Colonization and Education: Exploring the Legacy of Local Elites in Korea

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Abstract

In this paper we look at the impact of Korea’s pre-colonial elites and Japanese colonization on modernizing Korea. Our case study focuses on the historical Korean kingdom known as Joseon, the first monarchial state to be colonized by Japan in 1910. In particular we investigate how pre-existing scholarly traditions and colonial public school provision influenced the overall literacy level in Korea. We introduce novel data from Joseon’s historical court exam archives, colonial education data, and census data going back to 1930. Our findings suggest that the spread of Korean literacy during the early colonial period can be explained by the historical presence of an educated upper class from the Joseon dynasty known as yangban. Regions with greater yangban presence witnessed a higher number of Korean teachers as well as more private schools established as alternatives for the colonial public schools.
1 Introduction

Joseon, as Korea was known before 1910, was the first monarchial state in Asia to be colonized by Japan. As in other states that went through similar transitions, the process of colonization had significant influence on Joseon’s social and economic outcomes in the subsequent decades. Studies of Joseon and other former Asian colonies contribute to a large literature on colonization and its impact, as they provide invaluable testing grounds for existing hypotheses in the literature within a mainly European context. However, they have also been marred by a lack of historical data. Studies of pre-colonial factors and their role in colonial institutions in Asia have similarly been scarce. From the existing works focusing on other geographic regions, we find that there is little consensus on the lasting impact of pre-colonial development on colonization processes (Englebert 2000; Gennaioli and Rainer 2007; Van de Walle 2009; Huillery 2010; Juif and Baten 2013; Michalopoulos and Papaioannou 2013).

In this paper we aim to investigate how Joseon’s pre-colonial factors influenced its developmental outcome during the colonial period. Specifically, we look at the effect of pre-colonial elite presence on Joseon’s literacy rate, while Japan established public schools in its systematic effort to assimilate the colonial subjects.

There continues to be much debate among historians and economists on how the Japanese colonization at the turn of the 20th century modernized Joseon. On the one hand, this act of aggression may have acted as a catalyst for modernization by exposing the subjugated state to new frontiers of technology and development; on the other hand, the imperialists used extractive means to hinder the natural trajectories of these states towards modernization, which likely would have taken place even without the intervention of external force (Cumings 1984; Eckert 1991; Kimura 1993; Kohli 1994; Haggard et al. 1997; Kohli 1997). Our study

\footnote{1}Much scholarly interests on the rise of the West and the advent of the Industrial Revolution have led to a large body of works explaining, among many things, the role of colonial institutions in economic development of the West, and why the Revolution happened specifically in Western Europe (Skocpol 1979; Mokyr 1990; Pomeranz 2000; Acemoglu et al. 2002). Building on this literature, numerous works have also considered institutional and modernization outcomes in European colonies as legacies of colonization and settlement (Sokoloff and Engerman 2000; Acemoglu et al. 2001, 2002; Bertocchi and Canova 2002; Lange 2004; Nunn 2007).

\footnote{2}For example, Huillery (2010) argues that most prosperous pre-colonial areas in West Africa lost their advantage because they were hostile to the colonizers. The author claims this causes the “reversal of fortune.” On the other hand, Gennaioli and Rainer (2007) find that pre-colonial centralization in African countries improved current public goods provision in rural areas.
contributes to the debate by focusing on the educational effects of the educated upper class from the Joseon dynasty, known as *yangban*, which ceased to exist after the abolition of the court exam system in 1894 and the subsequent Japanese colonization in 1910. The elites from the pre-colonial era therefore sought to integrate themselves into the new society through various means. Many sought employment in new institutions, one of which was the public school. The incipient growth and effectiveness of public school system depended on these former elites, who were highly educated and yet had found themselves unemployed after the former regime ended.

Different works specifically related to the Korean context have used literacy improvement during the colonial period to support the modernization theory (Kimura 1993; Kohli 1994). Kohli (1994, pp.1276-1277), for example, claims that the Japanese colonial rule contributed to subsequent economic development of South Korea by endowing “a relatively literate labor force.” Haggard et al. (1997, p.877), on the other hand, rebuts 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.” In our paper the process of early *yangban* involvement under colonial rule remains the focus, and we look at the spread of literacy as an outcome of *yangban* presence and the public school system. The following study is, to our knowledge, the first empirical study of how the pre-colonial elite class in Korea influenced the literacy rate, one of the key indicators for human capital accumulation and economic growth (Romer 1990; Azariadis and Drazen 1990; Psacharopoulos 1994; Galor and Moav 2004; Hanushek and Woessmann 2008). It is also one of the few studies that look at the level of Korea’s modernization before the Korean War and the country’s subsequent divide.

We introduce novel data from Joseon’s historical court exam archives, colonial education data, and census data going back to 1930. Within the colonization period between 1910 and 1945, 1930 marks roughly a midpoint during which there was an especially rapid expansion of

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3Similar to Korea, the late Qing period in China experienced the abolition of its imperial exam system. Bai (2015) shows that this event redirected those who would have studied Confucian classics instead to modern science and technology. The abolition also meant that the prospect of upward mobility for a large group of commoners in society was no longer feasible; the ones that were affected by this were more likely to be participants of the uprisings in 1911, which in turn led to the end of the imperial rule by Qing (Bai and Jia 2015).
public primary schools in order to influence the colonial subjects.\footnote{Starting in the 1920s and through the 1930s the number of public schools increased almost fourfold (Oh 2000).} It is also noteworthy that Japanese rule in Korea was relatively stable by 1930, indicating that the Japanese policies were not tightly linked to outside needs such as imperial wars which marked the Korean history before 1910 and after 1937. Furthermore, 1930 is also the first and only year when the public census was carried out on literacy in Joseon as a colony; the next census on literacy came in 1960, after the country’s independence in 1945.

Our main findings suggest that the variation in the literacy rate by 1930 can be explained by the historical presence of yangban. While higher literacy rates in regions of pre-colonial elites may reflect concentration of yangban descendants who benefitted from scholarly family upbringing, we also find that regions with more yangban presence witnessed a higher number of Korean teachers as well as private schools established as alternatives to the colonial public schools.\footnote{The human capital accumulation found in yangban can be attributed to the generational transmission of norms emphasizing education attainment. There is a growing literature tracing the importance of ancestry in transmitting wealth and capital, and their impact on socio-economic outcomes. Clark and Cummins (2015) for example discuss the lasting impact of wealth transfer in the context of England, while Lefgren et al. (2012) document the importance father’s human capital on the income levels of sons. Jiang and Kung (2015) show that parents’ educational attainment and ancestral experience with officialdom (“cultural capital”) both contribute to the exam success of descendants. In the case of Korea, Paik (2014) finds that regions with a higher concentration of elite ancestry also have a higher percentage of college attendance, likely due to transmission of ancestral norms in yangban families emphasizing the virtues of education.} Our analysis shows that the effect of pre-colonial elites remains robust after considering various historical factors that might have affected both the yangban presence and the long-term literacy level.

The remainder of the article is structured as follows. The next section presents a brief background of the class system in Joseon and a time-line of the country’s transition from the Joseon dynasty to Japan’s colony. Section three describes the historical exam data construction and 1930 census data. Section four discusses various empirical strategies, and section five the main findings. Section six provides further discussions on the role of yangban on the literacy outcome, and section seven finally concludes.
2 Background

The status of nobility in Korea during the Joseon Dynasty between the 15th and 19th century was determined largely by scholarship, and the educated upper class qualified for their status by passing court exams. This class was called yangban; yangban literally means two groups, consisting of civilian officials (munban or munguan) and military officials (muban or muguan). Before the end of the Joseon Dynasty and abolishment of official court examination (guageo) system in 1894, those who became civilian or military court officials only did so by first passing these difficult exams. Passing exams was the first step toward obtaining high social status and exerting significant influence in Joseon’s court politics. There were different types of exams for court official positions. In civil service, there were two preliminary “small” exams (sogua) and one “big” exam (daegua), which combined were called mungua. Sogua consisted of two exams, saengwon-si and jinsa-si. Saengwon-si involved the study of the Confucian classics (saseo-samkyung), while jinsa-si involved essay writing. In order to prepare for daegua, scholars would attend Sungkyunkwan, a higher educational institution that prepared students. The very first mungua exams were held in 1399, and over the course of five centuries during the Joseon dynasty between 1393 and 1894 there were in total 230 saengwon-si, 212 jinsa-si and 804 daegua exams held. Passing daegua 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 10 to 15 years. Given that the kings lived for 46.3 years on average and the mean life expectancy was estimated at around 40, studying for these exams would likely have been an option available only for elite families with substantial resources (Lee 1980).

The military exam, or mugua, involved both military training as well as Confucian classics also known as Four Books and Three Classics, or the Seven Chinese Classics, and Theory of Legislation (Gyeongguk Daejeon). 801 mugua were held from 1402 to 1894. In addition to military and civilian exams, there was japgua reserved for the middle class (jungin) in lower ranking official positions in the fields of medicine, law, astrology an physics, and translation and foreign diplomacy. There were also a subset of official positions that were either bought

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6From an early study by Wagner (1974), scholars agree that yangban was an aristocratic elite group of Joseon until the early 20th century.
off or reserved for merit subjects who could avoid the exam requirement (eumguan).  

While the elite class formally included families of both military and civil officials, the status of those with only military lineage was often undermined. In general scholars agree that there was much discrimination against military officials by civilian officials, especially during the late Joseon period. A number of factors appear to have contributed to this outcome; typically there were more applicants from lower social classes for military exams, which would have further contributed to the class division within the yangban class. During wartime (the Japanese invasion of Korea from 1592 to 1598 and the Manchu invasion of Korea from 1636 to 1637), more commoners were recruited and promoted to military ranks. Furthermore, studying for military exams entailed less emphasis on literary knowledge and instead mandated a set of physical and military skills. Given munguan’s social status during the Joseon period as well as the nature of its scholarly pursuit and exclusivity, this paper uses the number of daegua passers in history in each district or province as a proxy for the presence of educated upper elite class.

After violent confrontations at Ganghwa Island in 1875-76, Japan was the first country which successfully forced the Joseon Dynasty to establish modern diplomatic relationships and allow foreign trade. Since then the Joseon government struggled between traditional governance and modern reform, with frequent political interventions from foreign countries including China, Japan, and Russia. After defeating competitors by winning two consecutive wars (the First Sino-Japan War in 1894-95 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.

It is worth noting that Joseon’s tributary relationship with China was fundamentally different from its colonial status under Japan. For a long period, kingdoms founded in the Korean peninsula maintained a hierarchical relationship with Chinese dynasties. Although this tributary system was based on the idea of strict superiority of the Chinese empire, it

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7 Paik (2014) provides a detailed summary on different types of exams and qualifications involved in taking these exams.

8 See Eugene Park’s work on military exams (Park 2000, 2001) and Kyungmoon Hwang’s work (Hwang 2004) on the middle class.

9 Although the length of the tributary relationship is a topic of much debate among scholars, most agree that the incipient relationship between the kingdoms in the Korean peninsula and Chinese dynasties began around the fourth century.
was clearly distinct from the modern colonial system (Fairbank 1968). The main purpose of
the tributary system was to set up an orderly foreign relationship confirming the hierarchy,
not to conquer the tributary states. Regular exchanges of envoys and tributes represented
such nature of the system, and the internal politics of Joseon stayed largely independent.

Over the course of colonization, the Japanese government set out to change the under-
pinnings of Joseon’s pre-existing institutions. The colonial government quickly realized that
the education system in Joseon had to differ from that of other colonies because of relatively
advanced culture and education within Joseon (Kang 2007, p.19). This led to adoption and
expansion of a schooling system in 1911 that Joseon already had established before the colo-
nial occupation in 1910, while at the same time pursuing expanded use of Japanese language
in these schools. The Education Decree in Joseon issued in 1911 states that the main pur-
pose of elementary education is the propagation of the Japanese language. Whether to teach
Korean in primary education or not was debated within the Japanese government and the
Japanese Government General of Korea (Kang 2007, pp.41-42). In the end, Korean language
classes and the use of Chinese characters became part of the regular teaching curriculum. The
Japanese government needed to include the Korean language in the curriculum not only as
means to teach Japanese but also to attract Korean students to public schools in competition
with private schools and traditional schools called seodang (Kang 2007, p.43). As colonial
institutions settled, however, hours of Korean language classes taught decreased over time.
Records indicate that the Korean language was taught in public primary schools for five to
six hours per week from 1911 to 1921, which were later reduced to three to four hours in
1922. These classes became optional in 1938 and were finally abolished by 1943 (Kim 2005).

3 Data

In order to examine the variation in literacy rates during the colonization period, we present
the colonial census data from 1930 and exam records both at the district and the provincial
level. Data on district-level literacy during the colonial period are collected from the 1930

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\(^{10}\)After 1894 certain members of the Joseon court attempted various reforms in governance and policies. One of these initiatives included establishing public schools in Seoul (also known during this period as Hanyang or Gyeongseong) and numerous private schools by both the reformists and missionaries.
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.

Korean literacy indicates the ability to read and write in Hangul, the Korean alphabet, and a set of traditional Chinese characters (Yoon 2006, pp.75-77). Until recent years both Chinese characters and Korean alphabet were used in the written script. The Korean alphabet was invented by King Sejong during the Joseon Dynasty in 1443 to avail the common people a written language. Yangban who had communicated in Chinese characters until then were resistant to the use of Hangul during the Joseon Dynasty. As a result, for centuries both Hangul and Chinese characters coexisted in the Korean language system until 1970, when the South Korean government adopted the Exclusive Usage of Hangul Act.

In 1930, after 20 years of colonial occupation, 22 percent of Koreans were literate in either Korean or Japanese, compared with 80 percent of Japanese. For analysis the Korean population is classified into two groups, one literate in the Korean language and another literate in the Japanese language. We calculate the literacy rate in Japanese by combining the number of people who are literate in Japanese and those literate in both languages. Likewise, Korean literacy rate is calculated by combining the number of residents literate in Korean and and 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 (Watanabe and Abe 1987). The number of public schools is our measure of the extent of colonial influence on literacy. The level of school provision in each district was mainly determined by the colonial government with some influence from the elite class or the local population.\footnote{Between 1920 and 1930 some local elites became involved in the spread of 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 in the 1930s (il myun il gyo undong) (Ryuta 2007; Oh 2000).} Given that district-level literacy data are available only for the 1930 census, we also use provincial-level data on annual population, schools of different kinds (traditional and private primary schools, as well as public schools) from 1911 to 1930 available from Statistics Korea. Throughout the analysis we re-scale the number of schools in each year by the corresponding
As described above the most stringent classification of the elite class is used for our study. Based on the scholarly effort families would have needed to put in for studying the civil court exams and the status that munguan enjoyed, this paper looks at how many people passed the big civil exam (daegua) as an indicator for the level of pre-colonial elite accumulation. The examination records during the Joseon Dynasty are obtained from the Academy of Korean Studies’ Historical Figures Comprehensive Information System (http://people.aks.ac.kr). According to the database there were 15,150 people who passed mungua in total. In order to create a measure for pre-colonial elite presence in each region, we first identified the district from which each daegua passer came from. Matching records indicate that out of 15,150 passers, 6,193 had residential information. Then we matched each location of residence to the 1930 census administrative units, from which we successfully matched 6,178 out of 6,193 passers. Next we added the number of all the daegua passers located in each district. Finally, we re-scale the mungua passer measure by dividing them by population in thousands for each year available in the data. While one way to measure relative elite presence is to divide the number of exam passers by historical elite population, census data of yangban during the Joseon period at the district level, to our knowledge, do not exist. This means that we are not able to scale the number of exam passers by the size of the elite population. Instead we interpret our measure as the level of pre-colonial elite presence in the region, in which the quality of scholarly talent and its legacy effect, rather then the number of yangban population, is paramount in the yangban’s influence on the region. Based on the earliest available census data, we then normalize the presence variable by the population in the region. By doing this we avoid using the variable to simply capture the regional population effect on the literacy rate.

12 For district-level analysis we divide the number of schools and teachers by the 1930 population. For province-level time-series analysis we use the corresponding year’s population to normalize our school and teacher variables.
13 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 18th century and on was residential information systemically recorded for all daegua passers.
14 Mungua passers are normalized by the 1925 population in the district-level analysis, as 1925 census is the first census where district level population data are available. In the following provincial analysis we use the 1911 population. 1911 is the year right after colonization and also the first year that the provincial population figures are available.
One key issue to address in our study is the endogeneity of *mungua* passers’ distribution. As shown in Figure 1, the distribution of elite population is not random. There are districts with zero passers including developed cities such as Busan and Mokpo, while districts like Jeongju and Andong have many more passers. Seoul, as the capital of Joseon and with more than two thousand passers, is a clear outlier. Therefore we cannot treat the presence of historical elites as if they are exogenous to various factors, which may also affect the long-term literacy spread. One obvious confounder would be the level of industrialization of each district. We first identify 14 cities as urban centers by 1930, including Seoul, Incheon, Gaesung, Gunsan, Mokpo, Daegu, Busan, Masan, Pyongyang, Jinnampo, Shineuiju, Wonsan, Chongjin, and Hamheung.\(^\text{15}\)

From the population census we also distinguish the level of development in different regions by concentration of non-agricultural occupation and population density. Concentration of non-agricultural occupation is calculated as the share of population occupied in manufacturing, commerce, transportation, public or freelance sectors, while population density is measured by the districts population in thousands divided by the total area.\(^\text{16}\) The industrialized districts by 1930 likely required more literate labor than rural ones, and most of them were historically wealthy, with a high concentration of *yangban*. The set of these variables therefore control for the possibility that the locations of the elites’ residences coincided with towns that developed into business, trade and industrial centers, and also attracted a highly literate population in 1930.

In addition to the set of controls in 1930, we collect new data on historical factors that may have affected the distribution of *mungua* passers and subsequent spread of literacy. We find three factors that potentially explain historical differences across districts in the number of *mungua* passers. The first source of potential omitted variable bias is a set of historical administrative districts. Each administrative district has usually been the political center of each province and also the place where *mungua* passers resided to work. Given

\(^\text{15}\) The districts that were identified as cities were called *bu*, while others were called *gun*.

\(^\text{16}\) At the provincial level, accurate area data are available annually in square *li* \((\approx 16 \text{ km}^2)\) from the Japanese Government-General of Korea Statistics. We convert them into km\(^2\) for interpretation. At the district level, instead of using the exact area which are not available, we use a proxy for the area which we incorporate from the product of horizontal and vertical distances of each district in 1910, available from the Land Survey Project (1910-1918). Both horizontal and vertical distances are originally in miles, which we convert to kilometers.
the strong hereditary pattern of elite education in the Joseon dynasty, these administrative districts were likely where the residences for descendants of mungua passers were located. To address the effect of historical administrative centers, we create indicator variables for 18 historical administrative centers. The 18 centers consist of 15 districts from which the names of the eight Korean provinces were originated (Seoul, Chungju, Cheongju, Jeonju, Naju, Gyeongju, Sangju, Gangreung, Wonju, Hwangju, Haeju, Pyongyang, Anju, Hamheung, and Gyeongseong) and 11 districts where provincial governments (gamyeong) were located in 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 development of commerce before the colonization. Although limited, the Korean merchant class was slowly emerging and growing in influence in Confucianism-centered Joseon, especially after around 1800. Development of commerce could affect the number of mungua passers and also local education system in the long run. For instance, given the low standing of the merchant class, elites may have avoided residing in commercial centers, which explains why large ports such as Busan and Mokpo report no mungua passers in history. To address such possibility we code 19 historical commercial centers (Won 2002), out of which seven districts served as cores of Joseon’s trade by either being designated as trading centers with China or Japan, or by having substantially large 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 regular basis. These include Bakcheon, Hwangju, Tosan, Deokwon, Gwangju (in Gyeonggi province), Pyeongchang, Anseong, Eunjin, Jeonju, Namwon, Changwon, and Daegu.

Finally, we control for districts that may have functioned as scholarly centers 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 formed their own schools to teach their philosophy and theories to disciples. Among them a few scholars were named as “virtuous scholars” by descendent Confucian scholars and

\[\text{\footnotesize Traditional Confucianism positions merchants as the lowest class following scholars, farmers and manufacturers.}\]
canonized in the national Confucian shrine. Depending on the criteria and historical importance, there are five and 18 virtuous Confucian scholars in Korea, who are called *Dongguk O-Hyun* and *Dongguk Sipal-Hyun*, respectively. We coded the scholars’ birthplaces to control for the historical influence of these virtuous scholars on promoting *mungua* passers in their respective home districts.\footnote{\textsuperscript{18}} We use the birthplace locations because long-standing traditional norms in Korea dictate that people should not be detached from the place of origin.\footnote{\textsuperscript{19}} The virtues 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 of 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. Figures A.1 to A.4 in Appendix illustrate the location of these historical districts and urban centers in 1930.

### 3.1 Descriptive Statistics

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, as well as the number of *mungua* passers from the Academy of Korean Studies. Table 1 presents detailed statistics on the number of *mungua* passers at the provincial and city level. The mean number of passers in cities is 193 including Seoul, and 16 excluding Seoul. In each of the 14 cities identified as urban centers in 1930, we see large variations in terms of *mungua* passers. Historical urban centers such as Seoul, Gae-sung, Daegu, Pyongyang, and Hamheung show large numbers of passers, while commercial centers including Incheon, Busan, Mokpo, Sineuiju, and Wonsan report almost no passers. In comparison, the mean number of *mungua* passers in rural districts is 16. There were 15,150 people in total who passed *mungua*, and 6,178 of them had residence information; the district

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\textsuperscript{18} 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.

\textsuperscript{19} Korean family names for example come with lineage information derived from the location of place of origin (*bonguan*), and this allows classification of different family clans within the same family name (*seongssi*): for a detailed description of the family names in Korea see Paik (2014).
with the highest number of passers, 2,498, is Seoul (Gyeongseong-bu) located in Gyeonggi province. The standard deviation in the number of mungua passers is 164 while the mean is 26.4, and the number of districts with zero mungua passers was 36, suggesting a highly skewed distribution. About 85 percent of the districts had at least one or more mungua passers. Figures 1 and 2 show the spread of our measure of pre-colonial elite presence and literacy rate by 1930, respectively. Between the two maps we find a consistent pattern in which both Pyongyang and Seoul have many mungua passers as well as high overall literacy rate in 1930. Other cities with the same pattern include Jeungju and Gaesung in the north, and Daegu in the south. The maps also show that numerous districts in the north often had no exam passers, and those in the interior regions witnessed less exam passers and lower literacy rates.

Table 2 presents statistics on the number of schools and literacy rate by province. We see that the provinces in the north (Huanghae, Pyeongbuk, Pyeongnam, Hambuk and Hamnam) dominate over the southern provinces in terms of both Korean and Japanese literacy rates despite having a smaller number of public schools. The Korean literacy rate in Pyeongnam province, for example, is 30 percent, compared to 17 percent in Gyeongbuk or Gyeongnam province. Both Pyeongnam and Pyeongbuk provinces have exceptionally high literacy rates in Japanese as well (9.3 and 9.8 percent, respectively), suggesting that province-specific mechanisms are at hand. These relative high literacy rates are also evident in the northern provinces when the number of mungua passers, schools and teachers are normalized by provincial population in Figure 3. The high literacy rates in these provinces, as well as in Gyeonggi, Huanghae, Hambuk and Hamnam relative to the rest, can be attributed to the movement aimed at “educating and saving the country” (Gyoyuk Guguk Undong). This movement between 1905 and 1910 was particularly active in the northern regions and arguably remained influential for subsequent decades. Among a number of organizations involved in the patriotic enlightenment movement, the New Citizens Society (Sinminhoe), was the most active in the northern provinces. The society was founded in 1907 by intellectuals from the northern provinces (Pyeongan, Huanghae, and Hamgyeong provinces) and prospered under political activists including An Changho, Yang Gitak, and Shin Chaeho, establishing branches in six provinces - Gyeonggi, Huanghae, Pyeongbuk, Pyeongnam, Hambuk, and
Hamnam. It was especially involved in the building of private schools in the Pyeongan area.

Table 3 presents district-level summary statistics normalized by population. In 1930 the mean Japanese literacy rate in Korea was only 8.5 percent, while the mean Korean literacy rate was 22 percent. Records show that 80 percent of Japanese living in Korea were literate in Japanese, and 6.2 percent of them were literate in Korean as well. By comparison only seven percent of Koreans were literate in Japanese, and 22 percent were literate in Korean. 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 per district in 1930 was 89,993. Among the country’s total population, 4.3 million were within the primary education age group, between 6 to 14 in 1930, whereas the number of public schools was 1,620 (8,259 classes) which educated only 422,820 students comprising less than 10 percent of the given age group in 1929. In Seoul, there were only 18 primary public schools, and 14,758 students out of 49,768 6 to 14-year-olds were enrolled in them.

At the provincial level, the data are available for 20 years (1911 to 1930) for the 13 provinces (five in North Korea and eight in South Korea). Table 4 presents the number of mungua passers, different types of schools and teachers, as well as provincial-level controls including population, land area and agricultural data. The mean number of mungua passers per population in thousands is 0.398; Gyeonggi province has the highest number of mungua passers, with 2.115 per population in thousands, while Hwanghae province has the lowest number of records, with 0.109. There also appears to be a time trend; in the 1920s we see dramatic changes in the number of seodang per population, which increases over the years 1911 and 1921 from 1.214 to 1.458 but decreases afterwards to 0.537 in 1930. One can attribute this result to the colonial policy on seodang enacted in 1918, which mandated the Japanese Government General’s permission for establishing any seodang 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. There were yearly increases in the number of schools per 1,000 people present across all provinces. Figure 3 illustrates the provincial-level distribution of Korean literacy rate in 1930 and mungua passers, and public schools and teachers in 1929, all normalized by corresponding population.

The population census in 1930 also has literacy rate information by different age groups,
albeit only at the provincial level. We divide the population into two similar groups: those of 25 to 39-year-olds who would have been considered to be school-bound in 1910 before the Japanese colonization, and a similar cohort of 6 to 191-year-olds in 1930. With the caveat of small number of observations in mind (there are 26 in total with two cohorts in 13 provinces), we see in Table 5 that the presence of yangban continues to be a persistent and positive influence on the population, with little changes in its impact across different cohort groups. As expected, the latter cohort also shows a lower Korean literacy rate and a higher Japanese literacy rate 20 years after colonization.

4 Empirical Strategy

In order to assess the average effect of pre-colonial elite class on the literacy rate, we first present a reduced-form equation of the following form at the district level:

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\text{LitRate}_i = \alpha + \beta_1 Mungua_i + \beta_2 Development_i + \beta_3 PopDen_i + \sum I_{urban1930} + \sum I_{prov} + \varepsilon_i,
\]

In the equation \(i\) indexes the district in Joseon. \(\text{LitRate}_i\) is the literacy rate in 1930 (literacy rates in Korean and in Japanese are considered separately) and \(Mungua_i\) is the number of mungua passers per population in thousands in each district. A set of controls in 1930 include \(Development_i\), the share of population employed in non-agricultural sectors, \(PopDen_i\), population density, and \(\sum I_{urban1930}\), a set of 1930 urban center indicators. Finally, \(\sum I_{prov}\) captures the provincial fixed effects.

Next we estimate the average effect of colonial government on literacy through provision

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20The slight difference in the size of cohorts is due to age groupings in the census. The first age group is obtained by taking the age group of 25 to 39-year-olds in 1930. The second group is obtained by combining three different groups present in the 1930 census: 6 to 9-year-olds, 10 to 14-year-olds and 15 to 19-year-olds.

21We employ the literacy rate from all age groups for the following reasons. There was no official restriction or rule on age in regard to primary education or traditional education during this period. Anecdotal evidence points out cases of diverse age groups within the same grade. Furthermore, literacy improvement was also possible through various channels other then official education. For instance, a self-motivated community gathering called “night study group (yahak)” thrived throughout the colonization period and served as an unofficial source of literacy improvement, especially for adults.
of public schools:

\[
\text{LitRate}_i = \alpha + \beta_1 \text{PublicSchool}_i + \beta_2 \text{Development}_i + \beta_3 \text{PopDen}_i \\
+ \sum I_{urban1930} + \sum I_{prov} + \varepsilon_i. 
\] (2)

In the equation \(\text{PublicSchool}_i\) is the number of public schools per population in thousands in 1929 in district \(i\), and other variables remain the same as Equation (1). Coefficient \(\beta_1\) captures the estimated impact of colonial education system on the district level of literacy by 1930. A positive \(\beta_1\) would indicate evidence of higher literacy through provision of public school. Next, in order to assess the effect of pre-colonial elite class presence independent of colonial influence, we present the following equation:

\[
\text{LitRate}_i = \alpha + \beta_1 \text{Mungua}_i + \beta_2 \text{PublicSchool}_i + \beta_3 \text{Development}_i + \beta_4 \text{PopDen}_i \\
+ \sum I_{urban1930} + \sum I_{admin} + \sum I_{commercial} + \sum I_{confucian} \\
+ \sum I_{prov} + \varepsilon_i. 
\] (3)

Equation (3) allows us to explore the yangban effect in literacy apart from colonial government’s decision to establish schools. To address potential omitted variable bias, we run additional analyses based on Equation (3) where we also include indicators for historical administrative centers \((\sum I_{admin})\), commercial centers \((I_{commercial})\) and Confucian centers \((\sum I_{confucian})\).22

A positive \(\beta_1\) value may capture a descendant effect, as more educated descendants were likely found in regions where there were many mungua passers prior to colonization.23 However more likely the case were indirect channels through which the elite class influenced the public. In spite of little influence that the elite class had over the establishment of public

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22We introduce a dummy variable for each of the historical centers instead of dummies for each categorical group in order to account for each center’s idiosyncratic effect. For instance, the impact of Seoul as a historical administrative center must have been different from other districts given its importance as the capital.

23Such effect would not be present if there was systematic migration of elites over the colonization period to weaken the link between exam records and concentration of elites in the region. However we find no evidence of such migration except perhaps for urbanization trend, in which both non-elites and elites alike moved to cities and controlled by urban center fixed effect in the regressions.
schools, they were instrumental in how these schools, once established, operated themselves. In addition they could also build private and traditional schools (*seodang*) to raise the literacy rate. Given the information on various types of schools and the number of Korean teachers hired, we explore these likely channels through which the elite class influenced the literacy rate. In the following two equations we first look at whether elites influenced the number of public schools, and also whether more elite-concentrated regions had more Korean teachers:

\[
PublicSchool_i = \alpha + \beta_1 Mungua_i + \beta_2 Development_i + \beta_3 PopDen_i + \sum I_{urban1930} + \sum I_{admin} + \sum I_{commercial} + \sum I_{confucian} + \sum I_{prov} + \epsilon_i \tag{4}
\]

and

\[
KoreanTeachers_i = \alpha + \beta_1 Mungua_i + \beta_2 Development_i + \beta_3 PopDen_i + \sum I_{urban1930} + \sum I_{admin} + \sum I_{commercial} + \sum I_{confucian} + \sum I_{prov} + \epsilon_i \tag{5}
\]

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

\[
\text{School}^z_{p,t} = \alpha + \beta_1 Mungua_p + \beta_2 Development_{p,t} + \beta_3 PopDen_{p,t} + \sum I_t + \epsilon_{p,t} \tag{6}
\]

where \(\text{School}^z_{p,t}\) is the number of school type \(z\) (*seodang*, public school, or private school) in province \(p\) in year \(t\). Population density and development indicator are employed as proxies for the relative economic development of each province in each year. The development
variable is the share of non-agricultural area. $I_t$ denotes year fixed effects.\(^{24}\)

Similarly, we present a set of equations that look at the impact of pre-colonial elite class on the number of Korean teachers hired in each of the school types:

$$
Teacher_{p,t}^z = \alpha + \beta_1 Mungua_p + \beta_2 Development_{p,t} + \beta_3 PopDen_{p,t} + \sum I_t + \varepsilon_{p,t} \quad (7)
$$

where $Teacher_{p,t}^z$ is the number of Korean teachers in school type $z$ in province $p$ in year $t$. Positive $\beta_1$’s in the above equations indicate that pre-colonial elite class has a positive impact on the number of schools and the number of teachers supplied; their magnitudes suggest the extent of differential effects that the elite class had on schools depending on the type of school.

5 Findings

In the first two columns of Table 6, we first 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 group accumulation measured by the number of successful candidates in $mungua$ examination has positive and statistically significant explanatory power on the overall literacy rate at the district level. When a set of the year 1930 controls and provincial fixed effects are included, having one more $mungua$ passer per 1,000 people increases the Korean-language literacy rate in 1930 approximately by 2.3 percentage point (Column (2)). We also find that $mungua$ passers remain positively correlated with Japanese literacy, although the magnitude is much smaller than in the case of Korean literacy. Having one more $mungua$ passers per thousands increases the Japanese literacy by approximately one percent (Column (1)).

The rest of the columns in Table 6 present empirical findings from Equations (2) and (3). We first investigate whether colonial public schools have effects on the Japanese or Korean literacy rate. Columns (3) and (4) in Table 5 present the average effect 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 Column (3) and Column

\(^{24}\)We omit additional sets of 1930 urban centers and historical controls, since in aggregation up to the province level we find essentially no variation for these controls across provinces.
include provincial fixed effects and urban center dummies. The results show that the presence of public schools per se does not affect the literacy rate significantly at the district level.

When considered with the presence of schools, the direct impact of yangban is still significant, as seen in Columns (5) to (6). That is, controlling for the effects of public schools, pre-colonial human capital accumulation explained by the number of mungua passers, appears to remain positive and significant, and is robust with province fixed effects and controls in 1930. Controlling for the number of schools where Japanese was intensively taught and most regular courses were taught in Japanese, the elite presence has a significantly positive and direct impact on Korean literacy. According to Column (6), one unit change in the mungua variable explains an increase of Korean literacy by 2.3 percentage points. The magnitude of the effect is large considering that the average literacy rate was only 22 percent during this time period (see Table 3). Finally, throughout all specifications we observe that districts with higher industrial development (those with higher concentration of non-agricultural occupation labor force or higher population density) also have more literate population.

As Table 1 and Figure 1 clearly show the distribution of mungua passers is neither uniform nor random. Although it is difficult to elucidate all the historical factors of importance, there are several important ones that likely affected the distribution of yangban and the literacy outcome. We incorporate historical, district-level information on the locations of administrative, commercial and scholarly (Confucian) centers. Table 7 presents results with the inclusion of these additional controls. Columns (1) and (2) employ fixed effects for the 18 districts that served as administrative centers during the Joseon dynasty. Column (3) and (4) include fixed effects for the 19 commercial centers in Joseon, while the subsequent two columns (Columns (5) and (6)) control for the 11 districts of Confucian centers. Finally, the last two columns include fixed effects for all three categories. We find that the value of the mungua coefficient remains in the range between 1.9 and 2.6 depending on the specification, and the positive effect stays statistically significant at the five percent level or below. With the exception of Columns (5) and (6) where we include the Confucian fixed effect, controlling for other historical factors increases the magnitude of mungua effect on Korean literacy in
1930. These results indicate that the *yangban* effect is not biased or entirely explained by these historical factors associated with the distribution of *yangban* and literacy. We also find that the effect of *mungua* on the Japanese literacy, while positive in sign, is less robust compared to that on the Korean literacy.

In both Table 6 and 7, we find that the number of schools has a positive and sizeable effect on both Korean and Japanese literacy rate, but the coefficient values are not statistically significant. The results suggest that while there are records of the local elites pushing for establishment of public schools and improving the literacy rate, their main impact on literacy came through other means such as providing teachers to existing schools or running voluntary courses for enlightenment of the public, but not through increasing the number of new public schools. 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 on from 1930 to provide the necessary education for the people after Korea’s liberalization from Japan in 1945, while the traditional schools (*seodang*) declined in their numbers under repressive measures by the Japanese Government-General and are now rarely found. In many aspects the current Korean school system continues to closely follow the institutional structure (in grade system, curriculum, class times and teacher-student relations) introduced during the colonial period.\textsuperscript{25} Our cohort analysis in Table 5 also suggests that schools could be very effective at raising the literacy rate (particularly Japanese) in just a generation. The colonial institutions would also have affected the Korean literacy rate, although the extent of their influence from 1930 until the end of the colonial period cannot be estimated given our data.\textsuperscript{26}

Tables 8 and 9 investigate a major channel through which the pre-colonial elite class influenced the literacy rate: supplying public schools with teachers. First, Table 8 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 the 1930 urban center and historical fixed effects, the presence of the elite class increases the number of teachers

\textsuperscript{25}See Figure 4 for example, where we see a dramatic upward trend in the number of schools in 1920s and 1930s.

\textsuperscript{26}By 1955 the literacy rate among South Koreans over 12 years of age was around 90 percent for males and 70 percent for females, indicating at least some positive influence of public schools, the most widely accessible means of education for the subjects, on literacy. We thank an anonymous reviewer for this insight.
but has no impact on the number of schools. The magnitude of effect on the number of
teachers is significant; the coefficient values for mungua passers in Columns (3) and (4) for
example suggests that having one more mungua passers per population (in thousands) leads
to between 0.07 to 0.09 more teachers. Considering that the average number of teachers
per population (in thousands) was 0.304, the effect corresponds to a significant increase in
the number of teachers hired. As there was always a short supply of teachers during the
colonization period (Lee 2007, p.104) and at the same time active grass-root movements
among Koreans for more schools and classes, regions with higher yangban presence certainly
would have benefitted from the availability of Korean teachers.

The results in Table 8 overall show that the channel through which local elite affects
educational attainment of districts is supply of human capital, but not colonial institution. In
order to understand the size of direct effect of historical elite compared to the mediated effect
through colonial institutions, we also present results from the Sobel-Goodman mediation
analysis (Sobel 1982). This test will inform whether the presence of mungua passers has a
direct impact on district’s literacy level in 1930 or the effects are carried out through Korean
teachers working in public schools. If mediated, the test also provides the relative size of
mediated effect to direct effect, or the degree of direct elite effects on literacy rate relative to
the effect mediated by colonial investments. Table 9 presents the results; the proportion of
total effects (mungua passers on Korean literacy in 1930) that is mediated by Korean teachers
is 0.396, indicating that approximately 40 percent of historical elite’s effect on literacy is by
increasing Korean teachers working in local public schools.

In Table 10, we explore another channel through which the elite class influenced the
literacy rate by building private and traditional schools. The analysis is at the provincial
level employing the numbers of schools and teachers from 1911 to 1930. As discussed earlier
there are three distinctive types of primary education 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. From Column (4) to (6), we test the impact of mungua on the number
of teachers by province. We find that the elite class had positive influence on various types
of primary education institutions. Presence of more mungua passers promotes establishment
of private schools which focus more on Korean education. As shown in Columns (3) and (6)
both number of schools and teachers of private schools are positively affected by 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, but not the supply of schools. These results are also consistent with the district level analysis presented in Table 8.\(^{27}\) We also find positive correlations between \textit{mungua} passers and the number of \textit{seodang}, although the standard errors are too large to meet standard statistical criteria in terms of significance.

6 Discussions

The empirical findings above suggest that the presence of pre-colonial elite class can explain the level of Korean literacy in a representative district. They also suggest that while the \textit{yangban} effect may reflect concentration of educated descendants, regions with more \textit{mungua} passers also witnessed a higher number of Korean teachers in both public and private schools, and establishment of private schools as well.

The descendant effect can be the main explanation for our findings especially if one considers the persistent, inter-generational effect of the lineage system, and the scholarly nature of \textit{munguan} families.\(^{28}\) That is, if there are more elite families in districts with more \textit{munguan} passers, then the finding is evidence of continuing social division. Given that the public school system did not help much with literacy improvement, one may simply conclude that 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, there is a possibility that the proportion of elite members out of the

\(^{27}\)The impact of different types of primary schools on literacy improvement in colonial era are hard 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. Based on school registers, [Ryuta (2007)](p.221) shows that many incoming students had gone through traditional or private education before entering public primary schools. [Oh (2000)](p.117) also shows that approximately 30 percent of new students entering public schools in the early 1930s had attended \textit{seodang} before.

\(^{28}\)In a similar examination system in late imperial China, [Jiang and Kung (2015)](p.221) finds evidence of strong intergenerational effect. They find the ascendant’s ability, not wealth, significantly increases the probability of the descendent’s success in a civil exam. For long-lasting effects of lineage system and social mobility, see [Clark (2013)](p.117), [Clark and Cummins (2013)](p.117) and [Paik (2014)](p.117). For the direct descendant effect on education see [Banerjee et al. (2007)](p.117).
total population corresponds to the number of mungua passers. However one also cannot ignore the possibility that in certain districts most mungua passers came from a small number of exclusive elite families, and their relative share of total total population was also very small. Furthermore during the 18th century, the period of the largest number of mungua passers, only 3,493 candidates passed the exam, while the average population of Joseon was approximately 7.3 million (Oh 2010). Even when the number of passers was the largest, it did not exceed 0.05 percent of the total population. Therefore it is unlikely that the direct descendant effect of munguan families alone can explain why there is a strong correlation between our proxy for elite class presence and literacy rate in 1930.

More importantly, however, there are historical records describing concerted efforts by the 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), the patriotic enlightenment movement (Aeguk Gyemong Undong) also involved active participation from some elite members to educate the public mass, and enhancing literacy was one of the major goals of this movement (Lee 2010). The elite class also likely provided the necessary human capital needed to run the public schools, as each public school was headed by Japanese principals but staffed otherwise by local teachers. In fact, the literature suggests that local elites affected education during colonial period in two ways. First, the elite class taught classes to local children through various channels. In many cases, they established seodang in their communities, set up smaller gatherings called sasuk or yahak, or even worked as independent teachers. Second, the majority of teachers in all public schools were Koreans. This was especially the case for most schools in rural areas. Large shares of Korean teachers likely affected the level of literacy positively. Andrabi et al. (2008) suggest, for example, that teachers from the same group are likely to induce better educational attainment through teachers’ efforts and parents’ demands. It further provides evidence that new educational institutions could successfully settle down because there was prior educational investment. Finally, some elites

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[29] In 1929, the share of Korean teachers in total public school teachers was more than 71 percent.
[30] 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 into teachers (Lee 2007).
[31] Andrabi et al. (2008) finds that private schooling proliferated in Pakistan only in places where female
provided private education to local students who had limited access to public schools.

We do not intend to argue that the pre-colonial elite group’s active engagement in primary education was driven solely by patriotic or altruistic motivation. Given that the major skills of yangban came from studying Confucian classics and writing essays, their comparative advantage certainly would have been in the areas of teaching the classical literature. Many of the elites lost their status and place in the court after the Japanese colonization, which in turn led to loss of their income source. For those who had never worked in agriculture or commerce, education would have been the most suitable sector. The Confucian culture, which considers scholars (and teachers) superior to other professions, must have played some role as well. The delayed effect of the elites on literacy came only after colonization as there was little incentive for yangban to empower the commoners through education during the Joseon dynasty. After the loss of political power by the Japanese, a significant part of the former yangban class remained resistant to Japanese rule, while others pursued enlightenment movements under the colonial rule. The new government allowed the former elites’ involvement in the education sector and low-level administration, especially in the early period of occupation. According to [Park (1995) 1999], 68 percent of the Korean bureaucrats who served in 1909, a year prior to the annexation, kept working in the government under the Japanese rule. Our data also show large-scale employment of Korean elites as teachers in primary schools. Out of 1,716 total teachers in primary schools in 1914, 1,207 (70.3 percent) were Korean teachers, and the share of Korean teachers remained at 71 percent in 1929.

So far we measured human capital accumulation of the elite class during the Joseon dynasty using all the mungua examination passers whose residential information are available in the historical records. While it is only from 1700 and onwards that most of the residential information became available, some records are from an earlier period. For instance, the earliest residential record is from 1414. As we claim that the legacy of former elites lasts for a long time in local communities, we need to check whether recent mungua passers had more direct and larger impact on education during the colonial period. In addition, we are

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32 Private institutions expanded in the 1920s. Many of them were later substituted by public schools as the number of public schools increased (Ryuta 2007).
interested in whether the type of reign over which the exams took place matters. That is, we need to check whether the quality of the regime determined the legacy of elites. One may argue for a strong correlation between the quality of regime and that of human resources selected under the regime, while others may believe that the quality of an elite group depends solely on the selective exams.

In order to address these issues we restrict our measure of elite accumulation to mungua passers after 1800 and re-run our analyses (see Appendix for the results). 1800 is the year when King Jeongjo suddenly died under mysterious circumstances. The era governed by King Yeongjo and Jeongjo (1724-1800) is largely considered as the renaissance period of the Joseon dynasty. Amid intense court politics and polarized officials, Yeongjo and Jeongjo pursued pragmatic policies that facilitated economic development and cultural prosperity in the 18th century. The general consensus among Korean historians is that the Joseon dynasty declined from its apex since King Jeongjo’s reign, after which political turmoils ensued in the 19th century and led to the Japanese colonization.

The tables in Appendix give support to our story. Using the restricted sample of mungua 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 mungua passers and their direct descendants have stronger and 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 the elite group in influencing the literacy rate.

7 Conclusion

In this paper we present evidence that the pre-colonial elite class in Korea had significant influence on the literacy rate during the early Japanese colonization period. By 1930 yangban not only impacted the number of private schools that were alternatives for 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 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 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 paper 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 Korean case provides a rare historical example in which at least part of the pre-colonial institution survived because of its strong foundation, and continued to play a significant role during the colonial era. This contrasts to cases in Africa where the weak statehood played a critical role in institutional changes during the colonial period (Jackson and Rosberg 1982; Michalopoulos and Papaioannou 2013, 2015).

There are several remaining avenues for future research. First we believe that more in-depth studies of other former Japanese colonies are warranted and possible by obtaining available colonial records from Japan. These works on Asian former colonies will certainly enrich our understanding of historical institutionalism under the context of colonialism and forced regime changes. We would also encourage further studies on the degree to which varying qualities of pre-colonial institutions affected both colonial and post-colonial outcomes; the majority of existing works focus only on states with weak institutions, which likely led to the demise of the state but not necessarily the persistence of pre-colonial institutions. Finally we believe that the yangban effect has long term implications beyond improvement in literacy. The literature on determinants of voting behaviors in Korea for example may benefit from looking at historical factors such as yangban influence, as regions with high yangban concentration likely have had both ideological and income divergence from the rest of the country.
8 Tables and figures

<table>
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<tr>
<th>Province</th>
<th>Mungua (urban center)</th>
<th>Population (1930)</th>
<th>Province</th>
<th>Mungua (urban center)</th>
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Table 2: Schools and Literacy Rate by Province

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<td>1,589</td>
<td>1,605</td>
<td>122</td>
<td>396</td>
<td>10</td>
<td>43</td>
<td>24.84</td>
<td>6.16</td>
</tr>
<tr>
<td>Pyeongbuk</td>
<td>1,413</td>
<td>1,554</td>
<td>103</td>
<td>490</td>
<td>1</td>
<td>6</td>
<td>26.80</td>
<td>7.21</td>
</tr>
<tr>
<td>Pyeongnam</td>
<td>1,297</td>
<td>1,316</td>
<td>101</td>
<td>391</td>
<td>3</td>
<td>29</td>
<td>30.04</td>
<td>9.29</td>
</tr>
<tr>
<td>Hambuk</td>
<td>220</td>
<td>255</td>
<td>54</td>
<td>259</td>
<td>7</td>
<td>22</td>
<td>24.86</td>
<td>9.84</td>
</tr>
<tr>
<td>Hamnam</td>
<td>589</td>
<td>625</td>
<td>79</td>
<td>369</td>
<td>18</td>
<td>72</td>
<td>22.80</td>
<td>8.42</td>
</tr>
<tr>
<td>Total</td>
<td>11,469</td>
<td>11,908</td>
<td>1,620</td>
<td>6,107</td>
<td>78</td>
<td>417</td>
<td>22.23</td>
<td>6.79</td>
</tr>
</tbody>
</table>
Table 3: Summary statistics (district level)

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>Obs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literacy rate</td>
<td>Japanese literacy rate (%)</td>
<td>234</td>
<td>8.461</td>
<td>7.025</td>
<td>2.83</td>
<td>43.755</td>
</tr>
<tr>
<td></td>
<td>Korean literacy rate (%)</td>
<td>234</td>
<td>21.921</td>
<td>5.184</td>
<td>11.618</td>
<td>43.744</td>
</tr>
<tr>
<td>Local elite</td>
<td>mungua passers per 1000</td>
<td>232</td>
<td>0.222</td>
<td>0.691</td>
<td>0</td>
<td>10.1</td>
</tr>
<tr>
<td>Public schools</td>
<td># of schools per 1000 (1929)</td>
<td>233</td>
<td>0.074</td>
<td>0.027</td>
<td>0</td>
<td>0.222</td>
</tr>
<tr>
<td></td>
<td># of teachers per 1000 (1929)</td>
<td>233</td>
<td>0.304</td>
<td>0.134</td>
<td>0</td>
<td>1.574</td>
</tr>
<tr>
<td>Controls</td>
<td>non-agricultural occupation (%)</td>
<td>234</td>
<td>6.558</td>
<td>5.916</td>
<td>1.504</td>
<td>34.604</td>
</tr>
<tr>
<td></td>
<td>population density</td>
<td>232</td>
<td>0.554</td>
<td>0.596</td>
<td>0.037</td>
<td>5.07</td>
</tr>
<tr>
<td>Category</td>
<td>Variable</td>
<td>Obs</td>
<td>Mean</td>
<td>Std. Dev.</td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>-----</td>
<td>-------</td>
<td>-----------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Local elite</td>
<td>mungua passers per 1000</td>
<td>260</td>
<td>.398</td>
<td>.514</td>
<td>.109</td>
<td>2.115</td>
</tr>
<tr>
<td>Schools</td>
<td>seodang per 1000</td>
<td>260</td>
<td>1.193</td>
<td>.500</td>
<td>.146</td>
<td>2.602</td>
</tr>
<tr>
<td></td>
<td>public schools</td>
<td>221</td>
<td>.053</td>
<td>.024</td>
<td>.014</td>
<td>.108</td>
</tr>
<tr>
<td></td>
<td>private schools</td>
<td>221</td>
<td>.003</td>
<td>.004</td>
<td>0</td>
<td>.015</td>
</tr>
<tr>
<td>Teachers</td>
<td>seodang per 1000</td>
<td>260</td>
<td>1.216</td>
<td>.500</td>
<td>.146</td>
<td>2.616</td>
</tr>
<tr>
<td></td>
<td>public schools</td>
<td>221</td>
<td>.199</td>
<td>.107</td>
<td>.047</td>
<td>.429</td>
</tr>
<tr>
<td></td>
<td>private schools</td>
<td>221</td>
<td>.007</td>
<td>.018</td>
<td>0</td>
<td>.102</td>
</tr>
<tr>
<td>Controls</td>
<td>non-agricultural area (%)</td>
<td>260</td>
<td>92.933</td>
<td>4.219</td>
<td>70.889</td>
<td>97.685</td>
</tr>
<tr>
<td></td>
<td>population density</td>
<td>260</td>
<td>9.274</td>
<td>4.34</td>
<td>2.146</td>
<td>16.683</td>
</tr>
</tbody>
</table>
Table 5: Local elites and literacy rate (by cohort, province level)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Japanese</td>
<td>Korean</td>
</tr>
<tr>
<td>mungua per 1000</td>
<td>0.636***</td>
<td>1.416***</td>
</tr>
<tr>
<td></td>
<td>(0.091)</td>
<td>(0.272)</td>
</tr>
<tr>
<td>mungua × cohort 6-19 in 1930</td>
<td>0.742*</td>
<td>0.412</td>
</tr>
<tr>
<td></td>
<td>(0.361)</td>
<td>(0.442)</td>
</tr>
<tr>
<td>cohort 6-19 in 1930</td>
<td>6.857***</td>
<td>-7.810***</td>
</tr>
<tr>
<td></td>
<td>(1.258)</td>
<td>(2.327)</td>
</tr>
<tr>
<td>N</td>
<td>26</td>
<td>26</td>
</tr>
</tbody>
</table>

Notes: Standard errors clustered at the province level are in parentheses. Dependent variables are literacy rate defined as the proportion of population who can read and write in Korean or Japanese. Column (1) employs Japanese literacy rate, while column (2) uses Korean literacy rate. Mungua is the number of mungua passers per 1000 population in 1911. Cohort 6-19 indicates population between age 6 and 19 in 1930, and the baseline group is cohort 20-35, whose age is between 20 and 35. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$. 
Table 6: Local elites, schools and literacy rate (district level)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Japanese</td>
<td>Korean</td>
<td>Japanese</td>
<td>Korean</td>
<td>Japanese</td>
<td>Korean</td>
</tr>
<tr>
<td>mungua (per 1000)</td>
<td>0.963*</td>
<td>2.274***</td>
<td>0.993*</td>
<td>2.343***</td>
<td>0.993*</td>
<td>2.343***</td>
</tr>
<tr>
<td></td>
<td>(0.541)</td>
<td>(0.817)</td>
<td>(0.527)</td>
<td>(0.802)</td>
<td>(0.527)</td>
<td>(0.802)</td>
</tr>
<tr>
<td>public schools (per 1000)</td>
<td>5.783</td>
<td>22.346</td>
<td>9.412</td>
<td>22.021</td>
<td>9.412</td>
<td>22.021</td>
</tr>
<tr>
<td>non-agricultural occupation (%)</td>
<td>0.290***</td>
<td>0.281***</td>
<td>0.301***</td>
<td>0.286***</td>
<td>0.294***</td>
<td>0.291***</td>
</tr>
<tr>
<td></td>
<td>(0.104)</td>
<td>(0.108)</td>
<td>(0.107)</td>
<td>(0.108)</td>
<td>(0.105)</td>
<td>(0.109)</td>
</tr>
<tr>
<td>population density</td>
<td>1.086***</td>
<td>0.753*</td>
<td>1.127***</td>
<td>0.960**</td>
<td>1.213***</td>
<td>1.051**</td>
</tr>
<tr>
<td></td>
<td>(0.272)</td>
<td>(0.437)</td>
<td>(0.296)</td>
<td>(0.448)</td>
<td>(0.289)</td>
<td>(0.440)</td>
</tr>
<tr>
<td>1930 urban center FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>province fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>230</td>
<td>230</td>
<td>231</td>
<td>231</td>
<td>230</td>
<td>230</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors are in parentheses. Dependant variables are literacy rate defined as the proportion of population who can read and write in Korean or Japanese. Columns (1), (3) and (5) employ Japanese literacy rate, while columns (2), (4) and (6) use Korean literacy rate. *Mungua* is the number of *mungua* passers per 1000 population based on 1925 census. Public schools are per 1000 population in 1930 census. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district investigated in 1910. Variables not shown include province fixed effects and the fixed effects for 14 city-level districts in 1930. * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$. 
<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mungua (per 1000)</td>
<td>0.877</td>
<td>2.404***</td>
<td>0.946*</td>
<td>2.607***</td>
<td>1.202**</td>
<td>1.885*</td>
<td>1.055</td>
<td>2.527**</td>
</tr>
<tr>
<td></td>
<td>(0.643)</td>
<td>(0.896)</td>
<td>(0.544)</td>
<td>(0.799)</td>
<td>(0.584)</td>
<td>(0.976)</td>
<td>(0.748)</td>
<td>(1.076)</td>
</tr>
<tr>
<td>non-agricultural occupation (%)</td>
<td>0.278**</td>
<td>0.294**</td>
<td>0.255***</td>
<td>0.295**</td>
<td>0.292***</td>
<td>0.292**</td>
<td>0.235**</td>
<td>0.304**</td>
</tr>
<tr>
<td></td>
<td>(0.109)</td>
<td>(0.115)</td>
<td>(0.098)</td>
<td>(0.116)</td>
<td>(0.109)</td>
<td>(0.114)</td>
<td>(0.101)</td>
<td>(0.128)</td>
</tr>
<tr>
<td>population density</td>
<td>1.240***</td>
<td>1.087**</td>
<td>1.281***</td>
<td>1.043**</td>
<td>1.224***</td>
<td>1.081**</td>
<td>1.365***</td>
<td>1.093**</td>
</tr>
<tr>
<td></td>
<td>(0.306)</td>
<td>(0.466)</td>
<td>(0.271)</td>
<td>(0.445)</td>
<td>(0.298)</td>
<td>(0.449)</td>
<td>(0.301)</td>
<td>(0.479)</td>
</tr>
<tr>
<td>1930 urban center FE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>historical districts FE</td>
<td>historical administrative districts</td>
<td>historical administrative districts</td>
<td>historical commercial districts</td>
<td>historical commercial districts</td>
<td>historical Confucian districts</td>
<td>historical Confucian districts</td>
<td>all historical districts</td>
<td>all historical districts</td>
</tr>
<tr>
<td>province fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors are in parentheses. Dependant variables are literacy rate defined as the proportion of population who can read and write in Korean or Japanese. Columns (1), (3), (5) and (7) employ Japanese literacy rate, while columns (2), (4), (6) and (8) use Korean literacy rate. Mungua is the number of mungua passers per 1000 population based on 1925 census. Public schools are per 1000 population in 1930 census. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district measured in 1910. Variables not shown include province fixed effects, the fixed effects for 14 city-level districts in 1930, and a series of historical districts. In columns (1) and (2), indicator variables of 18 historical administrative centers are included. In columns (3) and (4), dummy variables for 19 commercial districts are included. In columns (5) and (6), dummies for 11 historical Confucian districts, birthplaces of 18 virtuous Confucian scholars, are included. Finally, all historical district fixed effects are controlled in columns (7) and (8). * p < 0.1, ** p < 0.5, *** p < 0.01.
Table 8: Local elites and Korean teachers in public primary schools for Korean (district level)

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>public schools per 1000</td>
<td>Korean teachers per 1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>mungua (per 1000)</td>
<td>-0.003</td>
<td>0.002</td>
<td>0.070***</td>
<td>0.090***</td>
</tr>
<tr>
<td></td>
<td>(0.005)</td>
<td>(0.006)</td>
<td>(0.020)</td>
<td>(0.026)</td>
</tr>
<tr>
<td>non-agricultural occupation (%)</td>
<td>-0.0005</td>
<td>-0.001***</td>
<td>0.002</td>
<td>0.006***</td>
</tr>
<tr>
<td></td>
<td>(0.0004)</td>
<td>(0.0003)</td>
<td>(0.002)</td>
<td>(0.002)</td>
</tr>
<tr>
<td>population density</td>
<td>-0.014***</td>
<td>-0.013***</td>
<td>-0.016</td>
<td>-0.023**</td>
</tr>
<tr>
<td></td>
<td>(0.002)</td>
<td>(0.003)</td>
<td>(0.010)</td>
<td>(0.011)</td>
</tr>
<tr>
<td>district fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>urban centers in 1930</td>
<td>Yes</td>
<td>Yes</td>
<td>urban centers in 1930</td>
<td>historical districts</td>
</tr>
<tr>
<td>historical districts</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>230</td>
<td>230</td>
<td>230</td>
<td>230</td>
</tr>
</tbody>
</table>

Notes: Robust standard errors are in parentheses. Dependant variable is the number of public schools per 1000 population based on 1930 census in columns (1) and (2), and the number of Korean teachers per 1000 residents from 1930 census in columns (3) and (4). Mungua is the number of mungua passers per 1000 population based on 1925 census. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1000 population divided by approximate area; approximate area is the product of horizontal and vertical distances (km) of each district measured in 1910. Variables not shown include province fixed effects, the fixed effects for urban centers in 1930 in columns (1) and (3), and fixed effects for historical districts in columns (2) and (4). * p < 0.1, ** p < 0.5, *** p < 0.01.
Table 9: Sobel-Goodman mediation test for *mungua* passers, Korean teachers in public schools and Korean literacy rate

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>mungua</em> (per 1000)</td>
<td>2.76**</td>
<td>.099***</td>
<td>1.67</td>
</tr>
<tr>
<td>Korean teachers in public schools (in 1929)</td>
<td>11.06***</td>
<td></td>
<td>(3.80)</td>
</tr>
</tbody>
</table>

Proportion of total effect that is mediated: **0.396**

Ratio of indirect to direct effect: **0.657**

Ratio of total to direct effect: **1.657**

*Notes:* *Mungua* is the number of *mungua* passers per 1000 population based on 1925 census. Korean teachers is the number of Korean teachers working in public schools per 1000 population in 1930 census. Variables not shown include non-agricultural occupation, population density and fixed effect for urban centers in 1930. Non-agricultural occupation is the share of population working in non-agricultural sectors. Population density is 1000 population divided by approximate area; approximate area is the product of horizontal and vertical distances of each district investigated in 1910.
Table 10: The effects of historical elites on schools and teachers (province level)

<table>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>schools per 1000</td>
<td>public schools</td>
<td>private schools</td>
<td>seodang</td>
<td>public schools</td>
<td>private schools</td>
</tr>
<tr>
<td>mungua</td>
<td>0.011</td>
<td>0.0004</td>
<td>0.003**</td>
<td>0.022</td>
<td>0.036***</td>
<td>0.014***</td>
</tr>
<tr>
<td>(per 1000)</td>
<td>(0.106)</td>
<td>(0.003)</td>
<td>(0.001)</td>
<td>(0.105)</td>
<td>(0.010)</td>
<td>(0.003)</td>
</tr>
<tr>
<td>non-agricultural area (%)</td>
<td>-0.005</td>
<td>0.0003</td>
<td>-0.0001</td>
<td>-0.005</td>
<td>-0.0004</td>
<td>-0.0001</td>
</tr>
<tr>
<td></td>
<td>(0.004)</td>
<td>(0.001)</td>
<td>(0.0002)</td>
<td>(0.004)</td>
<td>(0.003)</td>
<td>(0.0004)</td>
</tr>
<tr>
<td>population density</td>
<td>-0.034</td>
<td>0.002***</td>
<td>-0.001*</td>
<td>-0.038</td>
<td>0.0004</td>
<td>-0.001</td>
</tr>
<tr>
<td></td>
<td>(0.026)</td>
<td>(0.001)</td>
<td>(0.0004)</td>
<td>(0.027)</td>
<td>(0.004)</td>
<td>(0.001)</td>
</tr>
<tr>
<td>year fixed effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>N</td>
<td>260</td>
<td>221</td>
<td>221</td>
<td>260</td>
<td>221</td>
<td>221</td>
</tr>
</tbody>
</table>

Notes: Standard errors clustered at the province level are in parentheses. Dependant variables are the number of schools per 1000 population of corresponding year (columns (1) to (3)) or the number of Korean teachers per 1000 population of corresponding year (columns (4) to (6)). Column (1) and column (4) employ the number of seodang and the number of teachers in seodang, respectively, as dependent variable. Columns (2) and (5) use the number of public schools and the number of Korean teachers serving in public schools, respectively, as dependent variable. Columns (3) and (6) employ the number of private schools and the number of teachers in private schools, respectively, as dependent variable. Mungua is the number of mungua passers per 1000 population in 1911. Non-agricultural area is the proportion of non-cultivated area. Population density is 1000 population divided by area (km²). Variables not shown include year fixed effects. * p < 0.1, ** p < 0.5, *** p < 0.01.
Figure 1: Number of Mungua Passers by District
Figure 2: Literacy Rate Spread in 1930
Figure 3: *Mungua* passers, schools, teachers and literacy in 1930 by province

Notes: Abbreviated name of 13 provinces are listed on x-axis. GG = Gyeonggi, GW = Gangwon, CB = Chungbuk, CN = Chungnam, JB = Jeonbuk, JN = Jeonnam, GB = Gyeongbuk, GN = Gyeongnam, HH = Hwanghae, PB = Pyeongbuk, PN = Pyoengnam, HB = Hambuk, HN = Hamnam. Dashed horizontal line indicates the share of Korean literate population in 1930.
Figure 4: The Number of Public Schools during Japanese colonization (1914-1943)

Notes: Data source is Oh (2000) p.123. Dashed vertical line indicates 1930 when census surveyed the literacy rate.
References


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