

Do Middle and Vocational Schools Foster Meritocracy? Historical Evidence from Japan

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Intergenerational occupational mobility and education

- Family managed firms: commonly observed across countries, but particularly more in premodern societies
- Modern school-based education might have substituted family-based occupational training and qualification
- If so, schools may create larger potential pool of high ability managers, resulting in more meritocratic society and more efficient economy
- Q. Better access to advanced schools (middle/vocational schools) ⇒ becoming successful in different occupations from parents ?
 - ▶ Public officer's kid ⇒ elite business manager?
 - ▶ Merchant's kid ⇒ elite public officer?

Summary of this paper

- Setting: Meiji period in Japan
 - ▶ Soon after Meiji revolution when formal occupational segregation ended
 - ▶ A large number of middle schools and vocational schools were constructed due to some educational reforms
- Data (birth region and cohort level)
 - ▶ Number of elites who became famous in business or public sector
- Empirical strategy
 - ▶ Using region-cohort level variations in the timing of school construction
 - ▶ Estimates the impacts of school constructions on elite production by family backgrounds (noble/commoner)
- Main findings
 - ▶ Middle schools improve occupational mobility of both commoners and nobles.
 - ▶ Vocational schools are effective for commoners, but no effect was found for nobles

Literature

Literature on the intergenerational mobility and education

- Chetty et al (2014); Chetty and Hendren (2016); Meghir, Palme (2003)

Literature on the impacts of education

- Card (1993), Angrist, Krueger (1991); Harmon, Walker (1995); Aakvik, Salvanes, Vaage (2003); Meghir, Palme (2003); Pischke, Von Wachter (2005); Oosterbeek and Webbink 2007), Duflo (2001, 2004)

Literature of vocational and business training

- Vocational training: Malamud, Pop-Eleches (2010)
- Business training: Bloom et al (2013); de Mel, McKenzie, Woodruff (2014); Karlan, Valdivia (2011); Higuchi, Nam, Sonobe (2015), Mano et al (2012), Bruhn, Zia (2012)

Related studies of Japanese Meiji period

- Vocational schools: Asada (1985), Sawai (2012), Hashino (2007, 2012), Takatsuki (2017)
- Elites and education: Aso (1963, 1964), Amano (1989, 1992), Morikawa (1981), Kinmonth (1995), Hirota (1997), Okazaki, Matsumoto (2017)
- Nobles: Sonoda, Hamana, Hirota (1995), Matsumura (2010)

Before and after Meiji Restoration (1868)

Before: 1603-1868: Edo period, feudal society, very low social mobility

- Samurai families (**nobles**): dominated public sector jobs, kids received Confucianism education to become governors
- Others (**commoners**): merchants, farmers, craft makers, kids learned occupational knowledge from their parents

Soon after: the new government abolished economic privileges of nobles

- 1869–1876: Nobles lost privileges to receive income from government¹
- 1873: Nobles lost status of exclusively holding military occupations²
- Even after these changes, nobles still dominated elite public jobs for several decades. Evidence

¹Abolition Measures of Hereditary Stipend (*Chitsuroku Shobun*)

²The Conscription Law (*Chou Hei rei*)

Education reforms by Meiji government

Early period of establishing modern education system: 1870s

- New idea: Educational achievement (not families' occupation) determines one's occupation and future income
- Rapid elementary school constructions Elementary schools

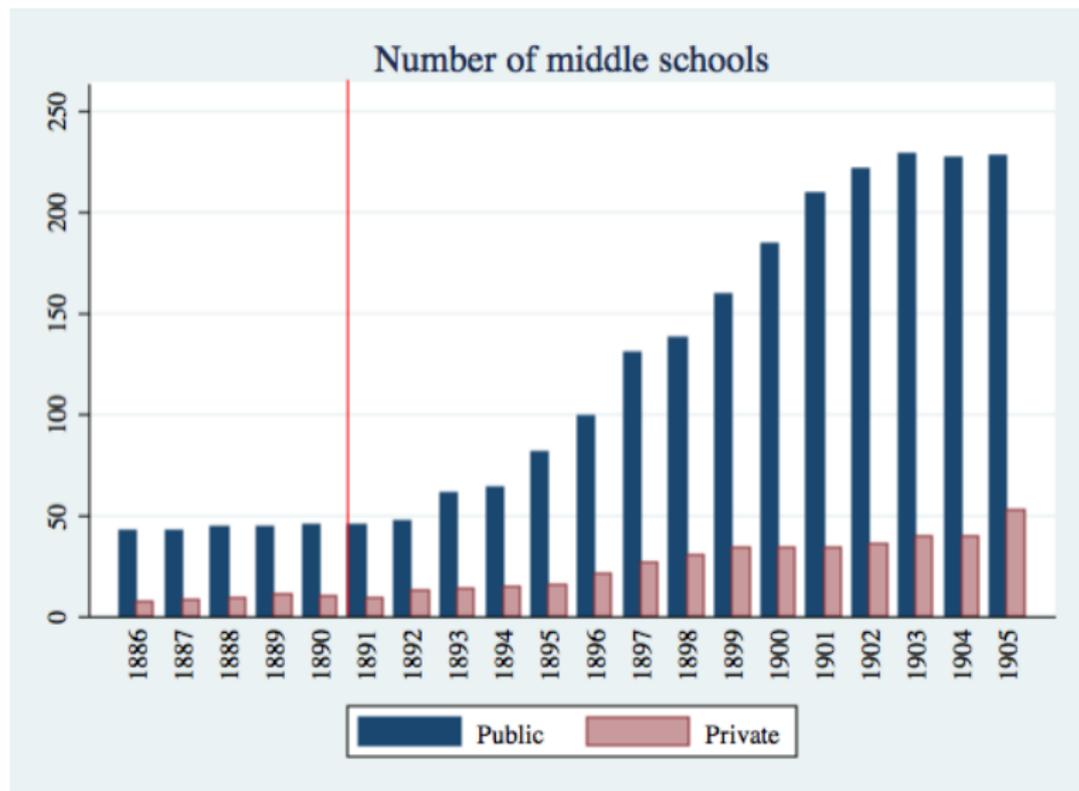
Period of institutionalizing middle schools: 1880s-90s

- 1886: Middle School Order³ restructured early schools and limited the number of public school per prefecture to be at most one
- 1891: **Revision of the 1886 Middle School Order** allowed more than 1 school per prefecture to be constructed by local governments

Types of students, eligibility

³(*Chugakkou Rei*)

Expansion of middle schools



Reforms on vocational schools

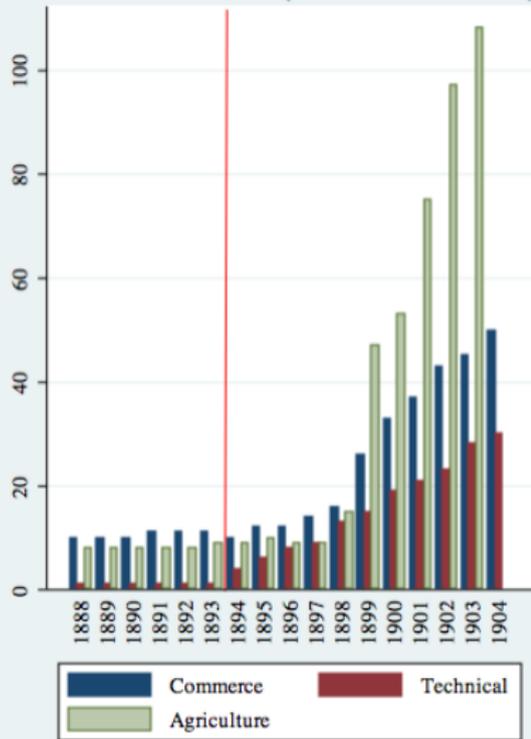
- Early stage of vocational schools establishment, 1870s-80s.
 - ▶ Institutionalizing by new laws setting curriculum, schooling ages
 - ▶ School types: Commerce, Technology, Agriculture
 - ▶ School levels: Advanced, Standard, Supplementary
- 1894: **The Law for Subsidizing Vocational Education Expenses from National Treasury**: Subsidy from national treasury for constructions of vocational schools



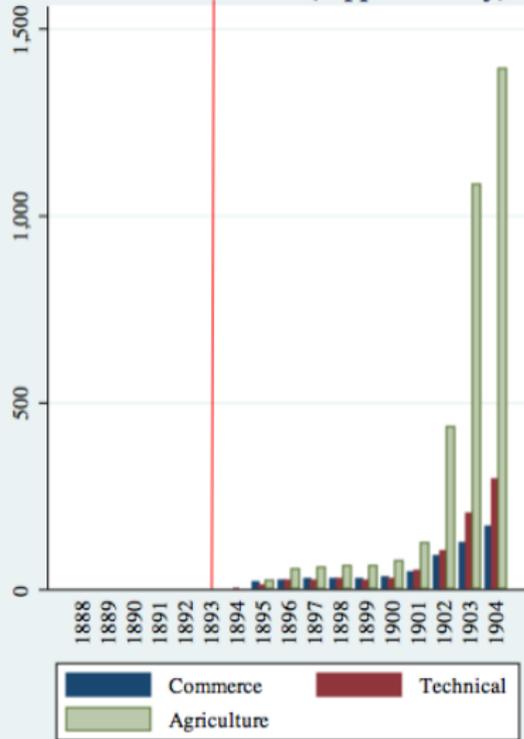
Figure: Hitotsubashi University (the first existing commerce school)

Expansion of vocational schools

Vocational schools (standard+advanced)

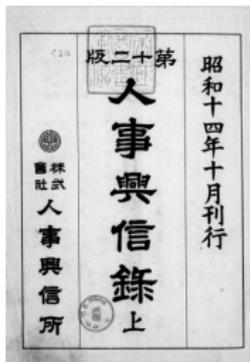


Vocational schools (supplementary)



(1) Outcome data on business and public elites from JPIR

- Japanese Personal Inquiry Records (*Jinji Koshin Roku*) published in 1928, 1934 and 1939
 - ▶ Purpose: provide information of business/marriage partners Purpose
- Biography of notable persons (similar to "who's who")
 - ▶ National highest taxpayers, executives and managers of notable companies, high-rank government officers, scholars
 - ▶ Proxying "top" 0.3% of total population
- Data: Names, birth dates, birth prefecture, final education, firm names, positions, tax payments



井上俊太郎 從四位勳六等、滿洲國產業部林野局長、三重縣在籍
親父 金次郎 明八、六生、現戶生
妻母 小きん 明五、六生、三重、徳水惣右衛門二女
養母 桑明三五、五生、兵衛、富永安美長女
同三十年兄次郎の養子となる大正十九年東京帝大法
科を卒業し同年文官高等試験に合格す山林事務官
に任じ山林事務官營林局事務官大塚營林局林務課長
兼農林事務官農林書記官農務局肥料課長山林局林政
課長等に歷任昭和九年滿洲局臨時産業調査局理事官
に任じ資料課長となり滿洲局副局長を経て昭和十二
年十一月現職に任ず同六年歐米各國に出張す團圓商
運技女館子館一〇生あり(新京市義和館第一代用官
全三編一三三)

(2) Outcome data on elite government officers

- The government introduced an exam system to hire officers at the central government since 1887⁴.
- Anyone could take the exam, but highly competitive.
- Biography of successful candidates who passed the exam for government administrative department (Ikuhiko Tai 1981)
- Data: Birth prefecture, nobility, education, year of finishing education, year of entry to ministry, ministry, department, final position

Graph

Other data

⁴*Bunkan Koutou Shiken*

Baseline empirical equations

- Variation across cohorts and regions in exposures to new schools
- Outcome variables: numbers of national elites by regions of birth and cohorts, by nobility (cohorts 1874-1890)

j : prefecture, c : cohort, (r : record if JPIR)

$$N_{j,c,r} = \sum_k \beta_k S_{j,c+a_k} + \sum_p \pi_p \ln GDP_{j,c+p} + \theta_2 \text{Birth_Pop}_{j,c} + E_j + E_c + E_r + u_{j,c,r}$$

- $N_{j,c}$: the number of elites who were born in prefecture j in year c
- $S_{j,c+a_k}$: the number of schools of type k in prefecture j in year $c + a_k$ where a_k is the school eligibility age of the type k school.
- $GDP_{j,c+p}$ (for $p = 10, 20$ and 30): birth prefecture's manufacturing and textile GDP when the cohort became the age of p
- $\text{Birth_Pop}_{j,c}$: Birth population of the cohort in the prefecture

Middle schools \Rightarrow managers, engineers (For both commoners and nobles)

Parents' background Occupation	Commoner Managers (registered company)	Commoner Engineers	Commoner Traditional business	Noble Managers (registered company)	Noble Engineers	Noble Traditional business
N middle schools	0.367*** (0.097)	0.059*** (0.019)	0.126*** (0.038)	0.081* (0.048)	0.091*** (0.019)	0.009** (0.004)
N commerce schools (standard)	0.666** (0.263)	0.132 (0.125)	-0.219 (0.247)	-0.156 (0.169)	0.047 (0.028)	-0.028** (0.011)
N technical schools (standard)	0.778* (0.443)	0.304*** (0.080)	0.407* (0.236)	0.027 (0.108)	0.082 (0.083)	-0.003 (0.015)
N agricultural schools (standard)	-0.126 (0.206)	0.063 (0.073)	0.053 (0.100)	0.115 (0.121)	-0.014 (0.034)	-0.022 (0.018)
N commerce schools (supplemental)	0.087 (0.055)	-0.038** (0.017)	-0.116*** (0.025)	0.016 (0.025)	-0.013 (0.009)	-0.006 (0.004)
N technical schools (supplemental)	-0.225** (0.109)	-0.014 (0.090)	-0.075 (0.093)	-0.022 (0.048)	-0.009 (0.017)	-0.005 (0.009)
N agricultural schools (supplemental)	0.036 (0.071)	0.022 (0.029)	0.069** (0.032)	0.000 (0.022)	0.015 (0.014)	0.012** (0.005)
Observations	2,290	2,290	2,290	2,290	2,290	2,290
Mean dep var	7.900	0.903	2.677	1.132	0.333	0.0693
Coeff. of N middle school / mean	0.0464	0.0650	0.0471	0.0717	0.272	0.128

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All equations control for prefecture fixed effects, cohort fixed effects, birth population of nobles, birth population of commoners, number of elementary schools, number of high schools and the log of estimated manufacturing and textile GDP at age x (for $x=10, 20$, and 30).

Commerce and Technical schools \Rightarrow managers, engineers (Only commoners)

Parents' background Occupation	Commoner Managers (registered company)	Commoner Engineers	Commoner Traditional business	Noble Managers (registered company)	Noble Engineers	Noble Traditional business
N middle schools	0.367*** (0.097)	0.059*** (0.019)	0.126*** (0.038)	0.081* (0.048)	0.091*** (0.019)	0.009** (0.004)
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Middle schools \Rightarrow elite public officers (Mostly for commoners)

Parents' background	Commoner	Commoner	Commoner	Noble	Noble	Noble
Occupation	Public officer	Military officer	Public officer	Public officer	Military officer	Public officer
Data	JPIR	JPIR	Exam	JPIR	JPIR	Exam
N middle schools	0.090*** (0.030)	0.078** (0.030)	0.148*** (0.036)	0.012 (0.009)	-0.045*** (0.014)	0.073*** (0.024)
N commerce schools (standard)	0.038 (0.037)	0.023 (0.052)	0.037 (0.117)	-0.014 (0.030)	-0.024 (0.044)	0.059 (0.055)
N technical schools (standard)	0.002 (0.059)	-0.034 (0.037)	0.040 (0.091)	0.094** (0.045)	-0.024 (0.034)	0.133** (0.062)
N agricultural schools (standard)	0.031 (0.055)	0.039 (0.035)	-0.019 (0.051)	0.025 (0.027)	0.035 (0.029)	0.032 (0.058)
N commerce schools (supplemental)	-0.039* (0.023)	-0.002 (0.017)	0.019 (0.019)	-0.002 (0.010)	0.008 (0.007)	0.019 (0.016)
N technical schools (supplemental)	0.047 (0.044)	-0.072** (0.027)	0.031*** (0.011)	0.022 (0.014)	0.003 (0.022)	-0.009 (0.007)
N agricultural schools (supplemental)	0.004 (0.015)	-0.008 (0.011)	-0.004 (0.006)	0.015 (0.009)	-0.016 (0.012)	0.002 (0.004)
Observations	2,290	2,290	1,007	2,290	2,290	1,007
Mean dep var	0.657	0.676	1.070	0.187	0.275	0.617
Coeff. of N middle school / mean	0.138	0.116	0.139	0.0660	-0.164	0.118

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All equations control for prefecture fixed effects, cohort fixed effects, birth population of nobles, birth population of commoners, number of elementary schools, number of high schools and the log of estimated manufacturing and textile GDP at age x (for $x=10, 20, \text{ and } 30$). Using data of cohorts born from 1874–1890.

Robustness checks and additional results

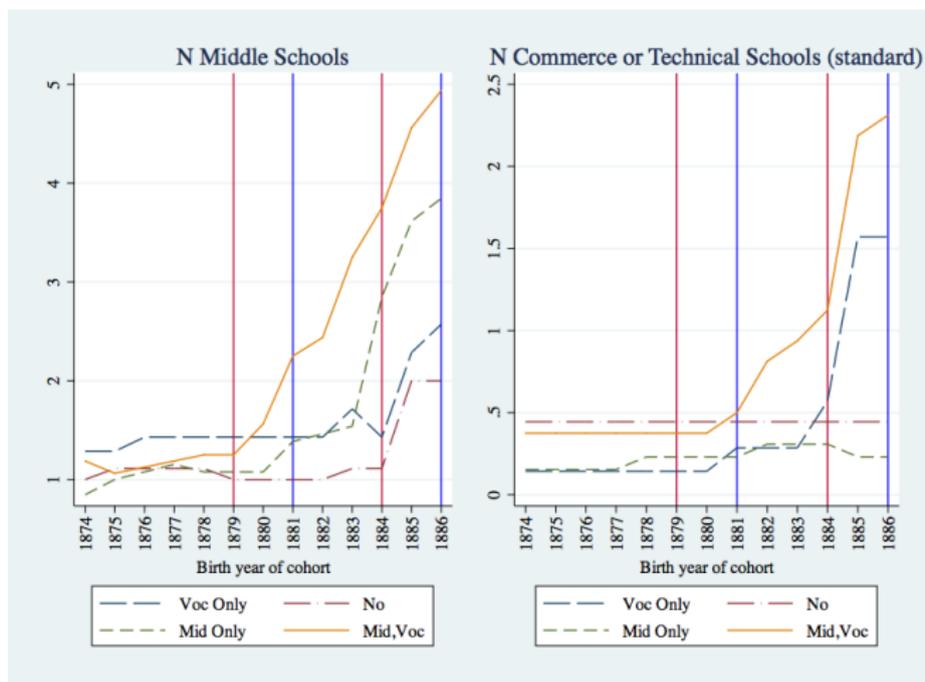
- Pre-trend checks Trend graphs: groups Trend graphs: education Trend graphs: occupation
 - ▶ Divided prefectures into 4 groups by whether there was a new middle/vocational school constructed within 5 years after each reform
 - ▶ Confirmed that mean trends of N elites up to the reform are similar across the 4 groups.
- Placebo tests placebo JPIR placebo Exam
 - ▶ Replaced the N schools to be N schools when the cohort becomes school eligibility age plus 7 years
 - ▶ No systematic effects found for the effect of future N middle schools and vocational schools
- Elites by education types Result JPIR Result Exam
 - ▶ Middle schools \Rightarrow N elites who went to imperial university, (advanced) commerce, technical schools \uparrow
 - ▶ Commerce schools \Rightarrow N elites who went to commerce schools \uparrow
- Effects on total tax payments N tax payers Total tax payments
 - ▶ Middle schools \Rightarrow total tax payments by commoners and nobles \uparrow
 - ▶ Commerce, technical schools \Rightarrow total tax payments by commoners \uparrow

Concluding remarks

- Q. Does providing children with better access to education improve their occupational mobility?
- Meiji period in Japan when a large number of middle schools and vocational schools were constructed
- Results: Middle schools
 - ▶ Public officer's kid \Rightarrow manager, engineer, public officer
 - ▶ Farmer/merchant's kid \Rightarrow manager, engineer, public officer
- Results: Commerce and technical vocational schools
 - ▶ Public officer's kid \Rightarrow public officer
 - ▶ Farmer/merchant's kid \Rightarrow manager, engineer
- Possible explanations for null effect of vocational schools on nobles
 - ▶ Vocational schools did not attract nobles
 - ▶ Little effects of vocational schools (puzzling because middle schools produce noble managers)

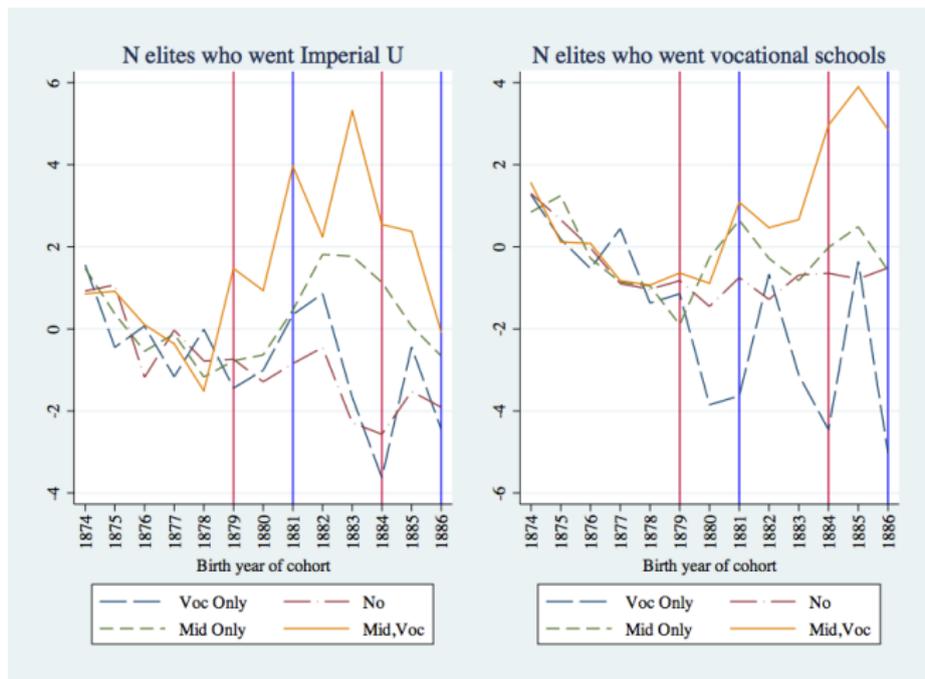
Back Up

Trend check: N schools (JPIR)



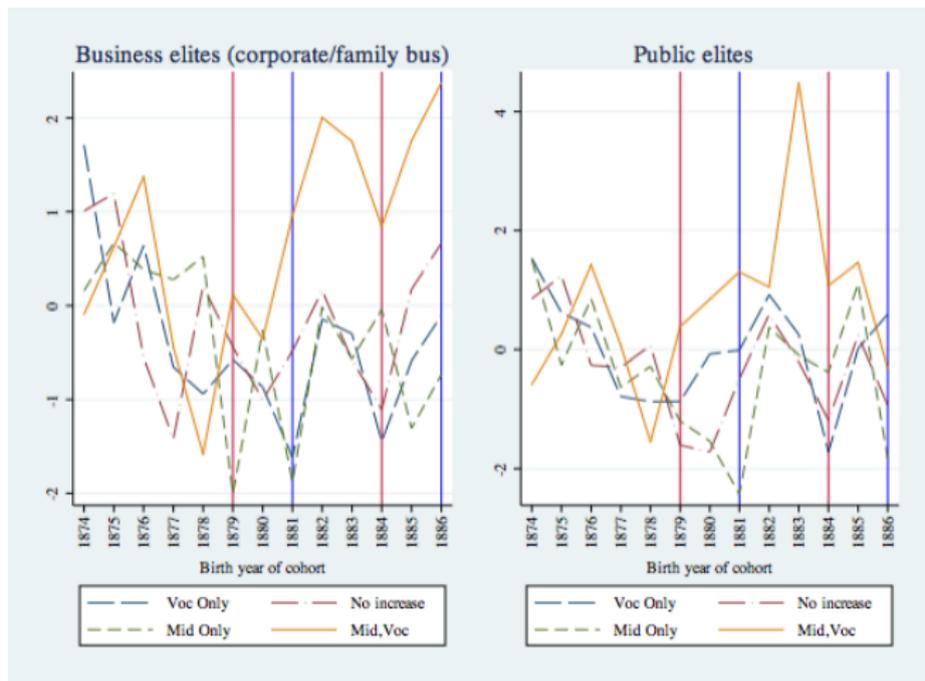
Notes: I divided the prefectures into four groups based on whether there was an increase in (1) the number of middle schools between 1879–1884 and/or (2) the number of commerce or technical vocational schools between 1881–1886. The figures show the average number of available schools at the cohort's school eligibility age within each group of prefectures.

Trend check: N elites by education (JPIR)



Notes: I divided the prefectures into four groups based on whether there was an increase in (1) the number of middle schools between 1879–1884 and/or (2) the number of commerce or technical vocational schools between 1881–1886. The figures plot the within-group average of the residual of regression in which the number of elites were regressed on the number of elementary schools, high schools, age, age squared, log of manufacturing GDP at one's age of 10, and publish year fixed effect. The levels of the residuals were normalized using the group mean and standard deviation of pre-treatment period 1874–1878.

Trend check: N elites by occupation (JPIR)



Notes: I divided the prefectures into four groups based on whether there was an increase in (1) the number of middle schools between 1879–1884 and/or (2) the number of commerce or technical vocational schools between 1881–1886. The figures plot the within-group average of the residual of regression in which the number of elites were regressed on the number of elementary schools, high schools, age, age squared, log of manufacturing GDP at one's age of 10, and publish year fixed effect. The levels of the residuals were normalized using the group mean and standard deviation of pre-treatment period 1874–1878.

Placebo test (future schools) (JPIR)

	(1)	(2)	(3)	(4)
Occupation	Manager	Public	Manager	Public
Birth social class	Commoner	Noble	Commoner	Noble
Cohorts	1870–1879	1870–1879	1870–1879	1870–1879
N middle schools	-0.011	0.140	-0.075	0.068
(after 7 years)	(0.078)	(0.279)	(0.070)	(0.063)
N commerce schools (standard)	0.212	-0.178	0.071	0.273
(after 7 years)	(0.412)	(0.578)	(0.156)	(0.174)
N commerce schools	-0.068	0.130	0.027	-0.022
(after 7 years)	(0.042)	(0.105)	(0.035)	(0.023)
N technical schools (standard)	0.014	1.286**	0.169	0.061
(after 7 years)	(0.268)	(0.564)	(0.101)	(0.197)
N technical schools (supplemental)	0.044	0.555	-0.027	-0.469***
(after 7 years)	(0.325)	(0.601)	(0.381)	(0.130)
N agricultural schools (standard)	0.251	-0.077	0.084	-0.025
(after 7 years)	(0.226)	(0.385)	(0.124)	(0.075)
N agricultural schools (supplemental)	0.006	0.107	0.043	-0.102*
(after 7 years)	(0.121)	(0.267)	(0.056)	(0.054)
Observations	1,215	1,215	1,215	1,215
Mean dep var	1.816	6.232	0.566	1.079

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at 7 years after the cohort's school eligibility ages. Control variables are number of commoners and nobles at birth, fixed effects for birth cohorts, fixed effects of prefectures, estimated number of commoners's births as well as nobles' births of the cohort in the prefecture, and number of high schools.

Placebo test (future schools) Government officers

	(1)	(2)	(3)	(4)
	Placebo	Placebo	Actual	Actual
Birth social class	Commoner	Noble	Commoner	Noble
Cohorts	1870–1879	1870–1879	1877–1886	1877–1886
N middle schools	-0.030	0.013	0.113**	0.232***
(after 7 years for placebo)	(0.036)	(0.035)	(0.051)	(0.059)
N commerce schools (standard)	-0.021	0.063	0.199	0.537***
(after 7 years for placebo)	(0.148)	(0.115)	(0.255)	(0.187)
N commerce schools (supplemental)	0.037	-0.016	-0.022	-0.001
(after 7 years for placebo)	(0.023)	(0.019)	(0.029)	(0.019)
N technical schools (standard)	0.142	0.090	0.312	0.132
(after 7 years for placebo)	(0.128)	(0.077)	0.312	0.132
N technical schools (supplemental)	0.072	-0.025	0.011	0.008
(after 7 years for placebo)	(0.061)	(0.042)	(0.166)	(0.144)
N agricultural schools (standard)	0.090	0.037	-0.042	-0.136
(after 7 years for placebo)	(0.115)	(0.073)	(0.143)	(0.122)
N agricultural schools (supplemental)	0.037	-0.003	0.057	0.012
(after 7 years for placebo)	(0.033)	(0.047)	(0.079)	(0.109)
Observations	460	460	461	461
R-squared	0.336	0.399	0.552	0.605

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. In column (1) and (2), number of schools in the explanatory variables are the number of schools in the prefecture at 7 years after the cohort's school eligibility ages. Control variables are number of commoners and nobles at birth, fixed effects for birth cohorts, fixed effects of prefectures, estimated number of commoners's births as well as nobles' births of the cohort in the prefecture, and number of high schools.

Number of elites by education (JPIR)

Parents' background Final education	Commoner	Commoner	Commoner	Noble	Noble	Noble
	Imperial Univ	Commerce	Technical	Imperial Univ	Commerce	Technical
N middle schools	0.287*** (0.067)	0.084*** (0.025)	0.026** (0.012)	0.138*** (0.051)	0.053** (0.025)	-0.001 (0.008)
N commerce schools (standard)	0.313 (0.216)	0.145* (0.083)	0.027 (0.036)	0.011 (0.120)	-0.017 (0.027)	-0.005 (0.014)
N technical schools (standard)	0.663** (0.260)	0.160* (0.092)	0.068 (0.054)	0.056 (0.147)	0.052 (0.034)	0.007 (0.025)
N agricultural schools (standard)	0.079 (0.165)	0.002 (0.067)	-0.004 (0.027)	0.160** (0.068)	-0.025 (0.025)	0.018 (0.017)
N commerce schools (supplemental)	0.028 (0.042)	0.160*** (0.042)	-0.002 (0.005)	-0.021 (0.027)	-0.013 (0.011)	0.012** (0.005)
N technical schools (supplemental)	0.041 (0.133)	-0.042 (0.079)	0.031 (0.024)	-0.028 (0.048)	-0.027 (0.031)	0.014 (0.010)
N agricultural schools (supplemental)	0.015 (0.056)	0.029 (0.042)	-0.013 (0.014)	0.043 (0.039)	0.029* (0.017)	-0.002 (0.008)
Observations	2,290	2,290	2,290	2,290	2,290	2,290
Mean dep var	3.814	1.123	0.332	1.359	0.195	0.0889
Coeff. of N middle school / mean	0.0752	0.0748	0.0767	0.102	0.273	-0.0149

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All equations control for prefecture fixed effects, cohort fixed effects, birth population of nobles, birth population of commoners, number of elementary schools, number of high schools and the log of estimated manufacturing and textile GDP at age x (for $x=10, 20$, and 30). [Back](#)

Central government officers from Imperial U

Social background Cohorts	Commoner 1874–1893	Commoner 1874–1893	Commoner 1874–1893	Commoner 1874–1886	Noble 1874–1893	Noble 1874–1893	Noble 1874–1893	Noble 1874–1886
N middle school	0.191*** (0.034)	0.183*** (0.041)	0.157*** (0.037)	0.060 (0.036)	0.110*** (0.021)	0.096*** (0.019)	0.086*** (0.024)	0.234*** (0.041)
N commerce schools (standard)		0.023 (0.110)	-0.016 (0.120)	0.107 (0.204)		0.060 (0.062)	0.033 (0.061)	0.485*** (0.147)
N technical schools (standard)		0.069 (0.099)	0.050 (0.093)	0.288 (0.177)		0.179** (0.068)	0.170*** (0.058)	0.175 (0.160)
N agricultural schools (standard)		-0.026 (0.052)	-0.039 (0.050)	-0.105 (0.129)		0.046 (0.072)	0.049 (0.073)	-0.100 (0.122)
N commerce schools (supplemental)		0.006 (0.040)	-0.002 (0.039)	-0.013 (0.024)		0.022 (0.022)	0.017 (0.020)	0.004 (0.018)
N technical schools (supplemental)		0.023* (0.014)	0.023* (0.013)	-0.011 (0.168)		-0.011 (0.009)	-0.012 (0.009)	0.039 (0.131)
N agricultural schools (supplemental)		0.003 (0.009)	0.002 (0.008)	0.068 (0.084)		0.004 (0.006)	0.005 (0.006)	-0.034 (0.102)
GDP control	N	N	Y	Y	N	N	Y	Y
Observations	703	703	703	430	703	703	703	430
Mean dep pre-treatment (1874–1879)	1	1	1	1	0.795	0.795	0.795	0.795
b(N middle sch.)/pre-treatment mean	0.191	0.183	0.157	0.0599	0.139	0.120	0.109	0.294

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All regression control for fixed effects for birth cohorts, fixed effects of prefectures, number of elementary schools, and number of high schools. GDP control variables include estimated manufacturing GDP at age x (for $x=12$ and 24).

Elites' total tax payments (JPIR)

Tax payment = Income tax + corporate tax

Social background	Commoner	Commoner	Commoner	Noble	Noble	Noble
Tax type	All	Income tax	Corporate tax	All	Income tax	Corporate tax
N middle schools	1.940*** (0.654)	1.892*** (0.636)	0.048* (0.024)	0.289* (0.163)	0.281* (0.164)	0.008* (0.004)
N commerce schools (standard)	0.908 (2.325)	1.039 (2.259)	-0.131 (0.151)	-0.394 (0.843)	-0.365 (0.818)	-0.028 (0.028)
N technical schools (standard)	5.655 (4.367)	5.337 (4.259)	0.318** (0.126)	-0.460 (0.437)	-0.483 (0.428)	0.023 (0.019)
N agricultural schools (standard)	-1.632* (0.909)	-1.665* (0.881)	0.033 (0.050)	0.151 (0.290)	0.152 (0.284)	-0.001 (0.023)
N commerce schools (supplemental)	2.522*** (0.634)	2.435*** (0.617)	0.086*** (0.025)	0.281* (0.154)	0.286* (0.144)	-0.005 (0.012)
N technical schools (supplemental)	-2.127 (1.577)	-1.998 (1.541)	-0.128 (0.077)	0.208 (0.214)	0.207 (0.207)	0.002 (0.011)
N agricultural schools (supplemental)	-0.324 (0.780)	-0.322 (0.758)	-0.001 (0.031)	-0.043 (0.125)	-0.059 (0.123)	0.016** (0.008)
Observations	1,527	1,527	1,527	1,527	1,527	1,527
dep var	34.89	33.79	1.098	3.154	3.117	0.0372
Coeff. N middle school in mean	0.0556	0.0560	0.0439	0.0916	0.0901	0.219

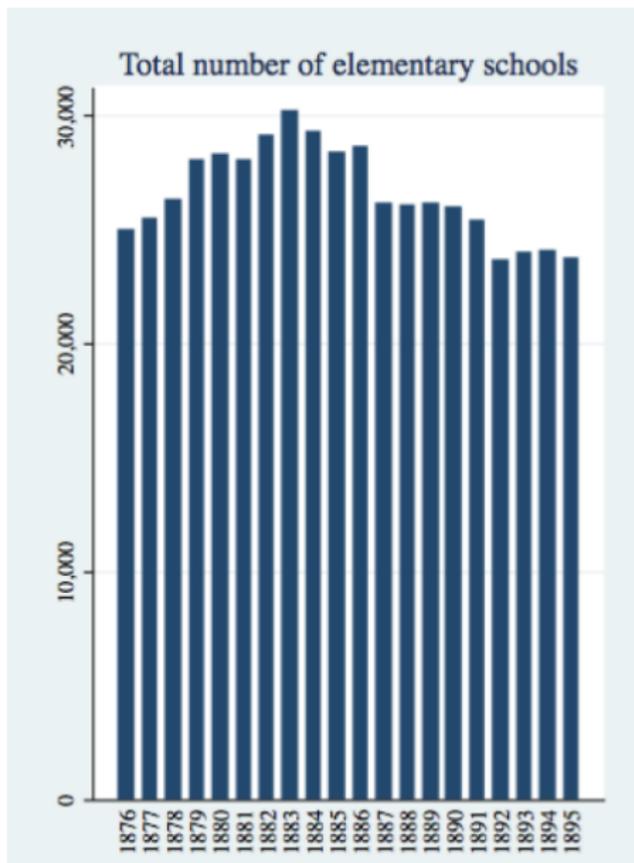
Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All equations control for prefecture fixed effects, cohort fixed effects, number of elementary schools, number of high schools and the log of estimated manufacturing and textile GDP at age x (for $x=10, 20$, and 30).

Elites' N who pay positive tax (JPIR)

Social background	Commoner	Commoner	Commoner	Noble	Noble	Noble
Tax type	Any	Income tax	Corporate tax	Any	Income tax	Corporate tax
N middle schools	0.692*** (0.196)	0.695*** (0.195)	0.165*** (0.049)	0.110** (0.050)	0.109** (0.050)	0.015*** (0.005)
N commerce schools (standard)	-0.097 (0.593)	-0.107 (0.592)	-0.247 (0.248)	0.011 (0.199)	0.011 (0.198)	-0.042 (0.035)
N technical schools (standard)	1.663 (1.008)	1.656 (1.007)	0.412* (0.235)	0.159 (0.155)	0.161 (0.155)	0.016 (0.026)
N agricultural schools (standard)	0.215 (0.307)	0.218 (0.304)	0.130 (0.096)	0.119 (0.105)	0.118 (0.105)	0.013 (0.011)
N commerce schools (supplemental)	0.573*** (0.152)	0.570*** (0.152)	-0.026 (0.025)	0.011 (0.025)	0.011 (0.025)	-0.004 (0.009)
N technical schools (supplemental)	-0.245 (0.286)	-0.243 (0.284)	-0.115 (0.076)	-0.016 (0.056)	-0.019 (0.055)	0.006 (0.009)
N agricultural schools (supplemental)	-0.132 (0.185)	-0.132 (0.185)	0.024 (0.039)	0.025 (0.035)	0.025 (0.035)	0.003 (0.007)
Observations	1,527	1,527	1,527	1,527	1,527	1,527
Mean dep var	12.38	12.37	2.418	1.545	1.544	0.0601
Coeff. N middle school in mean	0.0559	0.0562	0.0684	0.0709	0.0709	0.254

Notes: Standard errors are clustered at 45 prefecture levels and shown in parentheses. Number of schools in the explanatory variables are the number of schools in the prefecture at the cohort's school eligibility ages. All equations control for prefecture fixed effects, cohort fixed effects, number of elementary schools, number of high schools and the log of estimated manufacturing and textile GDP at age x (for $x=10, 20,$ and 30).

Elementary schools



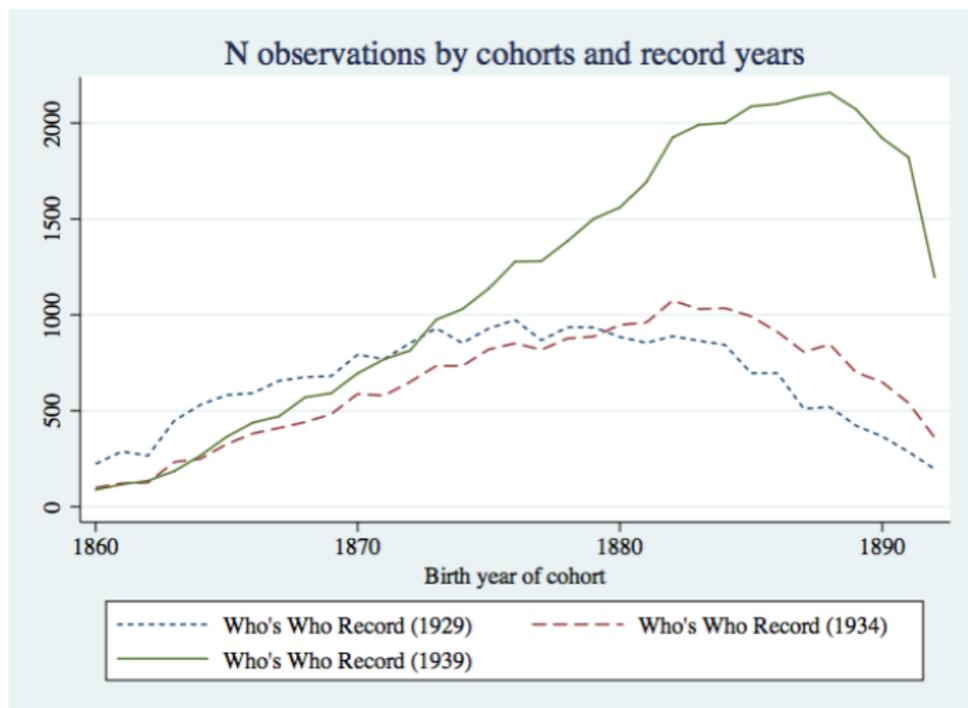
- Constructed rapidly within the first few years after the Education System Order (1872)
- 1886 Elementary School Order restructured the existing schools and reduced the numbers
- Started at the age of 6 and lasted for 8 years in total
- Not the main focus of this study mainly because of the span of the outcome data (1929-1939)
- I control for the numbers of elementary schools in the region

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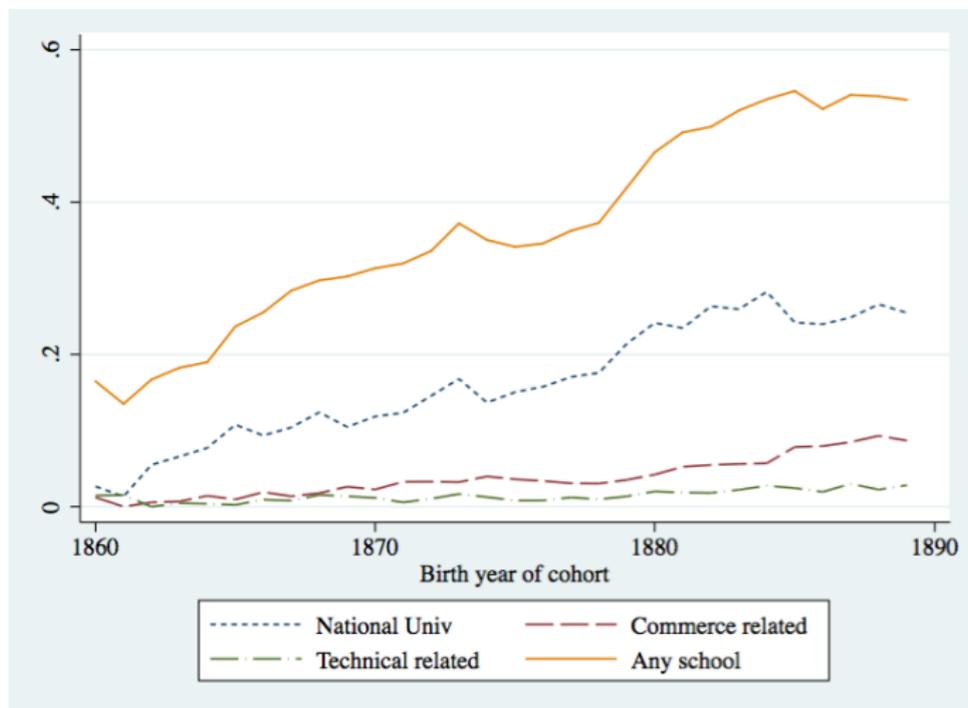
Data: Personnel Inquiry Record: Purpose

"Reflecting the complication of companies and business structures in the recent years, this book is trying to fill in the increasing demand for the information about business partners such as their names and backgrounds to facilitate stronger business relationships. The purpose of this book is to provide credible information about the persons' backgrounds and proving the existence of the companies and absence of crime records or other kinds of hidden problems (Translation of p. 8 of 8th edition by the author)."

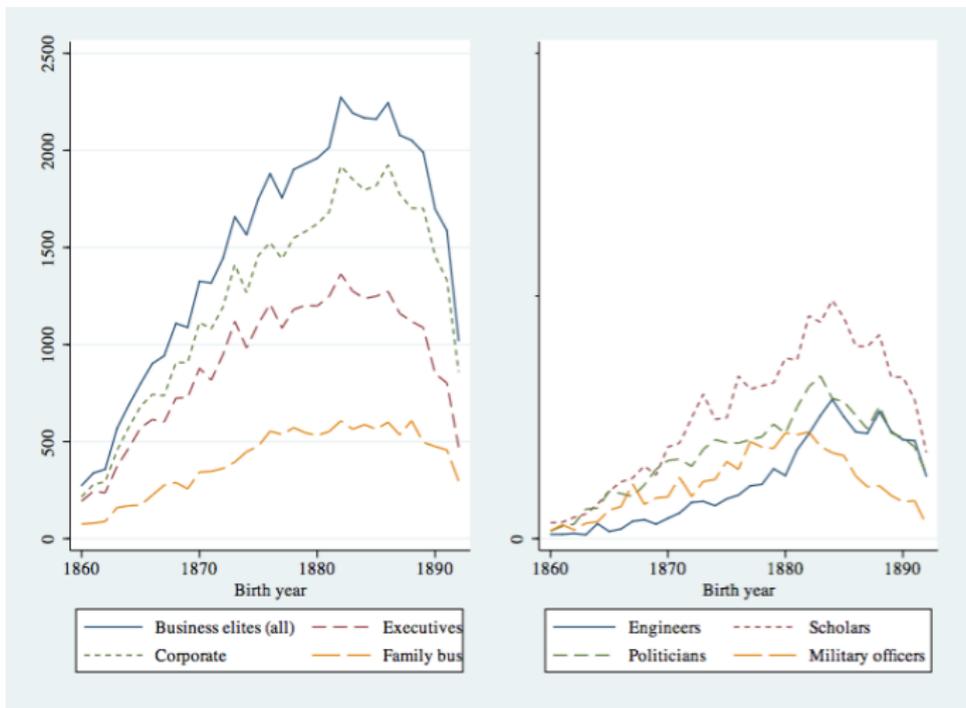
Personnel Inquiry Records: Total number by publish years



Personnel Inquiry Records: Schooling



Personnel Inquiry Records: Occupations



Processing JPIR for analysis

Processing data for empirical analysis

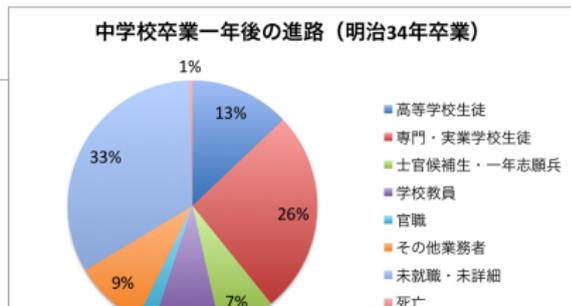
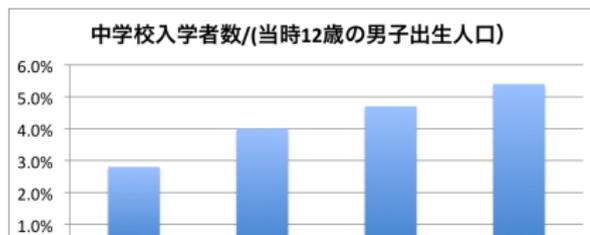
- 1 Pool the data from three publish years
- 2 Focus on cohorts born from 1875 to 1889
- 3 Focus on those born in prefectures except for Hokkaido and Okinawa (no manufacturing GDP variables for control)
 - ▶ 44,970 cases
- 4 Identify the types of education
- 5 Identify the types of occupations by firm names or positions
 - ▶ 40,704 cases are identified as either as a business elite, engineer, scholar, politician or military officer
- 6 Create birth prefecture, cohort, and record level data of the total number of persons listed, for each occupation category

N obs by publish year- cohort

Some key contexts on middle schools

Middle school eligibility: Started at the age of 12 and lasted for 5 years.

- School cost (incl. living): 3-5 yen/mo. (~ ave. labor income/mo.)
- Students' background: Considered to be mostly nobles and wealthy farmers' children (Kinmonth 1995)
- Schooling after graduation: High schools (→ Imperial Univ.), Imperial Army Academy, some vocational, specialized schools.
 - ▶ ↓ % noble among elites graduated from the Imperial University, 1890s–1990s (Aso 1964)
 - ▶ ↑ % farmers' kids at Imperial Army Academy around, 1900s (Hirota 1997)



Sampling criteria of JPIR

8th edition of the Record describes the sampling method as follows:

- ① The sampling targeted Japanese men living in Japan or in abroad who are well-known for the general public or business society.
- ② As for business persons, sampled based on
 - ▶ Japanese Who's Who Record ("*Nihon-Shinshi-Roku*")
 - ★ Celebrities ("*Meishi*") and national highest income/corporate tax payers living in 21 urban regions in Japan (target population size ~ 15,000, sampling rates ~ 34%, according to Yazawa 2005)
 - ▶ Bank directory ("*Ginkou-Kaisya-Youroku*")
 - ▶ Record of Company Directors in Japan ("*Zenkoku-Shogaisya-Yakuin-Roku*")
 - ▶ Bank of Japan directories ("*Teikoku-Ginkou-Gaisya-Youroku*")
- ③ As for public officers, used employment records of the government.
- ④ Checked the information with the national birth records ("*Koseki-Touhon*"), and whether the company is registered.

Definition of elite types (JPIR)

	Business elites				Public elites				landowner
	corporate		family business	engineer	Officer	Politician	Military	Scholar	
	manager	not manager							
firm register	Y	Y	N						
occupation	any place			技,工	官		軍	教	
occupation	last 3	社長			參事	大臣		博士	地主
occupation	last 3	會長			主事	知事		學士	家主
occupation	last 3	頭取			視学	市長		學長	
occupation	last 3	理事			領事	町長		講師	
occupation	last 3	取締役			書記	村長		研究	
occupation	last 3	監査役				議長			
occupation	last 3	企業家							
occupation	last 3	店長							
occupation	last 3	部長							
occupation	last 3	課長							
occupation	last 3	支配人				議員			
rank	any place						將		
rank	any place						尉		
rank	any place						佐		
firm	last 1		商						
firm	last 1		店						
firm	last 1		業						
firm	last 1		屋						
firm	last 2		not 商事			議院			
firm	last 2					内閣			

Number of persons on JPIR (1939)

	1876–1878 birth cohorts			1886–1888 birth cohorts		
	Commoners	Nobles	Total	Commoners	Nobles	Total
Cohorts' birth population (% of the social class)	1,107,873 (96)	47,275 (4)	1,155,147 (100)	1,565,360 (96)	73,548 (4)	1,638,908 (100)
N Business elites (% of the social class)	2,001 (91)	197 (9)	2,198 (100)	3,359 (91)	315 (9)	3,674 (100)
N Public elites (% of the social class)	260 (73)	98 (27)	358 (100)	532 (84)	141 (16)	631 (100)
Total income tax paid (% by social class)	5,927,674 (91)	593,997 (9)	6,521,671 (100)	8,930,192 (95)	488,452 (5)	9,418,644 (100)

N obs by publish year- cohort

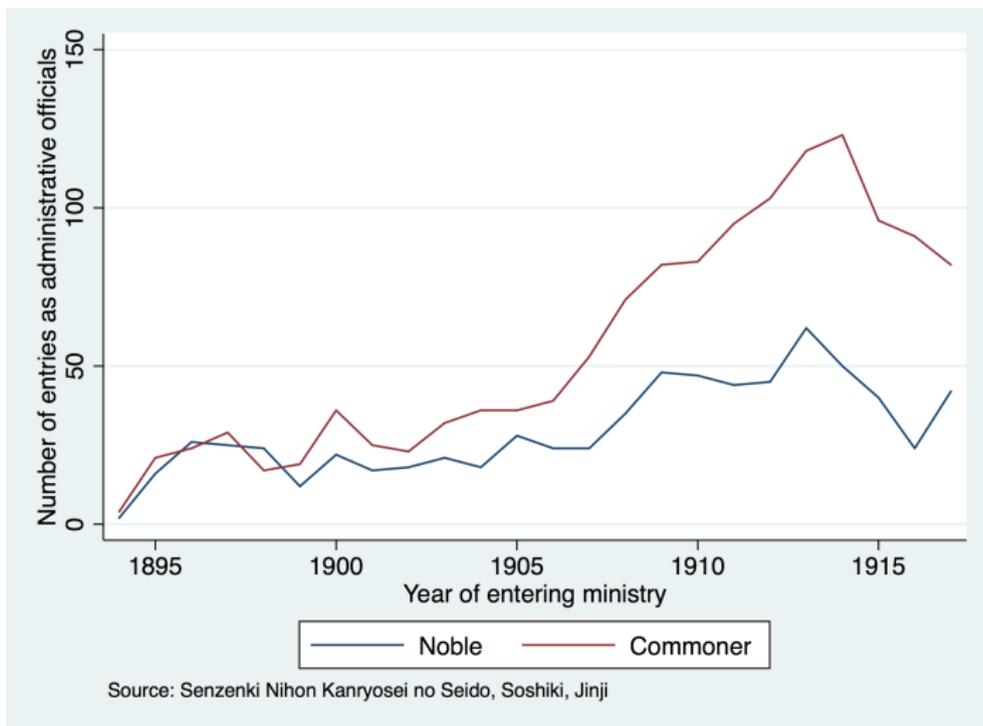
Prefecture-year level data construction

Basic Statistics (JPIR)

Variable	Mean	Std. Dev.	Min.	Max.	N
<u>Number of schools in prefecture at the school eligible age</u>					
N middle schools	2.879	3.163	0	29	2565
N commerce schools (standard)	0.574	1.077	0	12	2565
N commerce schools (supplemental)	0.374	1.67	0	16	2565
N technical schools (standard)	0.355	0.821	0	8	2565
N technical schools (supplemental)	0.343	1.829	0	44	2565
N agricultural schools (standard)	0.668	1.056	0	9	2565
N agricultural schools (supplemental)	1.053	5.02	0	112	2565
N high schools	0.156	0.363	0	1	2565
N elementary schools	572.013	239.88	0	1538	2565
Age	50.667	7.088	36	65	2565
<u>Number of observations on the Who's Who Records</u>					
N corporate manager (Commoners)	7.738	9.167	0	109	2565
N corporate manager (Nobles)	1.071	1.657	0	20	2565
N corporate non-manager (Commoners)	2.086	2.899	0	29	2565
N corporate non-manager (Nobles)	0.322	0.75	0	10	2565
N running family business (Commoners)	2.618	4.949	0	40	2565
N running family business (Nobles)	0.066	0.271	0	2	2565
N engineers (Commoners)	0.925	1.483	0	22	2565
N engineers (Nobles)	0.32	0.742	0	8	2565
N public officers (Commoners)	0.685	1.048	0	12	2565
N public officers (Nobles)	0.18	0.465	0	4	2565
N politicians (Commoners)	1.281	1.613	0	14	2565
N politicians (Nobles)	0.136	0.391	0	3	2565
N military officers (Commoners)	0.637	1.18	0	15	2565
N military officers (Nobles)	0.249	0.618	0	5	2565
N academic scholars (Commoners)	1.538	2.082	0	20	2565
N academic scholars (Nobles)	0.443	0.926	0	10	2565
N nobles (/1000)	4806.237	3969.336	-600.443	33213.395	2562
N commoners (/1000)	101731.364	49824.976	4898.249	657808.125	2562

Unit of observation is prefecture-cohort level. Data covers the cohorts born between 1874 and 1892 in 45 prefectures.

Number of administrative officers by the year hiring



Even after these changes, nobles still dominated elite public jobs

Population of nobles			
	Nobles	Commoners	Fraction of nobles
1876	1,834,758	132,333,082	5.34%
1882	1,940,271	36,557,330	5.00%
1898	2,089,134	41,130,741	4.83%

Number of high ranking* public officers at central government			
	Nobles	Commoners	Fraction of nobles
1872	12,077	2,187	81.4%
1882	17,627	4,812	72.5%
1898	28,716	19,057	59.9%

Notes: Tables from Sonoda, Hamana, Hirota (1995, p84). *Above *Han-nin-kan* or *Jun-nin-kan*. **Department of public administration

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Data on schools and prefecture economic conditions

Number of schools in each prefecture and year, from 1876–1906

- Yearbooks of the Ministry of education (*Nihon Teikoku Monbusho Nenpo*).

Birth population of nobles and commoners

- Estimated number of male births in each prefecture and year from *Nihon Zenkoku Kokou Hyo* and *Nihon Teikoku Kokou Hyo*
- Estimated fractions of nobles in each prefecture and year from *Nihon Zenkoku Kokou Hyo*

Prefecture economic conditions

- Manufacturing GDP, textile GDP, estimates available in each prefecture
- The Research Unit for Statistical and Empirical Analysis in Social Sciences (Hi-Stat) in Hitotsubashi University (2009)
- Data available only in years 1874, 1890, 1909, and 1925. Interpolated logged variable linearly within prefectures.