Econometrica Supplementary Material

SUPPLEMENT TO "ELITE RECRUITMENT AND POLITICAL STABILITY: THE IMPACT OF THE ABOLITION OF CHINA'S CIVIL SERVICE EXAM"

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APPENDIX

A.1. *Results on the Party Identification*

WE EXPLORE PARTY IDENTIFICATION of the parliament members in 1912 as another check on ideology. Compared with the other parties—the Republican Party (*Kunghotang*) and the Democratic Party (*Minzhutang*)—the KMT (*Kuomintang* literally means "Chinese Nationalist Party") was known to be more radical and more pro-redistribution (Chang (1985)). In contrast, the party ideology of the *Kunghotang* was based on Jean-Jacques Rousseau's The Social Contract, whereas the *Minzhutang* emphasized that stability was their primary goal.

We link quotas per capita to the parliament members' party identification in 1912, using the following cross-sectional specification:

$$\mathrm{KMT}_{i,p} = \varphi \ln \mathrm{Quota}_p + \nu \ln \mathrm{Pop}_p + \theta \mathrm{X}_p + \delta_{\mathrm{prov}} + \varepsilon_{i,p},$$

where $\mathrm{KMT}_{i,p}$ is a dummy indicating whether a party member i belongs to the *Kuomintang* or not.

The results are presented in columns (1)–(2) in Table A.V. Among the 703 party members for whom we can identify the origins and ages, 434 were identified with the KMT. Based on the individual-level information, we do not find any significant impact of quotas per capita on party identification. However, consistent with the hypothesis that the KMT was more radical, we find that younger people were more likely to identify themselves as KMT members.

Columns (3)–(8) report the results using prefecture-level information to examine the link between the quotas and the number of party members. As is shown, quotas per capita increased the party member probability for both the KMT and the other parties. This finding is expected because more revolutionaries should be associated with a higher probability of party members after the success of the revolution. However, the magnitudes of the impacts for the KMT and the other parties are not significantly different. Consistent with the placebo test using the Boxer Rebellion, the finding on party identification once

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again shows that potential ideological differences are unlikely to explain the impact of quotas.

A.2. *An Example for the Instrument*

To illustrate why the number of small rivers can be an instrument for quota per capita, one can consider two prefectures with similar population sizes but different numbers of small rivers.

Qingzhou and Xuzhou were two prefectures of similar population size and area size. Qingzhou had a population of 3.8 million and an area of 17,000 km^2, whereas Xuzhou had a population of 4 million and an area of 17,000 km^2. There were 21 small rivers in Qingzhou and 18 small rivers in Xuzhou. As a result, Qingzhou was divided into 11 counties while Xuzhou was divided into 8 counties. Due to the stepwise rule, each county was assigned a positive quota. Adding the additional quota for the whole prefecture, Qingzhou had a quota of 195, higher than that of Xuzhou (167). Consequently, the quotas per capita at the prefecture level was higher in Qingzhou (51.3 per million) than that in the Xuzhou (41.8 per million). This is the variation we explore in our analysis.

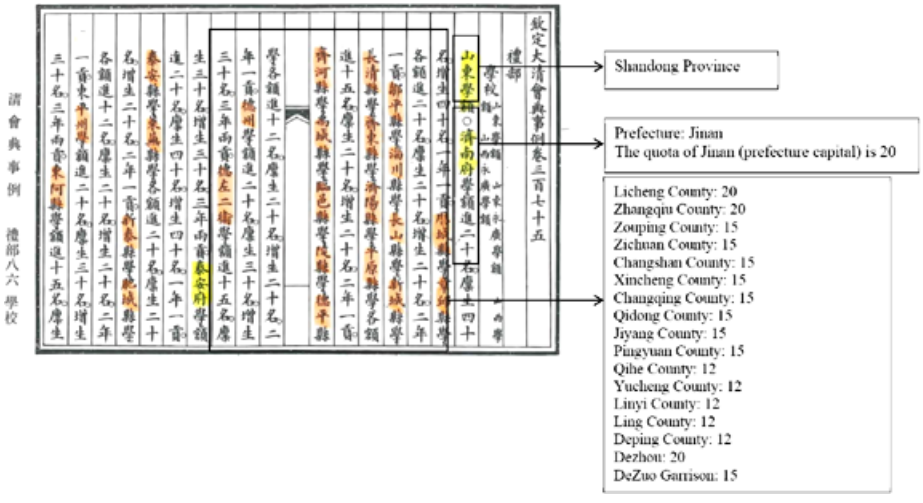
Note that this difference also holds at the county level due to the fact that county-level population sizes were smaller in Qingzhou (with more counties). There was no systematic information on the county-level population, but we can rely on average population sizes. On average, a county in Qingzhou had a population of 0.35 million while a county in Xuzhou had a population of 0.5 million. Depending on the scale and importance, counties in Qingzhou got assigned quota values of 12, 15, and 20. Thus, quotas per capita for a country in Qingzhou ranged between 34.3 per million and 57 per million. In contrast, counties in Xuzhou got assigned quota values of 16 and 20. Hence, quotas per capita for a county in Xuzhou ranged between 32 per million and 40 per million, which are likely to be lower than quotas per capita for an average county in Qingzhou.

A.3. *Varying the Definition of Small Rivers*

For robustness checks of using small rivers as an instrument, we vary the definition of small rivers to be those under the length of X km ($X = 70, 80, 90, \ldots, 120$), while controlling for the interaction of the post dummy and those above X km. These results are presented in Table A.VII. They show that the results are robust to these variations.

Moreover, we find no similar impact of the number of big rivers per se, which once again confirms that our river instrument is reasonable.

(a) Records of Quotas



(b) Roster of the Chinese Revolutionary Alliance

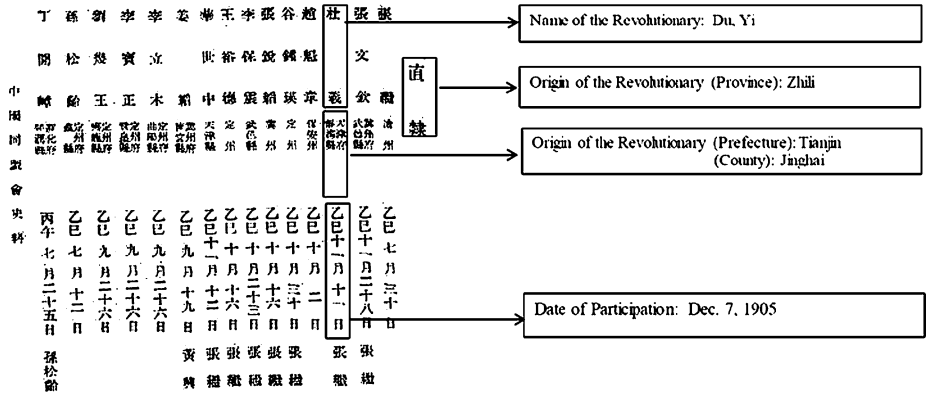


FIGURE A.1.—The data on quotas and revolutionaries. *Notes*: Panel (a) gives an example for the records of quotas for one prefecture (Jinan in Shandong Province). The quota for the prefecture capital is 20 and the total quota of the counties is 255. Thus, the total quota for the Jinan prefecture is 275. Panel (b) gives an example for the records of revolutionaries in the Chinese Revolutionary Alliance. There is information on the date of participation for the members of this group but only the year of participation for members of the other five groups. The dates were recorded in Chinese lunar calendar and are converted to dates in Gregorian calendar in our analysis.

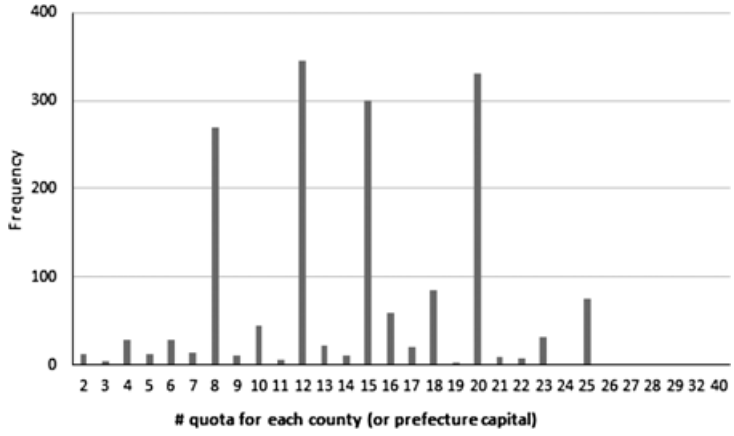


FIGURE A.2.—Distribution of quotas for each county. *Notes*: This figure shows that the quota values assigned to counties within a prefecture follow a stepwise rule: the most frequent values are 8, 12, 15, and 20. This is because the government did not have the capacity to implement a complicated proportional system and needed a simplified way of implementing the quota system.

(a) Overall Trends in the Yearly Data

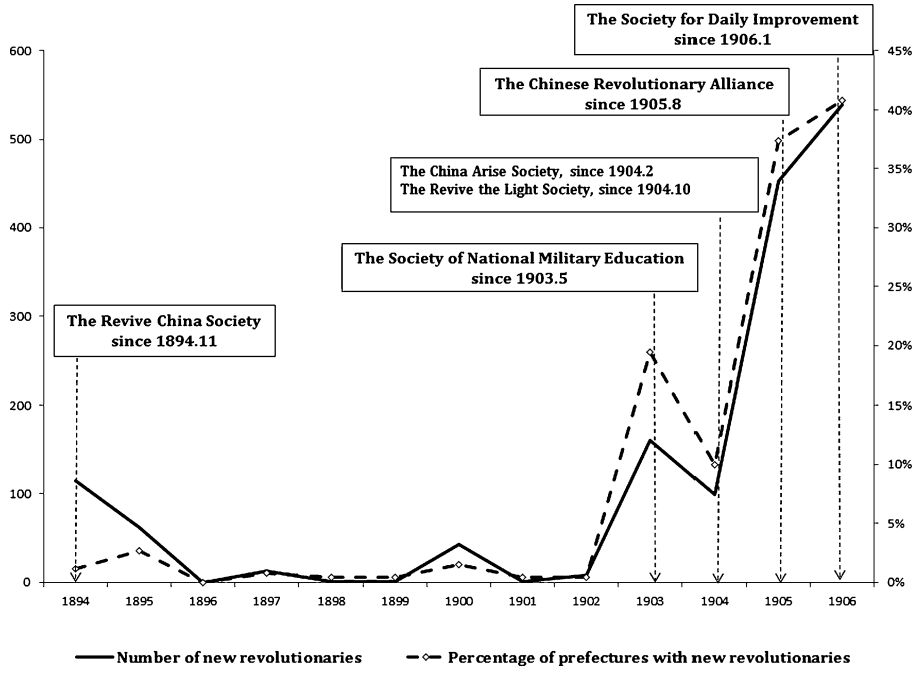


FIGURE A.3.—Aggregate trends of *new* revolutionaries. *Notes*: This figure plots the overall trends in revolution participation in the data. There tends to be an increase in revolution participation when a new group got established, such as in 1894, 1903, and 1905. The two groups established in 1904 were relatively small and only account for 4% (for the China Arise Society) and 3% (for the Revive the Light Society) of all revolutionaries between 1900 and 1906. (*Continues*.)

(b) Overall Trends in the Monthly Data

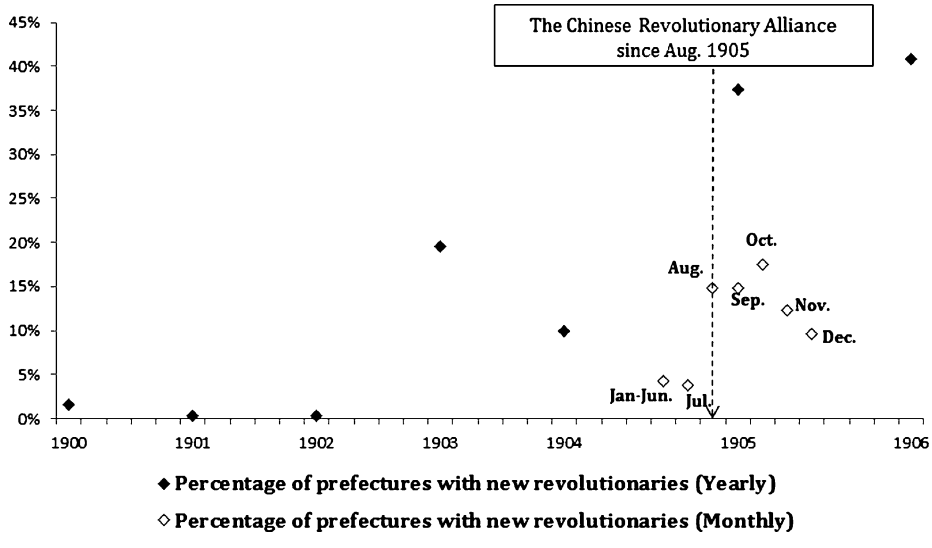


FIGURE A.3.—*Continued.*

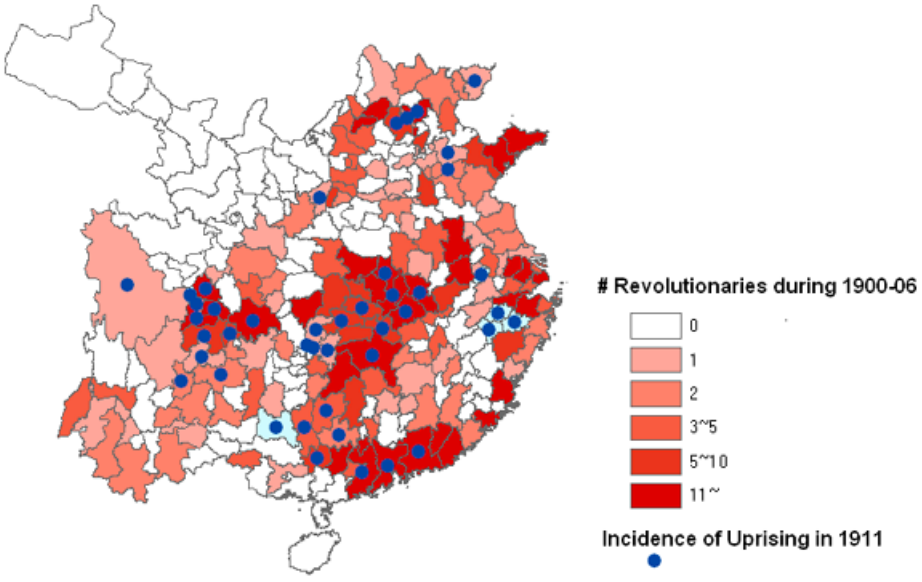


FIGURE A.4.—Revolutionaries and the 1911 Revolution. *Notes*: This map shows that the origins of revolutionaries are correlated with the incidence of uprisings in 1911.

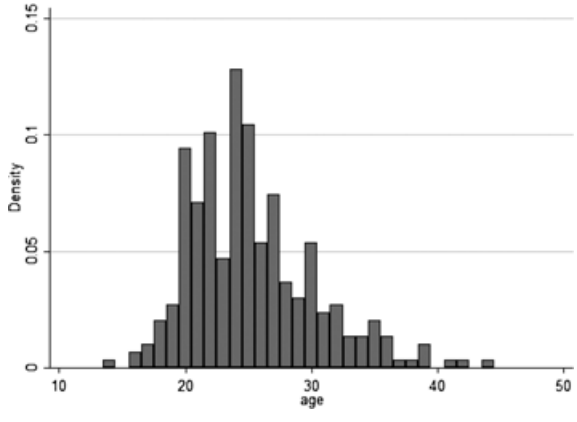
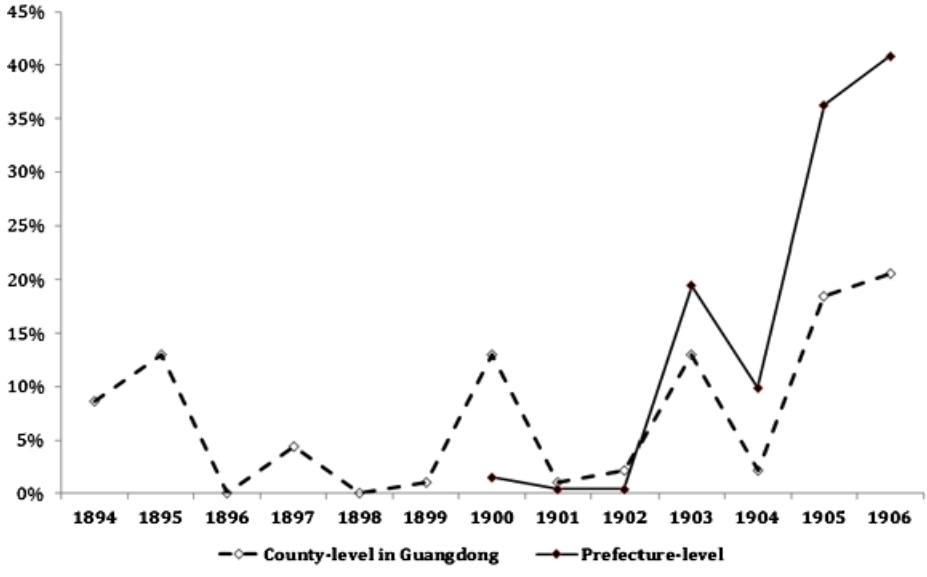


FIGURE A.5.—Age distribution of the revolutionaries in the Chinese Revolutionary Alliance. *Notes*: This figure plots the age distribution of the revolutionaries in the Chinese Revolutionary Alliance. The median is 24.

(a) Share of Counties/Prefectures With Revolutionaries



(b) Estimates from Differences-in-Differences (1894–1906)

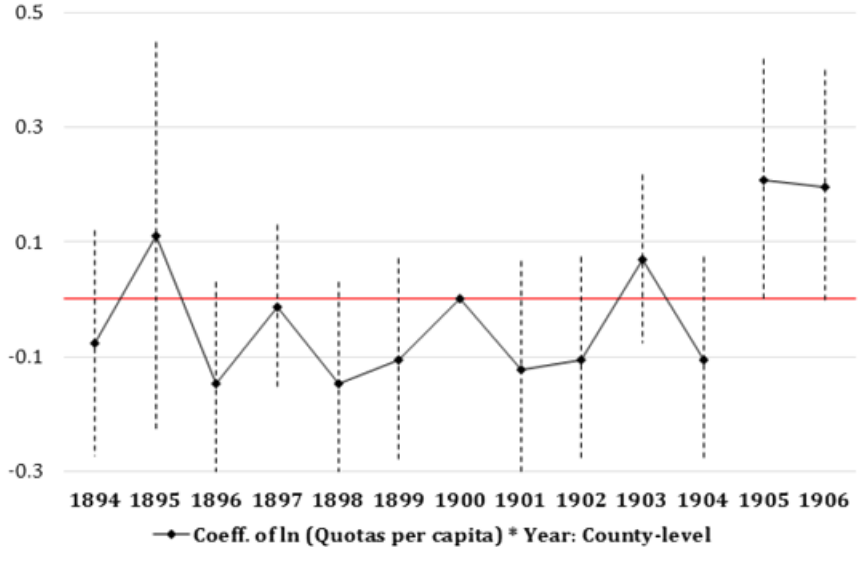


FIGURE A.6.—The results using county-year data (1894–1906). *Notes*: These figures present the pattern in the county-level data. Panel (a) plots the mean probability of revolution participation over years. Panel (b) visualizes the dynamic effects of quotas per capita on revolution participation, using the year 1900 as the reference. The solid line connects the estimates and the dashed line indicates the 95% confidence intervals.

FIGURE A.7.—Rivers and county seats. *Notes*: This map shows that county seats (indicated by the dots) are generally located on rivers. The bold rivers indicate the major ones (those ranked as the first- and second-order streams in the Chinese river hierarchy).

TABLE A.I

QUOTAS PER CAPITA AND PREFECTURE CHARACTERISTICS[a]

D.V.:	ln Quota				
	(1)	(2)	(3)	(4)	(5)
ln Pop	0.630***	0.665***	0.741***	0.667***	0.561***
	(0.042)	(0.042)	(0.092)	(0.096)	(0.110)
$(\ln \text{Pop})^2$			−0.013	−0.040	−0.012
			(0.028)	(0.026)	(0.024)
$(\ln \text{Pop})^3$			−0.023	−0.027*	−0.014
			(0.016)	(0.015)	(0.015)
ln Area			0.086	0.089	0.122
			(0.074)	(0.076)	(0.083)
Coastal			−0.364***	−0.282**	−0.166
			(0.114)	(0.120)	(0.111)
Main river				0.075	0.023
				(0.070)	(0.064)
Treaty port				−0.079	−0.062
				(0.086)	(0.087)
Small city				0.092	0.031
				(0.085)	(0.073)
Middle city				0.226**	0.123
				(0.088)	(0.085)
Large city				0.620***	0.430***
				(0.103)	(0.148)
Province capital					0.131
					(0.112)
Tax per capita in 1820					1.640**
					(0.768)
Transportation (*chong*)					0.171**
					(0.072)
Business (*fan*)					0.178**
					(0.087)
Difficulty of taxing (*pi*)					0.099
					(0.063)
Crime (*nan*)					−0.043
					(0.072)
Province FE		Y	Y	Y	Y
Observations	262	262	262	262	257
R-squared	0.579	0.728	0.747	0.765	0.794

[a]This table reports the correlations between quotas and other prefecture characteristics. Standard errors in parentheses are clustered at the prefecture level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.II

USING THE NUMBER OF REVOLUTIONARIES AS AN ALTERNATIVE OUTCOME[a]

D.V.:	# Revolutionaries Linear	Revolutionaries per 100,000 Linear	# Revolutionaries Poisson
	(1)	(2)	(3)
ln Quota × Post	0.509**	2.912*	0.849**
	(0.242)	(1.722)	(0.422)
ln Pop × Post	1.130***	−3.238	0.698
	(0.422)	(2.265)	(0.450)
ln Area × Post	−0.145	−0.355	−1.550***
	(0.089)	(0.392)	(0.286)
Coastal × Post	−0.857	0.938	−0.554
	(0.568)	(1.191)	(0.347)
Main river × Post	0.073	0.547	−0.837***
	(0.183)	(0.648)	(0.249)
Treaty port × Post	0.409	0.895	−0.305
	(0.374)	(0.704)	(0.243)
Small city × Post	−0.142	3.196	0.440
	(0.423)	(2.713)	(0.299)
Middle city × Post	0.317	0.366	0.580**
	(0.593)	(0.862)	(0.286)
Large city × Post	0.265	−0.380	−0.277
	(1.160)	(0.940)	(0.344)
$(\ln \text{Pop})^2 \times$ City	0.868***	0.024	−0.318
	(0.231)	(0.288)	(0.223)
$(\ln \text{Pop})^3 \times$ City	0.181***	0.255	0.083
	(0.057)	(0.181)	(0.108)
Prefecture FE, Year FE	Y	Y	Y
Province FE × Year FE	Y	Y	Y
Weighted by population	Y	Y	
Observations	1,834	1,834	1,064
R-squared	0.284	0.309	

[a]This table shows that quotas also affected the number of revolutionaries after the abolition. Standard errors in parentheses are clustered at the prefecture level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.III

THE DYNAMIC EFFECTS OF QUOTAS ON THE REVOLUTIONARY INDICATOR
(D.V.: REVOLUTIONARY = 0/1)[a]

	(1)	(2)	(3)	(4)
ln Quota × 1901	−0.003	−0.002	−0.004	0.005
	(0.011)	(0.014)	(0.015)	(0.008)
ln Quota × 1902	−0.003	−0.002	−0.004	0.005
	(0.011)	(0.014)	(0.015)	(0.008)
ln Quota × 1903	0.048	0.057	0.042	0.017
	(0.039)	(0.039)	(0.039)	(0.014)
ln Quota × 1904	0.004	0.008	−0.011	0.003
	(0.028)	(0.027)	(0.028)	(0.010)
ln Quota × 1905	0.157***	0.150***	0.136**	0.141**
	(0.051)	(0.054)	(0.055)	(0.060)
ln Quota × 1906	0.124**	0.106*	0.091	0.136**
	(0.053)	(0.056)	(0.059)	(0.062)
Prefecture FE, Year FE	Y	Y	Y	Y
Province FE × Year FE	Y	Y	Y	Y
$(\ln \text{Pop})^{1,2,3}$ × Year FE	Y	Y	Y	Y
(ln Size, Coastal, River) × Year FE		Y	Y	Y
(Urbanization, Treaty port) × Year FE			Y	Y
Weighted by population				Y
Observations	1,834	1,834	1,834	1,834
R-squared	0.460	0.469	0.479	0.411

[a]This table reports the dynamic effects of quotas per capita on the revolutionary indicator, using the year 1900 as the reference group. It shows that the effect of quotas only took place after the abolition. Standard errors in parentheses are clustered at the prefecture level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.IV

YEAR-BY-YEAR IMPACTS ACROSS COUNTIES IN GUANGDONG (D.V.: REVOLUTIONARY = 0/1)[a]

	(1)	(2)	(3)	(4)
ln Quota × 1894	−0.087	−0.120	−0.093	−0.077
	(0.109)	(0.115)	(0.133)	(0.099)
ln Quota × 1895	0.028	0.071	0.100	0.109
	(0.137)	(0.151)	(0.178)	(0.171)
ln Quota × 1896	−0.188*	−0.211*	−0.182	−0.146
	(0.106)	(0.111)	(0.128)	(0.089)
ln Quota × 1897	−0.067	−0.056	0.015	−0.015
	(0.121)	(0.128)	(0.151)	(0.073)
ln Quota × 1898	−0.188*	−0.211*	−0.182	−0.146
	(0.106)	(0.111)	(0.128)	(0.089)
ln Quota × 1899	−0.138	−0.164	−0.118	−0.106
	(0.108)	(0.111)	(0.126)	(0.089)
ln Quota × 1901	−0.149	−0.160	−0.116	−0.124
	(0.124)	(0.138)	(0.166)	(0.096)
ln Quota × 1902	−0.149	−0.172	−0.125	−0.106
	(0.111)	(0.113)	(0.131)	(0.090)
ln Quota × 1903	0.153	0.151	0.182	0.070
	(0.108)	(0.113)	(0.136)	(0.074)
ln Quota × 1904	−0.149	−0.172	−0.125	−0.106
	(0.111)	(0.113)	(0.131)	(0.090)
ln Quota × 1905	0.224*	0.243*	0.229	0.207*
	(0.116)	(0.127)	(0.154)	(0.107)
ln Quota × 1906	0.175	0.174	0.242	0.196*
	(0.128)	(0.134)	(0.152)	(0.103)
Post- vs. Pre-	0.293***	0.313***	0.300***	0.266***
	(0.074)	(0.078)	(0.083)	(0.092)
Year FE, County FE	Y	Y	Y	Y
Prefecture FE × Year FE	Y	Y	Y	Y
$(\ln \text{Pop})^{1,2,3}$ × Year FE	Y	Y	Y	Y
(ln Size, Coastal, River) × Year FE		Y	Y	Y
(Urbanization, Treaty port) × Year FE			Y	Y
Weighted by population				Y
Observations	1,196	1,196	1,196	1,196
R-squared	0.328	0.348	0.367	0.345

[a]This table reports the dynamic effects of quotas per capita using data from 92 counties in Guangdong between 1894 and 1906, using the year of 1900 as the reference. It shows that the quotas only had an effect after the abolition. Standard errors in parentheses are clustered at the county level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.V

QUOTAS AND PARTY IDENTIFICATION[a]

	Individual-Level		Prefecture-Level			Prefecture-Level		
	KMT = 0/1		KMT (0/1)	Other (0/1)	Diff.	# KMT	# Other	Diff.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ln Quota	−0.027	−0.021	0.134**	0.193***	−0.059	0.391**	0.334**	0.057
	(0.044)	(0.052)	(0.054)	(0.055)	(0.076)	(0.181)	(0.131)	(0.238)
Age in 1912		−0.005*						
		(0.003)						
Province FE	Y	Y	Y	Y	Y	Y	Y	Y
$(\ln \text{Pop})^{1,2,3}$	Y	Y	Y	Y	Y	Y	Y	Y
Other baseline controls		Y	Y	Y	Y	Y	Y	Y
Observations	701	699	262	262	262	262	262	262
R-squared	0.184	0.191	0.426	0.433	0.238	0.555	0.494	0.347

[a]This table shows that quotas per capita did not affect party identification, although younger people tend to join the more radical party (the KMT), as shown in the individual-level analysis in columns (1)–(2). Columns (3)–(8) report the results using prefecture-level data: quotas per capita increase the party member probability for both the KMT and the other parties, but the impacts of quotas are not significantly different in terms of party identification. Other baseline controls include (i) logged area; (ii) whether a prefecture is located on the coast and whether it is located on a major river; (iii) whether a prefecture has a treaty port; and (iv) whether a prefecture was counted as a big city, a middle-size city, or a small city. Standard errors in parentheses are clustered at the prefecture level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.VI

EXAMINING THE IMPACT OF INTERNATIONAL INFLUENCE[a]

	(1)	(2)	(3)	(4)	(5)
ln Quota × Post	0.101**	0.113**	0.108**	0.118**	0.109**
	(0.046)	(0.045)	(0.046)	(0.046)	(0.046)
Newspaper per capita × Post	4.419				2.720
	(14.931)				(15.525)
Newspaper per capita × ln Quota × Post	−0.485				0.824
	(14.403)				(17.579)
Newspaper per capita × ln Pop × Post	−1.176				1.426
	(5.387)				(6.834)
Enclave × Post		−0.137		0.097	0.004
		(0.244)		(0.425)	(0.468)
Enclave × ln Quota × Post		0.030		−0.602	−0.567
		(0.304)		(0.669)	(0.724)
Enclave × ln Pop × Post		−0.048		0.133	0.024
		(0.118)		(0.212)	(0.280)
Japanese enclave × Post			−0.262	−0.375	−0.228
			(0.322)	(0.510)	(0.506)
Japanese enclave × ln Quota × Post			0.347	0.903	0.680
			(0.348)	(0.719)	(0.742)
Japanese enclave × ln Pop × Post			−0.104	−0.241	−0.080
			(0.150)	(0.244)	(0.359)
Prefecture FE	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y
Province FE × Year FE	Y	Y	Y	Y	Y
Baseline controls × Post	Y	Y	Y	Y	Y
Observations	1,834	1,834	1,834	1,834	1,834
R-squared	0.465	0.466	0.465	0.467	0.471

[a]The table shows that foreign penetration cannot explain our main findings. The baseline controls include (i) third-degree polynomials of logged population in 1880, and logged area; (ii) whether a prefecture is located on the coast and whether it is located on a major river; (iii) whether a prefecture has a treaty port; and (iv) whether a prefecture was counted as a big city, a middle-size city, or a small city. Standard errors in parentheses are clustered at the prefecture level: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.VII

ROBUSTNESS CHECKS OF USING SMALL RIVERS (D.V.: REVOLUTIONARY = 0/1)[a]

Small Rivers:	≤70 km	≤80 km	≤90 km	≤100 km	≤110 km	≤120 km
	(1)	(2)	(3)	(4)	(5)	(6)
ln Quota × Post	0.253***	0.252***	0.243***	0.241***	0.246**	0.237**
	(0.090)	(0.089)	(0.092)	(0.093)	(0.096)	(0.098)
# rivers (>70 km)/River length × Post	−0.081					
	(0.075)					
# rivers (>80 km)/River length × Post		−0.067				
		(0.091)				
# rivers (>90 km)/River length × Post			−0.116			
			(0.102)			
# rivers (>100 km)/River length × Post				−0.094		
				(0.103)		
# rivers (>110 km)/River length × Post					−0.012	
					(0.111)	
# rivers (>120 km)/River length × Post						−0.068
						(0.124)
Baseline controls × Post	Y	Y	Y	Y	Y	Y
ln(River length) × Post	Y	Y	Y	Y	Y	Y
Placebo variables × Post	Y	Y	Y	Y	Y	Y
Prefecture FE, Year FE	Y	Y	Y	Y	Y	Y
Province FE × Year FE	Y	Y	Y	Y	Y	Y
Observations	1,834	1,834	1,834	1,834	1,834	1,834
R-squared	0.459	0.459	0.460	0.460	0.459	0.460

[a]This table shows that the results using the number of smaller rivers as an instrument are robust to variations in defining smaller rivers. The baseline controls include (i) third-degree polynomials of logged population in 1880, and logged area; (ii) whether a prefecture is located on the coast and whether it is located on a major river; (iii) whether a prefecture has a treaty port; and (iv) whether a prefecture was counted as a big city, a middle-size city, or a small city. The placebo variables are the transportation importance, crop suitability, climate shocks, and basin fragmentation. Standard errors in parentheses: *significant at 10%; **significant at 5%; ***significant at 1%.

TABLE A.VIII

EXAMINING TAXES YEAR BY YEAR[a]

	ln(Land Tax)		ln(Non-Agricultural Tax)	
Reference Year:	1893	1893	1891	1891
	(1)	(2)	(3)	(4)
ln Quota × 1892			−0.113*	−0.098
			(0.052)	(0.167)
ln Quota × 1893			0.077	0.072
			(0.149)	(0.344)
ln Quota × 1894			−0.047	−0.235
			(0.141)	(0.248)
ln Quota × 1895			0.405*	0.365
			(0.202)	(0.367)
ln Quota × 1896			0.185	−0.102
			(0.234)	(0.383)
ln Quota × 1897			0.178	−0.054
			(0.242)	(0.463)
ln Quota × 1898			0.052	−0.103
			(0.232)	(0.639)
ln Quota × 1899			−0.146	−0.679*
			(0.223)	(0.347)
ln Quota × 1900			−0.507*	−1.104**
			(0.250)	(0.421)
ln Quota × 1901			−0.348	−0.749
			(0.409)	(0.499)
ln Quota × 1902			0.381	0.251
			(0.826)	(0.873)
ln Quota × 1903	−0.233**	−0.067	0.378	0.382
	(0.110)	(0.145)	(0.766)	(0.930)
ln Quota × 1904			0.273	−0.079
			(0.819)	(0.601)
ln Quota × 1905			0.047	−0.505
			(0.838)	(0.669)
ln Quota × 1906			−0.271	−0.167
			(0.722)	(0.989)
ln Quota × 1907			−0.413	−0.176
			(0.686)	(0.899)
ln Quota × 1908	−0.172	−0.088	−0.474	−0.112
	(0.147)	(0.218)	(0.761)	(1.069)
Province FE, Year FE	Y	Y	Y	Y
ln Pop × Year FE	Y	Y	Y	Y
Other baseline controls × Year FE		Y		Y
Observations	52	52	252	252
R-squared	0.829	0.982	0.402	0.844

[a]This table shows that provincial-level taxes did not respond to the interaction of quotas and the abolition. Other baseline controls include (i) logged area of a province; (ii) the number of prefectures located on the coast or a major river in a province; (iii) the number of prefectures being treaty ports; and (iv) the number of prefectures counted as big cities, middle-size cities, or small cities. Standard errors in parentheses are clustered at the province level: *significant at 10%; **significant at 5%; ***significant at 1%.

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