2L+\omega_2)+C\right].$$

Since $\tau_2^K \geq 0$, $p_2L+\omega_2 > 0$, and $C > 0$, it remains the case that a sufficient condition for the *expropriation condition* to be satisfied is that $\gamma_{D=0}(\cdot) \geq \gamma_{D=1}(\cdot)$; i.e., that expropriating leads to a lower probability of deposal.

In terms of the parameters, this happens if:

$$\gamma_{D=0}(\cdot) \geq \gamma_{D=1}(\cdot)$$
$$\frac{r^*_{D=0}p_1L}{r^*_{D=0}p_1L+q^D} \geq \frac{r^*_{D=1}p_1L}{r^*_{D=1}p_1L+q^D},$$

which, after some algebra simplifies to

$$\frac{q^H(q^H - q^L)}{q^L} \geq \frac{p_2 L^D(1-\tau_2^K)+C}{(\omega_2 + p_2 L)\tau_2^K}.$$

With respect to the *capacity-building condition*, first note that, when $0 < r^* < 1$, E's best response to R_1's investment in capacity increases the probability that R_1 is deposed, as in the baseline model:

$$\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot)$$
$$\frac{r^*_{K=1} p_1 L}{r^*_{K=1} p_1 L + q^D} > \frac{r^*_{K=0} p_1 L}{r^*_{K=0} p_1 L + q^D}.$$

After substituting for r^* and some algebra, this expression simplifies to

$$(\tau_2^H - \tau_2^L)[\omega_2 + p_2(L - L^D)] > 0,$$

which is satisfied when $\tau_2^H \geq \tau_2^L$ (true by assumption). Note that the punishment cost, C, cancels out, leaving this condition exactly as in the baseline model. Choosing to enhance capacity always leads to a lower probability that the ruler survives.

The *capacity-building condition* itself changes slightly, and can be reduced to

$$k \leq \left\{(\tau_2^H - \tau_2^L)p_2 L - [p_2 L + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L] - C\left[\gamma_{K=1}(\cdot) - \gamma_{K=0}(\cdot)\right]\right\}.$$

When $p_1 \leq \underline{p_1}$, the results on expropriation from section E.2 hold—the ruler always expropriate. When $p_1 \leq \underline{p_1}$, the right hand side of the *capacity-building condition* reduces to $\Delta(K, r^* = 1)$:

$$k \leq \left\{(\tau_2^H - \tau_2^L)[p_2 L - \gamma(r^* = 1)(p_2 L + \omega_2)]\right\},$$

which is the same expression as in the baseline model. How does this *capacity-building condition* compares to the case where prices are not low enough? When do rulers choose to invest in capacity at larger values of k? Investment in capacity is chosen for larger investment costs k when $p_1 \leq \underline{p_1}$ if:

$$\left\{(\tau_2^H - \tau_2^L)p_2L - [p_2L + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L] - C\left[\gamma_{K=1}(\cdot) - \gamma_{K=0}(\cdot)\right]\right\} <$$
$$\left\{(\tau_2^H - \tau_2^L)[p_2L - \gamma(r^* = 1)(p_2L + \omega_2)]\right\},$$

which, after some algebra reduces to

$$\tau_2^H[\gamma_{K=1}(\cdot) - \gamma(r^* = 1)] > \tau_2^L[\gamma_{K=0}(\cdot) - \gamma(r^* = 1)] - C\left[\gamma_{K=1}(\cdot) - \gamma_{K=0}(\cdot)\right].$$

This condition is always true, because $\tau_2^H > \tau_2^L$, $\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot)$, and $C > 0$. □

E.4 Proof of Proposition 3

Proof. The decision to invest in capacity depends on satisfying the *capacity-building condition* ($k \leq \Delta(K)$), which in its simplified form is:

$$k \leq (\tau_2^H - \tau_2^L)p_2(L - L^D) - [p_2(L - L^D) + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L].$$

When $p_1 \leq \underline{p_1}$, the elite resists as much as possible (i.e., $r^* = 1$), as in the baseline model. E cannot further increase resistance, and thus $\gamma_{K=0}(r^* = 1) = \gamma_{K=1}(r^* = 1) = \frac{p_1 L}{p_1 L + q^D}$. Hence, when $p_1 \leq \underline{p_1}$, the right hand side of the *capacity-building condition* reduces to $\Delta(K, r^* = 1)$:

$$k \leq (\tau_2^H - \tau_2^L)[p_2(L - L^D) - \gamma(r^* = 1)(p_2(L - L^D) + \omega_2)].$$

The investment in capacity is chosen for larger investment costs k when $p_1 \leq \underline{p_1}$ if $\Delta(K)$ is also larger as prices are low enough; that is, if

$$(\tau_2^H - \tau_2^L)p_2(L - L^D) - [p_2(L - L^D) + \omega_2][\gamma_{K=1}(\cdot)\tau_2^H - \gamma_{K=0}(\cdot)\tau_2^L]\} <$$
$$\{(\tau_2^H - \tau_2^L)[p_2(L - L^D) - \gamma(r^* = 1)(p_2(L - L^D) + \omega_2)],$$

which, after some algebra reduces to the same expression as in the baseline model:

$$\tau_2^H[\gamma_{K=1}(\cdot) - \gamma(r^* = 1)] > \tau_2^L[\gamma_{K=0}(\cdot) - \gamma(r^* = 1)].$$

Again, this condition is always true, because $\tau_2^H > \tau_2^L$ and $\gamma_{K=1}(\cdot) > \gamma_{K=0}(\cdot)$.

Since this difference is unaltered from the baseline model, the last result in proposition 3 also holds: the threshold investment cost, $\underline{k} \equiv \Delta(K, r^* = 1)$, increases with a decline in first-period prices, p_1, when prices are low enough (i.e., $p_1 \leq \underline{p_1}$). □

E.5 Proof of Propositions 4 and 5

Proof. When selecting the level of investment in capacity and the intensity of expropriation, the ruler takes the elite's actions (i.e., his choice of r^*) as given, and solves

$$max_{\{e,c\}}\omega_1 - c + \gamma(\cdot)\omega_2(1-\tau(c)) + [1-\gamma(\cdot)][p_2 L\tau(c) + \omega_2].$$

This function is concave in e and c, and thus the first order conditions characterize the ruler's optimal choices. Solving for the ruler's optimal choices, however, is not necessary to see that marginal changes in first-period prices will not affect the solution.

The elite's resistance, r, is bounded by assumption between $[0,1]$, and takes a value of 0 when $\sqrt{q(e)(\omega_2 + p_2 L)\tau(c) + p_2 e(1-\tau(c))} \leq q(e)$. As before, I ignore the set of equilibria that arise from this set of parameter values. The proposition assumes that the elite has enough resources, and thus $r^* < 1$.

Under these conditions, the elite chooses an interior level of resistance, $r^* \in (0,1)$, as in the baseline model, and substituting r^* into $\gamma(\cdot)$, p_1 cancels out and leaves the maximization problem unaffected.

What about when p_1 is low enough, as in proposition 5? As before, define $\underline{p_1} \in \mathbb{R}^+$ as the value of p_1 that solves r^* when $r^* = 1$:

$$\underline{p_1} = \frac{1}{L}\left[\sqrt{q(e)\left[(\omega_2 + p_2 L)\tau(c) + p_2 e(1-\tau(c))\right]} - q(e)\right].$$

For any value of p_1 such that $p_1 \leq \underline{p_1}$, the best E can do is to use all of their available resources to resist R_1, by setting $r^* = 1$.

From the ruler's maximization problem, it is clear that expropriation always results in a corner solution: either the ruler chooses to expropriate as much possible ($e = L$), or nothing at all. Which corner is chosen depends solely on whether expropriation leads to a higher or lower probability of the ruler being deposed. Whether this is the case depends on the value of the parameters: while expropriation increases the support that the ruler can mobilize through redistribution, it also increases the level of elite resistance.

When prices are low enough, increasing the level of expropriation e always reduces the probability that the ruler is ousted. Since expropriation is only costly to the ruler to the extent that it increases elite resistance, when $p_1 \leq \underline{p_1}$ (and thus $r^* = 1$) the ruler always chooses the maximum level of expropriation.

In contrast with the choice of expropriation intensity, the investment level ($c \geq 0$) can have an interior solution. The first order condition of the ruler's maximization problem is:

$$0 = -1 - \tau_c(c^*)\gamma(\cdot)\omega_2 - \tau(c^*)\gamma_c(\cdot)\omega_2 + p_2L\tau_c(c^*) - \gamma(\cdot)p_2L\tau_c(c^*) - \gamma_c(\cdot)p_2L\tau(c^*)$$

which, after substituting in $\gamma_c(\cdot)$ and some algebra reduces to

$$\frac{1}{\tau_c(c^*)} = p_2L - [\omega_2 + p_2L]\left[\gamma(\cdot) + \frac{\tau(c^*)q(e)}{2\left[\tau(c^*)\left[q(e)(\omega_2 + p_2L) - p_2e\right] + p_2e\right]^{3/2}}\right],$$

which implicitly defines the optimal level of investment in capacity c^*.

When prices are low enough, $p_1 \leq \underline{p_1}$, so that the elite uses all available resources to resist the ruler ($r^* = 1$), this condition further reduces to

$$\frac{1}{\tau_c(c^*)} = p_2L - [\omega_2 + p_2L]\gamma_{p_1 \leq \underline{p_1}}(\cdot),$$

which becomes

$$\frac{1}{\tau_c(c^*)} = p_2L - [\omega_2 + p_2L]\left[\frac{p_1L}{p_1L + q(e)}\right].$$

First, note that the right hand side of the first order condition is decreasing in p_1. Because $\tau(\cdot)$ is concave in c, this implies that the optimal level of investment c^* is also decreasing in p_1.

Finally, note that the implied optimal level of investment is more likely to be higher when $p_1 \leq \underline{p_1}$ as compared to $p_1 > \underline{p_1}$ as first-period prices fall. This can be seen from comparing the rearranged first order condition in both cases. The expressions are the same, except for the last term; the probability of deposing the ruler is smaller when prices are low enough if:

$$\gamma_{p_1 \leq \underline{p_1}}(\cdot) < \left[\gamma(\cdot) + \frac{\tau(c^*)q(e)}{2\left[\tau(c^*)\left[q(e)(\omega_2 + p_2L) - p_2e\right] + p_2e\right]^{3/2}}\right].$$

The rightmost term in the right hand side of the inequality above is always non-negative, so a sufficient condition for the expression to hold is $\gamma_{p_1 \leq \underline{p_1}}(\cdot) < \gamma(\cdot)$. This, in turn, is true if the argument of $\gamma_{p_1 \leq \underline{p_1}}(\cdot)$ is smaller than the argument of $\gamma(\cdot)$:

$$\frac{\underline{p}_1 L}{\underline{p}_1 L + q(L)} < \frac{rp_1L}{rp_1L + q(e),}$$

which, after some algebra, leads to

$$r > \frac{\underline{p}_1 q(e)}{p_1 q(L)}.$$

This condition is likely to be satisfied at very low first-period prices $\underline{p}_1$, and as the maximum support from expropriation and redistribution $q(L)$ is higher. □

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