Long Live *Keju*! The Persistent Effects of China's Imperial Examination System

Ting Chen,† James Kai-sing Kung,§ Chicheng Ma§ †Hong Kong Baptist University §The University of Hong Kong

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 - Extractive institutions can generate persistence in the development process and lead to underdevelopment (Acemoglu, Johnson, and Robinson, 2001, 2002; Acemoglu and Robinson, 2012)
 - Slavery \longrightarrow mistrust \longrightarrow underdevelopment (Nunn and Wantchekon, 2011)

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China's Civil Exam System (Keju) is one such institution

- Commenced in the Sui dynasty (581-618) and consolidated in the Song (970-1279), China's civil exam system was the world's first meritocratic institution
 - European intellectuals with the likes of Voltaire, Quesnay, and Christian Wolff all viewed China's civil exam system as a superior alternative to the traditional European aristocracy in terms of governance
 - Selection of government officials based on ability or merit (e.g., exam qualifications) instead of (inherited) class privilege or wealth
 - As a scholar-official, a *jinshi* received generous pecuniary rewards and extraordinary prestige
 - *keju* thus attracted millions of zealous scholars to it

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- Over time, the civil exam institution created a distinct group of local elites with deep respect for learning and academic achievements
- Generated a culture of valuing education among the Chinese (also countries influenced by similar institutions)
 - "At any rate, for good or evil, the examination system profoundly affected the civilization of China. Among its good effects were a widely-diffused respect for learning..." (Bertrand Russell, 1922, p. 46)

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- Abundant anecdotal evidences suggests *keju* has a persistent effect of human capital outcomes today
 - College entrance exam (Gaokao) in China
 - Confined to not only Greater China but also East Asian societies heavily influenced by Confucianism (e.g., South Korea) Air Traffic Control during English Oral Exam
 - And to second-generation Chinese Americans The "Tiger Mum" Phenomenon

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Chinese Exam Hell



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Figure 1. Historical Success in China's Civil Exam (keju) and Human Captial Accumulation Today

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Research Questions

- Whether keju's positive effect on human capital outcome in the long run is causal?
- Through what channel(s) does such persistence occur?
- Persistent effect on socioeconomic inequality

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Preview of Findings

- A doubling of *jinshi* per 10,000 people during the Ming-Qing period leads to a 8.7% increase in schooling today (2010)
- *Keju* persistence is transmitted through:
 - Family transmission of culture—an additional *jinshi* ancestor increases a descendent's cultural value placed upon education, parental inputs and children's academic performance
 - Educational infrastructure and social capital are also possible channels
 - And to a lesser extent political elites (but only up to the Republican period
- ▶ *Keju* also facilitates intergenerational (educational and income) mobility

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Keju Insitution

- Why *keju* was considered so valuable in imperial times?
 - Under the lasting influence of Confucianism, government job was the most honorable and worthwhile occupation of all (officials 士> peasants 農> artisans エ> merchants 商)
 - Civil exam was the only way of becoming an official
 - Intense competition under Keju Figure 2
 - Extraordinary returns to degree holders: Pecuniary benefits and exceptional honor

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Background

Intense Competition under Keju

► Intense competition for *jinshi*—the highest degree in *keju* exam



Figure 2. Hierarchy of Civil Exam System in Ming-Qing China

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Keju Culture

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Background

Pecuniary Benefits

- Lucrative returns to the *jinshi* degree holders
 - A gentry's income was 16 times that of a commoner (Chang, 1955)
 - Salaried income only a fraction of *jinshi's* overall income (Chang, 1962)

Income Sources	Size (10,000
	Tael Silver)
Officeholding	12100
Consultant Services	19062.5
Land Rent	22000
Mercantile Actitivies (real estate, banks, jew-	11360
elry shops, and the monopoly trade of salt)	
Total	64522 5

Table 1. The Annual Gentry Income in the Late19th Century, According to Sources

Source: Chang (1962), The Income of the Chinese Gentry, p.197

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Honors and Recognitions

- A variety of ritualistic and community recognitions (Chaffe, 1995; Chang, 1955; Ho, 1962)
 - Jinshi included in local gazetteer and genealogy Xuanjuzhi in Provincial Gazetteer
 - Name carved on monument of local county school and Confucian Temple (Taixue) in Beijing Commemorated in Timingbei
 - Erection of arches, gateways, and temples *Inshibei & Zhuangguanfang*

Background



Achievements in the Keju exam were clearly documented in the Provincial Gazetteer

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Background



Taixue & Timingbei

Long Live Keju!

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Background



Jinshibei & Zhuangyuanfang

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Background

Roadmap

Effect of Keju on Contemporary Human Capital

Baseline Results

Identifying the Causal Effect of Keju

Accounting for the Channels of Keju Persistence

- Transmission of Keju Culture
- Educational Infrastructure
- Social Capital
- Political Elites
- Social Mobility

Conclusion

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Sample

 278 prefectures covering Ming-Qing China Proper (18 provinces), matched to 272 municipalities in today's China



Matching

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Figure 3. Number of Jinshi across China Proper in Ming-Qing Dynasty

Empirical Model and Explanatory Variable

$y_i = \beta keju_i + \gamma_1 X_i^b + \gamma_2 X_i^a + v_i$

- ► Total # of *jinshi* in a prefecture (per 10,000 people) in 1368-1905
 - ^o 47,294 *jinshi* in 534 years (1371-1904), averaging 1.034 per 10,000 people

Empirical Model and Dependent Variables

$$\mathbf{y}_i = \beta keju_i + \gamma_1 X_i^b + \gamma_2 X_i^a + \mathbf{v}_i$$

Years of schooling (Census 2010)



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Empirical Model and Baseline Control Variables

Baseline Controls:

- Geography
 - Distance to Coast
 - Terrain Ruggedness Index
- Economic Prosperity
 - Nighttime lights in 2010
- Province Fixed Effects

$$y_i = \beta k e j u_i + \gamma_1 X_i^b + \gamma_2 X_i^a + v_i$$

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Migration

Empirical Model and Additional Control Variables

Additional Controls:

- Historical Economic Prosperity
 - Population Density (logged)
 - Ming-Qing Urbanization Rates
 - Agricultural Suitability

$$y_i = \beta keju_i + \gamma_1 X_i^a + \gamma_2 \frac{X_i^a}{i} + \upsilon_i$$

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		Average Years	s of Schooling	çs	Share of Population with					
		-	-		No	Elementary	High	University		
					Education	and	School	and		
						Middle		Above		
						School				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Jinshi Density (logged)	0.092***	0.064***	0.070***		-0.201***	-0.090***	0.122***	0.506***		
	(0.007)	(0.008)	(0.007)		(0.034)	(0.015)	(0.024)	(0.083)		
	[0.008]	[0.007]	[0.007]		[0.032]	[0.013]	[0.021]	[0.064]		
Jinshi Density (logged,				0.079***						
excluding migrant)				(0.022)						
0 0 .				[0.020]						
Baseline Control Variables	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Additional Control Variables	No	No	Yes	Yes	Yes	Yes	Yes	Yes		
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Number of Observations	274	274	274	274	274	274	274	274		
Adj. R-squared	0.659	0.744	0.762	0.697	0.733	0.586	0.707	0.593		

Table 2. Impact of Jinshi Density on Contemporary Human Capital Outcomes: OLS Estimates

Note: All results are OLS estimates. Robust standard errors adjusted for clustering at the province level are given in parentheses, whereas Conley (1999) standard errors adjusted for two-dimensional spatial autocorrelation are reported in brackets. Conley standard errors are constructed assuming a window with weights equal to 1 for observations less than 1 degree apart and 0 for observations further apart. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

Full Table

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Robustness Checks: Validity of Jinshi Measure

- There were too few *jinshi*
 - Only 1.034 per 10,000 people throughout Ming-Qing period
 - The knowledge elite in the French Industrial Revolution was "a tiny proportion of the overall population" (Squicciarini and Voigtländer,2015)
 - Use juren and shengyuan quota density as alternative measures Figure 5 Table 3

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Figure 5. Regional Distributions of *Jinshi, Juren* and *Shengyuan* Quota Densities in the Ming-Qing Period

Chen, Kung, Ma (HKBU & HKU & HKU)

Long Live Keju!

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			(0.010)	(0.010)	(0.052)	(0.016)	(0.028)	(0.101)
Juren Density (logged)	0.038***		0.006	0.004	-0.093	-0.011	0.017	0.066
	(0.009)		(0.009)	(0.009)	(0.057)	(0.011)	(0.023)	(0.056)
Shengyuan Density (logged)		0.048		0.016	0.057	0.023	0.146	-0.012
		(0.034)		(0.030)	(0.146)	(0.031)	(0.093)	(0.171)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	274	274	274	274	274	274	274	274
Adj. R-squared	0.702	0.664	0.761	0.761	0.738	0.585	0.711	0.592

Table 3. Impact of Keju on Contemporary Human Capital: Alternative Measures

Note: All results are OLS estimates. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability, population density, urbanization rates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, ***, and * indicate statistical significance at the 1%,5%, and 10%, respectively.

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Note: All results are OLS estimates. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability, population density, urbanization rates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, ***, and * indicate statistical significance at the 1%,5%, and 10%, respectively.

	Average	Years of Scho	ooling in 201	0 (logged)		Share of Pop	ulation with	
					No	Elementary	High	University
					Education	and	School	and
						Middle		Above
						School		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
inshi Density (logged)			0.066***	0.066***	-0.139**	-0.083***	0.106***	0.462***
			(0.010)	(0.010)	(0.052)	(0.016)	(0.028)	(0.101)
Juren Density (logged)	0.038***		0.006	0.004	-0.093	-0.011	0.017	0.066
	(0.009)		(0.009)	(0.009)	(0.057)	(0.011)	(0.023)	(0.056)
Shengyuan Density (logged)		0.048		0.016	0.057	0.023	0.146	-0.012
		(0.034)		(0.030)	(0.146)	(0.031)	(0.093)	(0.171)
Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	274	274	274	274	274	274	274	274
Adj. R-squared	0.702	0.664	0.761	0.761	0.738	0.585	0.711	0.592

Table 3. Impact of Keju on Contemporary Human Capital: Alternative Measures

Note: All results are OLS estimates. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability, population density, urbanization rates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, ***, and * indicate statistical significance at the 1%,5%, and 10%, respectively.

	Average	Years of Scho	ooling in 2010	(logged)		Share of Pop	ulation with	
					No	Elementary	High	University
					Education	and	School	and
						Middle		Above
						School		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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	(0.009)		(0.009)	(0.009)	(0.057)	(0.011)	(0.023)	(0.056)
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Baseline Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	274	274	274	274	274	274	274	274
Adj. R-squared	0.702	0.664	0.761	0.761	0.738	0.585	0.711	0.592

Table 3. Impact of Keju on Contemporary Human Capital: Alternative Measures

Note: All results are OLS estimates. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability, population density, urbanization rates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, ***, and * indicate statistical significance at the 1%,5%, and 10%, respectively.

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Robustness Checks: Effects of *Jinshi* Density in Different Periods

- Ming-Qing only accounts for half of the entire history of keju
- 600 years is a very long time!

Figure 6

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Figure 6. Impact of Keju by Period on Contemporary Human Capital

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Figure 6. Impact of Keju by Period on Contemporary Human Capital

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Figure 6. Impact of Keju by Period on Contemporary Human Capital

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Roadmap

Effect of Keju on Contemporary Human Capital

- Baseline Results
- **Identifying the Causal Effect of** Keju
- Accounting for the Channels of Keju Persistence
 - Transmission of Keju Culture
 - e Educational Infrastructure
 - Social Capital
 - Political Elites
- Social Mobility
- Conclusion

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Printing Ingredients as Plausible IV

- Availability of text and reference books was crucial to *keju* exam success
 - De The Four Books and the Five Classics were the lynchpin of China's civil exam
 - Need to demonstrate a solid understanding of the nuanced, authoritative interpretations of these texts
 - * Collected Commentaries on the Four Books and Five Classics (四書五經法程)
 - * Full Purport of the Four Books (四書補註備旨題竅匯參)

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Determinants for Book Availability

- But access to books varied enormously across prefectures
 - Out of 278 prefectures only 19 major printing centers, accounting for 80% of the books published in the Ming-Qing period Figure 7A
 - From 14th century onwards China relied on woodblock printing, which depended on pine for producing ink and bamboo for producing paper
 - Due to prohibitive overland transport cost, printing centers were located near the ingredients required for printing Figure 7D
 - The main ingredients for printing or the final products were shipped along the river Figure 7D



Figure 7A. Locations of Printing Centers

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Determinants for Book Availability (Cont'd)

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 - Out of 278 prefectures only 19 major printing centers, accounting for 80% of the books published in the Ming-Qing period Figure 7A
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Determinants for Book Availability (Cont'd)

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 - From 14th century onwards China relied on woodblock printing, which depended on pine for producing ink and bamboo for producing paper
 - Due to prohibitive overland transport cost, printing centers were located near the ingredients required for printing Figure 7B Figure 7C
 - The main ingredients for printing or the final products were shipped along the river Figure 7D

Printing Centers and Ingredients



Figure 7B. Locations of Pine and Bamboo and Printing Centers

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Printing Centers and Ingredients (Cont'd)



Figure 7C. Two Examples of Printing Center's Proximity to Pine and Bamboo Sites

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Determinants for Book Availability (Cont'd)

- But access to books varied enormously across prefectures
 - Out of 278 prefectures only 19 major printing centers, accounting for 80% of the books published in the Ming-Qing period Figure 7A
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 - The main ingredients for printing or the final products were shipped along the river Figure 7D

Printing Centers and Ingredients (Cont'd)



Figure 7D. Locations of Pine and Bamboo, Printing Centers, and Major Navigable Rivers

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Instrumental Variable

- Our IV is a prefecture's shortest river distance to its nearest sites of pine and bamboo
- ► Pine/Bamboo ⇒ Printed Books ⇒ Jinshi Density ⇒ Schooling Today

	Printed Books (logged)		Jinshi Dens	sity (logged)	Jinshi Density (logged)		
	(1)	(2)	(3)	(4)	(5)	(6)	
River Distance to Pine/Bamboo	-0.092***	-0.084***			-0.102***	-0.099***	
	(0.029)	(0.029)			(0.011)	(0.012)	
Printed Books (logged)			0.179***	0.170***			
			(0.031)	(0.036)			
Baseline Control Variables	No	Yes	No	Yes	No	Yes	
Provincial Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
Number of Observations	272	272	272	272	272	272	
Adj. R-squared	0.323	0.332	0.449	0.463	0.526	0.528	

Table 4. Locations of Pine and Bamboo, Printing Centers and Jinshi Density

Notes: All results are OLS estimates. Baseline controls include agricultural suitability, distance to coast, and terrain ruggedness. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

Instrumental Variable (Cont'd)

- Our IV is a prefecture's shortest river distance to its nearest sites of pine and bamboo
- ► Pine/Bamboo ⇒ Printed Books ⇒ *Jinshi* Density ⇒ Schooling Today

	Printed Books (logged)		Jinshi Dens	sity (logged)	Jinshi Density (logged)		
	(1)	(2)	(3)	(4)	(5)	(6)	
River Distance to Pine/Bamboo	-0.092***	-0.084***			-0.102***	-0.099***	
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Printed Books (logged)			0.179***	0.170***			
			(0.031)	(0.036)			
Baseline Control Variables	No	Yes	No	Yes	No	Yes	
Provincial Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
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- Our IV is a prefecture's shortest river distance to its nearest sites of pine and bamboo
- ► Pine/Bamboo ⇒ Printed Books ⇒ *Jinshi* Density ⇒ Schooling Today

	Printed Books (logged)		Jinshi Den	sity (logged)	Jinshi Density (logged)		
	(1)	(2)	(3)	(4)	(5)	(6)	
River Distance to Pine/Bamboo	-0.092***	-0.084***			-0.102***	-0.099***	
	(0.029)	(0.029)			(0.011)	(0.012)	
Printed Books (logged)			0.179***	0.170***			
			(0.031)	(0.036)			
Baseline Control Variables	No	Yes	No	Yes	No	Yes	
Provincial Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	
Number of Observations	272	272	272	272	272	272	
Adj. R-squared	0.323	0.332	0.449	0.463	0.526	0.528	

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Notes: All results are OLS estimates. Baseline controls include agricultural suitability, distance to coast, and terrain ruggedness. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

Exclusion Restrictions

- Concern that the locations of pine and bamboo may directly impact upon human capital today
 - Pine and bamboo are natural habitats with long growth cycles
 - * 10-30 years for pine and 15-20 years for bamboo (shortest 5-7)
 - IV is uncorrelated with a wide gamut of historical (and contemporary) correlates Table 5

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Exclusion Restrictions (Cont'd)

Economic prosperity

- Commercial centers, tea and silk exports
- Population density and urbanization
- Contemporary economic prosperity (nighttime lights in 2010)
- Agricultural suitability
 - Rice and wheat
 - Economic crops
 - New World crops
 - Terrain ruggedness
- Distance to economic and political centers
 - Large cities in 1920
 - National and provincial capitals

Table 5. Exclusion Restrictions	Table 5.
---------------------------------	----------

Panel A	Commercial	Tea	Silk	Population
	Centers	Centers	Centers	Density
			Silk	
	(1)	(2)	(3)	(4)
River Distance to Pine/Bamboo	-0.006	0.033	0.046	-0.02
	(0.005)	(0.021)	(0.045)	(0.019)
Number of Observations	272	272	272	272
Adj. R-squared	0.314	0.650	0.751	0.628
	Population	Urbanization	Urbanization	Light
	Density	Rate	Rate	Density
	in 1953		in 1920	in 2010
	(5)	(6)	(7)	(8)
River Distance to Pine/Bambo	-0.021	-0.001	-0.022	-0.021
	(0.017)	(0.001)	(0.024)	(0.015)
Number of Observations	267	272	272	272
Adj. R-squared	0.537	0.666	0.301	0.64

Notes: All results are OLS estimates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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Exclusion Restrictions (Cont'd)

Economic prosperity

- Commercial centers, tea and silk exports
- Population density and urbanization
- Contemporary economic prosperity (nighttime lights in 2010)

Agricultural suitability

- Rice and wheat
- Economic crops
- New World crops
- Terrain ruggedness
- Distance to economic and political centers
 - Large cities in 1920
 - National and provincial capitals

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Table 5. Exclusion Restrictions							
Panel B	Suitability	Suitability	Suitability	Suitability			
	(Rice)	(Wheat)	(Tea)	(Mulberry			
				Tree)			
	(9)	(10)	(11)	(12)			
River Distance to Pine/Bamboo	-0.012	-0.102	-0.011	-0.0.08			
	(0.044)	(0.134)	(0.021)	(0.019)			
Number of Observations	272	272	272	272			
Adj. R-squared	0.661	0.615	0.622	0.587			
	Suitability	Suitability	Terrain				
	(Maize)	(Sweet	Ruggedness				
		Potato)					
	(13)	(14)	(15)				
River Distance to Pine/Bamboo	-0.117	0.004	0.001				
	(0.097)	(0.064)	(0.002)				
Number of Observations	272	272	272				
Adj. R-squared	0.653	0.833	0.642				

Table 5 Exclusion Restrictions

Notes: All results are OLS estimates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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Exclusion Restrictions (Cont'd)

Economic prosperity

- Commercial centers, tea and silk exports
- Population density and urbanization
- Contemporary economic prosperity (nighttime lights in 2010)

Agricultural suitability

- Rice and wheat
- Economic crops
- New World crops
- Terrain ruggedness
- Distance to economic and political centers
 - Large cities in 1920
 - National and provincial capitals

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Table 5. Exclusion Restrictions							
Panel C	Distance	Distance	Distance	Distance	Distance	Distance	
	to	to	to	to	to	to	
	Commercial	Silk	Tea	Large	National	Provincial	
	Centers	Centers	Centers	Cities	Capital	Capital	
				in 1920	•		
	(16)	(17)	(18)	(19)	(20)	(21)	
River Distance to Pine/Bamboo	0.031	0.045	0.051	0.035	-0.035	-0.064	
	(0.034)	(0.086)	(0.091)	(0.083)	(0.085)	(0.080)	
Number of Observations	272	272	272	272	272	272	
Adj. R-squared	0.647	0.7	0.698	0.7	0.688	0.706	

Notes: All results are OLS estimates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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2.2.3. Exclusion Restrictions (Cont'd)

- Our instrument is unlikely to affect contemporary human capital via the channel of printing
 - New printing technology (lithographic and relief press) replaced traditional woodblock printing
 - * Rags, asphalt and wood replaced bamboo for paper and resin and graphite replaced pine for ink Figure 8
 - * Shanghai and Tianjin replaced the previous 19 printing centers

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Figure 8. Effects of River Distance to Pine and Bamboo Locations on Jinshi Density, by Period

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Reduced-Form Results

$$y_i = \theta distance_i + \kappa X_i + \mu_i$$

	,	*		<u> </u>		
Panel A	Reduced-form					
	Average Yea	rs of Schoolings	Share of Population with			
			High	University		
			School	and Above		
	(1)	(2)	(3)	(4)		
River Distance to Bamboo/Pine	-0.007***	-0.007***	-0.012***	-0.055***		
	(0.001)	(0.001)	(0.004)	(0.010)		
Distance to Major Navigable Rivers		0.008	0.016	0.057		
		(0.006)	(0.016)	(0.047)		
Baseline + Additional Controls	No	Yes	Yes	No		
Province Fixed Effects	Yes	Yes	Yes	Yes		
Number of Observations	274	274	274	274		
Adj. R-squared	0.710	0.714	0.682	0.514		

Table 6. Impact of Keju on Contemporary Human Capital: Reduced-form Results Using River Distance

Note: Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability, population density, urbanization rates. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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Identifying the Causal Effect of Keju

The Instrumented Results

 $y_i = \beta j \widehat{inshi}_i + \gamma X_i + v_i$

$$jinshi_i = \lambda distance_i + \tau X_i + \varepsilon_i$$

Table 6. Impact of *Keju* on Contemporary Human Capital: Instrumented Results

Panel B	Average Year	rs of Schoolings	Share of Population with			
			High	University		
			School	and Above		
	(1)	(2)	(3)	(4)		
Jinshi Density (logged)	0.087***	0.087***	0.139***	0.653***		
	(0.011)	(0.011)	(0.036)	(0.092)		
Distance to Major Navigable Rivers		0.022	0.041***	0.085**		
		(0.031)	(0.015)	(0.038)		
	First Stage					
River Distance to Bamboo/Pine	-0.084***	-0.085***	-0.085***	-0.085***		
	(0.010)	(0.010)	(0.010)	(0.010)		
First Stage F-stat	61.62	61.33	61.33	61.33		
First Stage Partial R-squared	0.323	0.352	0.325	0.325		
Baseline + Additional Controls	Yes	Yes	Yes	Yes		
Provincial Fixed Effects	Yes	Yes	Yes	Yes		
Number of Observations	274	274	274	274		
Adj. R-squared	0.757	0.757	0.706	0.580		
Kleibergen-Paap rk Wald F-stat	66.620	66.042	66.042	66.042		
Note: Peopling controls in shude nightting lights in 2010, distance to coast, and tomain meson de soc						

Note: Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are agricultural suitability population density urbanization rates. Robust Chen, Kung, Ma (HKBU & HKU & HKU) 70/115 Long Live Keju!

The Instrumented Results

 $y_i = \beta \widehat{jinshi}_i + \gamma X_i + v_i$

$$jinshi_i = \lambda distance_i + \tau X_i + \varepsilon_i$$

Table 6. Impact of Keju on Contemporary Human Capital: Instrumented Results

Panel B	Average Year	s of Schoolings	Share of Population with					
			High	University				
			School	and Above				
	(1)	(2)	(3)	(4)				
Jinshi Density (logged)	0.087***	0.087***	0.139***	0.653***				
	(0.011)	(0.011)	(0.036)	(0.092)				
Distance to Major Navigable Rivers		0.022	0.041***	0.085**				
		(0.031)	(0.015)	(0.038)				
	First Stage							
River Distance to Bamboo/Pine	-0.084***	-0.085***	-0.085***	-0.085***				
	(0.010)	(0.010)	(0.010)	(0.010)				
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The Instrumented Results

	1 7	1			
	Average Year	s of Schoolings	Share of Population with		
	0	0	High	University	
			School	and Above	
	(1)	(2)	(3)	(4)	
Jinshi Density (logged)	0.087***	0.087***	0.139***	0.653***	
	(0.011)	(0.011)	(0.036)	(0.092)	
Distance to Major Navigable Rivers		0.022	0.041***	0.085**	
, .		(0.031)	(0.015)	(0.038)	
	First Stage				
River Distance to Bamboo/Pine	-0.084***	-0.085***	-0.085***	-0.085***	
	(0.010)	(0.010)	(0.010)	(0.010)	
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Table 6. Impact of Keju on Contemporary Human Capital: Instrumented Results

 A 1% ↑ in *jinshi* → 0.087% ↑ in average years of schooling in 2010 (an additional *jinshi* per 10,000 people → 0.8 ↑ in years of schooling)

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The Instrumented Results

Table 6. Impact of Keju on Contemporary Human Capital: Instrumented Results						
	Average Yea	ars of Schoolings	Share of Pop	oulation with		
			High	University		
			School	and Above		
	(1)	(2)	(3)	(4)		
Jinshi Density (logged)	0.087***	0.087***	0.139***	0.653***		
	(0.011)	(0.011)	(0.036)	(0.092)		
Distance to Major Navigable Rivers		0.022	0.041***	0.085**		
		(0.031)	(0.015)	(0.038)		
		First	Stage			
River Distance to Bamboo/Pine	-0.084***	-0.085***	-0.085***	-0.085***		
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 According to the UN, the difference in the years of schooling between the low- and middle-income countries in 2010 was a mere 1.4 years, yet they differ in annual income by more than three times (2,109 versus 6,452 USD)

Roadmap

Effect of Keju on Contemporary Human Capital

- Baseline Results
- Identifying the Causal Effect of Keju

Accounting for the Channels of Keju Persistence

- Transmission of Keju Culture
- e Educational Infrastructure
- Social Capital
- Political Elites
- Social Mobility
- Conclusion

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Transmission of *Keju* Culture

"Children from successful families are more likely to be successful themselves by virtue of the additional time spent on them and also their superior endowments of culture and genes" (Becker, 1991, p.179)

- Cultural traits could be transmitted vertically across generations within the family context through parental indoctrination and input (Becker, 1991; Doepke and Zilibotti, 2014; Guryan, Hurst, and Kearny, 2008)
- ▶ In the context of China, it is commonly understood as "jiaxue yunyuan or shuxiang mendi" (家學淵源、書香門第), meaning "a long tradition of learning in the literati families"

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Measuring Family Transmission of Keju Culture

 Use number of *jinshi* ancestors based on surname and hometown information provided in 2010 Chinese Family Panel Survey (CFPS) to proxy for cultural transmission at family level

• e.g. $\frac{9 \text{ jinshi of the surname Kung in prefecture i in the Ming and Qing}}{34,000 \text{ people with surname Kung in prefecture i today}} \rightarrow jinshi \text{ ancestors density}$ = 0.0003

- Controlling for inherited ability (using the respondents' memory and logic test scores)
- Controlling prefectural fixed effects for confounding regional factors
- Ancestors' *jinshi* density thus measures the family transmission of *keju* culture

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Measuring Cultural Channels

- CFPS consists of a national representative adult sample, a subsample of those who are parents and a subsample of children (7-16)
- Two attitudinal questions regarding the value of education in the adult sample
 - "Do you regard education as the most important determinant of social status?"
 - "Whether government to prioritize spending on education (among a long list of public expenditures)?"
- Then use another four questions measuring parental inputs in the parent sample
 - For the parents:
 - * "The years of schooling their children were (ideally) expected to receive"
 - * "Whether they often give up watching TV in order to accompany children"
 - * "The total hours they spent on tutoring children's home work per week"
 - Another one ask interviewers:
 - * "Whether parents effectively communicated with (their) children"

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 - □ "您是否认为教育是决定个人社会地位的最重要因素?"
 - □ "在众多公共支出当中,政府是否应该优先投资于教育?"
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 - For the parents:
 - * "您期望孩子最少得到什么程度的教育(教育年限)?"
 - * "您是否会为了陪伴孩子而放弃看电视?"
 - * "您每周花多少时间来辅导孩子做功课?"
 - Another one ask interviewers:
 - * "作为父母,您是否能够和孩子有效沟通?"

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Panel A	Full S	ample		Parent Sample		Parent Sample
	Whether education is the most important determinant of social status	Whether the government should prioritize spending on education	Years of schooling parents expected their children to achieve	Frequently give up watching TV	Hours spent weekly on tutoring children's homework	(Interviewer Evaluated) Whether parents communicate frequently with children
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal Jinshi Ancestor Density	0.285***	0.193***	0.089**	0.025**	0.099***	0.061*
Matrilineal Jinshi Ancestor Density	(0.037) 0.109** (0.043)	(0.035) 0.096** (0.038)	(0.041) 0.159*** (0.046)	(0.012) 0.071* (0.042)	(0.020) 0.332* (0.201)	(0.036) 0.089** (0.041)
Individual Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	31245	31245	4541	4541	4541	4541
Adj. R-squared	0.359	0.377	0.512	0.132	0.131	0.117

Table 7. Testing the Cultural Transmission Channel

Notes: All results are based on OLS estimates from 1% of the 2005 mini-census data. Baseline controls include nighttime lights in 2010, agricultural suitability, distance to coast, and terrain ruggedness. Additional controls are commercial centers, population density, urbanization rate, Confucian academies, private book collections, strength of clan and political elites. Individual control variables are age, gender, ethnicity, and residential status (rural versus urban). Robust standard errors adjusted for clustering at the prefecture level are given in parentheses. "4", "and " indicate statistical significance at the 0.1%, 1%, and 5%,

Full Table

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Panel A	Full S	ample		Parent Sample		Parent Sample
		•		-		(Interviewer Evaluated)
	Whether	Whether the	Years of	Frequently	Hours spent	Whether
	education	government	schooling	give up	weekly on	parents
	is the most	should	parents	watching	tutoring	communicate
	important	prioritize	expected	TV	children's	frequently
	determinant	spending on	their		homework	with
	of social	education	children			children
	status		to achieve			
	(1)	(2)	(3)	(4)	(5)	(6)
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Full Table

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Measuring Cultural Channels (Cont'd)

- Further use the child sample to examine their actual academic performance
 - On word and math ability test scores
 - On class (exam) ranking
 - On non-cognitive skills
 - * "您上个月旷课多少次?"
 - * "您每周有多少时间花在学习上?"
- Controlling for children inherited ability (memory and logic test scores), family background (parents' year of education, annual household income etc.) and prefecturual fixed effects

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Panel B	Child Sample (7 <age<=16)< th=""></age<=16)<>									
	Word Ability	rd Ability Math Ability		Math Ability	Class (Exam)	Absenteeism	Time Spent			
	Tests	Tests	Tests	Tests	Ranking	Last Month	on Study			
							per Week			
	(7)	(8)	(9)	(10)	(11)	(12)	(13)			
Patrilineal Jinshi Ancestor Density	0.018*	0.063*	0.007**	0.021***	0.105**	-0.112***	0.061**			
	(0.010)	(0.033)	(0.004)	(0.007)	(0.043)	(0.024)	(0.029)			
Matrilineal Jinshi Ancestor Density	0.011***	0.077*	0.010**	0.052*	0.291***	-0.109**	0.025*			
	(0.004)	(0.040)	(0.004)	(0.027)	(0.076)	(0.046)	(0.014)			
Memory Test Score			0.003	0.023***	0.092**	0.087	0.018			
			(0.003)	(0.005)	(0.045)	(0.077)	(0.032)			
Logic Test Score			0.020***	0.001	0.013	0.056	-0.029			
			(0.004)	(0.002)	(0.009)	(0.065)	(0.039)			
Parents' Years of Education			0.060***	0.021***	0.026**	0.031	0.011**			
			(0.013)	(0.005)	(0.013)	(0.020)	(0.005)			
Annual Household Income			0.079	0.011	0.069***	-0.12	0.063*			
			(0.095)	(0.027)	(0.011)	(0.181)	(0.033)			
Individual Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Prefecture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes			
Number of Observations	4541	4541	4541	4541	4541	4541	4541			
Adj. R-squared	0.571	0.223	0.32	0.14	0.659	0.571	0.223			

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Roadmap

Effect of Keju on Contemporary Human Capital

- Baseline Results
- Identifying the Causal Effect of Keju

Accounting for the Channels of Keju Persistence

- Transmission of Keju Culture
- **2** Educational Infrastructure
- Social Capital
- Political Elites
- Social Mobility

Conclusion

Channel of Educational Infrastructure

- Historically, prefectures having excelled in *keju* may also have established better educational infrastructure
- ► If so, historical success in *keju* may result in:
 - More Confucian academies in the Ming-Qing dynasties Figure 9
 - More primary and middle schools in 1900 and universities in 1947 when the traditional education system began to modernize
 - More primary and middle schools and universities today (2010)

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Confucian academies (shuyuan)

- In imperial times, education was mainly financed by the gentry in the form of Confucian academies (*shuyuan*)
- ► The "Big Four" Confucian Academies originated from Song dynasty where the confucian master *Zhuxi* and *Fanzhongyan* had taught
- Source: A Compendium on the Chinese Academies



Modern schools and universities in late Qing and Republican period

- ► In the *Gengzi Reform* (1901-1911), Qing government established new schools (Western-style curriculum)
- After the abolition of *keju* in 1905, the new schools eventually replaced the Confucian academies



Source: primary and middle school data from *First Educational Survey* (Diyici jiaoyu tongji tubiao initiated by Emperor Guangxu) in 1900 and universities data from *Second Education Yearbook of China* (Dierci Zhongguo jiaoyu nianjian) compiled by the Republican government in 1947

Chen, Kung, Ma (HKBU & HKU & HKU)

	Confucian	nfucian Academies Prima		nd Middle	Universit	ties (1947)	Primary and Middle		Universities (2010)	
	(Ming-Qin	g Dynasties)	Schools (1900)				Schools (2010)			
	OLS	ĪV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jinshi Density (logged)	0.338*	0.395	0.072	0.174*	0.841***	0.833***	-0.094	0.001	0.589***	0.779***
	(0.193)	(0.417)	(0.065)	(0.089)	(0.194)	(0.271)	(0.063)	(0.085)	(0.095)	(0.154)
River Distance		0.041		-0.052		-0.039		-0.019		0.047
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Baseline Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	274	274	274	274	270	270	271	271	247	247
Adj. R-squared	0.491	0.498	0.773	0.766	0.707	0.702	0.393	0.387	0.395	0.369

Table 8. Impact of Keju on Educational Infrastructure

Note: Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are population density, urbanization rate, agricultural suitability. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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	Confucian Academies I		Primary and Middle		Universities (1947)		Primary and Middle		Universities (2010)	
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Accounting for the Channels of Keju Persistence

- Transmission of Keju Culture
- e Educational Infrastructure
- Social Capital
- Political Elites
- Social Mobility
- Conclusion

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Channel of Social Capital

- Competitive nature of *keju* meant *keju* elites became part of an exclusive network of the gentry class upon becoming officials
- These scholar-officials had likely created social capital via providing public goods and organizing philanthropic activities
- Testing whether *keju* has a positive effect on various social organizations historically and today

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Measuring Social Capital

- Clan or lineage organization was the most prominent source of social capital in late imperial China
 - Overriding goal was to provide public goods and a social safety net to its members who share the same ancestors (Freedman, 1966; Greif and Tabellini, 2016)
 - Powerful and wealthy clans accumulated enormous educational resources for descendents to receive a better education (teachers, books, etc.) and achieve greater success in *keju* (Elman, 2000; McDermott, 1997)

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Measuring Social Capital

- Clubs and associations in which individuals sharing common interests, beliefs or identities form close-knit groups provide another sources of social capital
 - Charitable organizations engaged in relieving famine and running orphanages in the Qing dynasty
 - Non-profit social organizations including farmers' associations, labor unions, chambers of commerce, women's associations, educational and student bodies, religious associations, charitable organizations etc. in 1935 and in 2008

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	С	lans	Charitable	Organizations	Social Org	ganizations	Socia	l Organizations		
			()	1840)	(19	935)		(2008)		
	OLS	IV	OLS	IV	OLS	IV	OLS	IV		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Jinshi Density (logged)	0.160*	0.340**	0.326***	0.407***	0.273***	0.347***	0.114***	0.104***		
	(0.093)	(0.163)	(0.045)	(0.077)	(0.038)	(0.056)	(0.035)	(0.038)		
River Distance		-0.027		0.030		-0.000		0.029		
		(0.038)		(0.038)		(0.036)		(0.021)		
Baseline Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Additional Control Vari-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
ables										
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Number of Observations	274	274	274	274	274	274	274	274		
Adj. R-squared	0.016	0.045	0.490	0.482	0.324	0.309	0.540	0.541		

Table 9. Impact of Keju on Social Capital

Note: Social organizations include, but are not restricted to, farmers' associations, labor unions, chambers of commerce, women's associations, educational and student bodies, religious associations, and charitable organizations. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are population density, urbanization rate, agricultural suitability. Robust standard errors adjusted for clustering at the province level are given in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

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Roadmap

Seffect of Keju on Contemporary Human Capital

- Baseline Results
- Identifying the Causal Effect of Keju

Accounting for the Channels of Keju Persistence

- Transmission of Keju Culture
- e Educational Infrastructure
- Social Capital
- Political Elites
- Social Mobility
- Conclusion

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- Upon passing the civil exam the *jinshi* was granted entry into officialdom, with some becoming high-level officials
- These political elites could then influence a prefecture's long-term educational outcomes by influencing the distribution of educational resources in their hometowns
 - "Regional favoritism" (Hodler and Raschky, 2014)
- The distribution of political elites produced by *keju* may persist over time and affect the human capital outcomes today through regional favoritism
- ▶ We test if *keju* has positive effect on the regional (hometown) distribution of political elites
 - 33,620 officials (provincial level or above) in late Qing
 - 3,996 officials (provincial level or above) in Republican era
 - 2,118 (164+511+1443) CCP Central Committee members in pre-1949 (1921-1948), socialist (1949-1977) and economic reform (1978-2017) periods

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	High-	ranking	High-1	anking	Central C	ommittee	Central C	ommittee	Central	Committee
	Offic	ials in	Offic	ials in	Men	nbers	Men	ubers	Me	mbers
	Late	Qing	Republican Era		(1921-1948)		(1949-1977)		(1978-2017)	
	OLS	IV	OLS	IV	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jinshi Density (logged)	0.788***	0.670***	0.362***	0.496***	-0.005	0.019	-0.014	0.007	0.004	0.016
	(0.121)	(0.235)	(0.104)	(0.070)	(0.034)	(0.059)	(0.044)	(0.023)	(0.041)	(0.062)
River Distance		-0.057		0.042		-0.000		-0.011		-0.068
		(0.088)		(0.039)		(0.000)		(0.016)		(0.121)
Baseline Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	274	274	271	271	271	271	271	271	271	271
Adj. R-squared	0.564	0.565	0.551	0.650	0.586	0.565	0.512	0.527	0.392	0.507

Table 10. Impact of Keju on Political Capital

Note: High-ranking officials in the late Qing period include officials who served at the provincial level and above, whereas those in the Republican period include those who were either a minister (n= 25) or who served as a provincial or higher level official. The number of Central Committee members was 164, 511, and 1,443 in the three subperiods of Communist rule. Baseline controls include nighttime lights in 2010, distance to coast, and terrain ruggedness. Additional controls are population density, urbanization rate, agricultural suitability. Robust standard errors adjusted for clustering at the province level are given in parentheses. "", and " indicate statistical significance at the "%, "%, and " indicate stati

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Roadmap

Effect of Keju on Contemporary Human Capital

- Baseline Results
- Identifying the Causal Effect of Keju
- Accounting for the Channels of Keju Persistence
 - Transmission of Keju Culture
 - e Educational Infrastructure
 - Social Capital
 - Political Elites
- Keju and Social Mobility
- Conclusion

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- Well-documented positive relationship between education and social mobility (Lipset and Bendix, 1959; Breen, 2010; Chetty et al. 2014)
- ▶ What is the likely effect of *keju* on socioeconomic inequality?
 - *keju* may increase the average educational and income level of all social groups
 - *Keju* could reinforce the existing inequality if legacies of *keju* have a stronger effect for some—the wealthier—groups than others
- We examine the effect of *keju* on intergenerational mobility
 - Educational mobility (proxied by correlations between parents' and children's years of schooling)
 - Income mobility (proxied by correlations between parents' and children's income in the 1% mini census of 2005)

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	Ye	ars of Educa	tion		Income	
	(1)	(2)	(3)	(4)	(5)	(6)
Jinshi Density	0.272***	0.385***	0.444***	0.363***	0.537***	0.589***
	(0.038)	(0.041)	(0.041)	(0.060)	(0.088)	(0.115)
Father's Years of Education (YOE)	0.027***	0.090***	0.027***	0.007	0.007	0.007
	(0.003)	(0.008)	(0.003)	(0.009)	(0.009)	(0.009)
Mother's Years of Education (YOE)	0.062***	0.062***	0.162***	0.050***	0.050***	0.050***
	(0.005)	(0.005)	(0.013)	(0.008)	(0.008)	(0.008)
Parents' Income	-0.000	0.000	0.000	0.103***	0.134***	0.103***
	(0.001)	(0.001)	(0.001)	(0.004)	(0.009)	(0.004)
Housing Property	0.013***	0.013***	0.013***	0.122***	0.123***	0.167***
	(0.002)	(0.002)	(0.002)	(0.011)	(0.011)	(0.020)
Jinshi Density*Father YOE		-0.078***				
		(0.008)				
Jinshi Density*Mother YOE			-0.127***			
			(0.013)			
Jinshi Density*Parents' Income					-0.036***	
					(0.010)	
Jinshi Density*Housing Property						-0.051*
						(0.022)
Baseline + Additional Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Individual Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at Prefecture Level	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	106112	106112	106112	106112	106112	106112
Adj. R-squared	0.136	0.139	0.144	0.073	0.074	0.073

Table 11. Impact of Keju on Socioeconomic Inequality

Notes: All results are based on OLS estimates from 1% of the 2005 mini-census data. Baseline controls include nighttime lights in 2010, agricultural suitability, distance to coast, and terrain ruggedness. Additional controls are commercial centers, population density, urbanization rate. Confucian academies, private book collections, strength of clan and political elites. Individual control variables are age, gender, ethnicity, and residential status (rural versus urban). Robust standard errors adjusted for clustering at the prefecture level are given in parentheses. ***, **, and

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	Ve	are of Educa	tion	,	Incomo	
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Adj. R-squared	0.136	0.139	0.144	0.073	0.074	0.073

Table 11. Impact of Keju on Socioeconomic Inequality

Notes: All results are based on OLS estimates from 1% of the 2005 mini-census data. Baseline controls include nighttime lights in 2010, agricultural suitability, distance to coast, and terrain ruggedness. Additional controls are commercial centers, population density, urbanization rate. Confucian academies, private book collections, strength of clan and political elites. Individual control variables are age, gender, ethnicity, and residential status (rural versus urban). Robust standard errors adjusted for clustering at the prefecture level are given in parentheses. ***, **, and

* indicate statistical significance at the 0.1%, 1%, and 5%, respectively.

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Conclusion

Roadmap

Effect of Keju on Contemporary Human Capital

- Baseline Results
- Identifying the Causal Effect of Keju
- Accounting for the Channels of Keju Persistence
 - Transmission of Keju Culture
 - e Educational Infrastructure
 - Social Capital
 - Political Elites
- Social Mobility

Conclusion

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- Using China's civil exam as an example, we verify that the effect of an institution can persist over a long time even long after it is gone
- Prefectures having produced more *jinshi* and *juren* historically have higher human capital outcomes today
- Cultural transmission, educational infrastructure, social capital and political elites are the possible channels through which this effect persists
- By enhancing human capital outcomes among all social groups, *keju* has a
 positive spillover on intergenerational mobility measured in terms of
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Thank you!

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Appendix

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Variable	# Obs.	Mean	Std. Dev.	Min	Max
Average Years of Schooling	274	8.712	0.951	5.62	11.71
Share of Population with No Ed-	274	0.062	0.044	0.007	0.296
ucation					
Share of Population with	274	0.717	0.071	0.431	0.844
Elementary-Middle School					
Education					
Share of Population with High	274	0.140	0.041	0.052	0.260
School Education					
Share of Population with Uni-	274	0.031	0.027	0.004	0.202
versity and Above Education					
Jinshi density	274	1.3	1.107	0	8.753
Juren density	274	6.805	5.276	0	34.064
Shengyuan quota density (per	274	0.52	0.201	0.002	1.429
exam)					
Nighttime Lights in 2010	274	0.727	1.232	-4.072	3.482
Distance to Coast (1,000 km)	274	12.605	1.173	9.731	14.698
Terrain Ruggedness	274	0.205	0.175	0.005	0.821
Agricultural suitability	274	3.014	0.715	0.55	4.838
Population Density	274	0.013	0.011	0.002	0.064
Urbanization Rates	274	0.052	0.035	0	0.307

Table A1. Summary Statistics

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	1	Average Years	of Schooling	s	No Education	Share of P Elementary and Middle School	High School	th University and Above		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)		
Jinshi Density (logged)	0.092***	0.064***	0.070***	0	-0.201***	-0.090***	0.122***	0.506***		
. ,	(0.007) [0.008]	(0.008) [0.007]	(0.007) [0.007]		(0.034) [0.032]	(0.015) [0.013]	(0.024) [0.021]	(0.083) [0.064]		
Jinshi Density (logged, excluding migrant)				0.079*** (0.022) [0.020]						
Nighttime Lights in 2010		0.055*** (0.010)	0.062*** (0.010)	0.073*** (0.007)	-0.236*** (0.037)	-0.026 (0.017)	0.151*** (0.018)	0.343*** (0.086)		
Distance to Coast (logged)		[0.011] 0.011 (0.013)	[0.011] 0.008 (0.012)	[0.011] 0.011 (0.012)	[0.041] -0.011 (0.061)	[0.013] 0.002 (0.011)	[0.024] 0.019 (0.028)	[0.058] -0.045 (0.070)		
Terrain Ruggedness		[0.008] 0.058 (0.068) [0.067]	-0.075 (0.065)	[0.009] -0.017 (0.072) [0.072]	[0.037] 0.650* (0.370) [0.326]	[0.011] -0.260*** (0.081) [0.076]	[0.021] -0.123 (0.196) [0.176]	[0.056] 1.315** (0.531) [0.350]		
Agricultural Suitability		[0.007]	-0.004 (0.014)	-0.008 (0.015)	0.009 (0.090)	0.009 (0.009)	-0.018 (0.029)	-0.062 (0.071)		
Population Density (logged)			-0.054*** (0.016)	-0.042** (0.016)	(0.057) 0.142 (0.090) [0.064]	0.026 (0.020) [0.017]	-0.156*** (0.038) [0.033]	[0.034] -0.279*** (0.095) [0.087]		
Ming-Qing Urbanization Rates			0.068	0.284	-1.637	-0.336	1.007*	1.42		
			(0.163) [0.179]	(0.209) [0.181]	(1.157) [0.871]	(0.267) [0.207]	(0.496) [0.495]	(1.425) [1.335]		
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		
Number of Observations	274	274	274	274	274	274	274	274		
Adj. R-squared	0.659	0.744	0.762	0.697	0.733	0.586	0.707	0.593		

Table 2. Impact of Jinshi Density on Contemporary Human Capital Outcomes: OLS Estimates

Appendix

Note: All results are OLS estimates. Robust standard errors adjusted for clustering at the province level are given in parentheses, whereas Back onley (1999) standard errors adjusted for two-dimensional spatial autocorrelation are reported in brackets. Conley standard errors are constructed assuming a window with weights equal to 1 for observations less than 1 degree apart and 0 for observations further apart. ***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

Appendix

Panel A	Full Sample			Paront Sampla		Paront Sampla
T uner / Y	1 un oc	ampie		i arent ounipie		(Interviewer Evaluated)
	Whether	Whether the	Vears of	Frequently	Hours spont	Whether
	education	government	schooling	give up	weekly on	naronts
	is the most	should	naronts	watching	tutoring	communicate
	immortant	prioritizo	parents	TV	childron/o	frequently
	dotorminant	opending op	their	1 V	homowork	with
	determinant	spending on	their deit door		nomework	with
	or social	education	children			children
	status		to achieve	(4)	(5)	
	(1)	(2)	(3)	(4)	(5)	(6)
Patrilineal Jinshi Ancestor Density	0.285***	0.193***	0.089**	0.025**	0.099***	0.061*
	(0.037)	(0.035)	(0.041)	(0.012)	(0.020)	(0.036)
Matrilineal Jinshi Ancestor Density	0.109**	0.096**	0.159***	0.071*	0.332*	0.089**
	(0.043)	(0.038)	(0.046)	(0.042)	(0.201)	(0.041)
Memory Test Scores	0.078***	0.029**	0.036***	0.018	0.006	0.030**
	(0.028)	(0.014)	(0.009)	(0.029)	(0.017)	(0.015)
Logic Test Scores	0.019**	0.018**	0.001	0.001	0.003	0.007
0	(0.008)	(0.007)	(0.003)	(0.003)	(0.003)	(0.013)
Years of Education	0.025***	0.090***	0.027***	0.025*	0.028***	0.061*
	(0.009)	(0.021)	(0.009)	(0.014)	(0.010)	(0.036)
Annual Household Income	0.109**	0.097**	0.159***	0.012***	0.003	0.024**
	(0.043)	(0.038)	(0.045)	(0.004)	(0.003)	(0.011)
Individual Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Prefecture Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering at Province Level	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	31245	31245	4541	4541	4541	4541
Adj. R-squared	0.359	0.377	0.512	0.132	0.131	0.117

Table 7. Testing the Cultural Transmission Channel

Notes: All results are based on OLS estimates from 1% of the 2005 mini-census data. Baseline controls include nighttime lights in 2010, agricultural suitability, distance to coast, and terrain ruggedness. Additional controls are commercial centers, population density, urbanization rate, Confucian academies, private book collections, strength of clan and political elites. Individual control variables are age, gender, ethnicity, and residential status (rural versus urban). Robust standard errors adjusted for clustering at the prefecture level are given in parentheses. "4", "and " indicate statistical significance at the 0.1%, 1%, and 5%,

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