

Colonization and education: exploring the legacy of local elites in Korea[†]

By JI YEON HONG and CHRISTOPHER PAIK*

In this article we examine the impact of pre-colonial educated elites and colonization on modernization. Using the case of Joseon, as Korea was known before being colonized by Japan in 1910, we investigate how the civil exam system and scholarly traditions, as well as the provision of public schools under Japanese colonial rule, influenced levels of literacy in the colony. We introduce novel data from Joseon's historical court examination archives, colonial education records, and censuses dating back to 1930. Our findings suggest that the spread of Korean literacy during the early colonial period was strongly correlated with the historical presence of civil exam passers from the Joseon Dynasty. Regions with a greater presence of educated elites later had higher numbers of Korean teachers, as well as more private schools established as alternatives to the colonial public schools.

Joseon, as Korea was known prior to 1910, was the first monarchical state in Asia to be colonized by Japan. As in other states that experienced similar transitions, the process of colonization had a notable influence on Joseon's social and economic outcomes in subsequent decades. Joseon and other former Asian colonies thus contribute important case evidence to a large literature on colonization and its effects; they also provide invaluable testing grounds for existing hypotheses in the literature on colonization, most of which focuses on European colonial powers.¹

Drawing on studies from other geographic regions, we still find little consensus on the lasting impact of pre-colonial characteristics on colonization processes and outcomes.² In this article, we thus contribute to that literature by investigating

*Authors' Affiliations: Ji Yeon Hong, Hong Kong University of Science and Technology; Christopher Paik, NYU Abu Dhabi.

[†] We would like to thank Myung Soo Cha, Young-Sun Ha, James Kung, Seongcheol Oh, participants at the 2014 Asian Historical Economics Congress and the 2014 Annual Midwest Political Science Association Conference, and our colleagues at New York University, SOAS London, Stanford University, and Hong Kong University of Science and Technology for their insightful comments; Jonghyuk Kim for providing the historical map of Korea; and Jae-Ok Lee at the Academy of Korean Studies (www.aks.ac.kr) for providing the exam passers data. All errors are our own. [Correction added on 4 August 2017, after first online publication: Acknowledgements have now been added.]

¹ Numerous studies have considered institutional and modernization outcomes in European colonies as legacies of colonization and settlement: Sokoloff and Engerman, 'History lessons'; Acemoglu, Johnson, and Robinson, 'Colonial origins'; eisdem, 'Reversal of fortune'; Bertocchi and Canova, 'Colonization'; Lange, 'British colonial legacies'; Nunn, 'Historical legacies'; Chaudhary and Garg, 'Does history matter?'.

² Englebert, 'Pre-colonial institutions'; Gennaioli and Rainer, 'Modern impact'; van de Walle, 'Institutional origins'; Huillery, 'Impact of European settlement'; Juif and Baten, 'Human capital'; Michalopoulos and Papaioannou, 'Pre-colonial ethnic institutions'. For example, Huillery, 'Impact of European settlement', argues that most prosperous pre-colonial areas in West Africa lost their advantage because they were hostile to the colonizers. The author claims that this caused the 'reversal of fortune'. On the other hand, Gennaioli and Rainer, 'Modern impact', find that pre-colonial centralization in African countries improved current public goods provision in rural areas.

how Joseon's pre-colonial features influenced its development during the colonial period. Specifically, we examine the relationship between the pre-colonial presence of an educated elite and the literacy rate during the colonial period, in which Japan established public schools in a systematic effort to assimilate its colonial subjects. In this article, public schools refer to those run by the colonial government. Private schools, on the other hand, refer to those run by non-government entities, including individuals and religious organizations.

Historians and economists continue to debate the extent to which Japanese colonization at the turn of the twentieth century modernized Joseon. On one hand, the act of aggression may have served as a catalyst for modernization by exposing the subjugated state to new frontiers of technology and development; on the other hand, however, the imperialists were known to use extractive means to undermine the natural progress toward modernization in subjugated states, thus potentially setting back colonies like Joseon from where they may have been in the absence of intervention from external forces.³ Our study contributes to this debate by focusing on those who passed the civil examination (known as *mungwa*), intended for official positions in the Joseon Dynasty.⁴ The court examination system was abolished along with the social status system in 1894, followed by colonization by Japan in 1910. In spite of this, the incipient growth and effectiveness of public schools at the time depended on the local accumulation of this educated pre-colonial human capital.

Studies specifically related to the Korean context have used literacy improvement during the colonial period to support the modernization theory⁵—for example, which claims that Japanese colonial rule contributed to the subsequent economic development of South Korea by endowing the state with 'a relatively literate labor force'.⁶ Haggard et al., on the other hand, rebut this claim, arguing that the main driver behind the economic growth was not Japanese colonialism but the Joseon Dynasty, which made educational attainment the 'chief means to political and economic success'.⁷ In our article, the early process of the educated elites' involvement in colonial institutions remains the focus, and we treat the spread of literacy as an outcome of the presence of *mungwa* passers in the public school system. To the best of our knowledge, this research constitutes the first empirical study of how the pre-colonial elite presence in Korea may have influenced subsequent literacy rates, which are one of the key indicators of human capital accumulation and economic growth.⁸ It is also one of the few studies that examine the level of modernization in Korea prior to the Korean War and the country's division.

³ Cumings, 'Origins and development'; Eckert, *Offspring of empire*; Kimura, 'Standards of living'; Kohli, 'High growth'; idem, 'Japanese colonialism'; Haggard, Kang, and Moon, 'Japanese colonialism'; Cha, 'Facts and myths'; Cha and Kim, 'Korea's first industrial revolution'; Cha, 'Unskilled wage gaps'.

⁴ *Mungwa* consisted of two civil exams: *sogwa* and *daegwa*. Throughout the article, we refer to *daegwa* passers, who completed the higher official exam process, as *mungwa* passers. Those who only passed *sogwa* are referred to as *sogwa* passers.

⁵ Kimura, 'Standards of living'; Kohli, 'High growth'; Cha and Kim, 'Korea's first industrial revolution'.

⁶ Kohli, 'High growth', pp. 1276–7.

⁷ Haggard et al., 'Japanese colonialism', p. 877.

⁸ Romer, 'Human capital'; Azariadis and Drazen, 'Threshold externalities'; Psacharopoulos, 'Returns to investment'; Galor and Moav, 'From physical to human capital accumulation'; Hanushek and Woessmann, 'Role of cognitive skills'.

In our empirical analysis, we introduce novel data from Joseon's historical court examination archives, colonial education records, and census records going back to 1930. By 1930, about halfway through the colonization period between 1910 and 1945, there was an especially rapid expansion of public primary schools aiming at influencing the colonial subjects.⁹ It is also noteworthy that Japanese rule in Korea was relatively stable by 1930, indicating that Japanese policies in Korea were not tightly linked to external factors such as the imperial wars that marked Korean history before 1910 and after 1937. Furthermore, 1930 is also the first and only year when a public census was carried out on literacy in Korea as a colony; the next census on literacy came in 1960, after the country's independence in 1945.

Our main findings suggest that variation in the literacy rate by 1930 is strongly correlated with the historical presence of *mungwa* passers. While higher literacy rates in regions with a greater presence of pre-colonial elites may reflect a concentration of exam passers' descendants who benefited from studious family upbringings, we also find that regions with a stronger presence of elites had a greater number of Korean teachers, as well as more private schools that were established as alternatives to the colonial public schools. Our analysis shows that the effect of pre-colonial elites remains robust after considering various historical factors that might have affected both the presence of *mungwa* passers and the long-term literacy rate.

The remainder of the article is structured as follows. The next section presents a brief background of the class system in Joseon and a timeline of the country's transition from the Joseon Dynasty to a Japanese colony. Section II describes the construction of our main variables and controls. Section III discusses various empirical strategies, followed by the presentation of the main findings and robustness checks in sections IV and V. Section VI provides further discussion of the role played by the educated elites in shaping literacy rates, and section VII concludes.

I. Background

In theory, noble status in Korea during the Joseon Dynasty, between 1392 and 1897, was determined largely by scholarship, and the primary status qualification for the upper class was attained by passing court exams. The upper social class in Joseon was called *yangban*; *yangban* literally means two groups, consisting of civilian officials (*munban* or *mungwan*) and military officials (*muban* or *mugwan*). Before the end of the Joseon Dynasty and the abolishment of the official court examination (*gwageo*) system in 1894, those who became civilian or military court officials usually did so by first passing these difficult exams.¹⁰

⁹ Starting in the 1920s and throughout the 1930s, the number of public schools increased almost fourfold; Oh, *Sikminji ch'odŭng kyoyugŭi hyŏngsŏng*, p. 119.

¹⁰ On the basis of an early study by Wagner, *Literati purges*, scholars agree that *yangban* was an aristocratic elite group in Joseon until the early twentieth century. However, while closely related, exam passers and *yangban* did not necessarily comprise the same group. The *yangban* status was sometimes granted outside the civil exam system (Song, *Chosŏnsahoesayŏn'gu*), while commoners could pass exams to rise to high-ranking positions in the court (Ch'oe, 'Commoners'; Wagner, 'Civil examination process'; Han, *Kwagŏ, ch'ulseŭi sadari*). At the same time, examination success did not always guarantee that a person would become *yangban*; the status was established by tradition and needed to be acknowledged by local communities (Song, *Chosŏnsahoesayŏn'gu*). In this study, we focus on civil exam passers as a proxy for the presence of highly educated elites, rather than the broader *yangban* class.

Different types of exams existed for official court positions: two preliminary lower civil service exams (*sogwa*) were usually followed by one higher civil service exam (*daegwa*), which combined were called *mungwa*. The *sogwa* consisted of two exams, *saengwon-si* and *jinsa-si*. The *saengwon-si* component involved the study of the Confucian classics (*saseo-samkyung*), while *jinsa-si* involved essay writing. In order to study for the higher-tiered *daegwa*, scholars would typically attend *Sungkyunkwan*, a higher educational institution that prepared students for the exam.¹¹ The very first *mungwa* exams were held in 1399, and over the course of five centuries of the Joseon Dynasty, from 1392 to 1894, a total of 230 *saengwon-si*, 212 *jinsa-si*, and 804 *daegwa* exams were held. The military exam, or *mugwa*, involved military training as well as knowledge of the Confucian classics—also known as Four Books and Three Classics, or the Seven Chinese Classics—and legislative theory (*gyeongguk daejeon*). From 1402 to 1894, 801 *mugwa* were held.¹²

After violent confrontations on Ganghwa Island in 1875–6, Japan was the first country to succeed in forcing the Joseon Dynasty to establish modern diplomatic relationships and allow foreign trade. From that point, the Joseon government struggled between traditional governance and modern reform, with frequent political interventions from foreign countries such as China, Japan, and Russia. After defeating competitors in two consecutive wars (the First Sino-Japan War in 1894–5 and the Russo-Japanese War from 1904 to 1905), Japan made Korea a protectorate in 1905 and finally colonized it under the Japan–Korea Annexation Treaty of 1910.

Over the course of the colonial period, the Japanese government set out to change the underpinnings of Joseon's existing institutions. The colonial government quickly realized that the education system in Joseon had to differ from that of other Japanese colonies due to the relatively advanced culture and education levels already established within Joseon.¹³ The country had a long-standing Confucian tradition with a strong emphasis on education, and it established several tiers of educational institutions, primarily for the members of the upper social class who would take up positions in the court and civil service. This led to the adoption and expansion of a schooling system in 1911 that Joseon had already established prior to colonial occupation in 1910, while at the same time pursuing expanded use of the Japanese language in these schools.¹⁴ The Education Decree in Joseon issued in 1911 states that the main purpose of elementary education is the propagation of the Japanese language. While Korean language classes and the use of Chinese characters became part of the regular teaching curriculum, the number of hours devoted to the teaching of the Korean language decreased over time as colonial institutions gained traction. Records indicate that the Korean language was taught in public primary schools for five to six hours per week from 1911 to 1921, a figure

¹¹ Passing the *sogwa* was necessary in order to enter *Sungkyunkwan*. Although enrolling at *Sungkyunkwan* increased the chance of passing the *daegwa*, it was not mandatory for scholars either to go through the institution or to pass the *sogwa* before taking the *daegwa*.

¹² Paik, 'Does lineage matter?', pp. 439–42, provides a detailed summary of the different types of exams and the qualifications involved.

¹³ Kang, 'Study of the establishing process', p. 19.

¹⁴ After 1894 certain members of the Joseon court attempted various reforms in governance and policies. One of these initiatives included the establishment of public schools in Seoul (also known during this period as Hanyang or Gyeongseong) and numerous private schools by both the reformists and missionaries.

that declined to three to four hours in 1922. Korean language classes became optional in 1938, and were finally abolished by 1943.¹⁵

II. Data

II.1. *Mungwa*

In this article, we rely on the number of *mungwa* passers—that is, people who passed the higher civil service exam (*daegwa*)—as the foremost indicator for the level of educated pre-colonial elite accumulation in an area.¹⁶ The *mungwa* passers literally represent those who passed the higher civil exams and thus can be reliably considered as educated, consequently supplying the labour force of school teachers and influencing decisions concerning various school establishments. *Yangban*, on the other hand, may be more broadly defined as the upper social class, whose members achieved their status through the merit-based exam system, but also through other means.¹⁷

The examination records during the Joseon Dynasty were obtained from the Academy of Korean Studies' Historical Figures Comprehensive Information System.¹⁸ According to the database, 15,150 people passed *mungwa* (that is, *daegwa*) in total, during the entire period of the Joseon Dynasty. In order to create a measure for the pre-colonial elite presence in each region, we first identified the district from which each *mungwa* passer originated. Out of the 15,150 exam passers, matching records with residential information were identified for 6,193 individuals. We then matched each location of residence to the 1930 census administrative units, which allowed us successfully to determine the administrative unit for 6,178 of the 6,193 passers. It is worth noting that missing residence data do not bias our results. Residence information was rarely recorded in the early Joseon period, and only from the eighteenth century onwards was residential information systemically recorded for all *mungwa* passers. Next, we aggregated the number of all *mungwa* passers located in each district. Finally, we re-scaled that *mungwa* passer measure according to population, dividing the figure by thousands of residents in each district for each year available in the data.¹⁹ In doing so, we avoid using the variable simply to capture the regional population effect on the literacy rate.

Table 1 shows that at the provincial level, the mean number of *mungwa* passers per 1,000 people is 0.398, and at the district level, 0.222; Gyeonggi province has the highest number of *mungwa* passers with 2.115 per 1,000 people, while Hwanghae

¹⁵ Kim, *Hanguk geundae chodeung*, pp. 71–107.

¹⁶ Passing the *daegwa* appears to have been extremely difficult; on average the age of successful applicants who completed all three exams was 34.3, and exam preparation time took anywhere from 10 to 15 years. While open to all social classes, studying for these exams would probably have been an option available only for families with substantial resources; Lee, *Joseon ch'ogi yangban yon'gu*, pp. 68–79.

¹⁷ We control for the potential *yangban* effect on literacy, that is separate from the presence of the educated elite, by adding a measure of *yangban* presence in 1909, the year prior to the Japanese occupation in 1910, in addition to *mungwa* passers in all analyses. The main results remain the same.

¹⁸ Historical Figures Comprehensive Information System, Academy of Korean Studies, <http://people.aks.ac.kr/index.aks>.

¹⁹ *Mungwa* passers are normalized by the 1925 population in the district-level analysis, as the 1925 census is the first census in which district-level population data are available. In the following provincial analysis, we use the 1911 population. The year 1911 is the year right after colonization and also the first year for which provincial population figures are available.

Table 1. *Summary statistics of all variables in statistical analyses*

Category	Variable	Obs.	Mean	Std. dev.	Min.	Max.
District level						
Literacy rate	Japanese literacy rate (%)	234	8.461	7.025	2.830	43.755
	Korean literacy rate (%)	234	21.921	5.184	11.618	43.744
Local elite	<i>Mungwa</i> passers per 1,000	232	0.222	0.691	0	10.100
	<i>Yangban</i> share (1909)	223	0.007	0.013	0	0.099
Public schools	No. of schools per 1,000 (1929)	233	0.074	0.027	0	0.222
	No. of teachers per 1,000 (1929)	233	0.304	0.134	0	1.574
Controls	Non-agricultural occupation (%)	234	6.558	5.916	1.504	34.604
	Population density (1,000 people/km ²)	232	0.554	0.596	0.037	5.070
	Distance to Seoul (km)	233	223.120	122.660	0	642.630
	Land tenancy ratio	228	1.099	0.898	0.012	7.808
	Soil acidity	211	2.091	0.752	1.000	5.000
Province level (1911–30)						
Local elite	<i>Mungwa</i> passers per 1,000	260	0.398	0.514	0.109	2.115
Schools per 1,000	<i>Seodang</i>	260	1.193	0.500	0.146	2.602
	Public schools	221	0.053	0.024	0.014	0.108
	Private schools	221	0.003	0.004	0	0.015
Teachers per 1,000	<i>Seodang</i>	260	1.216	0.500	0.146	2.616
	Public schools	221	0.199	0.107	0.047	0.429
	Private schools	221	0.007	0.018	0	0.102
Controls	Non-agricultural area (%)	260	92.933	4.219	70.889	97.685
	Population density (1,000 people/km ²)	260	9.274	4.340	2.146	16.683

province has the lowest number of passers, with 0.109. The district with the highest number of passers (2,498) is Seoul, located in Gyeonggi province. About 85 per cent of the districts had at least one or more *mungwa* passers.²⁰

Figures 1 and 2 illustrate the spread of our measures of pre-colonial elite presence and literacy rates by 1930, respectively. The two maps suggest a consistent pattern, according to which both Pyongyang and Seoul had many *mungwa* passers as well as high overall literacy rates in 1930. Other cities following a similar pattern include Jeungju and Gaesung in the north, and Daegu in the south. The maps also show that numerous districts in the north frequently had no exam passers, and that those in the interior regions tended to have fewer exam passers and lower literacy rates.

II.2. *Measures of literacy and education in 1930*

In order to examine variation in literacy rates during the colonial period, we present the colonial census data from 1930 both at the district and the provincial levels. Data on district-level literacy during the colonial period come from the 1930 census taken by the Japanese Government General of Korea. The census covers Korean and Japanese residents and includes data on those literate in Korean, Japanese, both languages, and neither language. In this study, we focus on the literacy of the Korean population.

²⁰ Online app. tab. S1 presents detailed statistics on the number of *mungwa* passers for all provinces and urban centres.

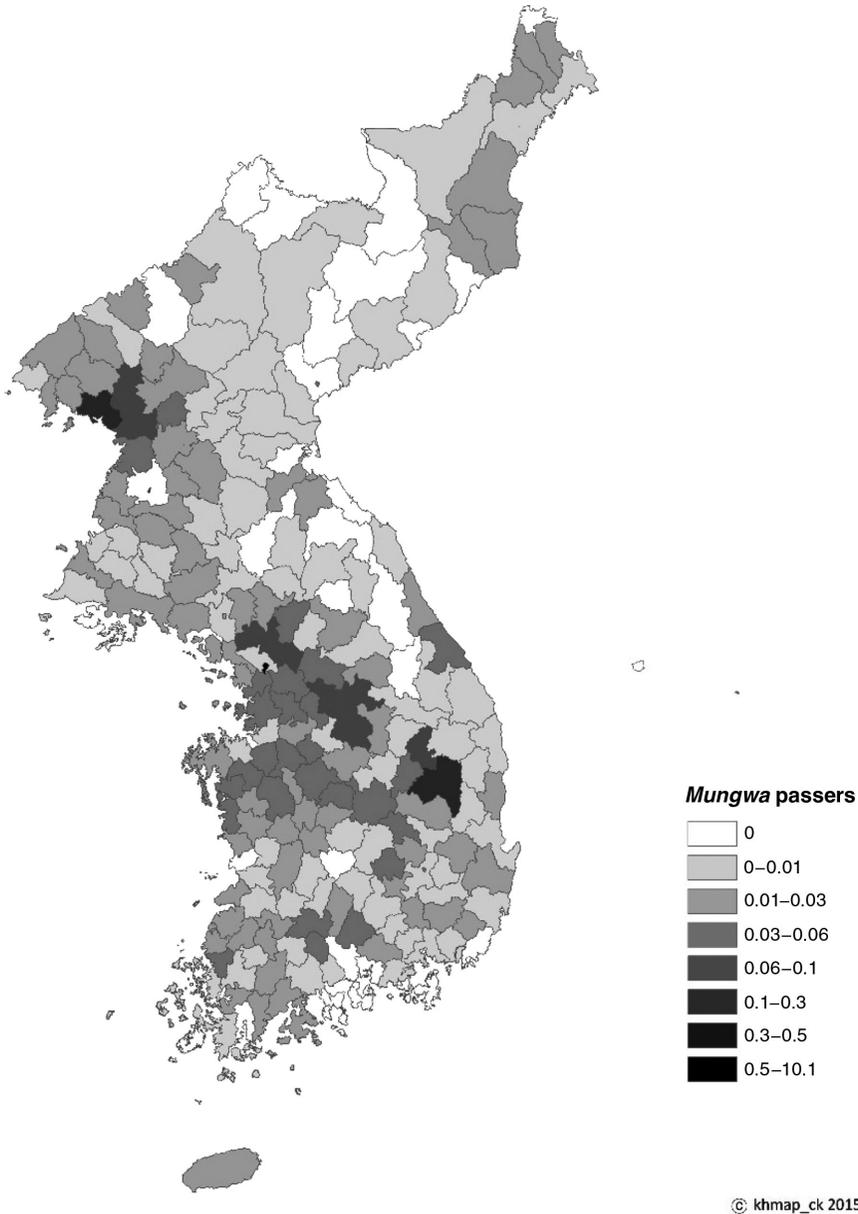


Figure 1. *Number of mungwa passers (per 1,000) by district*

Source: Historical map directed by Dr Jonghyuk Kim and drawn by Binna Yoon.

Literacy in Korean involves the ability to read and write in Hangul, the Korean alphabet, and a set of traditional Chinese characters.²¹ The Korean alphabet was invented by King Sejong during the Joseon Dynasty in 1443 to provide the common

²¹ Yoon, *Gukeogyoyuk baeknyeonsa*, pp. 75–7.

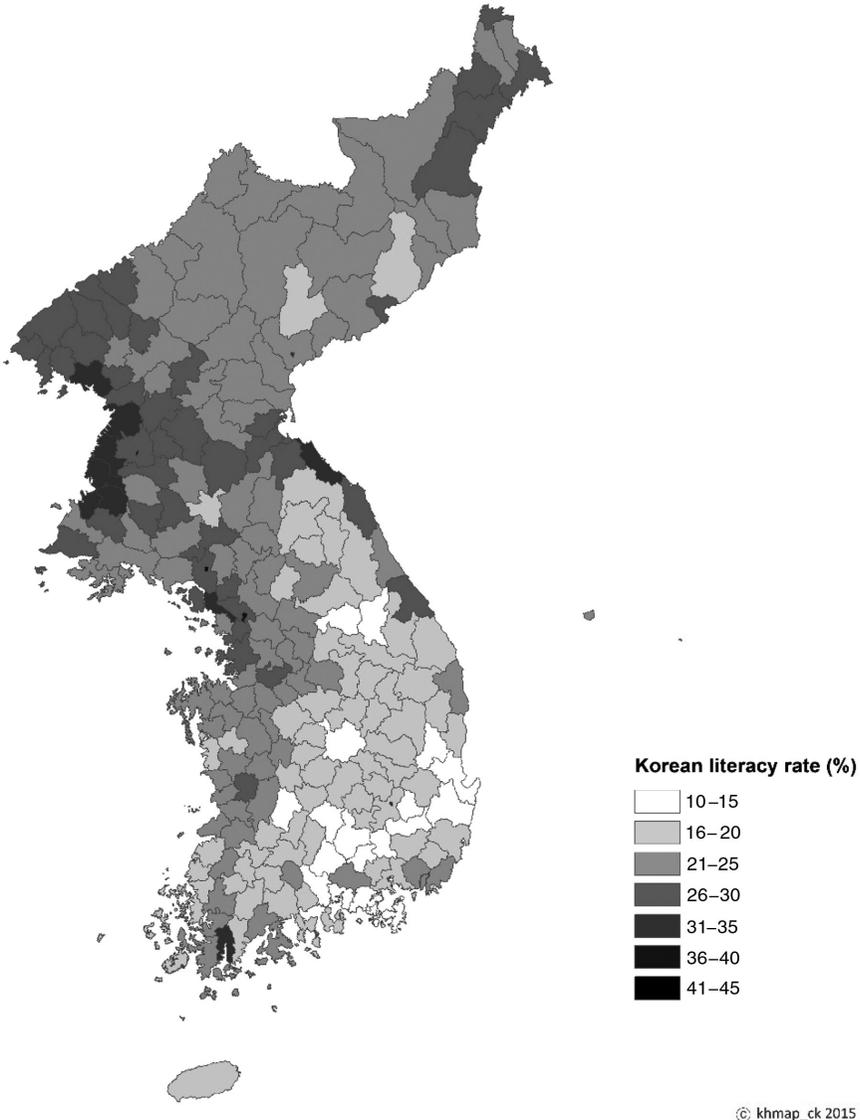


Figure 2. *Literacy rate spread in 1930*
Source: Historical map directed by Dr Jonghyuk Kim and drawn by Binna Yoon.

people with a written language. *Yangban* who had communicated in Chinese characters until then were reluctant to use Hangul during the Joseon Dynasty. As a result, for centuries both Hangul and Chinese characters coexisted in the Korean language system; only in 1970 did the South Korean government adopt the Exclusive Usage of Hangul Act.

In 1930, after 20 years of colonial occupation, 22 per cent of Koreans were literate in either Korean or Japanese, compared with 80 per cent of Japanese. For our analysis, the Korean population is classified into two groups, one literate in the

Korean language and the other literate in Japanese. We calculate the literacy rate in Japanese by combining the number of people who were literate in Japanese and those literate in both languages. Likewise, the Korean literacy rate is determined by combining the number of residents literate in Korean with those literate in both languages.

For the number of public primary schools and teachers in each district in 1929, we gather the data from *Japan's colonial education policy document collection: Joseon*.²² The number of public schools is our measure of the extent of colonial influence on literacy; the provision of schools in each district was determined primarily by the colonial government, with some influence from the elite class or the local population.²³ Given that district-level literacy data are available only for the 1930 census, we also use provincial-level data on annual population and schools and teachers of different kinds (traditional and private primary schools, as well as public schools) from 1911 to 1930, available from Statistics Korea.²⁴ Throughout the analysis we re-scale the numbers of exam passers, schools, and teachers by the corresponding population.²⁵

In 1930, the Japanese colonial census recorded detailed information on the literacy rate in Joseon at the district (*bu* and *gun*) level. For all 234 districts, we matched the number of schools and teachers from another source (*Japan's colonial education policy document collection: Joseon*) to each district.²⁶ Figure 3 shows high relative literacy rates across the provinces in the north (Huanghae, Pyeongbuk, Pyeongnam, Hambuk, and Hamnam) as well as in Gyeonggi, Huanghae, Hambuk, and Hamnam; this outcome can be attributed to the patriotic enlightenment movement aimed at 'educating and saving the country' (Gyoyuk Guguk Undong).²⁷ This movement, undertaken between 1905 and 1910, was particularly active in the northern regions and arguably remained influential over several decades.²⁸ Among a number of organizations involved in the movement, the New Citizens Society (Shinminhoe) was the most active in the northern provinces, while the Korean Self-enforcement Society (Daehan Jaganghoe) was active in the Seoul area. Critical to the movement's success were missionaries who contributed to the establishment of private schools. Christian schools not only represented a large share of the private schools in colonial-era Korea, but they also played a significant role in modernizing the education sector.²⁹ To avoid disputes with western powers, the Japanese government seldom engaged in repressing those private missionary schools, which in turn encouraged numerous Korean organizations to cooperate with western missionaries to enhance education among

²² Watanabe and Abe, *Japan's colonial education policy*.

²³ Between 1920 and 1930 some local elites became involved in the spread of the public school system by petitioning for more schools and classes in the one school for every three townships (*myun*) movement (*sam myun il gyo undong*) in the 1920s, and the one school for every township movement (*il myun il gyo undong*) in the 1930s; Ryuta, 'Public primary schools'; Oh, *Sikminji ch'odung kyoyugui hyöngsöng*, pp. 186–200.

²⁴ Statistics Korea, <http://kosis.kr/>.

²⁵ For the district-level analysis, we divide the number of schools and teachers by the 1930 population. For the province-level time-series analysis, we use the population in the corresponding year to normalize our school and teacher variables.

²⁶ Watanabe and Abe, *Japan's colonial education policy*.

²⁷ See also online app. tab. S2, which presents statistics on the number of schools and the literacy rate by province.

²⁸ Jeong, 'Aegukkyemongundonggwa'.

²⁹ Yi, *Hangukidokgyowa Minjokuisik*, pp. 356–73.

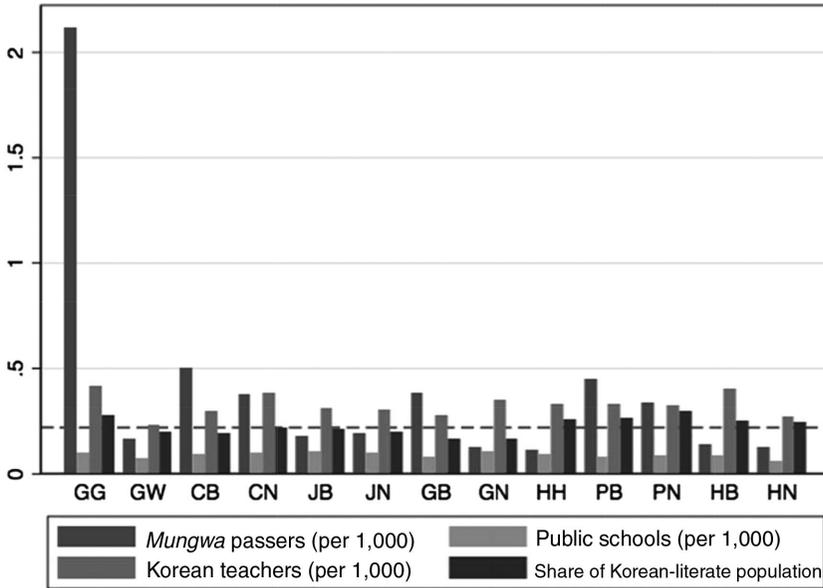


Figure 3. *Mungwa passers, schools, teachers, and literacy in 1930, by province*

Notes: Abbreviated names of 13 provinces are listed on the x-axis. GG = Gyeonggi, GW = Gangwon, CB = Chungbuk, CN = Chungnam, JB = Jeonbuk, JN = Jeonnam, GB = Gyeongbuk, GN = Gyeongnam, HH = Hwanghae, PB = Pyeongbuk, PN = Pyeongnam, HB = Hambuk, HN = Hamnam. The dashed horizontal line indicates the average share of Korean literate population in 1930.

Sources: Mungwa passers are from Historical Figures Comprehensive Information System (see n. 18). Schools, teachers, and literacy in 1930 are from Statistics Korea, <http://kosis.kr/>.

the local populations.³⁰ Shinminhoe and Daehan Jaganghoe both worked actively with western missionaries to encourage the education movement in the 1910s, and the many private missionary schools that were set up in the northern provinces contributed to the region’s high literacy rate in 1930.

Table 1 presents both district- and province-level summary statistics normalized by population. At the district level in 1930, the mean Japanese literacy rate in Korea was only 8.5 per cent, while the mean Korean literacy rate was 22 per cent. National records indicate that 80 per cent of Japanese people living in Korea were literate in Japanese, and 6.2 per cent of them were also literate in Korean. By comparison, only 7 per cent of Koreans were literate in Japanese, and 22 per cent were literate in Korean.³¹ The mean number of public schools per 1,000 people by 1929 was 0.074, while the number of teachers was 0.304. The mean population density at the district level (in thousands of people per square kilometre) in 1930 was 0.554.

Across Korea, 4.3 million people fell within the primary education age range of six to 14 years in 1930. Yet the number of public schools stood at just 1,620

³⁰ Jung, ‘1910 Nyōndae Joseon’, pp. 218–19.

³¹ In our district-level analysis, we calculate the literacy rate based on all residents living in Korea. While the population census by nationality was only made available at the provincial level, Japanese residents in Korea lived predominantly in urban centres and constituted only 2.5% of the total population in 1930. The district-level rate therefore represents the colonial subjects’ level of literacy, especially in rural districts.

(with 8,259 classes), accommodating only 422,820 students, or less than 10 per cent of the primary school age group in 1929. In Seoul, only 18 primary public schools existed, enrolling 14,758 students out of the 49,768 eligible six- to 14-year-olds.³²

At the provincial level, the data are available for 20 years (1911 to 1930) for 13 provinces. There appears to be a time trend in the number of schools: dramatic changes took place in the 1920s in the number of *seodang* (traditional schools) per 1,000 people, which increased over the years 1911 to 1921 from 1.214 to 1.458, but subsequently decreased to 0.537 in 1930. One can attribute this result to the colonial policy on *seodang* enacted in 1918, which mandated that each institution seek the Japanese Government General's permission for its recruitment and qualification of teachers. Meanwhile, the number of public schools per 1,000 people gradually expanded from 0.025 in 1914 to 0.088 by 1930. Annual increases in the number of schools per 1,000 people took place across all provinces.

II.3. Controls

In addition to the key independent variables, we include several controls in the analysis. First, our main independent variable proxies for the historical accumulation of educated human capital over the Joseon period, derived from the total number of *mungwa* passers. Alternatively, it could be proposed that the relationship between local elites and literacy is better explained by the presence of *yangban* rather than *mungwa* passers during the colonization period. By this time, the *yangban* class could be construed more broadly as inclusive not only of the traditional *yangban*, but also those who rose to prominence through other occupations. To test this possibility, we obtain additional data from the population register census conducted by the Japanese government in 1909, the year prior to the official annexation.³³ This census categorizes types of occupation in 1909 into 11 groups, among which are included government officials, *yangban*, and Confucian scholars as *yangban* occupations. We employ the ratio of the population employed in these three occupations to the total population of each district in 1909 as a control for the *yangban* share of the population in 1909.³⁴

Second, from the population census, we include the level of development in each region using the concentration of non-agricultural occupations and the population density in 1930. The concentration of non-agricultural occupations is calculated as the share of the population working in manufacturing, commerce, transport, and public or freelance sectors, while the population density is measured by the district's population (in thousands) divided by the total area.³⁵ We also include

³² During the Joseon period, Seoul was known officially as Hanseong-bu, although it was commonly called Hanyang. During the Japanese occupation period, the city was referred to as Gyeongseong-bu. Throughout the article we use Seoul as the name of the capital, to avoid confusion.

³³ In Lee, *Minjeok Tonggyeopyoeui*.

³⁴ We thank an anonymous reviewer for suggesting the use of this alternative elite presence data.

³⁵ At the provincial level, accurate area data are available annually. At the district level, instead of using the exact area (which is not available), we use a proxy for the area which we construct from the product of horizontal and vertical distances of each district in 1910, available from the Land Survey Project (1910–18); Statistics Korea, <http://kosis.kr/>. Both horizontal and vertical distances were originally in miles, which we have converted to kilometres.

the distance from each district centre to Seoul as a control for the educated elites' ease of access to the capital city, which probably affected their presence in districts within and around Seoul.³⁶

Next, the land tenancy ratio in 1930 may have depended on districts' level of achievement in the civil service examination, and may also have positively influenced the literacy rate. We use *Chōsenno kosaku kankō* (*Tenancy customs in colonial Korea*) (1930) to calculate the land tenancy ratio as the number of tenant households divided by the number of owner-operator households and landowning households combined.³⁷

Finally, we include a set of controls for soil quality in 1930. Cha and Hwang find that in pre-colonial Korea, the elite presence tended to be greater in areas of higher soil fertility due to their agricultural and economic acumen, which in turn probably affected the spread of literacy.³⁸ The set of soil quality indicators (soil acidity, soil acidity squared, and soil acidity variation) are based on *Sansei dojōni kansuru kenkyū* (*A study on soil acidity*) (1919).³⁹

In addition to the controls above, we also pay particular attention to districts that differed from the rest in terms of their accumulation of elites and their literacy rates in the colonial period. First, we create an indicator for districts containing urban centres, by identifying 14 commercially important cities in 1930: Seoul, Incheon, Gaesung, Gunsan, Mokpo, Daegu, Busan, Masan, Pyongyang, Jinnampo, Shineuiju, Wonsan, Chongjin, and Hamheung.⁴⁰ The industrialized districts probably required more literate labour by 1930 than the rural ones did, and some of them were historically wealthy with a relatively high concentration of *mungwa* passers. Identifying these cities therefore controls for the possibility that the locations of the elites' residences coincided with towns that developed into business, trade, and industrial centres, attracting a highly literate population in 1930.

Next, we collect new data on pre-1930 factors that may have affected the distribution of *mungwa* passers and the subsequent spread of literacy. In particular, we find three factors that potentially explain historical differences in the number of *mungwa* passers across districts. The first source of potential bias is a set of historical administrative districts. Each administrative district typically represented the political centre of each province, and also the place where *mungwa* passers resided to work. Given the strong hereditary pattern of elite education in the Joseon Dynasty, these administrative districts were probably the places where the descendants of *mungwa* passers resided. In order to address the effect of historical administrative centres, we include an indicator for each district that contained one of the 18 historical administrative centres. The 18 centres were located in

³⁶ The location of each district centre is determined as the location of either one of the 14 urban centres by 1930, or one of the 18 historical administrative centres that we identify in this article. In the absence of either, we obtain the geographic centroid of the district and calculate the distance to Seoul from the location.

³⁷ Chōsennoukai, *Chōsenno kosaku kankō*.

³⁸ Cha and Hwang, '1910 nyōndae e ssal saengsanūn chōngch'ehaenna?', pp. 151–3.

³⁹ Cha and Hwang (ibid., pp. 150–4) provide details on the use of soil acidity as a viable measure of soil quality, soil acidity being a key determinant of fertility. Chōsensōtokufu kangyōmohanjo, *Sansei dojō ni kansuru kenkyū*, categorized soil into five different types: acid (=1), mildly acid (=2), neutral (=3), mildly alkaline (=4), and alkaline (=5). We take the average of these index scores for each district, and include the mean, the standard deviation, and the squared mean as the set of soil quality controls in our regressions.

⁴⁰ The districts that were identified as cities were called *bu*, while others were called *gun*.

15 districts, from which the names of the eight Korean provinces originated (Seoul, Chungju, Cheongju, Jeonju, Naju, Gyeongju, Sangju, Gangreung, Wonju, Hwangju, Haeju, Pyongyang, Anju, Hamheung, and Gyeongseong); 11 of the districts were also home to provincial governments (*gamyeong*) during the Joseon Dynasty (Seoul, Chungju, Gongju, Jeonju, Sangju, Daegu, Wonju, Hamheung, Yeongheung, Pyongyang, and Haeju).

Another factor that may have influenced the spatial distribution of historical elites is the development of commerce prior to colonization. Although limited, the Korean merchant class was slowly emerging and growing in influence in Confucian Joseon, especially after 1800. The development of commerce may have affected the number of *mungwa* passers as well as the quality of the local education system in the long run. In our regressions, we thus include an indicator variable for districts containing one of the 19 historical commercial centres.⁴¹ Out of the 19, seven districts served as cores of Joseon's trade, either through designation as trading centres with China or Japan or by having substantial merchant guilds. These districts include Uiju, Hoiryong, Gyeongwon, Pyongyang, Gaeseong, Seoul, and Dongrae (Busan). The other 12 districts also had large markets which opened on a regular basis. These 12 were Bakcheon, Hwangju, Tosan, Deokwon, Gwangju (in Gyeonggi province), Pyeongchang, Anseong, Eunjin, Jeonju, Namwon, Changwon, and Daegu.

Finally, we consider districts that may have functioned as scholarly centres of Confucian studies. Confucianism developed through philosophical debates on how to understand the universe and how people should behave properly in various social relationships; prominent scholars then formed their own schools to teach their philosophy and theories to disciples. Among them, a few scholars were named 'virtuous scholars' by descendants of Confucian scholars and were canonized in the national Confucian shrine. Depending on the criteria, there are either five or 18 virtuous Confucian scholars in Korea, referred to as *Dongguk O-Hyun* and *Dongguk Sipal-Hyun*, respectively. We located the scholars' birthplaces and created an indicator for these Confucian centres, in order to control for the historical influence of these virtuous scholars on promoting *mungwa* passers in their respective home districts.⁴² We use the birthplace locations, because traditional norms in Korea dictate that people should not be detached from their place of origin.⁴³ The virtue of having permanent ties to one's birthplace meant that it was only natural for people to return to their birthplaces after retirement. Many esteemed Confucian scholars in Joseon followed suit by going back to their birthplaces to teach students and interact with local scholars, fulfilling their roles in what was the most prestigious profession in Confucian society. Online appendix figures S1 to S4 illustrate the location of these historical districts and urban centres in 1930.

⁴¹ Won, 'Commerce'.

⁴² The birthplaces of the five virtuous scholars are Andong, Yongin, Gyeongju, Hamyang, and Seoul, and those of the 18 scholars include Gyeongju, Sunheung, Youngil, Hamyang, Seoul, Yongin, Jangseong, Andong, Gangryeung, Gimpo, and Okcheon.

⁴³ Korean family names, for example, come with lineage information derived from the place of origin (*bongwan*), and this allows classification of different family clans within the same family name (*seongssi*); for a detailed description, see Paik, 'Does lineage matter?', pp. 436–8.

III. Empirical strategy

In order to assess the average effects of the pre-colonial elite class and of public schools on literacy rates in Joseon, we first present an ordinary least squares equation of the following form at the district level:

$$LitRate_i = \alpha + \beta_1 Mungwa_i + \beta_2 PublicSchool_i + X_i \gamma + \sum I_{prov} + \varepsilon_i \quad (1)$$

In the equation, i indexes the district in Joseon. $LitRate_i$ is the literacy rate in 1930 and $Mungwa_i$ is the number of *mungwa* passers per 1,000 people in each district. $PublicSchool_i$ represents the number of public schools per 1,000 people in 1929 in district i . A set of controls (X) includes the elite presence in 1909, the share of the population employed in non-agricultural sectors in 1930, population density, distance to Seoul, a set of soil quality measures (mean soil acidity, mean soil acidity squared, and soil acidity standard deviation), the land tenancy ratio, and a set of indicators for urban centres in 1930 (historical administrative centres, commercial centres, and Confucian centres, as discussed in section II.3). Finally, $\sum I_{prov}$ captures the provincial fixed effects.⁴⁴

A positive β_1 value may capture a descendant effect, as more educated descendants were probably found in regions with many *mungwa* passers prior to colonization. Such an effect would not be present if systematic migration of elites took place during the colonial era, which would have weakened the link between exam records and the concentration of elites in the region. We find no evidence of such migration, however, except for secular urbanization trends in which both non-elites and elites alike moved to cities; in the next section we present both subsample results with and without the urban centres. It is more likely that the educated elites influenced the public through indirect channels. Despite having little influence on the establishment of public schools, local educated elites were instrumental in shaping how these schools conducted their operations, once established. In addition, elites could also build private and traditional schools (*seodang*), which raised the literacy rate as well. Given the information on various types of schools and the number of Korean teachers hired, we explore the channels through which the elite class may have influenced the literacy rate. In the following equation, we consider whether the presence of *mungwa* passers influenced the number of public schools and the number of Korean teachers:

$$PublicEdu_i = \alpha + \beta_1 Mungwa_i + X_i \gamma + \sum I_{prov} + \varepsilon_i \quad (2)$$

In equation 2, $PublicEdu_i$ is either the number of public schools or the number of Korean teachers per 1,000 people. A positive β_1 therefore captures the *mungwa* effect in increasing public education; regions with more *mungwa* passers would be more likely to provide public schools and Korean instructors.

⁴⁴ In the empirical analysis, we consider the literacy rates in Korean and in Japanese separately. We include all age groups to calculate these literacy rates, since there was no official restriction or rule about age with regard to primary education or traditional education during this period. We find anecdotal evidence pointing out cases of diverse age groups within the same grade. Furthermore, literacy improvement was also possible through various channels other than official education. For instance, a self-motivated community gathering called 'night study group' (*yahak*) thrived throughout the colonial period and served as an unofficial source of literacy improvement, especially for adults.

At the provincial level, additional records are available for the different types of schools in operation from 1911 to 1930. These include *seodang* which taught basic Chinese classics and Confucian studies, and private schools set up by missionaries and Korean donors. We can infer the importance of the pre-colonial elite class for these institutions by examining their influence on the number of schools and teachers hired at each type of institution. We present the following equations for comparison:

$$Education_{p,t}^z = \alpha + \beta_1 Mungwa_p + X_{p,t} \gamma + \sum I_t + \varepsilon_{p,t}, \quad (3)$$

where $Education_{p,t}^z$ is the number of schools and teachers across types z (*seodang*, public school, or private school) in province p in year t . The vector of control variables ($X_{p,t}$) includes the elite presence in 1909, population density, and the development variable. Population density and the development indicator are employed as proxies for the relative economic development of each province in each year. The development variable is the share of the non-agricultural area. I_t denotes year fixed effects.⁴⁵

IV. Findings

In the first two columns of table 2, we estimate the average effect of the pre-colonial elite class on literacy in 1930, as described in equation 1. The results demonstrate that pre-colonial elite accumulation, measured by the number of successful candidates for the *mungwa* examination, has a positive and statistically significant correlation with the overall literacy rate at the district level. When a set of controls and provincial fixed effects are included, having one more *mungwa* passer per 1,000 people is associated with an increase in the Korean-language literacy rate in 1930 of approximately 1.9 percentage points (column 2). We also find that the correlation between *mungwa* passers and Japanese literacy is positive and statistically significant (column 1). We then investigate whether colonial public schools have an impact on the Japanese or Korean literacy rates. Columns 3 and 4 in table 2 present the average effects of colonial public schools built since the Japanese colonial occupation—from 1910 to 1929, a year before the 1930 census—on the literacy rate at the district level. Both regressions in columns 3 and 4 include provincial fixed effects. The results show that the presence of public schools has a positive effect on Korean and Japanese literacy in the full sample.

When we consider the accumulation of exam passers along with the presence of schools, in columns 5 and 6, the results suggest that the direct impact of exam passers is still significant. That is, controlling for the effects of public schools, the pre-colonial human capital accumulation explained by the number of *mungwa* passers remains positive and significant; it is also robust to the inclusion of province fixed effects and controls in 1930. Controlling for the number of schools where Japanese was intensively taught and where most regular courses were taught in Japanese, the elite presence has a significantly positive and direct impact on Korean

⁴⁵ We omit additional sets of 1930 urban centres and historical controls, since in aggregation up to the province level we find essentially no variation for these controls across provinces.

Table 2. *Local elites, schools, and literacy rate (district level)*

	(1) Japanese	(2) Korean	(3) Japanese	(4) Korean	(5) Japanese	(6) Korean
<i>Mungwa</i> (per 1,000)	1.367* (0.718)	1.943* (1.115)			1.623** (0.659)	2.099** (1.042)
Public schools (per 1,000)			59.426*** (18.239)	35.660** (17.593)	60.153*** (17.967)	36.600** (17.632)
<i>Yangban</i> share (1909)	19.044 (17.023)	17.165 (11.838)	20.487 (12.712)	20.661* (12.452)	16.664 (13.192)	15.717 (11.726)
Non-agricultural occupation (%)	0.640** (0.248)	0.380*** (0.135)	0.508*** (0.156)	0.309*** (0.087)	0.494*** (0.153)	0.291*** (0.089)
Population density (1,000 people/km ²)	0.627 (0.405)	0.495 (0.462)	1.539*** (0.408)	0.974** (0.421)	1.649*** (0.404)	1.117*** (0.425)
Distance to Seoul (km)	0.006 (0.005)	-0.005 (0.005)	0.009** (0.004)	-0.004 (0.004)	0.011** (0.004)	-0.002 (0.004)
Land tenancy ratio	0.610** (0.264)	0.775** (0.355)	0.800*** (0.280)	0.935*** (0.353)	0.735** (0.283)	0.851** (0.365)
Soil acidity	-0.228 (1.926)	-3.684* (2.035)	1.654 (1.932)	-2.328 (2.095)	1.345 (1.867)	-2.727 (2.004)
Soil acidity, squared	-0.097 (0.333)	0.438 (0.335)	-0.436 (0.337)	0.198 (0.332)	-0.389 (0.325)	0.260 (0.317)
Soil acidity variation	-0.329 (0.523)	0.477 (0.513)	-0.286 (0.504)	0.420 (0.502)	-0.164 (0.497)	0.577 (0.494)
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
N	201	201	201	201	201	201

Notes and sources: Robust standard errors are in parentheses. Dependent variables are the literacy rate defined as the proportion of the population who can read and write in Korean or Japanese. Columns with odd numbers employ the Japanese literacy rate, while columns with even numbers use the Korean literacy rate. *Mungwa* is the number of *mungwa* passers with residence information in *Kukjo Mungwabangmok* per 1,000 population based on the 1925 census; Statistics Korea, <http://kosis.kr/>. Public schools are per 1,000 population as listed in the 1930 census; Statistics Korea, <http://kosis.kr/>. *Yangban* share (1909) is from Lee, *Minjeok Tonggyeopyoewi*. Non-agricultural occupation is the share of the population working in non-agricultural sectors. Population density is 1,000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district investigated in 1910. Land tenancy refers to the number of tenant households divided by the number of owner-operator households and landowning households combined. Variables not shown are province fixed effects. *p < 0.1, **p < 0.05, ***p < 0.01.

literacy. According to column 6, for example, a one-unit change in the *mungwa* variable explains an increase in the Korean literacy rate of 2.1 percentage points. Given that the average literacy rate was only 22 per cent during this period, the effect represents about a 3 per cent increase relative to the mean. Historical elite accumulation also has a positive impact on Japanese literacy: having one more *mungwa* passer per thousand people increases Japanese literacy by approximately 1.6 per cent.

The subsequent analyses further control for unobservable variables by adding various sets of district fixed effects. A major potential concern with our main variable of interest is that the distribution of *mungwa* passers is probably not randomly determined. We therefore include in the following analyses the aforementioned factors that may have affected the distribution of exam passers and literacy outcomes. Specifically, we incorporate district-level information on the locations of urban centres in 1930 and historical administrative, commercial, and scholarly (Confucian) centres during the Joseon Dynasty. Table 3 presents results based on different sets of district fixed effects. Columns 1 and 2 employ a set of fixed effects for urban centres in 1930. Columns 3 and 4 include fixed effects for the 18 districts that served as administrative centres, the 19 commercial

Table 3. *Local elites, schools, and literacy rate (district level with fixed effects)*

	(1) Japanese	(2) Korean	(3) Japanese	(4) Korean	(5) Japanese	(6) Korean
<i>Mungwa</i>	1.404**	2.309**	1.584**	2.690**	1.584**	2.690**
(per 1,000)	(0.557)	(0.946)	(0.772)	(1.284)	(0.772)	(1.284)
Public schools	8.961	11.334	15.531*	8.571	15.531*	8.571
(per 1,000)	(8.684)	(13.198)	(9.225)	(15.305)	(9.225)	(15.305)
<i>Yangban</i> share	2.898	9.570	11.037	6.148	11.037	6.148
(1909)	(7.020)	(11.396)	(11.158)	(15.808)	(11.158)	(15.808)
Non-agricultural	0.228**	0.190**	0.185**	0.192**	0.185**	0.192**
occupation (%)	(0.092)	(0.077)	(0.090)	(0.090)	(0.090)	(0.090)
Population (1,000	1.264***	0.986**	1.444***	0.993**	1.444***	0.993**
people/km ²)	(0.259)	(0.412)	(0.295)	(0.460)	(0.295)	(0.460)
Province fixed	Yes	Yes	Yes	Yes	Yes	Yes
effects						
District fixed	Urban	Urban	Historical	Historical	Urban centres	Urban centres
effects	centres	centres	districts	districts	and historical	and historical
					districts	districts
N	201	201	201	201	201	201

Notes and sources: Robust standard errors are in parentheses. Dependent variables are literacy rate defined as the proportion of population who can read and write in Korean or Japanese. Cols. 1, 3, 5, and 7 use the Japanese literacy rate, while cols. 2, 4, 6, and 8 use the Korean literacy rate. *Mungwa* is the number of *mungwa* passers with residence information in *Kukjo Mungwabangnok* per 1,000 population, based on the 1925 census. Public schools are per 1,000 population in the 1930 census. *Yangban* share (1909) is from the population register survey conducted in 1909. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1,000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district measured in 1910. Variables included in regressions but not shown are province fixed effects, distance to Seoul (km), soil acidity, soil acidity squared, soil acidity variation, and land tenancy ratio. In cols. 1 and 2, dummies for 14 urban centres in 1930 are included. Indicators for historical districts, including 18 historical administrative centres, 19 commercial districts, 11 historical Confucian districts, and birthplaces of 18 virtuous Confucian scholars, are included in columns 3 and 4. Finally, all historical districts and 1930 urban centres are controlled in the analyses of cols. 5 and 6. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

centres in Joseon, and the 11 districts with Confucian centres during the Joseon Dynasty. Finally, the last two columns use the most extensive set of fixed effects, including the 1930 urban centres and the historical districts. We find that the value of the *mungwa* coefficient on Korean literacy remains in the range between 2.3 and 2.7 depending on the specification, and the positive effect remains statistically significant at the 95-per cent confidence level in all specifications. All analyses indicate that accounting for historical confounders does not affect the significance of *mungwa* on Korean literacy in 1930, suggesting that the results are not driven by historical factors that affect both elite concentration in certain districts and literacy improvement during the colonial period. The results instead indicate that the *mungwa* effect is not biased or entirely explained by these historical factors associated with the distribution of historical elites. Although the magnitude is smaller, we find a similar effect of *mungwa* passers on the Japanese literacy rate.

Table 3 shows that the number of schools has a positive and sizeable effect on both Korean and Japanese literacy rates, but the coefficient values are not significant; when controlling for districts with urban centres in addition to the historical districts, any significant effects of public schools disappear. This does not mean, however, that public schools themselves had no influence on literacy over the course of colonization. Once set in place, the colonial system continued from 1930 onwards to provide the necessary education for residents after Korea's liberation from Japan in 1945, while the traditional schools (*seodang*) declined severely in

Table 4. *Local elites and Korean teachers in public primary schools (district level)*

	(1) Public schools per 1,000	(2) Korean teachers per 1,000	(3) Public schools per 1,000	(4) Korean teachers per 1,000	(5) Public schools per 1,000	(6) Korean teachers per 1,000
<i>Mungwa</i> (per 1,000)	-0.004 (0.007)	0.061** (0.028)	-0.003 (0.005)	0.061*** (0.019)	-0.001 (0.008)	0.068** (0.027)
<i>Yangban</i> share (1909)	0.040 (0.116)	0.245 (0.719)	-0.080 (0.068)	-0.571* (0.300)	-0.129 (0.102)	-0.723 (0.485)
Non-agricultural occupation (%)	0.002 (0.002)	0.021* (0.011)	-0.000 (0.000)	0.001 (0.002)	-0.000 (0.000)	0.001 (0.002)
Population density (1,000 people/km ²)	-0.017*** (0.003)	-0.042** (0.021)	-0.013*** (0.002)	-0.017** (0.009)	-0.014*** (0.002)	-0.018* (0.010)
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects			Urban centres	Urban centres	Urban centres and historical districts	Urban centres and historical districts
N	201	201	201	201	201	201

Notes: Robust standard errors are in parentheses. Dependent variable is the number of public schools per 1,000 population based on the 1930 census in cols. 1, 3, 5, and 7 and the number of Korean teachers per 1,000 residents based on the 1930 census in cols. 2, 4, 6, and 8. *Mungwa* is the number of *mungwa* passers with residence information in *Kukjo Mungwabangmok* per 1,000 population based on the 1925 census. *Yangban* share (1909) is from the population register survey conducted in 1909. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1,000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district measured in 1910. Variables included in regressions but not shown are province fixed effects, distance to Seoul (km), soil acidity, soil acidity squared, soil acidity variation, and land tenancy ratio. Cols. 1 and 2 do not include district fixed effects; cols. 3 and 4 include 14 urban centres in 1930, and cols. 5 and 6 employ 1930 urban centres and historical districts as described in tab. 3. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

number under repressive measures by the Japanese Government-General and are now rarely found. In several respects, the current Korean school system continues closely to follow the institutional structure introduced during the colonial period, in terms of the grading system, curriculum, class times, and teacher–student relations. The colonial institutions would also have affected the literacy rate through subjects taught in Korean, although the extent of their influence from 1930 until the end of the colonial period cannot be estimated using our data.

Next, table 4 investigates two major potential channels through which the pre-colonial elite class could influence the literacy rate: building public schools and supplying public schools with teachers. First, table 4 presents the effects of the elite class on the number of public primary schools and the number of Korean teachers in these schools at the district level. We find that with various sets of fixed effects, the presence of the elite class increases the number of teachers but has no impact on the number of schools. The magnitude of the effect on the number of teachers is significant; the coefficient values for *mungwa* passers in table 4, for example, suggests that having one more *mungwa* passer per 1,000 people leads to between 0.06 and 0.07 more Korean teachers in public schools. Considering that the average number of teachers per 1,000 people was 0.304, the effect corresponds to a significant increase in the number of teachers hired. As teachers were always in short supply during the colonial period,⁴⁶ and at the same time active Korean grass-roots movements regularly pressed for more schools and classes, regions

⁴⁶ Lee, 'Social status', p. 104.

Table 5. *The effects of historical elites on schools and teachers (province level)*

	(1)	(2) <i>Schools per 1,000</i>		(3)	(4)	(5) <i>Korean teachers per 1,000</i>		(6)	
	Seodang	Public schools	Private schools	Seodang	Public schools	Private schools	Seodang	Public schools	Private schools
<i>Mungwa</i> (per 1,000)	0.0117 (0.1106)	0.0008 (0.0034)	0.0030** (0.0015)	0.0237 (0.1101)	0.0367*** (0.0101)	0.0145*** (0.0027)			
<i>Yangban</i> share (1909)	-8.2396 (11.1242)	-0.2528 (0.3188)	0.0852 (0.1062)	-7.9369 (11.1869)	-0.1967 (1.2622)	-0.0984 (0.1222)			
Non-agricultural area (%)	-0.0052 (0.0041)	0.0005 (0.0011)	-0.0002 (0.0003)	-0.0049 (0.0042)	-0.0000 (0.0032)	-0.0001 (0.0005)			
Population density (1,000 people/km ²)	-0.0301 (0.0306)	0.0026*** (0.0007)	-0.0009* (0.0005)	-0.0343 (0.0306)	0.0007 (0.0041)	-0.0009 (0.0006)			
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes			
N	260	221	221	260	221	221			

Notes: Standard errors clustered at the province level are in parentheses. Dependent variables are the number of schools per 1,000 population in the corresponding year (cols. 1 to 3) or the number of Korean teachers per 1,000 population in the corresponding year (cols. 4 to 6). Cols. 1 and 4 employ the number of *seodang* and the number of teachers in *seodang*, respectively, as the dependent variable. Cols. 2 and 5 use the number of public schools and the number of Korean teachers serving in public schools, respectively, as the dependent variable. Cols. 3 and 6 employ the number of private schools and the number of teachers in private schools, respectively, as the dependent variable. *Mungwa* is the number of *mungwa* passers with residence information in *Kukjo Mungwabangmok* per 1,000 population in 1911. *Yangban* share (1909) is from the population register survey conducted in 1909. Non-agricultural area is the proportion of the non-cultivated area. Population density is 1,000 population divided by area (km²). Variables not shown include year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

with a higher number of *mungwa* passers certainly would have benefited from the availability of Korean teachers. Overall the results in table 4 show that the channel through which local elites affect literacy is through the supply of teachers, rather than through the presence of colonial public schools.

In table 5, we explore yet another channel through which the elite class may have influenced the literacy rate: building private and traditional schools. The analysis is carried out at the provincial level using the numbers of schools and teachers from 1911 to 1930. As discussed earlier, three distinctive types of primary education existed in the colonial period: *seodang*, public schools, and private schools. Columns 1 to 3 present the effects of elites on the number of schools by province, and in columns 4 to 6 we test the impact of *mungwa* on the number of teachers by province. We find that the elite class has a positive influence on various types of primary education institutions. The presence of more *mungwa* passers promotes the establishment of private schools that focus more on Korean education. As shown in columns 3 and 6, both the number of schools and the number of teachers in private schools are positively affected by the historical presence of local elites. The results in columns 2 and 5 again show that the local elite class increases the number of Korean teachers working in public schools, though not the supply of schools. These results are consistent with the district-level analysis presented in tables 4 and 5.⁴⁷ Finally, we also find some correlation between *mungwa* passers and the

⁴⁷ The impact of different types of primary school on literacy improvement in the colonial era are difficult to separate from one another. Throughout the colonial period, especially until the 1930s when the Japanese government's assimilation policy was less intense, many students attended more than one type of school. On the basis of school registers, Ryuta, 'Public primary schools', p. 221, shows that many incoming students had gone through traditional or private education before entering public primary schools. Oh, *Sikminji ch'odŭng kyoyugŭi hyŏngsŏng*, p. 117, also shows that approximately 30% of new students entering public schools in the early 1930s had attended *seodang* before.

number of *seodang* as well as the number of teachers in the *seodang*, although the coefficient values do not reach statistical significance. This result can be attributed to the fact that the establishment of *seodang* required permission from the colonial government from 1918 onwards, and as such their proliferation until 1921 and the subsequent drastic decline was more an outcome of colonial policies than a function of the level of the local elite presence.

V. Robustness checks

In order to check first whether our results remain robust to different available datasets on civil service examination records, we run our analysis using data from two different sources. Our main results are based on *Kukjo Mungwabangmok* from the Historical Figures Comprehensive Information System.⁴⁸ A study by Lee, however, uses extended data including both *Kukjo Mungwabangmok* and *Boju Mungwabangmok*.⁴⁹ While *Kukjo Mungwabangmok* is the historical dataset recorded by the court of the Joseon Dynasty, *Boju Mungwabangmok* has been collected by historians Wagner and Song since the 1960s. Combining the two, I. Lee identifies the residential locations of 11,747 exam passers, nearly twice as many as in our dataset based only on *Kukjo Mungwabangmok*.

Online appendix tables S3 to S6 in the appendix replicate our main tables 2 to 5 using this extended dataset. In table S3, we note that the positive magnitude of the coefficient values for *mungwa* passers is diminished, while the effect of public schools on both Korean and Japanese literacy remains the same. Both variables continue to have statistically significant effects; with the extended data, the number of *mungwa* passers, when excluding public schools as a covariate in the regression, also shows statistical significance (columns 1 and 2). With the inclusion of the 1930 urban centres and historical district indicators in table S4, these coefficient values maintain their statistical significance. When we consider the effect of the elite presence on the number of public schools and Korean teachers using the extended data, the results in table S5 again remain similar to our main findings in table 4: having more *mungwa* passers in the district is positively associated with more Korean teachers, while the number of public schools appears to be unrelated to the elite presence measure. Finally, we examine the provincial-level results in the different types of schools that were built using the extended data in table S6. Compared to table 5, the results are again similar, albeit with smaller magnitudes on the coefficients. Both tables suggest that the elite presence is related to the number of private schools provided, as well as the number of Korean teachers in public schools and private schools.

Up to this point we have used the number of *mungwa* passers in our main analysis as the most conservative measure of elite presence in a district, but educated elites trained for civil service can be differentiated more broadly into two groups: those who passed *daegwa* (the upper civil service exam), and those who passed *sogwa* (the lower civil service exam). The former is a smaller, more exclusive group than the latter, so the *sogwa* variable would be a more suitable proxy for the presence of *sajok*, the class of *yangban* with limited power whose influence only reached their

⁴⁸ See n. 18.

⁴⁹ Lee, 'Mun'gwagŭpcheja kŏjuji punsŏk'.

local areas of residence. In addition to civil service exam passers, there were *mugwa* passers, the military class of *yangban* that comprised the other half of the *yangban* elite.

In tables S7 to S10, we replicate the results in tables 2 to 5, this time measuring elite presence by the number of *sogwa* passers instead of *mungwa* passers. In tables S11 to S14, we continue with the same exercise, in these models measuring elite presence by the number of *mugwa* (military exam) passers. In both cases, the positive association between the presence of the educated and literacy holds, with more Korean teachers and private schools found in districts with more exam passers. We note, however, that the magnitude of the effect decreases. For example, compared to the coefficient effect of *mungwa* passers on the Korean literacy rate in table 2 (2.099 in column 6), the value drops to 0.383 and 0.519 for *sogwa* passers in table S7 and *mugwa* passers in table S11, respectively. These findings lend support to the idea that *mungwa* passers were the most selective—and probably most influential—group of elites, heavily influencing the spread of literacy and the building of schools despite their relatively small number.

Finally, tables S16 to S19 present the main results using a different measure of elite presence based on more recent *mungwa* passers. So far we have measured the educated human capital accumulation during the Joseon Dynasty using all the *mungwa* examination passers whose residential information is available in the historical records. While it is only from 1700 onwards that most of the residential information becomes available, some records pre-date this period. For instance, the earliest residential record is from 1414. Given our claim that the legacy of former elites lasted for protracted periods in local communities, we must also determine whether recent *mungwa* passers had a more direct and larger impact on education during the colonial period. In addition, we are interested in whether the type of reign during which the exams took place matters. That is, we need to check whether the quality of the regime determined the legacy of the elites. One may argue that the quality of a regime influences the quality of human resources selected under that regime, while others may believe that the quality of an elite group depends solely on the selective exams.

To examine whether our results remain robust to these issues, we restrict our measure of elite accumulation to *mungwa* passers after 1800 and re-run our analyses. The year 1800 is the year in which King Jeongjo suddenly died under mysterious circumstances. The era governed by King Yeongjo and King Jeongjo (1724–1800) is widely considered to be the renaissance period of the Joseon Dynasty: amid intense rivalry in court politics and division among officials, both leaders pursued pragmatic policies that facilitated economic development and cultural prosperity in the eighteenth century. The general consensus among Korean historians is that the Joseon Dynasty then declined from the apex of King Jeongjo's reign, as political turmoil in the nineteenth century eventually led to Japanese colonization. Tables S16 to S19 lend support to our story. Using the restricted sample of *mungwa* passers since 1800, we find that the pre-colonial elite presence has a statistically significant effect on various measures of education during the colonial period. The results are consistent with our main results. Moreover, the coefficient values are larger in magnitude than the previous findings, indicating that more recent *mungwa* passers and their direct descendants have a stronger positive impact on education during the colonial period. As the results show, we also find

little evidence that the quality of regime affected the legacy of elites in influencing the literacy rate.

VI. Discussions

The empirical findings presented above suggest that the presence of a pre-colonial educated population is strongly associated with the level of Korean literacy in a given district. Regions with more *mungwa* passers also had higher numbers of Korean teachers in both public and private schools, and saw the establishment of more private schools as well. However, one potential alternative explanation for our main empirical findings could be that the *mungwa* effect simply reflects the concentration of educated descendants. The descendant effect could be the principal explanation for our findings, especially if one considers the persistent, intergenerational effect of the lineage system and the scholarly nature of *mungwan* families.⁵⁰ That is, if more elite families reside in districts with more *mungwa* passers, then the findings may be evidence of a continuing social divide. Given that the public school system did not help much with literacy improvement, one may simply conclude that the descendants of elite families continue to be literate while others do not.

There are several issues with this interpretation. First, since we do not have elite population data for 1930, it is possible that the proportion of elite members out of the total population corresponds to the number of *mungwa* passers. However, we cannot ignore the possibility that in certain districts most *mungwa* passers came from a small number of exclusive elite families, and their relative share of the total population was also very small. Furthermore, during the eighteenth century, the period which saw the largest number of *mungwa* passers, only 3,493 candidates passed the exam, while the average population of Joseon was approximately 7.3 million.⁵¹ Even when the number of *mungwa* passers was at its largest, this group did not exceed 0.05 per cent of the total population. It is therefore unlikely that the direct descendant effect of *mungwan* families alone can explain why a strong correlation exists between our proxy for elite class presence and the literacy rate in 1930.

More importantly, historical records from the colonial period describe concerted efforts by the educated elites to enlighten the illiterate class by establishing schools of different types, including *seodang*, adult schools (*yahak*), and private schools. In the aftermath of a failed independence movement (the March 1st Movement or Sam-Il Undong in 1919), the Culture Movement (Munhwa Undong) also involved active participation from some elite members to educate the masses, and enhancing literacy was one of the major goals of this movement. The elite class probably also provided the necessary human capital needed to run the public schools, as each public school was headed by a Japanese principal but otherwise staffed by local teachers. In fact, the literature suggests that local elites affected education during the colonial period in two ways. First, the elite class taught courses to

⁵⁰ On the long-lasting effects of lineage systems and social mobility, see Clark and Cummins, 'Intergenerational wealth mobility'; Paik, 'Does lineage matter?'. On the direct descendant effect on education, see Banerjee, Cole, Dufló, and Linden, 'Remedying education'.

⁵¹ Oh, 'Provincial population', pp. 244–5.

local children through various channels, in many cases establishing *seodang* in their communities, setting up smaller gatherings (*sasuk*) or *yahak*, or even working as independent teachers. Second, the majority of teachers in all public schools were Koreans.⁵² This was especially the case for schools in rural areas.⁵³ Large shares of Korean teachers probably had a positive effect on the literacy rate. Andrabi et al. suggests, for example, that teachers from the same group are likely to bring about better educational attainment.⁵⁴ This further explains how new educational institutions were able to establish roots successfully, by capitalizing on prior educational investment. Finally, some elites provided private education to local students who had limited access to public schools.⁵⁵

We do not intend to argue here that the pre-colonial elites' active engagement in primary education was driven solely by patriotic or altruistic motivation. Neither do we argue that the whole of the educated population suddenly realized the importance of public education which they had neglected throughout the Joseon period. We focus instead on the abolition of the traditional class system in 1894 and the options left for the educated elites. During 600 years of the Joseon Dynasty, the role and the social status of scholars had been transformed, but they mostly stayed away from productive activities. Before 1894, the main task of exam passers, regardless of whether they were rich or poor, was to focus on studying Confucian scripts and educating others, while often finding opportunities in the court. With the introduction of commerce and the gradual erosion of the rigid class system in the late Joseon Dynasty, followed by the 1894 reforms, the former elites began to participate in other occupational fields in order to secure a livelihood. Given that their principal skills came from studying Confucian classics and writing essays, one comparative advantage certainly would have been in the area of teaching classical literature, and for those who had never worked in agriculture or commerce, education would have been the most suitable sector. Confucian culture, which considers scholars and teachers superior to other professions, must have played some role as well. The delayed effect of the educated elite on literacy came only with colonization, as little incentive existed for them to empower the commoners through education during the Joseon Dynasty. After the loss of political power to the Japanese, many former members of the *yangban* class remained resistant to Japanese rule, but others pursued enlightenment movements under the colonial leadership. The new government permitted the former elites' involvement in the education sector and in low-level administration, especially in the early period of the occupation. According to Park, 68 per cent of the Korean bureaucrats who served in 1909, a year prior to the annexation, continued working in the government under Japanese rule.⁵⁶ Our data also show large-scale employment of members of the Korean elites as teachers in primary schools. Out of 1,716 total teachers

⁵² In 1929, the share of Korean teachers among all public school teachers was over 71%.

⁵³ At the beginning of the colonial period, a central training institution trained all public school teachers. By the early 1920s, provincial-level training institutions were built in every province to train local elites as teachers; Lee, 'Social status', pp. 101–9.

⁵⁴ Andrabi, Das, and Khwaja, 'Dime a day'.

⁵⁵ Private institutions expanded in the 1920s. Many of them were later substituted by public schools as the number of public schools increased; Ryuta, 'Public primary schools'.

⁵⁶ Park, 'Study on Korean bureaucrats'; idem, *Study on Korean bureaucrats*, p. 133.

in primary schools in 1914, 1,207 (70.3 per cent) were Korean, and the share of Korean teachers remained at 71 per cent in 1929.

VII. Conclusion

In this article we have presented evidence to show that pre-colonial exam passers in Korea had significant influence on literacy rates during the early Japanese colonial period. By 1930 they were not only involved in building private schools that provided alternatives to public schools, but also provided the necessary human capital to run public and private schools. The literacy rate in 1930 was not simply a reflection of the concentration of elite descendants in certain areas, but was instead an outcome of multiple channels through which the elites intended to and indeed succeeded in enlightening the public.

Since other Asian colonies had established political dynasties before the period of colonization, our research inquiry can be extended to those with similar historical paths, such as India, Vietnam, and Indonesia. The colonial period can be considered as an enforced rupture in history, but as this article suggests, the legacy of pre-colonial socioeconomic structures remains influential even under such transitions. This appears to be especially the case when the pre-colonial state fosters advanced levels of capital and development, as was the case in Joseon. The case of Korea provides a rare historical example in which at least part of the pre-colonial institution survived because of its strong foundations, and continued to play a significant role during the colonial era.

<i>Date submitted</i>	<i>16 December 2015</i>
<i>Revised version submitted</i>	<i>17 January 2017</i>
<i>Accepted</i>	<i>21 January 2017</i>

DOI: 10.1111/ehr.12538

Footnote references

- Acemoglu, D., Johnson, S., and Robinson, J. A., 'The colonial origins of comparative development: an empirical investigation', *American Economic Review*, 91 (2001), pp. 1369–401.
- Acemoglu, D., Johnson, S., and Robinson, J. A., 'Reversal of fortune: geography and institutions in the making of the modern world income distribution', *Quarterly Journal of Economics*, 117 (2002), pp. 1231–94.
- Andrabi, T., Das, J., and Khwaja, A. I., 'A dime a day: the possibilities and limits of private schooling in Pakistan', *Comparative Education Review*, 52 (2008), pp. 329–55.
- Azariadis, C. and Drazen, A., 'Threshold externalities in economic development', *Quarterly Journal of Economics*, 105 (1990), pp. 501–26.
- Banerjee, A. V., Cole, S., Duflo, E., and Linden, L., 'Remedying education: evidence from two randomized experiments in India', *Quarterly Journal of Economics*, 112 (2007), pp. 1235–64.
- Bertocchi, G. and Canova, F., 'Did colonization matter for growth? An empirical exploration into the historical causes of Africa's underdevelopment', *European Economic Review*, 46 (2002), pp. 1851–71.
- Cha, M. S., 'Facts and myths about Korea's economic past', *Australian Economic History Review*, 44 (2004), pp. 278–93.
- Cha, M. S., 'Unskilled wage gaps within the Japanese Empire', *Economic History Review*, 68 (2015), pp. 23–47.
- Cha, M. S. and Hwang, J. S., '1910 nyōndae e ssal saengsanūn chōngch'ehaenna?' ['Did rice production in 1910 stall?'], *Kyōngjesahak [Economic History Studies]*, 59 (2015), pp. 130–61.
- Cha, M. S. and Kim, N. N., 'Korea's first industrial revolution, 1911–1940', *Explorations in Economic History*, 49 (2012), pp. 60–74.
- Chaudhary, L. and Garg, M., 'Does history matter? Colonial education investments in India', *Economic History Review*, 68 (2015), pp. 937–61.

- Ch'oe, Y., 'Commoners in early Yi dynasty civil examinations: an aspect of Korean social structure, 1392–1600', *Journal of Asian Studies*, 33 (1974), pp. 611–31.
- Chōsennoukai, *Chōsenno kosaku kankō* [Tenancy customs in colonial Korea] (Keijou, 1930).
- Chōsensōtokufu kangyōmohanjo, *Sansai dojōni kansuru kenkyū* [A study on soil acidity] (Keijou, 1919).
- Clark, G. and Cummins, N., 'Intergenerational wealth mobility in England, 1858–2012: surnames and social mobility', *Economic Journal*, 125 (2015), pp. 61–85.
- Cumings, B., 'The origins and development of the Northeast Asian political economy: industrial sectors, product cycles, and political consequences', *International Organization*, 38 (1984), pp. 1–40.
- Eckert, C. J., *Offspring of empire: the Koch'ang Kims and the colonial origins of Korean capitalism, 1876–1945* (Seattle, 1991).
- Englebert, P., 'Pre-colonial institutions, post-colonial states, and economic development in tropical Africa', *Political Research Quarterly*, 53 (2000), pp. 7–36.
- Galor, O. and Moav, O., 'From physical to human capital accumulation: inequality and the process of development', *Review of Economic Studies*, 71 (2004), pp. 1001–26.
- Gennaioli, N. and Rainer, I., 'The modern impact of precolonial centralization in Africa', *Journal of Economic Growth*, 12 (2007), pp. 185–234.
- Haggard, S., Kang, D., and Moon, C., 'Japanese colonialism and Korean development: a critique', *World Development*, 25 (1997), pp. 867–81.
- Han, Y. W., *Kwagō, ch'ul'seūi sadari. Chisiksanōpsa* [Civil examination. Ladder to success] (Paju, 2013).
- Hanushek, E. A. and Woessmann, L., 'The role of cognitive skills in economic development', *Journal of Economic Literature*, 46 (2008), pp. 607–68.
- Huillery, E., 'The impact of European settlement within French West Africa: did precolonial prosperous areas fall behind?', *Journal of African Economies*, 20 (2011), pp. 263–311.
- Jeong, G., 'Aegukkyemongundonggwa kundaejōng kyoyukyōrui hyōngsōng' ['Patriotic enlightenment movement and the formation of modern educational fervor'], in *Han'guksahoehak'oe* [Korean Sociology Conference] (2009), pp. 1187–200.
- Juif, D. T. and Baten, J., 'On the human capital of Inca Indians before and after the Spanish conquest: was there a "pre-colonial legacy"?' *Explorations in Economic History*, 50 (2013), pp. 227–41.
- Jung, J. Y., '1910 Nyōndae Joseon ch'ongdokpuūi shingminji kyoyujōngch'aek kwa mission school' ['The colonial education policy of Chosun Government General and mission schools: a case of the secondary and higher education'], *Sahoewa yōksa* [Society and History], 72 (2006), pp. 213–45.
- Kang, M., 'A study of the establishing process of the first Joseon Education Decree during the Japanese Occupation', in M. Kang, K. Takeshi, S. Nam, C. Park, and S. Oh, eds., *Sikminji Gyoyuk yeongueui dabyeonhwa* [Diversification of colonial education research] (Seoul, 2007), pp. 13–46.
- Kim, G., *Hanguk geundae chodeung gyoyukeui joajeol* [Frustration of Korean modern primary education] (Seoul, 2005).
- Kimura, M., 'Standards of living in colonial Korea: did the masses become worse off or better off under Japanese rule?', *Journal of Economic History*, 53 (1993), pp. 629–52.
- Kohli, A., 'Where do high growth political economies come from? The Japanese lineage of Korea's "developmental state"', *World Development*, 22 (1994), pp. 1269–93.
- Kohli, A., 'Japanese colonialism and Korean development: a reply', *World Development*, 25 (1997), pp. 883–8.
- Lange, M. K., 'British colonial legacies and political development', *World Development*, 32 (2004), pp. 905–22.
- Lee, H., *Minjeok Tonggyeppyoeui Haeseolgia yiyongbangbeob* [Exposition and usage of Minjeok Tonggyeppy] (Seoul, 1997).
- Lee, K. H., 'The social status of the teachers assigned at common schools and their perception of themselves', *Yōksawa Hyōnsil* [Quarterly Review of Korean History], 63 (2007), pp. 99–135.
- Lee, S., *Joseon ch'ogi yangban yōngu* [Study on yangban in early Joseon] (Seoul, 1980).
- Lee, W., 'Mun'gwagūpcheja kōjuji punsōk' ['An analysis of mungwa passer residences'], *Paeksanhakpo* [Paeksan Academic Journal], 70 (2004), pp. 673–712.
- Michalopoulos, S. and Papaioannou, E., 'Pre-colonial ethnic institutions and contemporary African development', *Econometrica*, 81 (2013), pp. 113–52.
- Nunn, N., 'Historical legacies: a model linking Africa's past to its current underdevelopment', *Journal of Development Economics*, 83 (2007), pp. 157–75.
- Oh, G., 'Provincial population and farmland in the Joseon dynasty and analysis of tax burden', *Korean Journal of Taxation Research*, 27 (2010), pp. 241–77.
- Oh, S., *Sikminji ch'odūng kyoyugūi hyōngsōng* [Formation of colonial primary education] (Seoul, 2000).
- Paik, C., 'Does lineage matter? A study of ancestral influence on educational attainment in Korea', *European Review of Economic History*, 18 (2014), pp. 433–51.
- Park, E., 'A study on Korean bureaucrats under the Japanese colonial rule', *Korean Political Science Review*, 28 (1995), pp. 133–63.
- Park, E., *A Study on Korean bureaucrats under the Japanese colonial rule* (Seoul, 1999).
- Psacharopoulos, G., 'Returns to investment in education: a global update', *World Development*, 22 (1994), pp. 1325–43.

- Romer, P. M., 'Human capital and growth: theory and evidence', *Carnegie-Rochester Conference Series on Public Policy*, 32 (1990), pp. 251–86.
- Ryuta, I., 'Public primary schools and local community in colonial period: a case from Sangju, Gyeongsangbukdo', in M. Kang, K. Takeshi, S. Nam, C. Park, and S. Oh, eds., *Diversification of colonial education research* (Seoul, 2007), pp. 193–234.
- Sokoloff, K. L. and Engerman, S. L., 'History lessons: institutions, factors endowments, and paths of development in the New World', *Journal of Economic Perspectives*, 14 (2000), pp. 217–32.
- Song, J. H., *Chosŏnsaheosayŏn'gu [Joseon social history research]* (Seoul, 1987).
- Wagner, E. W., *The literati purges: political conflict in early Yi Korea* (Cambridge, Mass., 1974).
- Wagner, E. W., 'The civil examination process as social leaven: the case of the northern provinces in the Yi dynasty', *Korea Journal*, 17 (1977), pp. 22–7.
- van de Walle, N., 'The institutional origins of inequality in Sub-Saharan Africa', *Annual Review of Political Science*, 12 (2009), pp. 307–27.
- Watanabe, M. and Abe, H., *Japan's colonial education policy document collection: Joseon* (Tokyo, 1987).
- Won, Y., 'Commerce', in Kuksap'yŏnch'anwiwŏnhoe [National Institute of Korean History], ed., *Shimp'yŏn han'guksa [New Korean history]*, 24: *Joseon ch'ogŭi kyŏngjegujŏ [Economic structure in early Joseon]* (Seoul, 2002), pp. 121–207.
- Yi, M., *Hangukgidokgyowa Minjokuisik [Korean Christianity and national consciousness]* (Seoul, 2000).
- Yoon, Y. T., *Gukeogyoyuk baeknyeonsa II [A history of Korean language education]*, vol. 2 (Seoul, 2006).

Supporting information

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Table S1. *Mungwa* passers by province and urban centres

Table S2. Schools in 1929 and literacy rate in 1930 by province

Table S3. Local elites, schools, and literacy rate (district level, extended *mungwa* sample)

Table S4. Local elites, schools, and literacy rate (district level with fixed effects, extended *mungwa* sample)

Table S5. Local elites and Korean teachers in public primary schools (district level, extended *mungwa* sample)

Table S6. The effects of historical elites on schools and teachers (province level, extended *mungwa* sample)

Table S7. Local sub-elites, schools, and literacy rate (district level, *sogwa* passers)

Table S8. Local sub-elites, schools, and literacy rate (district level with fixed effects, *sogwa* passers)

Table S9. Local sub-elites and Korean teachers in public primary schools (district level with fixed effects, *sogwa* passers)

Table S10. The effects of historical sub-elites on schools and teachers (province level, *sogwa* passers)

Table S11. Local military elites, schools, and literacy rate (district level, *mugwa* sample)

Table S12. Local military elites, schools, and literacy rate (district level with fixed effects, *mugwa* sample)

Table S13. Local military elites and Korean teachers in public primary schools (district level, *mugwa* sample)

Table S14. The effects of historical military elites on schools and teachers (province level, *mugwa* sample)

Table S15. Summary statistics across *mungwa* passer groups (district level)

Table S16. Local elites, schools, and literacy rate (district level, *mungwa* passers since 1800)

Table S17. Local elites, schools, and literacy rate (district level with fixed effects, *mungwa* passers since 1800)

Table S18. Local elites and Korean teachers in public primary schools (district level, *mungwa* passers since 1800)

Table S19. The effects of historical elites on schools and teachers (province level, *mungwa* passers since 1800)

Figure S1. Urban centres in 1930

Figure S2. Historical administrative centres

Figure S3. Historical commercial centres

Figure S4. Historical Confucian centres