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The effects of South Korean Protestantism on human capital and female empowerment, 1930–2010[☆]

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ABSTRACT

We examine the short- and long-run effects of historical Protestant churches on human capital and female empowerment in South Korea by combining historical data on religious facilities and contemporary population census and social survey data. In the short run, we find a positive and significant effect of Protestant churches on women's literacy and employment, but not on men's. After almost a century, we find no strong relationship between historical Protestant churches and women's educational attainment or economic and political empowerment.

1. Introduction

The Protestant church has historically played an important role in promoting education, especially for females (Becker and Woessmann, 2008, 2009). During the age of colonialism, Christian missionaries spread the Gospel around the world, often maintaining a close cooperative relationship with colonial states as incubators of Western norms and values (Montgomery, 2017; Becker, 2022). A growing body of research indicates that the presence of Protestant missionaries is associated with better female educational outcomes and other forms of empowerment in former European colonies, in both the colonial and post-colonial periods (Lankina and Getachew, 2013; Nunn, 2014; Calvi et al., 2022). However, little is known about whether Protestant missions have such long-lasting impacts when they do not share common cultural and religious origins with colonial rulers, as is the case on the Korean peninsula.

In this paper, we examine this question by estimating the short- and long-run impacts of Protestantism on human capital and female empowerment in present-day South Korea. American Protestant missionaries arrived in Korea in 1884 and spread the Gospel while providing medical and educational services to locals in the early years. Protestantism steadily increased the number of its followers during the Japanese colonial period (1910–1945), and about 1.5 percent of the Korean population were Protestants in

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1940.¹ The growth of Protestantism in the post-colonial period is even more substantial, and the figure had grown to 19.7 percent in 2015,² making South Korea the largest Protestant country in Asia.³ Nevertheless, there is scant empirical evidence on whether and how historical exposure to Protestantism influenced female educational attainment and empowerment in the past century.

Historically and similarly to many Asian countries, Korean society was heavily influenced by Confucianism, which had been the state ideology of the Joseon dynasty (1392–1910) for about 500 years before the arrival of Protestantism. According to the ideals of Confucianism, women's economic and social roles were strictly limited to within the household, and most women lacked basic literacy skills, as they had little access to formal educational institutions or informal village schools. However, as literacy skills were necessary for reading the Korean-translated Bible, early Protestant missionary work, mostly led by foreign female missionaries, devoted a significant amount of effort toward educating women through local church Bible groups and missionary schools. These trained local women, referred to in the missions literature as “Bible women”, went from one village to another serving other women and children and spreading the Gospel.

To investigate the effect of historical exposure to Protestantism, we construct a novel historical dataset that contains information on religious facilities, demographics, and geographic variables covering all townships in Korea from the past century.⁴ Specifically, we digitized archival maps and Japanese colonial records on Protestant missions and churches in Korea during the period 1884–1915. These data are combined with fine-grained information on human capital and socioeconomic characteristics collected from population censuses in 1930 and 2010. We also exploit information on economic and political empowerment and gender norms from social surveys collected between 2000 and 2018. Before gaining access to restricted datasets for long-term analyses, we carefully designed and preregistered a pre-analysis plan for examining long-run outcomes.⁵

Our identification strategy relies on the variation in historical exposure to Protestantism, measured by the number of Protestant churches in 1915, across 1534 townships in South Korea. In our regression equations, we control for county fixed effects, which account for any unobservable differences across counties. Therefore, the identification assumption is that the spread of Protestantism is as good as random across townships within counties. Exploiting a rich set of geographic and socioeconomic characteristics of townships, we corroborate this assumption by showing that, within counties, the establishment of early Protestant churches is unrelated to a series of observable township characteristics. In addition, to support our causal interpretation, we conduct robustness tests by utilizing a wide range of historical controls that cover the demographic, spatial, and economic characteristics of townships.

The estimation results on the short-run impact show that the female illiteracy rate in 1930 is significantly lower in townships with more Protestant churches, while there is no such relationship for the male illiteracy rate.⁶ This is consistent with prior studies that have shown positive impacts of Protestantism on human capital accumulation in different contexts, especially for females (Lankina and Getachew, 2013; Nunn, 2014; Calvi et al., 2022). Examining the channels, we also find that while the female illiteracy rate is lower in townships with more female-only missionary schools, these schools do not fully account for the relationship between Protestant churches and the illiteracy rate. This suggests that local Protestant churches may have affected female literacy through other channels. We provide anecdotal evidence on the influential role of Korean Bible women in raising female literacy and spreading the Gospel to local communities, especially to women and girls.

Turning to short-run impacts on labor market activities, we find a significantly higher employment rate in 1930 for females, but not for males, in townships with more Protestant churches. The increase in the female employment rate is sizable: one additional Protestant church is associated with a 0.75 percentage point increase in female employment in an economy in which only 28.3 percent of females have a job. Consistent with the employment results, we also find a significantly lower marriage rate in townships with more Protestant churches. However, we find no such effects from other religions, such as Catholic churches or Japanese Shinto shrines, suggesting that the increase in literacy is unique to activities conducted at Protestant churches. This set of results indicates that Protestant churches may have played an important role in facilitating the empowerment of Korean women during the early 20th century.

Despite the positive empowering impact of Protestant churches for females in the short run, we find no significant relationship between historical exposure to Protestant churches and females' educational attainment, employment, and political participation today. First, using the 2010 population census, we find a precisely estimated zero effect on educational attainment, measured by years of education, for both females and males. Second, we use social survey data to estimate the impact of historical exposure to Protestantism on employment and participation in elections and political rallies and find no significant impact for females.⁷ However, we find that females in regions with more historical Protestant churches are more likely to possess gender-equal norms than females in regions with fewer historical Protestant churches. In contrast, male gender norms do not show a significant relationship with historical Protestant churches.

¹ Data from the Statistical Yearbook of Chosun. This includes both present-day North Korea and South Korea.

² According to the Population Census of South Korea. Among those who stated that they adhered to a religion in 2015, 45 percent were Protestants. The statistics on religion can be accessed at: https://kosis.kr/statHtml/statHtml.do?orgId=101&tblId=DT_1PM1502

³ Hong and Paik (2021) studied the political impacts of Protestantism in present-day South Korea. Unlike their study, we focus on the impact of historical exposure to Protestantism.

⁴ The township (*myeon*) is the lowest-level administrative unit in South Korea. An average county consists of approximately a dozen townships.

⁵ The pre-analysis plan was registered at OSF Registries (osf.io/2jg58).

⁶ Hong and Paik (2018) report a positive association between pre-colonial educated elites and literacy in colonial Korea and show that a higher presence of elites in a region led to higher number of Korean teachers and private schools.

⁷ Hong and Paik (2021) examine the relationship between Protestant churches and political party support in the context of contemporary South Korea.

We discuss several potential reasons that may explain the lack of long-run impacts. First, as the short-term success in improving female literacy appears to be predominantly through informal channels such as the activities of Bible women, their impacts could easily have been diminished once the public educational system was rapidly expanded in Korea. Second, rapid economic growth brought about structural changes and improved employment opportunities for women, which could have also weakened the long-term economic impacts of historical exposure to Protestantism. Third, Confucian-based social norms were deeply rooted in Korea long before the arrival of Christianity. Therefore, it is possible that the influence of Christianity is limited to changing the gender attitudes of individual women, and has not changed the gender norms of society as a whole.

We contribute to the literature on the role of religion in economic history and other social sciences (Iyer, 2016; Becker et al., 2021). A number of studies highlight the importance of Protestantism for various outcomes such as human capital accumulation (Boppart et al., 2013), demographic transition (Becker et al., 2010), and economic development (Becker et al., 2011). Furthermore, studies on religious missions have shown that Christian missionaries spread schooling and literacy outside Europe (Gallego and Woodberry, 2010; Waldinger, 2017), contributing to long-run economic development (Bai and Kung, 2015; Caicedo, 2018), state building (Dulay, 2022), and democratic development (Lankina and Getachew, 2012; Woodberry, 2012). Along this line, studies have shown that the effects of missions are often gendered. While Montgomery (2017) has shown that historical exposure to Catholic missionaries is associated with greater gender inequality in German East Africa, an increasing number of studies have shown that women benefited more from Protestant missions in India (Lankina and Getachew, 2013; Calvi et al., 2022) and in Africa (Nunn, 2014), which is consistent with the fact that Protestantism advocated for female literacy so that women could read the Gospel (Becker and Woessmann, 2008).

Along this line, the study closest to ours is Becker and Won (2021). Using county-level data from Korea, they find that a higher share of Christian priests is associated with a higher literacy rate in 1930, which is consistent with our findings on the short-term effects. Our paper differs from their study in several ways, however. First, we examine not only the literacy rate but also economic and demographic outcomes in 1930. Second, we examine the effects of Protestantism not only in the short term but also over the long term. Third, we take advantage of a geographically granular (township-level) dataset and exploit within-county variation for identification. We also include an extensive set of control variables from a newly digitized historical map. This could better mitigate a concern for endogenous determination of Protestantism. Finally, we directly measure the exposure to different Christian denominations (Catholicism and Protestantism) by utilizing novel data on the number of churches by denomination, while Becker and Won (2021) imputes the share of Protestant and Catholic priests at the county-level, assuming that the share of Protestant and Catholic priests is constant across counties within provinces.

We contribute to this literature in several ways. First, we advance the knowledge of the short-term impacts of religious missions on human capital accumulation by exploring the mechanisms. Our findings on the mechanisms of the short-term impacts of Protestantism suggest that formal education at missionary schools does not fully explain the short-term effects on human capital accumulation and rather suggest the importance of informal channels such as the activities of Bible women.

Second, by showing that historical exposure to Protestantism has no long-run effects on contemporary female educational attainment as well as economic and political participation despite the short-run positive effects on females, our paper brings a new insight to the literature that the long-run mission effects are conditional. While it is beyond the scope of this paper to fully identify the conditions that resulted in the absence of long-run effects, we discuss potentially important conditions, such as organization of the mission, post-independence development, and pre-existing social norms.

This relates to the third contribution of our paper: we provide the first empirical analysis of the long-run effects of Christian missions in a country that was colonized by a non-Western, non-Christian power. In European colonies, Christian missions were often an integral part of the colonial system, contributing to the legitimization of colonialism, the development of human capital among locals, and the imposition of cultural policies (Montgomery, 2017). In return, colonial government often supported missionary work by providing military protection and financial support (Becker, 2022). In contrast, the Japanese colonial institution was distinct from the institution of Protestant religious missions (Protestant mission groups from the United States and Canada). This provides a unique setting for studying the persistent effects of religious missions in the absence of synergistic interaction between colonial power and religious missionaries.

Last but not least, by incorporating a pre-analysis plan as part of the research design, we also contribute to recent developments on credible research designs in studies of persistence in economic history (Voth, 2021).

Beyond the studies on religion, this paper also relates to the literature on female empowerment, particularly in less developed economies, where there are large gender gaps in many domains (Doepke et al., 2012; Duflo, 2012). Studies have shown that, while economic growth can itself promote women's empowerment, gender-biased cultural norms can be a hindrance (Jayachandran, 2015); thus, there is ample scope for gender-focused interventions to help close the gender gaps, such as political quotas (Beaman et al., 2009), property rights (Roy, 2015), and the media (Jensen and Oster, 2009). This paper adds to this literature by examining the role of religion along these lines. Another strand of the literature on gender gaps studies their historical roots, and has shown that historical conditions, such as technology adoption (Alesina et al., 2013; Hansen et al., 2015; Xue, 2020), sex ratio (Grosjean and Khattar, 2019; Teso, 2019), and state regimes (Campa and Serafinell, 2019) are important in shaping today's gender roles. We join this line of research by studying the long-term impact of Protestant missionary work for women on female empowerment.

The remainder of the paper is organized as follows. Section 2 describes the historical background on women's status in Korea and Protestant missions. Section 3 describes the key data sources that we use for our main analysis. In Sections 4 and 5, we present the results of our empirical analysis on the short- and long-term impacts of Protestant churches, respectively. Section 6 concludes.

2. Historical background

2.1. Women's societal status in the late Joseon dynasty

The significance of Confucian ideology in shaping Korea's culture and norms dates back to at least the dawn of the Joseon dynasty (1392–1910), which adopted Neo-Confucianism as the state ideology.⁸ Neo-Confucian ideals of gender roles accord a public role to males and a domestic role to females. According to *Three Obediences and Four Virtues*, which provides the most fundamental set of moral principles for women, a moral woman is one who is obedient to three men—her father, husband, and son. An important characteristic of the Confucian patriarchy in Korea is that married women are expected to sever ties with their own family to be accepted as true members of their husbands' families (Won, 1994).

During the Joseon dynasty, women had extremely limited access to any type of education involving literacy skills. The state educational system was largely focused on preparing candidates for the imperial civil service examination (*Gwageo*), which persisted throughout the Goryeo (918–1392) and Joseon (1392–1897) dynasties in Korea.⁹ According to the law of the Joseon dynasty, candidates from various social backgrounds, except slaves, were eligible to take the civil service examination. However, this law only applied to men. Women, regardless of their social status, were ineligible to take the exam. Outside the formal education system, young girls (typically less than the age of seven) could attain a basic level of education by attending village schools, *Seodang*, where they were taught basic literacy and Confucian classics. Nonetheless, even such informal education was restricted to girls from *yangban* families, the elite social class.

The societal and cultural biases that most women in 19th century Korea had to face are well represented in the term “nameless women”, coined by Rosetta Hall, a female Protestant medical missionary, upon her arrival in 1890 to portray Korean women's status (Hall, 2016). Most Korean women were nameless because only the names of boys were required to observe genealogical customs, in contrast to those of girls, who were not given a formal name. Accordingly, married women were simply called someone's daughter-in-law, someone's wife, or someone's mother. Notably, Confucian virtues and principles extended beyond the class system and became even more prominent in the late Chosun dynasty (Park and Cho, 1995).

2.2. Development of protestantism in Korea from the late 19th century

Arrival of Protestantism. Unlike other Asian countries, such as India, China, and Japan, Korea did not witness the beginning of foreign Protestant mission work until the 1890s. Protestantism was introduced to Korea when the first wave of U.S. Protestant missionaries, representing Foreign Mission Societies of the Presbyterian Church and Methodist Episcopal Church in the United States, started entering the country through treaty ports in 1884 (Paik, 1929). However, early Protestant missionary work was limited to providing education and medical services through missionary schools and hospitals in the nation's capital. Evangelizing Koreans and teaching the Christian religion were legally prohibited. In 1890, the Korean government eased its regulations on direct evangelization, which created opportunities for mission work outside the capital.

In Korea, there were six major Protestant missionary groups, which consisted of four Presbyterian groups – the Northern Presbyterian Church (USA), the Southern Presbyterian Church (USA), the Canadian Presbyterian Church, and the Australian Presbyterian Church – and two Methodist groups – the Northern Methodist Episcopal Church and the Southern Methodist Episcopal Church. In March 1888, Henry Appenzeller delivered an address in Seoul on a comity agreement and called for Methodist and Presbyterian missions to demarcate specific regions throughout Korea for each mission group's work (Yoo, 2016). Missionaries from the Methodist Episcopal Church and Presbyterian Churches signed a comity agreement on February 3, 1893. Online Appendix Figure 1 provides a map showing the areas delimited by the comity agreement. The comity agreement stated that only one denominational mission would be permitted in areas with populations of less than 5000 Koreans, and that existing Korean Protestants in these areas were to become members of the approved denominational mission. The assignment of mission groups to regions was based on the location of existing mission stations established by each denomination. In large cities, there were no limits on denominational missions.

Foreign female missionaries and Korean Bible women. Foreign female missionaries played a significant role in early Protestant missionary work in Korea. From 1884 to 1910, 575 Protestant missionaries arrived in Korea, among which 324 (56.3 percent) were women (Oak, 2002). The high interest among female missionaries in serving in Korea was partly driven by earlier missionary reports on the poor conditions of women in Korea. In one prominent report by Underwood (1905), the life of the ordinary Korean woman is described as “one long, unvaried story of weary toil, sickness, anxiety, and sorrow... there are no schools for girls outside of those established by the missionaries”. Urging other females to join the missionary effort, the report states that “if any woman doubts whether life is worth living, let her enter the work for women in Korea”. Female missionaries led mission work to empower Korean women by providing education, medical services, and employment opportunities in mission activities (Choi, 2009). Missionaries were well aware of the fact that most Korean women were denied any form of education that provided literacy skills. Accordingly, female missionaries directed considerable effort toward educating women by establishing missionary schools.

Bible women were known in Christian missions history as local women who supported foreign female missionaries in their Christian missions activities. Bible women were recruited from various backgrounds, such as workers in missionary homes, wives

⁸ Neo-Confucianism is a Chinese philosophy that is heavily influenced by classical Confucianism which dominated East Asian culture between the 13th and 19th centuries.

⁹ The *Gwageo* was born out of the *keju* exam of imperial China, which was established in the Song dynasty (ca. 960–1276), with the main purpose of recruiting talent for the national bureaucracy (Ko, 2017; Chen et al., 2020).

of local church pastors, or female graduates of missionary schools (Wong and Chiu, 2018). In addition, Protestant missionaries opened Bible classes and offered training programs for Korean women who were hired as Bible women afterwards. Bible women were often supported by female missionaries or local churches (Tucker, 1985). Moreover, besides supporting foreign missionaries on their evangelistic and social missions, Bible women also directly engaged with local communities by carrying out various tasks, such as reading the Bible, teaching children in village schools, sharing their faith with local women, and mentoring girls and women.

The spread of Protestant churches. Protestant mission work in Korea was based on the Nevius–Ross method, which was developed through earlier missions in China and revised and adapted to the Korean context (Oak, 2004). The Nevius–Ross method emphasized the self-support of local Christians, including buying their own books, building their own churches, and paying their own preachers, the teaching of the Korean language in mission schools and the use of Korean in all literary mission work. Accordingly, foreign missionaries partnered with Korean pastors to build Protestant churches and train helpers and Bible women to disseminate the Christian message, especially to women. During the colonial period, among Christian churches, including Catholic and Protestant churches, Presbyterians formed the largest group, followed by Methodists. In 1920, 48 percent of the 3279 Christian churches and 58 percent of the 323,574 Christians were Presbyterian, while 25 percent of the churches and 15 percent of the Christians were Methodists (Government-General of Chosun, 1920). By 1989, approximately one-fourth of South Korea’s 40 million population was Protestant Christian, with 29,820 churches and 55,989 pastors (Kim, 2000). This is despite the fact that Korea had experienced 35 years of colonial rule (1910–1945) under Japan, where Christians comprised at most 1.5 percent of the population.

Some historical factors were considered to be important for such rapid growth of the Protestant faith in South Korea. First, throughout the 1950s, 1960s, and 1970s, the stance of the Korean Protestant church was aligned with anti-communism. This position was in accord with that of the U.S. Military Government, the first South Korean government led by Syngman Lee, and the authoritarian regime headed by Park Chung-hee until his death in 1979. By the end of the colonial period, Protestant churches also had a strong presence in North Korea. However, growing pressure from the communist regime after the liberation of Korea from Japanese colonization led many Christians in North Korea to settle in the South where they were generously supported by the U.S. military and South Korean government (Jang, 2004; Hong and Paik, 2021). In South Korea, they were continuously influenced by the Presbyterian Church of the United States of America, adopting an anti-communist pro-American conservative stance (Kim, 2020). During the authoritarian Park Chung-hee regime, many intellectuals from the North, the majority of them Christian, were later part of the Park government’s planning committee later (Kim, 2020). In addition, rapid urbanization, along with economic growth and industrialization, between the 1970s and 1980s fostered the growth of large churches. Migrants often experienced “loneliness in the crowd” (Gue, 1999), with Hong (2000) noting that the rapid industrialization and urban migration boosted church membership among migrants seeking a sense of belonging and a place for meeting their social needs.

3. Data sources

We collected, digitized, and compiled a vast amount of historical data on South Korea, such as maps, surveys, and censuses from various sources. Furthermore, to link with modern datasets, we tracked administrative boundary changes and created a township-level panel dataset spanning 100 years. To our knowledge, we are the first to create a panel micro dataset covering all administrative units in South Korea from 1918 to the present. In the Online Data Appendix, we explain the detailed procedure for our township-level geographical crosswalks (i.e., the procedure we used to delineate administrative units whose boundaries have changed over time).

Below, we provide a listing and brief description of each dataset that we utilize in this paper. Summary statistics at the township are provided in Table 1. More details can be found in the Online Data Appendix.

3.1. Historical data

Protestant churches in 1915. We obtained data on historical Protestant churches from the Japanese colonial gazette. As per the government regulation enacted in 1915, the gazette recorded all Christian churches that existed as of 1915, and all subsequent entries and exits until 1945 (Fig. 1). For each church, we identify the name, denomination, and address. We downloaded and digitized all the available gazette data from the website of the National Library of Korea.¹⁰ The church-level information was aggregated at the township level to calculate the number of Protestant churches in the relevant administrative divisions (Fig. 2).

Missionary schools in 1912 and public schools in 1929. We digitized the list of missionary schools in 1912, which is contained in the Survey of the Westerners Residing in Korea published by the colonial government (Government-General of Chosun, 1912). The information on colonial public primary schools in 1929 is collected from the “Chosun Shogakko Ichiran” (Government-General of Chosun, 1929). Based on the information, we calculate the number of missionary schools and public primary schools at the township-level.

Population census of colonial Korea (1930). We digitized Korea’s 1930 population census records (Government-General of Chosun, 1930). The census reports township-level (*myeon*) statistics on population, age, marital status, nationality, literacy, occupation (nine coarse-grained and 469 fine-grained categories), and size of households.

¹⁰ <https://www.nl.go.kr/>

Table 1
Summary statistics of main variables.

	Obs.	Mean	Median	S.D.	Min	Max
Panel A. Historical Data (1930)						
Demographics						
Population in 1925	1,534	7,925.97	6,967.00	9,684.53	3,110.0	342,626.0
Age 0 to 13 population (%)	1,534	37.78	37.85	1.49	29.6	42.3
Female population (%)	1,534	49.00	49.04	1.15	44.5	53.9
Illiteracy rate (%)						
Female	1,534	92.65	93.32	4.26	68.7	99.9
Male	1,534	70.02	70.29	7.70	20.6	91.1
Employment rate (%)						
Female	1,534	29.43	25.95	17.93	1.9	95.1
Male	1,534	60.49	60.55	2.78	50.2	68.9
Marriage rate (%)						
Female	1,534	47.67	47.71	2.24	39.8	53.5
Male	1,534	43.34	43.41	2.09	36.8	50.6
Religious and Educational Institutions						
Number of Protestant churches in 1915	1,534	0.85	1.00	1.11	0.0	23.0
Number of Catholic churches in 1915	1,534	0.07	0.00	0.30	0.0	5.0
Number of Confucian temples in 1924	1,534	0.15	0.00	0.36	0.0	1.0
Missionary schools in 1912	1,534	0.09	0.00	0.71	0.0	25.0
Public primary schools in 1929	1,534	0.65	1.00	0.68	0.0	18.0
Panel B. Contemporary Data						
Years of Education (2010 Population Census)						
Female	15,346,126	10.59	12	4.76	0	23
Male	14,301,464	12.45	12	4.13	0	23
Has a Job (KGSS)						
Female	7,252	0.50	1.00	0.50	0.0	1.0
Male	6,124	0.85	1.00	0.35	0.0	1.0
Manager Position (KGSS)						
Female	7,252	0.00	0.00	0.06	0.0	1.0
Male	6,124	0.02	0.00	0.15	0.0	1.0
Log(Income) (KGSS)						
Female	3,265	14.22	14.38	0.74	12.4	16.3
Male	5,096	14.80	14.83	0.66	12.4	16.3
Voted in Election (KGSS)						
Female	7,461	0.65	1.00	0.45	0.0	1.0
Male	6,375	0.70	1.00	0.43	0.0	1.0
Attended Protest (KGSS)						
Female	3,256	0.12	0.00	0.32	0.0	1.0
Male	2,860	0.20	0.00	0.40	0.0	1.0
Attended Rally (KGSS)						
Female	3,244	0.08	0.00	0.27	0.0	1.0
Male	2,851	0.14	0.00	0.34	0.0	1.0
Gender Equality Index of Full List (KGSS)						
Female	4,192	0.06	0.07	0.69	-2.3	2.1
Male	3,408	0.01	0.00	0.67	-2.6	2.1
Gender Equality Index of Pre-analysis Plan List (KGSS)						
Female	4,192	0.10	0.15	0.83	-1.8	2.2
Male	3,407	0.09	0.11	0.82	-1.8	2.1

Notes: This table provides summary statistics on selected variables that we collected from historical maps and records, and contemporary surveys.

Historical maps of colonial Korea in 1918. We created a georeferenced map of Korea by digitizing the “Chosun Gomanbun-no-ichi Chikeizu”, which is a collection of topographic maps of Korea at a scale of 1:50,000 (1 cm on the map equals 500 m) in 1918 (Government-General of Chosun, 1918). The map provides comprehensive information on various buildings and offices, including but not limited to schools, hospitals, markets, rice mills, police stations, courts, telegram and post offices, as well as all road and railroad networks.

3.2. Modern data

Education. We utilize the restricted-access, individual-level population census in 2010, provided by the Statistics Korea. This dataset consists of a 100% sample (i.e., every individual in the census) of a population census in South Korea and contains information on gender, marital status, current residence at the township level, and educational level. We calculated the years of education based on the level of educational attainment. To examine long-run effects, we use individual-level data as well as aggregated township-level data as a robustness check.

Date of notification

Church's name & denomination (in parenthesis)

Address (Province, County, Township, Village)

○既設布教所届出 布教規則第十九條ニ依リ布教所設置届ヲ提出シタル者左ノ如シ

届出年月日	布教所名稱	上 所 在 地
大正四年十一月十日	鴨谷教會堂(朝鮮耶蘇長老會)	全羅北道長水郡山西面鴨谷里
同三十一日	耶蘇教長老會講義所	全羅南道濟州島左面中文里二二、九番地
同二十四日	乃梅耶蘇教會堂(同)	慶尙北道榮州郡平恩面川本里一九二番地
同	芝谷里耶蘇教會堂(同)	同芝谷里一七三番地
同	西部洞耶蘇教會堂(同)	同慶基面西部里麗字三番地
同	榮州里教會堂(同)	同榮州面榮州里二二一番地
同	邑内里耶蘇教會堂(同)	同順興面邑内里生字七二番地
同十八日	龍山教會(同)	平安北道義州郡古城面龍山洞
同	昌城洞禮拜堂(南監理教會派)	京畿道京城府昌城洞一五六番地
同二十三日	水標町禮拜堂(同)	同水標町六五番地
同	初音町禮拜堂(同)	同初音町一三六番地
同	天然洞禮拜堂(同)	同天然洞七一一番地
同二十五日	三串里禮拜堂(同)	同漣川郡中面三串里
同二十四日	梧陰里禮拜堂(同)	同長湍郡長道面梧陰里
同二十一日	白田里禮拜堂(同)	同開城郡東面白田里
同二十四日	真鳥洞禮拜堂(同)	同長湍郡長道面上里六、十
同	梨長浦禮拜堂(同)	同津東面東坡里
同	蓬萊洞禮拜堂(同)	同漣川郡西南面率賢里
同	月田洞禮拜堂(同)	同北面余尺里
同二十一日	龍田里禮拜堂(同)	同開城郡中面龍田里
同	長芝洞講義所(同)	同進風面芝金里一四、四
同	玉山講義所(同)	同大聖面玉山里八二、一
同	長秋洞禮拜堂(同)	同西面寺盆里
同	射亭洞禮拜堂(同)	同嶺北面吉水里
同	忠橋禮拜堂(同)	同松都面北本町四八九
同二十五日	沙器慕禮拜堂(同)	同漣川郡官仁面中里
同	隱空禮拜堂(同)	同郡南面隱岱里
同	楮田洞禮拜堂(同)	同北面山馬山里
同	青水洞禮拜堂(同)	同開城郡嶺北面吉水里
同二十一日	漣洞禮拜堂(同)	同上道面漣洞
同	沙倉里禮拜堂(同)	同中面沙倉里

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Fig. 1. Raw data containing information on Protestant churches in 1915. Notes: This figure shows a scanned copy of the Japanese colonial gazette containing information about religious institutions in Korea in 1915.

Economic and political activities. The Korean General Social Survey (KGSS) is a South Korean version of the U.S.’s General Social Survey that provides measures of economic and political participation and subjective measures of individuals’ gender roles as well as religion between 2003 and 2018 (Kim et al., 2006, 2019).¹¹ We use this data to examine persistent effects on employment and electoral and political participation, as well as gender norms. Although the data are provided to the public, the public version does not provide information about administrative regions, such as the name of the town. Consequently, we obtained the restricted-access version, which contains town information and matched this with our historical data.

Gender norms. We constructed gender equality indices using the KGSS following the pre-analysis plan. First, we recoded the data so that larger values reflected gender equality and female empowerment. The normalized response subtracts the average response from the entire population in 2003 from each individual’s response to the same question and is divided by the standard deviation in the first year that the question is asked. The composite index for each individual is computed by taking the average of the normalized responses in each year. A higher index indicates more equitable gender views. For the sake of transparency, the complete list of the KGSS survey questions we use in the analysis is provided in the Online Data Appendix.

4. Short-run impact of Protestant churches

In this section, we first investigate the determinants of historical Protestant churches. Then, we provide the results for the short-term impact of Protestant churches.

4.1. Determinants of Protestant church establishment

The key assumption for identifying the impact of Protestantism is that the townships are similar except for the number of Protestant churches established by 1915. However, the distribution of Protestant churches may not be as good as randomly

¹¹ Information on KGSS can be found at: <http://kgss.skku.edu/>.

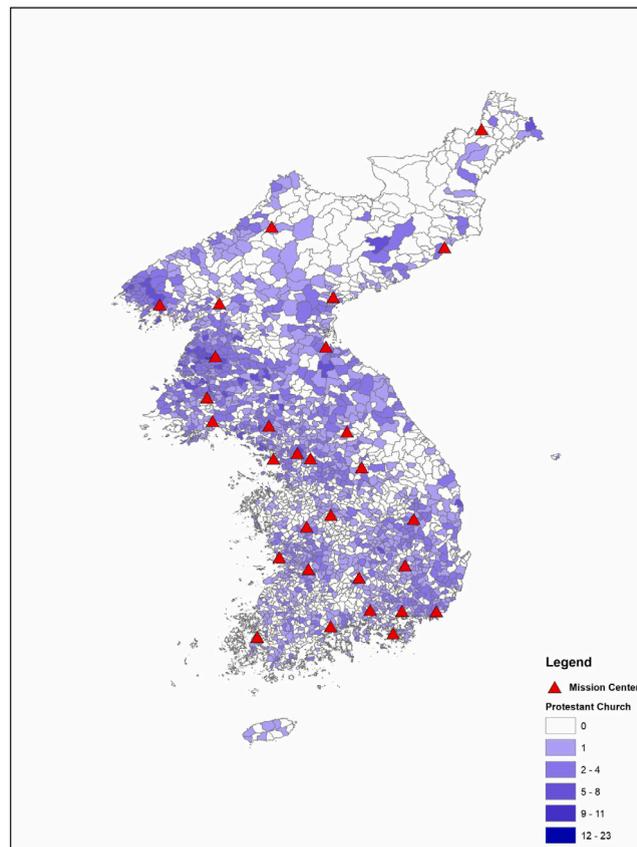


Fig. 2. Protestant churches and mission centers in 1915.
 Source: Church data collected from digitizing the 1915 Japanese colonial gazette. Mission center data were collected from the Directory of Protestant Missions in China, Japan and Korea for the year 1916.

determined. In fact, [Jedwab et al. \(2022\)](#) have shown that Christian missionaries in sub-Saharan Africa favored safer, more accessible, and developed areas first. If more Protestant churches were established in originally-developed areas in Korea, our estimate is likely to overestimate the true impact of Protestant churches on socioeconomic development.

To gain a better sense of the factors influencing the location of the Protestant churches, we regress the number of churches in 1915 on observable township characteristics, taking full advantage of the rich dataset that we compiled by digitizing historical archives. This includes geographic characteristics such as ruggedness of topography, crop suitability, distance to waterways, distance to coasts, logged area size, logged elevation, and latitude and longitude. Our second set of variables includes socioeconomic characteristics and public infrastructure information, such as the number of periodic markets, post offices, and police offices, the distance to railway stations and roads, and the population share of Japanese and other foreigners.

[Table 2](#) presents the estimation results. In Column (1), we include province fixed effects along with observable township characteristics. Therefore, the estimates capture the within-province determinants of the early Protestant churches. Some of the estimates are consistent with the idea that Protestantism spreads in more accessible and convenient areas first: the number of Protestant churches is significantly negatively correlated with elevation, distance to waterways, and distance to train stations and positively correlated with the number of post offices and police offices. Furthermore, the joint F-tests reject the assumption that the number of Protestant churches is not associated with geographic and historical characteristics ($p = 0.003$ and 0.000 , respectively).¹²

In column (2), we replace province fixed effects with county fixed effects to examine within-county determinants of church establishment. In this specification, we find no evidence that townships with more churches are systematically different from those

¹² Interestingly, the correlation between the number of Protestant churches and Confucian temples is negative and statistically significant. This may be because the presence of strong Confucian influences deterred the entry of Protestantism. However, the correlation becomes weaker and insignificant within counties (column 2).

Table 2
Determinants of Protestant churches.

	Num. of Protestant churches	
	(1)	(2)
The logarithm of population in 1925	0.677* (0.348)	0.746*** (0.192)
Terrain ruggedness index	0.000 (0.000)	-0.000 (0.000)
Average crop suitability index	-0.000 (0.001)	0.001 (0.001)
Distance to nearest waterway	-0.006 (0.008)	-0.008 (0.007)
Distance to nearest coast	0.001 (0.002)	0.007 (0.005)
The logarithm of area	0.258 (0.191)	0.037 (0.100)
The logarithm of elevation	-0.149 (0.096)	-0.013 (0.092)
Latitude	0.310* (0.164)	0.119 (0.399)
Longitude	0.432*** (0.117)	0.378 (0.422)
The number of markets in 1918	0.121 (0.169)	-0.044 (0.074)
The distance to nearest train station	-0.005*** (0.001)	-0.005 (0.004)
The distance to nearest main road	0.043 (0.039)	0.006 (0.020)
Japanese population share	-0.024 (0.033)	-0.018 (0.020)
Other foreign population share	-0.530 (0.373)	-0.074 (0.092)
The number of post offices in 1918	1.669*** (0.226)	0.222* (0.116)
The number of police offices in 1918	0.204* (0.108)	0.102 (0.069)
Catholic churches in 1915	0.301 (0.416)	-0.026 (0.120)
Confucian temples in 1924	-1.400*** (0.246)	-0.148 (0.134)
Province FE	✓	
County FE		✓
Mean of dep.	1.646	1.646
Obs.	1534	1534
R-squared	0.918	0.959
p-value: Geographic characteristics = 0	0.003	0.502
p-value: Historical characteristics = 0	0.000	0.348

Notes: Standard errors are clustered by county and reported in parentheses. Weights (population in 1930) added. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

with fewer churches, except for population size. In particular, with county fixed effects, while the number of post offices is still marginally correlated with the number of churches, we cannot reject the null hypothesis that geographic and historical characteristics have no association with the number of churches ($p = 0.502$ and 0.348 , respectively). We interpret these results as evidence that the spread of early Protestantism was selective within provinces but that it is close to random within counties.

The analysis here underscores the importance of controlling for county fixed effects. Therefore, in the following analysis, we always include them and exploit within-county variation to study the effect of Protestantism.

4.2. Main results on short-run effects of Protestant churches

We begin our analysis by examining the short-term impact of early Protestant churches on the human capital and socioeconomic outcomes of females in 1930. For this purpose, we utilize the township-level data obtained from the 1930 colonial census and compare townships with more Protestant churches to those with less of them within counties. More specifically, we estimate the regression equation below.

$$Y_{ij} = \alpha + \beta \text{Protestant churches}_{ij} + Z'_{ij} \gamma + \xi_j + \epsilon_{ij} \tag{1}$$

where Y_{ij} denotes the outcome of interest for township i in county j ; $\text{Protestant churches}_{ij}$ is the number of Protestant churches in 1915 in township i in county j ; and Z_{ij} is a set of observable characteristics of township i in county j . In the absence of instrumental

Table 3
Relationship between Protestant churches and short-term outcomes.

	Short-term outcomes (1930 Census)			
	Female		Male	
	(1)	(2)	(3)	(4)
	Panel A. Illiteracy rate (%)			
Protestant churches	−0.300*** (0.098)	−0.209** (0.093)	−0.364 (0.259)	−0.213 (0.265)
Mean of dep.	91.65	91.65	68.34	68.34
R-squared	0.81	0.82	0.77	0.78
	Panel B. Employment rate (%)			
Protestant churches	0.588 (0.385)	0.747** (0.377)	−0.099 (0.094)	−0.045 (0.085)
Mean of dep.	28.30	28.30	59.89	59.89
R-squared	0.66	0.67	0.64	0.66
	Panel C. Marriage rate (%)			
Protestant churches	−0.101*** (0.035)	−0.078** (0.032)	−0.102** (0.051)	−0.092** (0.046)
Mean of dep.	47.25	47.25	43.23	43.23
R-squared	0.85	0.87	0.73	0.76
Historical control		✓		✓
Obs.	1534	1534	1534	1534

Notes: Standard errors are clustered by county and reported in parentheses. Weights (population in 1930) added. All specifications include population and geographic variables as control variables and county fixed effects. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

variables, it is crucial to control for potential determinants of churches. We add an extensive set of socioeconomic controls from the georeferenced maps in 1918 and also add geographic controls, including terrain ruggedness, crop suitability, distance to waterways, distance to coasts, area size, elevation, latitude and longitude, distance to railroad stations, distance to major roads, and the number of markets. Finally, ξ_j is county fixed effects that control for fixed factors affecting the outcome across counties. Including county fixed effects is particularly important because townships appear to be more homogeneous except for the number of Protestant churches within counties, as we have shown in Section 4.1. The standard errors are clustered at the county level to account for spatial correlation within the county. We estimate Eq. (1) using ordinary least squares (OLS), where the observations are weighted by population in 1930.

Table 3 presents the estimation results separately for females (Columns 1–2) and for males (Columns 3–4). In Columns 1 and 3, we control for the logged population in 1925 and geographic characteristics, and in Columns 2 and 4, we add townships' socioeconomic characteristics as additional controls. Panel A reports estimates on the impact of early Protestant churches on the illiteracy rate. Column 1 shows that the point estimate of the coefficient on the number of Protestant churches is negative and statistically significant, indicating that one additional Protestant church is associated with a decline in the female illiteracy rate by 0.3 percentage points. Including socioeconomic characteristics as controls reduces the magnitude of the estimate by one third to −0.209, yet the estimate is still statistically significant at the 5 percent level. Given the 8.35 percent female literacy rate (derived as literacy rate = 100 − illiteracy rate), the estimate of 0.209 is suggestive of a sizable and economically significant effect of Protestant church on female human capital. In contrast, the estimates for males in Columns 3–4 are imprecise. Moreover, although the magnitude of estimates is similar to that for females, males have a much lower mean illiteracy rate (68.34) than females, suggesting that Protestant churches were of less economic significance for male literacy.

Panel B presents estimates of the short-term impact of early Protestant churches on the employment rate. Given the improvements in literacy, one might conjecture that Protestant churches might have also impacted females' economic activities.¹³ The estimate in Column 2 shows that the number of Protestant churches is positively related to female's employment rate. In particular, the estimate indicates that one additional church is associated with an increase in the female employment rate by 0.747 percentage points from a baseline 28.3 percent employment rate for females (equivalent to a 2.6 percent increase in female employment). In contrast, the estimates for males in Columns 3 and 4 are close to zero and statistically insignificant despite having much smaller standard errors than the estimates for females. In Online Appendix Table B1, we present estimates of the effect of Protestant churches on the employment rate by industry. Panel A shows that among the nine broadly classified industries, Protestant churches are associated with statistically significant increases in female employment in transportation (by 0.011 percentage points from a baseline of 0.18 percent) and public services (by 0.149 percentage points from a baseline of 1.24 percent). The increase in public services is in line with the estimates in Panel A of Table 3, since more females are taking jobs in occupations requiring literacy, such as clerks in

¹³ Female participation in economic activities outside the household may increase for several reasons, including a change in gender norms concerning females' economic participation or a rise in females' human capital. In our analysis, we do not differentiate between these different channels.

government offices. In Panel B, male employment in manufacturing and commercial industries is shown to have positive relationships with Protestant churches, although marginally significant statistically and economically.

Finally, Panel C examines the effect of Protestant churches on the marriage rate. The positive findings on female literacy and employment imply that the marriage rate could potentially fall, as females find more opportunities for economic activities while delaying their marriages. The estimates in Columns 1 and 2 support this view, suggesting that an increase in Protestant churches is associated with a lower marriage rate for females. We also find similar decreases in males' marriage rate, which is not surprising given the drop in the female marriage rate.

Overall, the estimates in Table 3 indicate that Protestant churches are associated with improved literacy and employment for females but not for males. This is in line with the idea that Protestant churches generally promoted female education (Becker and Woessmann, 2008), and consistent with the findings from the county-level analysis on colonial Korea by Becker and Won (2021).

Our identification strategy relies on the assumption that within counties, after controlling for various geographic and socioeconomic characteristics, the difference in outcomes across townships is due to the difference in Protestant churches and not because of other unobserved confounding factors. A potential concern is that even though we show that observed township characteristics are largely balanced within counties, some unobserved characteristics may confound our result. Accordingly, we conduct robustness checks by sequentially adding a rigorous set of control variables. The estimation results are reported in Online Appendix Table B2. In Columns 1 and 4, we first add demographic controls available from the 1930 census, which include the population share of ages 0–13 and the female population ratio. Next, in Columns 2 and 5, we also include distances to Seoul (the capital of Korea at that time), to Pyongyang (the capital of modern-day North Korea), and to the nearest treaty port. The distance to ports and to major cities are likely important predictors of Protestant churches across the country, as early missionaries entered through treaty ports and resided in major cities. However, because we include county fixed effects in our baseline regression, we are less concerned about such factors. In Columns 3 and 6, to capture any differences in modernization or economic development, we include in the regression the number of modern companies owned by Japanese and Koreans separately. Reassuringly, the estimates for females (Columns 1–3) are all statistically significant and close to the estimates in Table 3.

4.3. Exploration of potential mechanisms

Next, we shed light on the potential channels through which Protestant churches improved the female literacy rate in the short run. Early Protestant missions in Korea promoted female education by establishing missionary schools at which modern education was provided to Korean children. However, this is not necessarily the only channel through which missions promoted female education. For example, Bible women worked closely with local Protestant churches to provide education to women and children and teach the Bible.

To examine whether missionary schools fully explain the impact of Protestant churches on female literacy rate, we add the number of missionary schools divided by gender (female-only or coeducational) to our regression specification (1).¹⁴ Table 4 presents the results. The estimates including both types of missionary schools are reported in Column 1 for female illiteracy and Column 5 for male illiteracy. The results are consistent with our expectation that only female missionary schools reduce female illiteracy, while coeducational schools have a much weaker effect on females but a stronger effect on males, possibly due to son preference in human capital investment in South Korea. Importantly, the estimate of Protestant churches still remains economically and statistically significant. This suggests that while missionary schools played some role in improving the female literacy rate, they do not fully explain the positive relationship between Protestant churches and the female literacy rate.

An alternative channel is that the spread of Protestantism may have increased the demand for formal education, in which females might have benefited more than males since informal education at traditional schools (known as *Seodang*) was mostly offered to only males. To examine this channel, we include the number of public primary schools in 1929 and report the estimates in Column 2. While the estimate on public primary schools does suggest that public schools are associated with lower female illiteracy, we also find that the estimate on Protestant churches is almost unchanged.

To further understand how Protestant churches interacted with various types of schools in improving female literacy, in Column 3 we report estimates of coefficients of interaction terms using female illiteracy as the outcome variable. The coefficient of the interaction term can be interpreted as the differential effect of a Protestant church when there is a missionary school or public primary school compared to when there is not. The coefficient estimate of Protestant churches \times female missionary schools is positive, while the individual estimates of Protestant church and female missionary school are negative. The positive coefficient on the interaction term indicates that the effect of having a missionary school on female education is smaller when there is a Protestant church. This may suggest that the education provided to girls and females by Protestant churches, or Bible women, more likely substitutes than complements that offered by more formal education institutions, such as missionary schools.

Interestingly, we see the opposite with coeducational missionary schools. The interaction term is negative and statistically significant, although coeducational missionary school itself is statistically insignificant. This may imply that in the case of coeducational missionary schools, at which boys were more likely to be enrolled, local Protestant churches facilitated girls' school attainment by encouraging enrollment in coeducational missionary schools. The estimate of Protestant churches \times public primary schools is close to zero, suggesting the lack of interaction between Protestant church and public schooling, a secular educational

¹⁴ Although the method has been widely used in the literature (Alesina and Zhuravskaya, 2011), the Baron and Kenny (1986) causal steps approach may be biased, especially when there are omitted confounding factors or when the mechanism variable (i.e., number of missionary schools) is measured with errors.

Table 4
Protestant churches, schools, and literacy outcomes.

	Illiteracy Rate (%)							
	Female				Male			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Protestant churches	−0.208** (0.092)	−0.210** (0.091)	−0.236** (0.110)	−0.212** (0.092)	−0.207 (0.265)	−0.209 (0.267)	−0.486*** (0.182)	−0.206 (0.271)
Female-only missionary schools	−1.251 (1.519)	−1.307 (1.552)	−3.487 (3.746)	−1.181 (1.482)	−0.134 (2.693)	−0.177 (2.710)	1.743 (5.335)	0.399 (2.621)
Coeducational missionary schools	−0.305 (0.302)	−0.357 (0.317)	0.576 (0.451)	−0.315 (0.290)	−1.011 (0.786)	−1.050 (0.757)	−2.165 (2.257)	−1.102 (0.780)
Public primary schools		−1.075* (0.602)	−1.533** (0.634)	−1.033* (0.622)		−0.803 (1.224)	−2.308** (0.956)	−1.001 (1.155)
Protestant church × Female missionary schools			1.269 (1.617)				−1.496 (2.175)	
Protestant church × Coed missionary schools			−0.714** (0.284)				0.949 (1.367)	
Protestant church × Public primary schools			0.345 (0.382)				1.176* (0.665)	
Catholic churches				−0.670 (0.418)				−0.331 (0.689)
Japanese Shinto shrines				−0.100 (1.063)				3.204 (2.592)
Mean of dep.	91.65	91.65	91.65	91.65	68.34	68.34	68.34	68.34
R-squared	0.82	0.82	0.82	0.82	0.78	0.78	0.79	0.79
Historical control	✓	✓	✓	✓	✓	✓	✓	✓
Obs.	1534	1534	1534	1534	1534	1534	1534	1534

Notes: Standard errors are clustered by county and reported in parentheses. Weights (population in 1930) added. All specifications include population, geographic characteristics as control variables as well as county fixed effects. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

institution, on female education. Column 7 reports estimates with male illiteracy as the outcome. The results are largely opposite to those observed in Column 3. Interactions of Protestant church with coeducational missionary school and public school have positive coefficient estimates, while it is negative for the interaction with female missionary schools.

Given that missionary schools and the demand for formal education are unlikely to fully explain the effect of Protestant churches on female literacy, what are the other potential channels? Historical evidence suggests that although Bible women were the least known among evangelists, they were at the forefront of spreading the Gospel and serving other local women (Tucker, 1985).¹⁵ Bible women had distinctive advantages over foreign missionaries in carrying out missionary work in local communities. As local women Bible women were not subject to linguistic or cultural barriers that foreign missionaries had to overcome and possessed better connections with local networks, especially women and children. As Oak (2004, p. 188) notes:

The Korean Presbyterian by-law of 1896, defined the Bible woman as “a Christian woman employed in the distribution of Christian literature, and in biblical instruction.” But she was more than that. The Bible woman was an itinerant evangelist who taught the Bible by the example of their own self-sacrificing and happy Christian life. She helped a tired mother, cared for sick children, and penetrated to remote country districts where foreign missionaries had never gone.

A story of a Korean Bible woman published in the Annual Report of the British and Foreign Bible Society for 1913 exemplifies how devoted Bible women were to their mission:

Traveling 267 miles, all on foot, over a hard mountainous road in cold autumn winds, selling 40 Gospels, five New Testament, and one Old Testament, and other Portions of the Bible, and preaching to 790 people, surely cannot be thought of a poor month’s work for a woman of sixty-three years of age. This is what the old Bible woman Won Tabitha, supported by the Bible Society, had to report for her last month’s work. It is only four years since she believed, and yet she has learned to read, and even to write enough to keep her daily records.

Accordingly, the work of Bible women in local communities is likely to be imperative for understanding how Protestant missions and churches affected local women’s lives. Unfortunately, there are only scant records on Bible women which prevents any quantitative analysis using Bible women.

¹⁵ Compared to the large volume of documents on foreign missionaries and their evangelistic works in Korea and other countries, there are only scant records of Bible women today. Accordingly, despite the significance of Bible women in evangelizing their fellow women in their countries, they are largely left behind in the contemporary study of Christian missions (Tucker, 1985).

Finally, in Columns 4 and 8, we compare the estimates on Protestant churches to those on two other major religious institutions in colonial-period Korea, namely, Catholic churches and Japanese Shinto shrines. While we still find a negative and statistically significant relationship between the female illiteracy rate and Protestant churches, there is no evidence of such a relationship for Catholic churches or Japanese Shinto shrines. The point estimates for Catholic churches and Japanese Shinto shrines are negative but imprecisely estimated. The contrast between Protestant and Catholic churches is consistent with the work of Bible women in Protestant missions and churches but not in Catholic churches, and echoes findings on Protestant missions and female education in other contexts (Nunn, 2014).

5. Long-run impact of Protestant churches

Thus far, we have shown that early Protestant churches positively impacted human capital formation and economic participation for females in the short term. We turn to our next question, which is whether these effects persisted in South Korea till today. To examine this question, we utilize modern individual-level South Korean population census and social survey data and estimate the effects of historical Protestant churches on contemporary human capital formation, employment and political participation, and gender norms. To do so, we estimate the following equation:

$$Y_{kij} = \alpha + \beta \text{Protestant churches}_{ij} + X'_{kij} \delta + Z'_{ij} \gamma + \xi_j + \epsilon_{kij}, \quad (2)$$

where Y_{kij} is the outcome of interest for individual k residing in township i , county j ; $\text{Protestant churches}_{ij}$ is the number of Protestant churches in 1915 in township i in county j ; X'_{kij} is a vector of individual-level characteristics, including age and year of survey fixed effects; and Z_{ij} is a set of observable characteristics at the township level, which includes the control variables from Eq. (1) and contemporary controls, such as population measured in 1995, the length and density of roads in 2006, and nighttime light intensity in 2010. The inclusion of contemporary variables controls for the level of economic development. ξ_j is county fixed effects that control for fixed differences across counties. We estimate specification (2) using ordinary least squares.

We emphasize that our empirical analysis on long-term impacts follows our pre-analysis plan, both in the variables that we use and the empirical specification. To the best of our knowledge, pre-analysis plans are not widely used in empirical studies in economic history. However, designing an analysis plan prior to data collection is feasible in studies that exploit restricted population census data, especially if it can be proven that researchers have no access to such data otherwise. More importantly, the benefits of using a pre-specified dataset and econometric specification are well known and can potentially contribute to raising the credibility of findings in the literature on persistent effects (Voth, 2021).

5.1. Educational attainment

First, we analyze the persistent impact of early Protestant churches on years of education in 2010 by using the individual-level population census. We use the restricted-access population census, which contains every individual in South Korea as of 2010. Therefore, the analysis in this subsection does not have a sampling error. Table 5 shows the regression results using the years of schooling as the dependent variable. In Columns 1–2, we restrict the sample to females who are 30 years old or older.¹⁶ Columns 3–4 use male samples with the same age restriction as the female sample. Similarly to our short-term analysis, we include geographic and socioeconomic variables as controls as well as county fixed effects. The main difference from the short-term analysis is that we use individual-level observations. Across Columns 1–4, we fail to find evidence of the long-term impact of historical Protestant churches on education attainment. For both male and female samples, regardless of the set of controls, the estimates of the number of Protestant churches in 1915 show precisely estimated zero effects. The standard error is 0.023 for females in column (2), which translates into the 95% confidence interval of [−0.053, 0.037]. Comparing this with the mean years of education for females (10.608), it rules out the possibility that historical churches have any economically significant long-term impacts.¹⁷ For robustness and consistency with the short-term analysis, we also report estimates using township-level outcomes, obtained by aggregating individual-level observations, in Online Appendix Table B3. We find no evidence of long-term impacts of Protestant churches on average educational attainment.

5.2. Economic and political empowerment

Next, we turn to investigating the long-term effects of Protestant churches on several major economic and political activities. For this analysis, we utilize the KGSS dataset, which provides detailed responses to various survey questions using a nationally representative sample of individuals in South Korea in the past two decades (2003–2018). We estimate Eq. (2) using sampling weights provided by the KGSS dataset. The results are reported in Table 6. Panel A restricts the sample to female respondents only, whereas Panel B is for male respondents. For economic activities, we use the information on an individual's job status, i.e., whether an individual has a job (Column 1); an individual's job position, i.e., whether an individual is currently in a managerial position (Column 2); and the individual's income level (Column 3). We also use political outcome variables, such as voting in elections (Column 4), attending protest activity (Column 5), and attending political rallies (Column 6).

¹⁶ We set the restriction on age at 30 years old or older to exclude individuals who might be still undergoing postgraduate education (e.g., studying for Masters or Ph.D. degree). The results are robust to alternative age restrictions.

¹⁷ Similarly, the 95% confidence interval for males (column 4) is [−0.078, 0.040], which also rules out any economically significant long-term impacts of historical churches on years of education for males (mean: 12.457).

Table 5
Long-term impact of Protestant churches on years of education.

	Female years of education		Male years of education	
	(1)	(2)	(3)	(4)
Protestant churches	0.009 (0.024)	−0.008 (0.023)	0.004 (0.028)	−0.019 (0.03)
Mean of dep.	10.608	10.608	12.457	12.457
Obs.	14,989,587	14,989,587	13,975,622	13,975,622
R-squared	0.547	0.547	0.272	0.273
Individual-level control	✓	✓	✓	✓
Historical control		✓		✓

Notes: Dependent variables are from the 2010 Population Census. Standard errors are clustered by county level and reported in parentheses. All specifications include population and geographic controls and county fixed effects. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

Table 6
Long-term impacts of Protestant churches on economic and political empowerment.

	Economic activity			Political activity		
	Have job	Manager position	Log(Income)	Voted in Election	Attended Protest	Attended Rally
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A. Female Sample						
Protestant churches	0.004 (0.010)	0.001 (0.001)	−0.009 (0.019)	−0.004 (0.008)	−0.012 (0.009)	−0.008 (0.009)
Mean of dep.	0.50	0.00	14.23	0.65	0.12	0.08
Obs.	7252	7252	3265	7461	3256	3244
R-squared	0.08	0.06	0.22	0.20	0.10	0.09
Panel B. Male Sample						
Protestant churches	−0.008** (0.004)	0.004* (0.002)	−0.021 (0.014)	−0.013 (0.008)	−0.002 (0.009)	−0.002 (0.007)
Mean of dep.	0.86	0.02	14.80	0.71	0.20	0.14
Obs.	6124	6124	5096	6375	2860	2851
R-squared	0.19	0.30	0.28	0.24	0.13	0.10

Notes: Standard errors are clustered by county and reported in parentheses. All specifications include individual-level age fixed effects; population in 1925 and 1995; geographic and historic socioeconomic variables; and contemporary road length, density, and nightlight intensity measures in 2010 as control variables as well as county fixed effects and survey year fixed effects. Towns on islands are excluded, and sample weights are added into the analysis. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

Similarly to the findings with educational outcomes, we do not find a persistent impact of Protestant churches on females' economic and political outcomes. In all columns in Panel A, the estimated coefficients for Protestant churches are close to zero and statistically insignificant, indicating the lack of long-term impacts. The male sample results, which are presented in Panel B, broadly follow the results from the female sample (Panel A). However, we document historical Protestant churches having a negative association with a male's probability of having a job (statistically significant at the 5% level) and a positive association with a male being in a managerial position (statistically significant at the 10% level). We also explore the long-term relationship between historical Protestant churches and occupations of females and males. Appendix Table B4 reports the estimates by occupation (each column) and gender (females in Panel A and males in Panel B). For females, we find no evidence to suggest a persistent relationship between historical Protestant churches and modern occupational outcomes. For males, we find a weak positive association between historical Protestant churches and having an occupation in the crafts industry.

5.3. Gender norms

Our final set of results examines whether Protestant churches have a long-term impact on gender norms. The KGSS asks an extensive list of survey questions related to gender norms, such as “Do you agree with the statement: A man's job is to earn money; a woman's job is to look after the home and family?” This allows us to explore the relationship between historical Protestant churches and the respondent's belief regarding gender norms. Table 7 presents the regression results using gender equality indices we created from the survey responses related to gender norms. Columns 1 and 2 use the full list of 15 gender norm questions in KGSS to construct the index. The estimation results suggest that the historical Protestant church is positively correlated with more equal gender norms among females than for males. Based on this gender equality index, we find that an increase in one Protestant church in 1915 is associated with a 0.026 unit increase in the gender equality index for females. The estimate is statistically significant at the 1% level. Since the mean of the index is 0.09 and the standard deviation is 0.07, the magnitude of the estimate corresponds to 0.37 standard deviation. On the other hand, the estimate for the male respondents' sample is smaller and statistically insignificant.

Table 7
Long-term impacts of Protestant churches on gender norms.

	Gender Equality Index							
	Full list (15 questions)		Pre-analysis plan (5 questions)		Disagree: Wife has to help husband's career than own		Disagree: Husband makes money and wife looks after home and family	
	Female (1)	Male (2)	Female (3)	Male (4)	Female (5)	Male (6)	Female (7)	Male (8)
Protestant churches	0.026*** (0.010)	0.017 (0.012)	0.022* (0.012)	0.027 (0.018)	0.006 (0.019)	−0.028 (0.023)	0.044*** (0.015)	0.013 (0.023)
Mean of dep.	0.09	0.03	0.13	0.11	0.04	0.06	0.10	−0.04
Obs.	4192	3408	4192	3407	2426	2001	4182	3397
R-squared	0.29	0.24	0.29	0.26	0.35	0.30	0.26	0.20

Notes: Standard errors are clustered by county and reported in parentheses. All specifications include individual-level age fixed effects; population in 1925 and 1995; geographic and historic socioeconomic variables; and contemporary road length, density, and nightlight intensity measures in 2010 as control variables as well as county fixed effects and survey year fixed effects. Towns on islands are excluded, and sample weights are added into the analysis. * denotes statistical significance at 0.10, ** at 0.05, and *** at 0.01.

In Columns 3–4, we present the results using the five gender norm questions that we specified in our pre-analysis plan to construct the gender equality index. The estimate using the gender equality index constructed as specified in the pre-analysis plan is 0.022 and statistically significant at the 10% level. Thus, despite a decrease in precision, the magnitude is similar to that found with the full question list. Across Columns 5–8, we present the results on two specific questions that we think of as particularly pertinent to gender norms in Korean society. Columns 5 and 6 use the following question as a dummy dependent variable: “Disagree: It is more important for a wife to help her husband’s career than to pursue her own career”. The coefficient estimate is insignificant for both female and male samples. Columns 7 and 8 use the answer to the following question, “Disagree: A man’s job is to earn money; a woman’s job is to look after the home and family”. We find that for females, an additional Protestant church in 1915 is associated with an increase in the probability that a female respondent disagrees with the specific gender norm question by 4.4 percent, an increase of 44 percent relative to the sample mean. However, we find no such relationship for males.

5.4. Potential explanations for the lack of long-run effect of Protestant churches

Here we provide several potential explanations for why the effects of Protestant churches persisted on women’s gender norms but not on female’s education, employment, and political participation. First, one plausible explanation for the lack of a long-term effect of Protestant churches is migration. According to the Harris–Todaro model of rural–urban migration, there will be more rural to urban migration when the expected payoff of urban jobs is greater than that of traditional rural jobs (Harris and Todaro, 1970). If the Protestant mission increased the local human capital and if more human capital increased the expected payoff of urban jobs, educated males and females would be more likely to migrate from Protestant church towns to urban centers. This may bias our estimate toward zero if urban centers are associated with fewer Protestant churches. We indirectly test this possibility using the Statistics on Internal Migration, containing the universe of internal migration records from 2001, and examining whether there is a significant relationship between townships and historical Protestant churches and migration patterns.¹⁸ The results are reported in Online Appendix Table B5. Columns 1–2 report the estimates of Protestant churches on the net migration of females and males, respectively; Columns 3–4 report the in-migration rate, and Columns 5–6 report the out-migration rate. Overall, we find no significant relationship between historical Protestant churches and migrating into or out of those places. Although our data do not allow us to explore whether individuals with higher human capital were more likely to migrate out of Protestant church towns, the results suggest that at least at the aggregate level, no such migration pattern existed.

Second, as shown in the previous section, Bible women could have been a crucial factor behind the short-term success in improving female literacy. However, their role as educators and mentors in local communities may have dwindled over time as more women attended formal educational institutions thanks to the rapid expansion of public education and compulsory education policies. In fact, the primary school enrollment in South Korea was virtually universal already in the early 1960’s (Rodrik et al., 1995; Woo and Kahm, 2017). Thus, as Bible women were being replaced by more formal institutions, other places (outside Protestant church towns) also leveled up in terms of female education and employment. This implies that the effects of Protestant churches may eventually disappear after a certain period, once other places catch up to places that had Protestant churches.

Another potential explanation is based on South Korea’s development since the 1950s, when the country began its sectoral shift from agriculture to manufacturing and services. This sectoral transition increased demand for skilled female labor and provided labor market opportunities for women. According to population census data, the female employment rate grew from 33.9 percent in 1930 to 52.7 percent in 2010, whereas the male employment rate only increased from 60.3 percent to 70.4 percent during this period. Thus, while the widespread economic and societal transformation of South Korea increased women’s educational attainment and

¹⁸ Note that our data does not capture overseas migration (moves outside of South Korea) and we acknowledge that this is a limitation of our analysis on migration. Please refer to the Online Data Appendix for more details on this dataset.

labor market participation it may have diminished the effects of local Protestant churches, or Bible women, on female's educational and labor outcomes.

Despite rapid changes to women's access to education and labor markets, social norms on gender roles may have responded more sluggishly, as such beliefs and views are more likely to be transmitted across generations, from parents to children, and persist over time, as evidenced by recent studies on cultural persistence (Algan and Cahuc, 2010; Voigtländer and Voth, 2012; Alesina et al., 2013). For centuries, Korea was influenced by Confucianism, which strongly emphasized different roles for men and women: women in Korea were given the role of housewife due to Confucian gender roles and were not allowed to work outside the house. Today the legacy of Confucianism remains a fundamental part of Korean society, shaping the moral as well as legal system, social relations between old and young, and business practices. According to the 2012 Korean General Social Survey (KGSS), 51.3 percent of respondents considered themselves as Confucian regardless of one's religious affiliation, whereas only 21.3 percent said they were Protestants (Kim et al., 2019). But some of the strongest evidences of the persistence of the Confucian influence can be found in South Korean family life.¹⁹ Hence, the persistent effect of Protestant churches on female gender norms could be due to the slow, or lack of, change in gender norms of non-Protestants over the past century.²⁰

A related question is then why females with more gender equal norms are not found to be more economically or politically empowered relative to females with less equal gender norms. One possible explanation is that the society's view of women's role is constraining females from achieving a better economic and political status (Jayachandran, 2015). That is, females are less likely to participate in labor markets and other social activities because of the influence of prevailing social norms on the female's role, especially in family life, which may cause work-family guilt, or also known as mother's guilt.²¹ For instance, in the 2016 Korean General Social Survey (KGSS), 68 percent of respondents agreed to a statement that a pre-school child is likely to suffer if his or her mother works, and 60.6 percent agreed to the statement that family life suffers when the woman has a full-time job (Kim et al., 2019). Accordingly, despite Protestant influence on individual gender norms, the society's norm on the female's role as homemaker can serve as a major barrier to female empowerment. We believe an examination of this question is outside the scope of our study, but would be an interesting direction for future research.

6. Conclusion

In this paper, we investigate the short- and long-run effects of historical Protestant churches on female human capital and empowerment in South Korea. Using novel historical datasets, we empirically show that there was a substantial short-run impact of Protestant churches on improving female's literacy rate and economic participation. In the long-run, however, our analysis indicates that early Protestant churches did not have persistent impacts on the education, employment, and political activities of modern-day women, while we find some suggestive evidence of a long-run impact on females' gender norms.

While many previous studies have shown that historical religious missions have long-term positive effects on human capital accumulation and other socioeconomic outcomes, especially for females, the results of this study suggest that the long-run effects of religious missions are dependent on the context. Moreover, we offer several potential explanations for the lack of long-run effects of Protestantism on female education and empowerment in South Korea. A systematic investigation of the interactive role between religious and secular institutions may help provide a better understanding of the persistent effects of religious missions.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at <https://doi.org/10.1016/j.jce.2023.01.006>.

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¹⁹ Children are expected to respect and submit to parental authority, respect deceased ancestors to show Confucian filial piety, and women are still expected to be the primary domestic worker in the family. Moreover, 53.9 percent of survey respondents said they hold Confucian rites for deceased family members (Kim et al., 2019).

²⁰ Giuliano and Nunn (2021) argue that cultural traits are likely to change over time when external environments are unstable. Understanding why gender norms in South Korea have persisted until today despite the rapid economic development and a series of regime changes is an interesting question for future research.

²¹ Studies have also documented work-family guilt in Spain (Martínez et al., 2011) and in the United States (Borelli et al., 2017). Given the persistent influence of Confucianism in the society, it is not difficult to imagine that work-family guilt could be even stronger for females in South Korea.

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