The Mission to Educate Women: a Protestant legacy in China

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Abstract

Until the arrival of Protestant missionaries in the nineteenth century, women in China had little access to formal education. The Protestant missionaries built the first school, the first college, and the first medical school that admitted women, thereby opening up women's pathway to higher education and professional services. Using various measures of Protestant influence by 1920 and college yearbooks from 1928-1938, we show that compared to the Catholic missions, the Protestant missions increased women's college enrollment. Moreover, the effect came through two channels: providing secondary education infrastructure that was likely gender equal and affecting the norms among their converts. Finally, we provide evidence that the increase in educational attainment was meaningful, as it translated into a higher density of female doctors and politicians in the short run.

Keywords: China, Protestant missions, historical persistence, education attainment, higher education, fertility behavior, labor force participation

JEL Codes: I23, I25, N15,N35,Z12

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1 Introduction

Until the arrival of Protestant missionaries, women in China had little access to formal education. In traditional Chinese society, women's literacy and artistic talent were valued significantly less than men (*Liang* 2016). Although women from the upper class might receive tutoring from teachers in chambers (*guishushi*), the majority of women remained uneducated and illiterate (*Ko* 1995). While men acquired education to compete in the imperial examination (*keju*), an upward channel exclusively opened to men, women's ignorance was considered a virtue and a desirable marriage trait (*Chen* 2015). The Protestant missions turned the situation around. In 1844, the first private school for girls (*nvshu*) was founded in Ningbo by Mary Ann Aldersey, who was the first Protestant missionary woman to serve in China proper. In 1913, the first college to accept women in China, Jinling Women's College, was founded by the American united board of Protestant missionaries. The Protestant middle schools and colleges were the primary pathway to formal education for women before 1949.

In this paper, we empirically examine whether the Protestant missions in the nineteenth and early twentieth century increased women's education attainment in China. Instead of primary or secondary education, we focus on education attainment as measured by college enrollment, which has a direct consequence on women's fertility choices and labor market participation. At a glance, it was unclear if the Protestant missions would have any effect, given their slow progress in winning converts. After decades of preaching, the share of converts in population was only 0.02% in 1920 (*Stauffer* 1922). Nevertheless, the Protestant missions invested disproportionately in education infrastructure: out of the 80 colleges operating by 1935, 16 of them were founded by Protestant missionaries. That was 20 percent of total colleges. Moreover, admissions at Protestant colleges were open to women. Data from our sample shows that 1/3 of female enrollment were at Protestant colleges and the gender ratio (women/men) among Protestant colleges was around 0.4 in 1937, 2.6 times as much as that for non-Protestant colleges (see figure 1).

A growing literature, start with *Becker and Woessmann* (2009), has established the link between Protestantism and human capital investment. According to the principle of Sola

Scriptura, one can understand God's word only by reading the Bible. Therefore, Protestantism not only invented the mass education, but made the education access gender equal. In developing context where gender equality is low, Protestant missions were found to have a particularly positive effect on promoting women's literacy (*Calvi et al.* 2020; *Meier zu Selhausen* 2014; *Nunn* 2014). Conversely, Catholic missionaries in the same time period were not as effective at increasing women's education attainment, despite their many contribution in education in general (*Ma* 2021; *Valencia Caicedo* 2019).

To compensate for the lack of administrative data on college enrollment, we collected yearbook data on 12,479 students who were enrolled in 18 different colleges between 1928 and 1938. For each yearbook, we transcribed the hometown, gender, and graduation class of every student. For each of the 18 colleges, we recorded the tuition, faculty size, year of founding, and the founders of the college. We located the students' hometowns in their respective counties and then merged with the spatial distribution of Protestant activities according to *Directory of Protestant Missions in China* (abbreviated as *the Directory* hereafter) and *The Christian Occupation of China: A General Survey of the Numerical Strength and Geographical Distribution of the Christian Forces in China* (abbreviated as *the COC* hereafter). Using a discrete choice model, we first show that students disliked travelling long distances to college, but those from high Protestant-influenced counties were willing to travel further to attend Protestant colleges.

We then aggregate total students by gender to the county level and analyze the relationship between Protestant activities by 1920 and women's higher education attainment from 1928 to 1938, in a cross-section. Obviously, Protestant missionaries were not randomly located. They were more likely to settle in locations with more accessible transportation, proximity to treaty ports, and weaker local governments. Therefore, our main identification strategy compares Protestant missions to Catholic missions while controlling for province fixed effects, provincial capital, distance to coast, distance to treaty port, geo-coordinates, and historical population.[1] To alleviate the concern that Protestant missionaries settled in places with stronger educational demand, we include total male college students, number of *jinshi*, and distance to the nearest

[1]We use Protestant converts per 1000 people and Catholic stations per 1000 people to measure Protestant activities and Catholic activities respectively. Our data on Protestant converts varies at the county level while the data on Catholic stations varies at the prefecture-level.

university in the baseline control. We additionally control for the density of chaste women to proximate pre-existing gender norm.

Our main results show that the Protestant missionary effort, measured by either distance to the nearest Protestant Station or total missionaries, had positive and significant effects on female college enrollment. Moreover, counties with Protestant middle schools had 55 percent higher female college students per capita. The three supply-side measurements were correlated with each other. In a horse race regression where we stack all three variables together, half of the coefficients on missionaries and Protestant stations were absorbed by the coefficient on Protestant middle schools. On the other hand, if we measure Protestantism by total converts, the effect on total female college enrollment was positive but insignificant. Nevertheless, the effect on female college students at Protestant colleges was large and significant. We find one standard deviation increase in converts density leads to a 0.1 standard deviation increase in the density of female college students at Protestant colleges, which is equivalent to 31.5% increase relative to the mean value. Taken together, the Protestant missions effectively promoted female college enrollment through two channels: providing secondary education infrastructure that was likely gender equal and affecting the norms among their converts.

By exploring the heterogeneity of Protestant missionaries in settlement years, we find that earlier settlements had a larger impact. Earlier settlement implies more prolonged exposure to Protestant influence. Since human capital accumulation takes years, settlements close to 1920 may not result in college attendance by the 1930s.

The early settlement of missionaries is highly correlated with the distribution of treaty ports. To move closer to causality, we use the existence of a treaty port before 1910 as an instrumental variable for Protestant converts. We follow *Jia* (2014) and restrict our sample to counties along the coast or the Yangtze River, ensuring that the non-treaty port counties are comparable to treaty port counties. We take additional steps to verify that the treaty ports and non-treaty ports counties were similar in historical education demand, measured by the density of jinshi, or gender norm, measured by the density of chaste women. The IV estimations show that a higher Protestant converts density induced by treaty port locations increased female college students at Protestant colleges.

Next, we analyze whether college education opened up women's professional opportunities. Even though Protestantism included women in formal education, it didn't redefine women's role in the family and society. However, narrative evidence suggests that Protestant colleges were progressive in pushing women outside the domestic sphere, and many graduates pursued advanced degrees and careers in schools, hospitals, and the government.[2] We collected a novel dataset on physicians and politicians in the 1940s from *the National Directory of Registered Physicians*, *the Directory of Civil Servants in Yuan, Ministry, and Committee in National Government* and *the Directory of Civil Servants in Central Committee of the Chinese Nationalist Party* with information on the gender and hometown for each person. Both OLS and IV estimates show that Protestant influence increased the number of female doctors (significant at 1% in OLS) and female politicians (significant at 10% in OLS). Specifically, one standard deviation increase in the density of Protestant converts led to a 0.61 and 0.46 standard deviation increase in the density of female physicians and politicians, respectively.

Finally, we examine the persistent effect of missionary activities on women's educational attainment. Using the one percent sample from the 2000 census data, we show that greater historical Protestant influence is associated with longer schooling years of women and a higher share of women earning a college education in 2000. This difference in educational attainment has in turn affected labor force participation and fertility behavior. We find that places with higher historical exposure to Protestant activity have higher female labor participation rates in skilled occupations and a lower total fertility rate in 2000.

This paper contributes to the literature on the impact of Protestant activities in developing countries. The presence of Protestant missionaries is strongly correlated with increased educational attainment and economic development in Africa and India (*Calvi et al.* 2020; *Nunn* 2014). More closely, the paper adds to the literature on foreign influences in colonial China. *Jia* (2014) finds that prefectures with treaty ports grew faster in terms of population size in the short run, and had a higher population growth as well as economic growth in the long run. *Ma* (2021) finds that Catholic missions introduced European science to Chinese cultural elites and

[2] A survey of past graduates of Ginling College in 1947 shows that 27.1 percent of students decided to pursue master's or doctorate degrees after graduation and nearly 70 percent of graduates worked in educational institutions, social service sectors, hospitals, and government (*Zhang* 2007).

stimulated Chinese scholars' scientific achievements. In addition, *Bai and Kung* (2015) find that Protestant missions exerted a significant effect on modernization in China in the short run. *Chen et al.* (2022) and *Deng et al.* (2019) find that Protestant missions have a persistent effect on economic development in the long run. Our paper offers a new perspective by showing Protestant activities were a crucial engine of human capital accumulation in colonial China. As such, this paper highlights the higher education promotion effects of Protestant activities.

This paper also contributes to the literature on gender equality in China. Several studies have investigated the deep roots of gender inequality in historical China. *Xue* (2018) and *Qian* (2008) find that gender asymmetry in economic values is a significant reason for gender inequality in China. Moreover, *Fan et al.* (2016) argues that gender-specific social mobility institutions are another crucial engine of gender inequality. Several studies suggest an impact of Communist rule on women's social status (*Booth et al.* 2019; *Yao and You* 2018).Our paper provides a new determinant for the rise of Chinese women's status in the modern era. In our study, we observe that the Protestant missions had paved way for Chinese women to receive formal education all the way to the college level. The sufficient difference in education attainment opened up women's professional opportunities outside the home.

2 Historical Background

The Christian presence in China remained negligible until the 1860s. In 1860, after foreign troops occupied the capital, the Qing Dynasty was forced to sign *the Convention of Peking* to deliver more prestige to western countries. *The Convention of Peking* granted freedom of religion in China and allowed foreign missionaries to own land and build churches. However, the rapid expansion of Protestantism expected by foreigners did not take place in China at the beginning. The missionaries preached the gospel full of enthusiasm but converted only a small number of Chinese. Protestantism expanded unprecedentedly slowly because of resistance from Chinese traditional forces, especially the gentry who feared that foreign missions might threaten their position (*Lee* 2014). In addition, the missionaries always ignored the traditional customs and local religions in China, so people refused to be converted by the missionaries (*Lutz* 1971).

The futility of missionaries' early evangelization forced them to explore new approaches to proselytization through education. According to the principle of Sola Scriptura, one can understand God's word only by reading the Bible (*Calvi et al.* 2020), so women have the right to receive education as well. Since the 1840s, the missionaries began to build schools to expand the reach of the gospel in China (*Stuart* 1954). Protestant missionaries provided tuition-free enrollment and subsidies to attract students (*Luo* 1996), which was particularly effective in attracting female students from poor families. In 1869, the number of female students in Protestant schools was 576, which increased to 65000 in 1909 (*Luo* 1996). The clear interest in the education of women shown by Protestant missionaries was in sharp contrast with the Qing Government, which did not intend to build female schools until 1907. The first president of Yenching University and later United States ambassador to China, John Leighton Stuart recalled the scene of his parents running schools as follows:

"In addition to their evangelistic work among the poor classes and rural people, both of my parents were interested in starting schools. My father's school for boys was later closed by the mission because its members felt that preaching rather than secular instruction was his proper function. [...] My mother was even more successful. She helped to start the second girls' school in China, a school that grew steadily in numbers and influence. [...] It later became a part

of Christian Union Girls' school of Hangchow." (John Leighton Stuart, Fifty Years in China, New York, 1954, p.14)

The Protestant missionary education extended intentionally to higher education in the late 19th century in China. Timothy Richard[3] criticized missionaries who proselytized the grass-roots instead of Chinese elites. He supposed the upper classes' conversion and their friendly attitude towards Protestantism had a strong effect on other classes (*Lutz* 1971). Thus, Protestant missionaries built colleges where students can study western languages, mathematics, and science to arouse the interest of Chinese elites. Moreover, many American missionaries graduated from colleges founded by Protestant denominations, and they supposed Protestant Church in China had the obligation to provide higher education (*Stuart* 1954). These missionaries had witnessed the effect of education on proselytizing migrants in America, so they hoped higher education in China could also pave the way for the reach of the gospel (*Lutz* 1971). Before 1935, there were 80 universities in China, 16 of them were Protestant universities (4 of them were Catholic universities).

Protestant missionaries were particularly involved in the higher education of women in China. In a society that was close to indifferent to female education, Protestant missionaries were the pioneers in providing female higher education. Bounded by traditional Chinese norms, male missionaries could not interact with Chinese women closely. Thus, missionary women took the responsibility of conducting evangelical work among women. Since many missionary women had received master's or doctor's education, they hoped to provide women's higher education not inferior to men's in China. Teachers often reminded female students that they were the minority with respect to higher education in China and had special missions to society (*Lutz* 1971). For instance, the "Abundant Life" was interpreted as the guiding ideology for cultivating students of Ginling College, a leading Protestant school at that time. The ideology means that students not only to master their basic and professional knowledge well but also to have noble dreams. They should be diligent, tough, and selfless at their posts and dedicate their lives to others, society, and the nation with their wisdom and strength. Those female college students

[3]Timothy Richard (Chinese: Li Timotai, 10 October 1845 – 17 April 1919) was a Welsh Baptist missionary to China, who influenced the modernization of China and the rise of the Chinese Republic.

were deeply committed to their careers instead of marriage or family (*Luo* 1996). A survey of graduates of Ginling College in 1947 shows that 27.1 percent of students decided to pursue master's or doctorate degrees after graduation and nearly 70 percent of graduates worked in educational institutions, social service sectors, hospitals, and government (*Zhang* 2007).

One concern is that students came to college, not for Protestant proselytization, but for their wealthy families. There were indeed more students from wealthy families than poor ones. *National Higher Education Statistics* compiled by the Ministry of Education of the Nationalist Government in 1933, provides detailed information about college students' family backgrounds. In 1931, among the college students, rural families accounted for 25.9%, merchant families accounted for 23.9%, scholar families accounted for 22.2%, political families accounted for 11.5%, and working families accounted for 2.9%. However, female students from common families still had chance to receive higher education. First, students from poor families can receive free normal education in the 1930s. Although Peking Normal University was the only college that provided free higher education in the 1930s, the female students in this university accounted for 16.2% of total female college students in 1931. Moreover, Protestant colleges provided generous funding for female students from poor families. Because Protestant colleges put more emphasis on female students, women in Protestant colleges were more likely to obtain scholarships and study abroad than women in public schools (*Zhang* 2007).

Effective social service and evangelism were inextricably intertwined, and Protestant missionaries also provided medical services in China. Protestant missionaries believed that disease came through sin, ignorance, poverty, and superstition, so the Gospel message of health, liberty, and abounding life must be preached (*Shemo* 2011). Since the 1880s, Protestant missionaries began to build medical schools in China. In the 1930s, the most prominent four medical universities in China were all founded by Protestant missionaries, including Peking Union Medical College (Bei Xiehe), Xiangya School of Medicine (Nan Xiangya), Cheeloo College of Medicine (Dong Qilu), and West China Union University (Xi Huaxi).[4] Because women in China were reluctant to be treated by male doctors in that era, demand for female doctors and nurses rose

[4] Peking Union Medical College was founded in 1906. London Missionary Society and other five Protestant missionary societies cooperated in this foundation and maintained it until 1915. In 1915, the China Medical Board, founded by Rockefeller Foundation, acquired the property of this college.

rapidly with the expansion of these hospitals (*Zhang* 2007). The fraction of female students in medical colleges was also higher than the fraction in public colleges.

The Protestant missionaries were the main contributor to Chinese public health in history (*Shemo* 2011). In the early 20th centuries, because the local warlords posed a constant challenge, the central government could not provide nationwide public health. The Protestant missionaries built nursing schools to mitigate the shortage of trained doctors in inland China. The women nurses who graduated from nursing schools exercised considerable autonomy in decisions about treatment and healing(*Burton* 2005). Protestant missionaries also set criteria for the nursing profession in China. The Nurses Association of China (NAC hereafter), founded by Protestant missionaries in 1909, promulgated guidelines for nursing schools. Moreover, the NAC served as a nurses' registry organization until the Chinese Nationalist Government took over this function in 1935. Protestant missionaries invented the word *Hushi* as the translation of nurse, which means the guardian in Chinese. This word shows that missionaries wanted to build the noble images for nursing professions in China (*Lutz* 1971).

Doctors and nurses were the earliest professions opened for Chinese women. The first four Chinese female doctors received their medical education in the United States, funded by the Protestant mission society in America. Ida Kahn (Kang Cheng) and Mary Stone (Shi Meiyu) were the best-known of these four women. They graduated from the medical school of the University of Michigan. In 1897, the reformer Liang Qichao wrote an essay to praise Ida Kahn as a model for "new" Chinese women. After Kang and Shi came back to China, they established hospitals to treat thousands of women and children every year (*Shemo* 2011). The examples of Kang, Shi, and other female doctors were instrumental in inspiring more women to become physicians and in opening the medical profession to women in China. In the 1920s, the medical profession became the most common profession among Chinese young women (*Thompson* 1924). Shi explained why her hospital was run by purely Chinese women as follows:

"First, that should convince the Chinese women themselves that they are able to do things of which they never dreamed, and, second, that it should show the people of other nations that the only reason why Chinese women have for centuries lived such narrow lives is that they have not had opportunity to develop native power" (Shemo, Connie A, The Chinese medical ministries

of Kang Cheng and Shi Meiyu, 1872-1937: On a cross-cultural frontier of gender, race, and nation, Rowman & Littlefield press, 2011, p.70)

3 Data

In this section, we describe the data and introduce the sources. We begin with measures on Protestant activities and college enrollment, then move on to short-term and long-term outcomes. Finally, we estimate a school choice model and assess the validity of data and assumption.

3.1 Protestant Activities

We transcribed several measures of Protestant activities, namely, the number of converts, the number of missionaries by gender, the arrival year of the first missionary, the counts of mission stations, and the founding year of each station. The different measures cover religiosity from both the demand side and the supply side. The starting time of missionary activities also added intensity variation over time.

All data source on Protestant activities comes from publications of the China Continuation Committee, the central organization of Protestant churches in China (*Stauffer* 1922). Specifically, the data on converts comes from *the COC* (*Stauffer* 1922) and the rest comes from *the Directory* (*Boynton* 1920). We aggregated data to the county level according to the 1911 county boundaries.[5] Our sample covers 1,527 counties in 20 provinces. In 1920, there were 0.77 converts and 0.01 missionaries per 1,000 people in an average county in China. Figure 2 visualizes the distribution of Protestant mission stations and the density of Protestant converts across counties. While many coastal counties had a high density of Protestant converts, there was also a significant Protestant presence in inland regions. This suggests that the intensity of historical Protestant activities was not simply driven by distance to the coast.

[5]For long-term analysis, we harmonized data on Protestant activities to the 1999 county boundary (*Chen et al.* 2022)

3.2 Protestant Middle Schools

To measure the basic education Provided by Protestant missionaries in Chinese history, we transcribed additional data from *the COC* (*Stauffer* 1922). *The COC* (*Stauffer* 1922) provided the number of Protestant middle schools of each county in 1920.

3.3 Student Yearbooks in 1928-1935 & College Choices

We relied on college yearbooks to extract the characteristics of the colleges and their students. The yearbooks come from *the Collection of Historical Materials on Colleges in the Republic of China* (*Li* 2014). For each college, we recorded its location, tuition, faculty size, founding year, the volume of books in the library, and religious affiliation. For student information, a yearbook typically contains the full names, cohorts, and hometowns of enrolled students. Unfortunately, the gender of a student was not always specified, so we only kept yearbooks where we could recognize gender through either text or profile pictures.[6] We also limited data transcription to yearbooks published between 1928 and 1938, during which the Republic of China was at peace, and school attendance was unlikely to be interrupted by warfare.[7]

In total, we collected yearbooks from 18 different universities on 10,719 undergraduates and 1,760 preparatory students spanning 1928 to 1938. Our sample comprises 4 Protestant universities, 1 public normal university, 5 national public universities, 3 provincial public universities and 5 private universities. Table 2 presents the summary statistics of universities in our sample. Peking Normal University stood out with the highest percentage of female students (36%), thanks to its nature of training. Among other general-purpose colleges, Protestant universities had a significantly higher share of women than non-Protestant universities. Figure 1 plots the gender ratio over time for Protestant vs. non-Protestant universities and shows that the gender ratio at Protestant universities was twice as much as that for non-Protestant colleges. We

[6]We cannot approximate a person's gender from their Chinese name. From the text, we can only recognize gender if (female) is labeled next to a student's name.

[7]There were constant wars in the Warlord era(1916-1928) and during the Second Sino-Japanese War(1937-1945).

also noticed that a significant proportion of students were non-local.[8] On average, a student traveled 593.78 km to go to college.

3.4 Short-term Outcomes

Data on women in the workplace is quite scarce in the short term. We collect a novel data set on physicians and politicians by gender in the 1940s. Our data on physicians are collected from *the National Directory of Registered Physicians* (*Ministry of Health* 1942), published by the Ministry of Health (Weisheng shu), which contains information on licensed physicians in 1942. For physician information, this book records full names, age, gender, hometowns, sequence number of licenses, and issued year of licenses. We transcribed gender and hometown for each physician. We acquire a dataset on politicians from *the Directory of Civil Servants in Yuan, Ministry, and Committee in National Government* (*Civil Department of National Government* 1944) and *the Directory of Civil Servants in Central Committee of the Chinese Nationalist Party* (*Central Committee of the Chinese Nationalist Party* 1946). Both directories provide full name, gender, age, and hometown county for each politician. The dataset contains about 8000 politicians and 7200 physicians, including more than 500 female politicians and 1100 female physicians.

3.5 Long-term Outcomes

We use the 1% census in 2000 (*National Bureau of Statistics of China*) to construct outcome variables at the county level, including years of education, female labor force participation rates in skilled occupations, the total fertility rate and the age at first marriage.

3.6 Other Variables

The geographic controls are created to account for the substantial geographic heterogeneity in China. We use a historical map of China in 1911 from CHGIS to compute the latitude and longitude (and their interaction) of the centroid of the county, its distance (in kilometers) from the coastline, the Yangtze River and the Grand Canal, and elevation.

[8] Local students mean that their hometown and the university they chose belonged to the same province.

Jia (2014) provided treaty ports data from 1842 to 1910, which was a predictor for early missionary settlement.[9]

It is plausible that factors that prompted the location decisions of Protestant missionaries also influenced Catholic missionaries. Thus, we control for the density of Catholic stations at the prefecture-level to account for unobserved confounding factors. The Catholic station data is generously shared by Professor Ying Bai and used in *Bai and Kung* (2015).

To address the persistence of education attainment, we control the density of *jinshi* during the Ming and Qing dynasties at the county level. *Jinshi* data is obtained from *China Biographical Database Project* (CBDB). Professor Yu Hao generously shares the organized *jinshi* data.

We use chaste women[10] to proximate the pre-existing gender norm. The chaste women during Ming and Qing dynasties is obtained from *Liang et al.* (2021).

3.7 Faith and College Preferences

Did students from Protestant families prefer to go to Protestant colleges? Before regressing Protestantism on overall college attendance, we want to confirm that, conditional on going to college, the Protestant faith played a role in college choices. If lacking this evidence, either the validity of the data is in doubt, or any relationship between Protestantism and college attendance could not have operated through faith. Without knowing the religious background of each student, we assign a likelihood based on their hometown county. We define a county as having high protestant exposure if it had above median Protestant converts.

After assigning Protestant exposure to students' home counties and utilizing our yearbook observations as a linked student-college data, we form a dataset where college choices, college characteristics, and student's religious background are jointly observed. Based on the geo-codes of colleges and hometowns, we compute the euclidean distance a student traveled to attend their

[9] We follow *Jia* (2014) and the treaty ports in Tibet, Taiwan and northeastern China are not included in this paper.

[10] Chaste women were honored widowed women. They would not remarry and live a life of "virtuous chastity" after their husbands died. During the Ming and Qing dynasties, widow chastity became increasingly common, gained wide prominence and was given legal support.

respective college of choice. We adopt a discrete choice model to estimate the weight on faith, along with preferences for tuition, quality of education, and distance traveled.

The empirical model is similar to *Xiong and Zhao* (2017). It is a conditional Logit model based on the expected utility framework (*McFadden* 1974). The details of the framework are given in the appendix.

The estimates are reported in Table 3. The negative coefficient on the indicator variable for Protestant college shows that a university founded by missionaries would decrease the probability of a student choosing the school, conditional on other attributes. We also find that students preferred colleges that were closer to their hometown, founded earlier, and charged more tuition fees.[11] The positive coefficient for the interaction indicates that students from high Protestant influenced counties in history were more likely to choose Protestant universities.

Coefficient estimates in these models do not have a direct interpretation in terms of magnitude, but the relative size of the coefficients is informative. We derive the marginal willingness to travel as the coefficient on the interaction divided by the coefficient on distance from hometown to university. This is interpreted as the additional kilometers a student was willing to travel for the corresponding feature. Depending on this specification, students from high Protestant influenced counties were willing to travel up to 655 kilometers further to attend a Protestant college.

4 Empirical Evidence on Protestant Activities and Women's College Educational Attainment in 1928-1938

4.1 Empirical evidence from Protestant converts

To empirically examine the connection between the demand of historical Protestant activities and women's higher education in 1928-1938, we start by estimating the following cross-section equation:

[11] Because tuition fees were important sources of funding for colleges, higher tuition fees were associated with better education quality of universities during the Republican era.

$$Female_c^{1928-1938} = \alpha_1 Converts_c + \alpha_2 Male_c^{1928-1938} + \alpha_3 Cath_Station_f + X_c^{'}\beta + Province_p + \epsilon_c, \tag{1}$$

$Female_c^{1928-1935}$ equals to the logarithmic form of female college students or Protestant college students per million people between 1928 and 1938 in county c. $Converts_c$ is the logarithmic form of Protestant converts per 1000 people, which defines the demand of Protestant activities in county c in 1920, $Male_c^{1928-1938}$ is the density of male college students in county c, $Cath_Station_f$ is the density of Catholic stations in prefecture f, $X_c^{'}$ is a vector of controls in county c, $Province_p$ is province fixed effects, and ϵ_c is the error term clustered at the province level.[12]

The coefficient of interest, α_1, captures the relationship between the demand of Protestant activities and female college education attainment. A positive α_1 provides that demands of Protestant activities stimulated more women to receive college education.

As previously discussed, Protestant missions did not locate randomly across China and factors that determined the location of Protestant missions may also correlated with female college education. According to *the Convention of Peking*, both Protestant and Catholic missionaries were free to proselytize. We begin our investigation of the role of unobserved confounding factors using Catholic stations as a comparison group throughout our analysis. We control for the density of Catholic stations at the prefecture f. The density of Catholic stations is measured by the logarithmic form of Catholic stations per 1000 people in 1920.

To control for the effects of demand for college education, we control the density of male college students at county level throughout our analysis. We control for Province fixed effects and cluster standard errors at the province level in order to control for unobservables that affects the settlement pattern for both Protestant missions and colleges that are geographically fixed. This is intended to capture sharp regional differences in some degree of cultural attitude. Column 1 and column 4 of Table 4 show this baseline estimates for female students from all colleges and Protestant colleges.

[12] We choose different calculation methods for the density of college students and Protestant converts because only a small fraction of people received higher education in the Republican era.

Geographical controls include latitude and longitude of the centroid of the county (and their interaction), the natural log of distance to the coastline distance to the treaty portdistance to Yangtze River, distance to the Grand Canal and elevation. Including geographical controls is important as they affect the likelihood of settlement for both Protestant missions and college. Elevation also captures the economic development, because big cities often located in plains in Chinese history. Column 2 and 5 of Table 4 show that results are robust after controlling for geographical controls.

We consider two subcategories for education controls: local education tradition and access to higher education. The first category consists of density of *jinshi* during Ming and Qing dynasties. We measure access to higher education using the distance to the nearest university and the distance to provincial capital, because more than 20% universities in our sample is located in provincial capital. Moreover, because pre-existing gender norm may affect female college attendance, we control for the density of chaste women. Column 3 and 6 of Table 4 show estimates after controlling for education controls. We find one standard deviation increase in converts density lead to a 0.1 standard deviation increase in the density of female college students at Protestant colleges, which is equivalent to 31.5% increase relative to the mean value. By contrast, the historical Catholic missions did not affect female higher education attainment in the short run.

4.2 Empirical evidence from Protestant missionaries and stations

In our analysis so far, we have measured Protestant activities using the density of Protestant converts, which is a proper measure for the demand side of Protestant missions. We now consider alternative measures aimed at capturing the supply side of Protestant mission activities. Our first alternative is a measure of proximity to Protestant mission stations. Our second alternative is the density of missionaries, computed as the number of missionaries per 1000 people. Finally, to explore the role of basic education, we use whether missionaries had build middle schools in each county as an additional measure of Protestant activity.

We estimate cross-section equation analogous to (1) with $Converts_c$ replaced by one of the measures described above. Our findings in Table 5 confirm our previous results. Specifically, we find that one standard deviation increase in the average distance was associated with 0.11

standard deviation decrease in the density of female college students and in the density of female students from Protestant colleges, which is equivalent to 24.2% and 34.8% decrease relative to the mean value. Moreover, adding one standard deviation of Protestant missionaries yielded a 17.0% increase in the density of female college students and a 29.4% increase in the density of female Protestant college students relative to the mean value. Compared with counties without Protestant middle schools, counties with middle schools had 54.8% increase in the density of female college students and 35.9% increase in the density of female students from Protestant colleges. In column (4) and (8), we perform a a horse race regression where we stack all three supply side variables together. The estimations show that half of the coefficients on missionaries and distance to Protestant stations were absorbed by the coefficient on Protestant middle schools.

4.3 The length of Protestant exposure

The results in previous sections document a robust short-term link between both the demand side and supply side of Protestant missions and female higher educational attainment. Since human capital accumulation takes years, early settlement of Protestant missionaries may result in higher female college attendance. We consider alternative measures to capture the length of Protestant exposure. The first measure is the years since first Protestant missionary arrived. In the second measure, for each county, we calculate the minimum distance from Protestant station built before and after 1900 respectively.

Table 6 shows estimation results for several measures of the length of Protestant exposure. We find that counties historically exposed to Protestant missions longer had more female college students. Column 1 and 4 of Table 6 show that the first missionary arrived one year earlier to be associated with a 0.89 percent increase in the density of female college students and a 0.64 percent increase in the density of female Protestant college students. Turning to the distance measures, column 2 and 3 in Table 6 show that proximity to Protestant stations built before 1900 had a significant effect on female college attendance while proximity to stations built after 1900 did not have such an effect.

4.4 Sources of Variation on Early Settlement

In our analysis thus far, we find that the early settlement had larger impact on female college attendance. In this section, we intend to investigate the pattern of early settlement of Protestant missionaries.

Chen et al. (2022) use disaster frequency from 1880 to 1920 as an instrument for Protestant distribution and *Bai and Kung* (2015) use Boxer Uprising in 1900 to identify the diffusion of Protestantism. Since human capital accumulation takes years, settlements close to 1900 may not result in college attendance by the 1930s.

The early missionaries preferred to settle down in counties with proximity to treaty ports (). Since the late Qing Dynasty of China, the Qing government signed many unequal treaties with Western countries. Along with these treaties, China was forced to open more than forty cities called "treaty ports" from the 1840s to the 1910s. The majority of the treaty ports were located along the Yangtze River or the coast. We follow *Jia* (2014) and restrict our sample to counties along the coast or the Yangtze River. According to *Jia* (2014), since the treaty ports and their neighbors along the coast or the Yangtze River are close to each other, they share similar advantages. So focusing on this sub-sample, assigning treaty ports had some randomness.

We presents the correlation between the existence of treaty ports and the intensity of Protestant missions through OLS estimation as follows:

$$Converts_c = \beta_0 + \beta_1 Treaty_Port_c + \beta_2 Cath_Station_f + \Gamma_c^{'}\delta + \nu_p + \epsilon_c, \tag{2}$$

Where $Treaty_Port_c$ is an indicator variable for treaty port in county c, and Γ_c is the control variable including include latitude and longitude of the centroid of the county (and their interaction)elevation, chaste women per capita, *jinshi* and distance to provicial capital. A county is is included in the dataset if it was located along the coast or the Yangtze River.

Columns (5) and (6) in Table 7 present the estimates, which show the statistically significant correlation between becoming a treaty port and the density of Protestant converts, with and without historical controls. Interestingly, we find a strong correlation between Catholic and Protestant missions, which proves that the Catholic mission is a proper comparison group.

We utilize the existence of treaty ports as instrument to estimate the following equations by 2SLS:

$$Female_c^{1928-1935} = \beta_0' + \beta_1' \widehat{Converts}_c + \beta_2' Cath_Station_f + \Gamma_c' \delta' + \nu_p + \epsilon_c,$$

Where $\widehat{Converts}_c$ is the estimates from equation (3). The sample is also restricted to counties along the coast or the Yangtze River.

While the exclusion restriction is fundamentally untestable, we address the threat to the identification. One threat is that counties with treaty ports would develop higher education better even without Protestant missions. The treaty port counties might have had better education development than non-treaty port counties before Protestant missionaries arrived. We use the density of *jinshi* to measure historical education development. Table A3 shows that within the subsample, the treaty ports group and the control group had balanced education development in history.

The 2SLS estimates in Table 7 are larger than the OLS estimates, which are reported in Table 4. The discrepancy between 2SLS and OLS estimates points to the fact that unobserved variables negatively associated with female college attendance lead to bias in the baseline settings. We find the Protestant missions maintain a positive effect on female college education while the historical Catholic missions did not have such an effect.

4.5 The Intensive and Extensive Margin of Protestant Activities on Gender Ratio

In our analysis so far, we find Protestant activities in history increased the density of female undergraduates in the short term. We now consider how historical Protestant activities affected gender equality in college attendance.

We consider specification analogous to equation (1) that successfully replaces $Female_c^{1928-1938}$ by a gender parity index, which defines the ratio between female and male college students between 1928 and 1938. We utilize an indicator variable equal to one for Protestant converts' presence to capture the extensive margin of Protestant missions. The interaction between the indicator variable for Protestant converts' presence and the density of Protestant converts is our constructed variable to capture the intensive margin of Protestant missions. We also construct an interaction between Protestant converts' presence and the number of Protestant middle schools to investigate the intensive margin effect of basic education. Table 8 summarizes the estimate.

Column 3 and 4 in Table 8 show that in the extensive margin, Protestant missions boosted gender equality in Protestant college attendance. However, in intensive margin, we find no statistically significant association between the density of converts and gender equality in higher education. Interestingly, Column 2 show that the Protestant missions effectively promoted female college enrollment through providing secondary education.

5 Empirical Evidence on Protestant Activities and Women's Labor Market and Fertility Choice

5.1 Women's labor market choice in the short-run

In previous sections, we show that the Protestant activities exerted a positive effect on women's higher education in the short run. The difference in education might open up professional opportunities for women outside the home. In this section, we investigate whether the historical Protestant activities promoted female participation outside the domestic sphere.

The analysis in Columns 1 to 2 in Table 9 follows the 2SLS specifications in equation (4) with $Female_c^{1928-1938}$ replaced by the density of female physicians and politicians. We find Protestant missions had a positive effect on female doctors and politicians. By contrast, Catholic missions are found to have negative effect on women in the workplace in 1940s.

We extend our analysis further to utilize the full sample follows the estimating equation (1). Column 3 and 4 show the estimates. Specifically, we find one standard deviation increase in $Converts_c$ led to a 52.5% and 28.4% increase in the density of female physicians and politicians relative to the mean value respectively.

5.2 Protestant Activities and Women's Educational Attainment, Labor force participation and fertility rate in the long-run

In this section, we explore the link between exposure to historical Protestant missions and female human capital outcomes and their fertility choice in the long term. We utilize the one percent sample of 2000 census and aggregate the individual data to county level to perform an aggregated proximity analysis.

The analysis in this section follows the estimating equation (4) with a few modifications. We replace $Female_c^{1928-1938}$ by $Female_c^{2000}$, which are variables for years of schooling for women, the share of women with higher education, the share of women in skilled occupations, total fertility rate, and age at first marriage. We introduce per capita GDP in 2000 to account for local economic development.

We measure female educational attainment in the long-run by using the share of women with college and higher education and schooling years. Column 1 and 2 in Table 10 present the results. We find one percent increase in the density of Protestant converts in history is associated with an increase of 0.06 in share of women with higher education and 0.02 female years of schooling in 2000. To measure female labor force participation, we use share of women in high-skill sectors as a proxy for women in the workplace. We focus on this group because high-skill jobs demand college and higher level education. The result is shown in column 3. We find that one percent increase in the density of Protestant converts boosted 0.01 percentage point increase in share of women in high-skill sectors. We also investigate the impact of Protestant missions on female fertility choice in the long-run. We compute total fertility rate in 2000 as a proxy for female fertility choice. Column 4 show the estimation. We find one percent increase in intensity of Protestant converts led to 0.006 percentage point decrease in a county's total fertility rate. In Column 5 of Table **??**, we explore the impact of Protestant missions on female marriage age. Interestingly, we find although women decide to have fewer children, their age at first marriage is not affected by Protestant mission exposure in history. The OLS estimations for long-term outcomes are presented in Table A4.

6 Conclusions

Studies have emphasized that male-specific upward social mobility shock (*Fan et al.* 2016), rising demand for female labor in cotton weaving factor (*Xue* 2018), tea (*Qian* 2008) and sugar-cane cultivation (*Cheng et al.* 2022), and female membership in the Chinese Communist Party

(*Yao and You* 2018) have shaped women's social status in Chinese history. This paper's results do not discount the importance of these factors in reshaping Chinese women's social status. It was, however, within the social, legal and economic context before 1920s that the Protestant missions played a poineering role in improving female socio-economic status in China.

By firstly utilizing college yearbooks, data on arrival year of Protestant missionaries and Protestant middle schools, we find counties with higher intensity Protestant activities and longer Protestant missions' exposure in history had more women receive college education. We also find the basic education provided by Protestant missionaries was the main channel. The sufficient difference in education provided a powerful tool for women to capitalize on the emerging labor market opportunities. We find counties with higher intensity Protestant activities in history had more female doctors and politicians in 1940s and have more women working in high-skill sectors in 2000.

There is other reason to believe that the estimates of Protestant missions' impact are conservative. Reliance on variation in college students in 1930s does not allow the effects of Protestant missions on college students in 1940s to be estimated. Yet even these conservative estimates suggest that one standard deviation increase of Protestant converts lead to a 12.5% increase in density of female college students. The missionary arrived one year earlier to be associated with a 0.899 percent increase in the density of female college students.

Broadly speaking, this paper advances the hypothesis that Protestant missions in China contributed to the boom in young women's college attendance and market participation from 1930s to 1940s. More importantly, the findings provoke larger questions about the influence of Protestant missions on other outcomes of women's socio-economic status in China. For instance, Protestant female missionaries played a dominant role in anti-footbinding movement since 1860s. Further study of the importance of Protestant missions may advance our understanding of the rise of Chinese women and early modernization of China in the twentieth century.

Tables

Table 1: Descriptive Statistics

	Mean	Std.Dev.	Obs
Short-run:County level			
Protestant Mission Dummy	0.78	0.41	1528
Converts per capita (per 1000 people)	0.77	1.71	1528
Distance to Protestant Station (km)	35.82	41.76	1528
Distance to Protestant Station Built before 1900 (km)	60.10	54.11	1528
Distance to Protestant Station Built after 1900 (km)	65.42	59.26	1528
Years since First Missionary Arrive	10.24	15.63	1528
Missionaries per capita (per 1000 people)	0.01	0.04	1528
Literacy and Education			
Female College Student per capita in 1930 (per 1,000,000 people)	3.35	7.88	1528
Male College Student per capita in 1930 (per 1,000,000 people)	19.56	34.59	1528
Female Protestant College Student per capita in 1930 (per 1,000,000 people)	1.05	3.45	1528
Male Protestant College Student per capita in 1930 (per 1,000,000 people)	3.24	8.20	1528
Gender Ratio of College Students (Female/Male*100)	19.67	35.82	1024
Gender Ratio of Protestant College Students (Female/Male*100)	28.78	58.45	485
No. Protestant Middle Schools	0.17	0.88	1528
Historical Variables			
No. Jinshi per capita (per 1000 people)	0.13	0.27	1528
Distance to Nearest University (km)	318.17	186.19	1528
Career			
Female Doctors per capita in 1942 (per 1000 people)	1.57	5.22	1528
Male Doctors per capita in 1942 (per 1000 people)	12.06	22.47	1528
Female Politicians per capita in 1942 (per 1000 people)	0.71	2.52	1528
Male Politicians per capita in 1942 (per 1000 people)	14.44	27.59	1528
Number of Chaste Women per capita (per 1000 people)	0.16	0.18	1528
Distance to Provicial Capital in the 1930s (km)	185.32	111.31	1528
Geographic Variables			
Longitude	113.03	5.65	1528
Latitude	31.38	5.46	1528
Latitude*Longitude	3560.46	720.80	1528
Distance to Coastal Line (km)	423.19	318.98	1528
Distance to Treaty Port (km)	264.41	190.70	1528
Distance to Yangtze River (km)	411.65	306.78	1528
Distance to Grand Canal (km)	628.77	523.10	1528
Elevation (m)	511.42	561.69	1528
Short-run:Prefecture level			
Catholic Station per capita (per 1000 people)	0.00	0.00	253
Treaty Port Dummy	0.10	0.30	253
Long-run			
Ratio of women with higher education	4.55	3.85	1716
Ratio of men with higher education	7.11	4.88	1716
Years of schooling for women	6.36	1.35	1716
Years of schooling for men	7.94	1.07	1716
Share of women in sectors requiring higher education	0.94	0.82	1716
Share of men in sectors requiring higher education	1.52	0.82	1716
Total fertility rate	1.45	0.46	1716
Age at first marriage for women	21.85	0.90	1716
Age at first marriage for men	23.68	0.93	1716
GDP per capita in 2000 (yuan)	5398.22	3918.96	1716

Table 2: Descriptive Statistics:Yearbooks Data

University	Protestant	Province	Total students	Fraction of Female Students(%)	Percentage of Non-local Students(%)	Date of Organization	Tuition	Number of Volumes in Library	Number of Instructors
Provicial Anhui University	NO	Anhui	387	6.20	84.24	1927	10	21,590	82
Beiping Minguo College	NO	Beijing	239	8.37	44.35	1916		24,721	117
Peking Normal University	NO	Beijing	1,480	36.62	35.81	1898	0	76,728	183
Tsinghua University	NO	Beijing	292	1.71	12.33	1909	20	29,200	173
Yenching University	YES	Beijing	1,775	30.31	21.41	1919	40	238,514	151
Xiamen University	NO	Fujian	586	10.41	67.92	1920	45	65,337	62
National Sun Yat-sen University	NO	Guangzhou	213	12.21	82.16	1924	10	243,800	185
National Wuhan University	NO	Hubei	573	8.90	22.86	1913	10	94,046	94
Huachung University	YES	Hubei	182	26.92	45.60	1924	30	46,876	23
Provicial Jilin University	NO	Jilin	57	1.75	75.44	1929	12.5	8,815	40
National Central University	NO	Nanjing	543	5.89	47.88	1914	20	104,460	373
Tongji University	NO	Shanghai	198	10.61	21.21	1908	30	4,476	109
The Great China University	NO	Shanghai	2,497	13.66	33.40	1924	50	26,264	104
Zhongguo Gongxue Daxue Bu	NO	Shanghai	101	6.93	28.71	1921	40	21,224	61
Shanghai Fazheng College	NO	Shanghai	1,794	8.25	38.41	1924	50	13,601	57
Chongqing University	NO	Sichuan	181	6.63	96.69	1926	15	32,914	59
West China Union University	YES	Sichuan	126	14.29	95.24	1910	26	59,600	127
Hangchow University	YES	Zhejiang	301	15.95	43.85	1911	45	47,012	23

Note: This is a list of universities for which yearbooks are transcribed. For each university, we list the total number of students, fraction of female students (in percentage form), percentage of non-local students (in percentage form), whether university is Protestant university, province where university located, date of organization, tuition per semester, number of instructors and number of volumes in library. From 1928 to 1938, Nanjing, Shanghai, Beiping, Tianjin, Qingdao, Hankou and Guangzhou were special municipalities and directly controlled by central government. These cities were equivalent to provinces, so we list these cities in column “Province”.

Table 3: Individual-level Analysis: College choice

	Parameter Estimates
	(1)
Tuition per Semester	0.0277***
	[0.000739]
Date of Organization	-0.0290***
	[0.00152]
Distance from hometown to College(km)	-0.00161***
	[0.0000264]
Protestant College	-1.158***
	[0.0554]
High Protestant Activity Countie#Protestant College	1.055***
	[0.0610]
Province FE	Yes
Observations	178721

Note: This table shows results from estimating the conditional logit model discussed in section 4.4. The sample consist of all students which used to construct college students dataset at county level. ***, **, * mean statistical significance at 1, 5 and 10 percent levels.

Table 4: Cross-section Analysis: Protestant Converts

	Ln(Female College Students per capita in 1930+1)			Ln(Female Protestant College Students per capita in 1930+1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Converts per capita+1)	0.186**	0.132*	0.0901	0.204***	0.166**	0.142**
	[0.0654]	[0.0669]	[0.0687]	[0.0691]	[0.0665]	[0.0668]
Ln(Catholic Station per capita+1)	-0.382	0.745	0.597	8.047	6.861	5.662
	[9.815]	[9.297]	[6.707]	[5.959]	[5.002]	[4.403]
Ln(Male College Students per capita in 1930+1)	0.263***	0.232***	0.196***	0.116***	0.0973***	0.0743***
	[0.0334]	[0.0305]	[0.0278]	[0.0233]	[0.0218]	[0.0185]
Ln(Number of Jinshi per capita+1)			1.065**			0.581***
			[0.400]			[0.194]
Ln(Distance to Nearest University+1)			-0.227***			-0.186***
			[0.0516]			[0.0616]
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	No	Yes	Yes	No	Yes	Yes
Historical Controls	No	No	Yes	No	No	Yes
Observations	1528	1528	1528	1528	1528	1528
R-squared	0.250	0.272	0.310	0.142	0.173	0.210

Standard errors in brackets

* p¡0.10, ** p¡0.05, *** p¡0.01

Note: OLS estimates. The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude, distance to the coastal line (in logs), distance to treaty ports (in logs), elevation (in logs), distance to Yangtze River (in logs) and distance to the Grand Canal (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 5: Cross-section Analysis: Protestant Missionaries and Stations

	Ln(Female College Students per capita in 1930+1)				Ln(Female Protestant College Students per capita in 1930+1)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ln(Distance to Protestant Station+1)	-0.0594***			-0.0190*	-0.0409***			-0.0161
	[0.0143]			[0.00919]	[0.0125]			[0.0137]
Ln(Missionaries per capita+1)		4.117***		2.476***		2.570**		1.404
		[0.833]		[0.781]		[1.097]		[1.344]
Protestant Middle School Dummy			0.548***	0.373***			0.359***	0.247**
			[0.116]	[0.104]			[0.0888]	[0.103]
Ln(Catholic Station per capita+1)	2.221	-1.442	0.0361	-0.787	7.300	4.941	5.831	5.489
	[7.487]	[6.211]	[7.207]	[6.909]	[4.370]	[4.083]	[4.101]	[4.211]
Ln(Male College Students per capita in 1930+1)	0.189***	0.191***	0.185***	0.181***	0.0739***	0.0757***	0.0714***	0.0688***
	[0.0277]	[0.0263]	[0.0272]	[0.0269]	[0.0180]	[0.0184]	[0.0177]	[0.0169]
Ln(Number of Jinshi per capita+1)	1.080**	0.994**	1.034**	1.000**	0.603***	0.548***	0.572***	0.554***
	[0.393]	[0.388]	[0.391]	[0.387]	[0.194]	[0.189]	[0.193]	[0.191]
Ln(Distance to Nearest University+1)	-0.234***	-0.219***	-0.252***	-0.239***	-0.191***	-0.181**	-0.203***	-0.195***
	[0.0511]	[0.0537]	[0.0545]	[0.0547]	[0.0587]	[0.0633]	[0.0617]	[0.0658]
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1528	1528	1528	1528	1528	1528	1528	1528
R-squared	0.318	0.325	0.327	0.334	0.213	0.217	0.220	0.227

Standard errors in brackets

* p¡0.10, ** p¡0.05, *** p¡0.01

Note: OLS estimates. The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude, distance to the coastal line (in logs), distance to treaty ports (in logs), elevation (in logs), distance to Yangtze River (in logs) and distance to the Grand Canal (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 6: Cross-section Analysis: The Length of Protestant Exposure

	Ln(Female College Students per capita in 1930+1)			Ln(Female Protestant College Students per capita in 1930+1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Years since Arrival of the First Missionary	0.00887***			0.00637***		
	[0.00204]			[0.00185]		
Ln(Distance to Protestant Station Built before 1900+1)		-0.0702**			-0.0445**	
		[0.0258]			[0.0208]	
Ln(Distance to Protestant Station Built after 1900+1)			-0.0154			-0.0122
			[0.0158]			[0.0133]
Ln(Catholic Station per capita+1)	1.259	1.229	1.861	6.781	6.769	7.250*
	[7.254]	[7.228]	[6.892]	[4.121]	[4.482]	[4.118]
Ln(Male College Students per capita in 1930+1)	0.185***	0.190***	0.199***	0.0701***	0.0742***	0.0800***
	[0.0285]	[0.0286]	[0.0273]	[0.0177]	[0.0190]	[0.0189]
Ln(Number of Jinshi per capita+1)	1.038**	1.077**	1.079**	0.572***	0.600***	0.602***
	[0.387]	[0.393]	[0.400]	[0.191]	[0.196]	[0.195]
Ln(Distance to Nearest University+1)	-0.238***	-0.233***	-0.225***	-0.193***	-0.189***	-0.184***
	[0.0496]	[0.0543]	[0.0512]	[0.0619]	[0.0642]	[0.0628]
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1528	1528	1528	1528	1528	1528
R-squared	0.324	0.318	0.309	0.221	0.212	0.204

Standard errors in brackets

* p¡0.10, ** p¡0.05, *** p¡0.01

Note: OLS estimates. The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude, distance to the coastal line (in logs), distance to treaty ports (in logs), elevation (in logs), distance to Yangtze River (in logs) and distance to the Grand Canal (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 7: Sources of Variation on Early Settlement

	Second Stage				First Stage	
	Ln(Female College Students per capita in 1930+1)		Ln(Female Protestant College Students per capita in 1930+1)		Ln(Converts per capita+1)	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(Converts per capita+1)	0.910**	0.615	1.264***	1.046**		
	[0.363]	[0.541]	[0.342]	[0.442]		
Treaty Port Dummy					0.236***	0.222***
					[0.0491]	[0.0541]
Ln(Catholic Station per capita+1)	-11.00	-9.515	-31.50	-35.99*	16.55*	15.90**
	[22.14]	[11.27]	[24.35]	[18.24]	[9.257]	[6.646]
Ln(Number of Jinshi per capita+1)		2.580***		1.202***		0.541**
		[0.548]		[0.354]		[0.258]
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	No	Yes	No	Yes	No	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	371	371	371	371	371	371
KP Wald F					23.135	16.781

Standard errors in brackets

* p¡0.10, ** p¡0.05, *** p¡0.01

Note: The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude,elevation (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 8: The Intensive and Extensive Margin of Protestant Activities on Gender Ratio

	Gender Ratio of college students		Gender Ratio of Protestant college students	
	(1)	(2)	(3)	(4)
Protestant Mission	0.0525	0.0465	0.0951*	0.101**
	[0.0338]	[0.0306]	[0.0492]	[0.0420]
Protestant Mission × Ln(Converts per capita+1)	-0.000529		0.0324	
	[0.0262]		[0.0735]	
Protestant Mission × Ln(Number of Protestant Middle School+1)		0.0774**		0.0548
		[0.0331]		[0.0557]
Ln(Catholic Station per capita+1)	-1.632	-1.913	-4.710	-4.562
	[3.056]	[3.076]	[9.586]	[9.216]
Ln(Number of Jinshi per capita+1)	0.179*	0.165*	0.260	0.263
	[0.0956]	[0.0949]	[0.223]	[0.224]
Ln(Distance to Nearest University+1)	-0.00781	-0.00772	-0.0985	-0.0981
	[0.0175]	[0.0181]	[0.0720]	[0.0725]
Province FE	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes
Observations	1024	1024	485	485
R-squared	0.059	0.064	0.113	0.114

Standard errors in brackets
* p¡0.10, ** p¡0.05, *** p¡0.01

Note: OLS estimates. The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude, distance to the coastal line (in logs), distance to treaty ports (in logs), elevation (in logs), distance to Yangtze River (in logs) and distance to the Grand Canal (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 9: Women's Labor Market Choice in the Short-run

	Second Stage		OLS	
	Ln(Female Doctors per capita+1)	Ln(Female Politicians per capita+1)	Ln(Female Doctors per capita+1)	Ln(Female Politicians per capita+1)
	(1)	(2)	(3)	(4)
Converts per 1000 people (in logs)	1.641**	0.675	0.267***	0.0970*
	[0.544]	[0.560]	[0.0704]	[0.0485]
Catholic Station per per capita (in logs)	-24.17	-44.56**	2.173	5.149
	[21.30]	[17.57]	[4.979]	[5.085]
Number of Jinshi per per capita (in logs)	1.441*	0.566+	0.809**	0.420**
	[0.709]	[0.354]	[0.315]	[0.189]
Geographic Controls	Yes	Yes	Yes	Yes
Historical Controls	No	Yes	No	Yes
Province FE	Yes	Yes	Yes	Yes
Observations	371	371	1528	1528
R-squared	0.040	0.066	0.274	0.208

Standard errors in brackets

+ p¡0.15, * p¡0.10, ** p¡0.05, *** p¡0.01

Note: The unit of analysis is a county. Converts per capita and *jinshi* per capita are calculated as converts and *jinshi* per 1000 people in 1920. College students per capita are calculated as students per 1,000,000 people. We choose different calculation methods for the density of college students because only a small fraction of people received higher education in the Republican era. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude,elevation (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Table 10: Women's Educational Attainment, Labor Force Participation and Fertility Rate in the Long-run

	Second Stage				
	Share of Women with Higher Education	Years of Schooling for Women	Share of Women in High-skill Sector	TFR	Age at First Marriage
	(1)	(2)	(3)	(4)	(5)
Ln(Converts per capita+1)	5.627***	1.763***	1.088**	-0.641**	-0.0543
	[1.828]	[0.349]	[0.416]	[0.210]	[0.314]
Ln(Catholic Station per capita+1)	220.5*	59.92*	35.64	-3.446	37.54
	[114.9]	[30.13]	[29.85]	[15.65]	[25.26]
Ln(Per capita GDP in 2000+1)	-1.776**	-0.115	-0.271*	0.0171	-0.160
	[0.715]	[0.165]	[0.150]	[0.0392]	[0.147]
Ln(Number of Jinshi per capita+1)	-0.759***	-0.0955*	-0.136***	0.0407+	0.00340
	[0.197]	[0.0442]	[0.0418]	[0.0261]	[0.0580]
Geographic Controls	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes
Observations	325	325	325	325	325
R-squared	0.070	0.040	0.047	-0.442	0.181

Standard errors in brackets

+ p¡0.15, * p¡0.10, ** p¡0.05, *** p¡0.01

Note: The unit of analysis is a county. The share of women with higher education is defined as the share of women who had 2-year college or higher education status among all women over age 21 in this county. The sample for calculating years of schooling is restricted to people age 18 or older. The skilled occupation is defined as the sector where the mean education status for employees is 2-year college or higher. The share of women in the skilled occupations is the share of women employed by the skilled occupations among all women aged 18 to 60 in this county. TFR is the total fertility rate in 2000, directly calculated as the sum of age-specific fertility rates (women aged 15 to 49 years). For calculating the age at first marriage, we focus on people aged 15 to 50 years. Geographic controls include latitude of the centroid of the county, longitude of the centroid of the county, interaction of latitude and longitude,elevation (in logs). Historical controls include distance to provincial capital (in logs) and chaste women per 1000 people (in logs). Standard errors are clustered at the province level. ***, **, * mean statistical significance at 1, 5, and 10 percent levels.

Figures

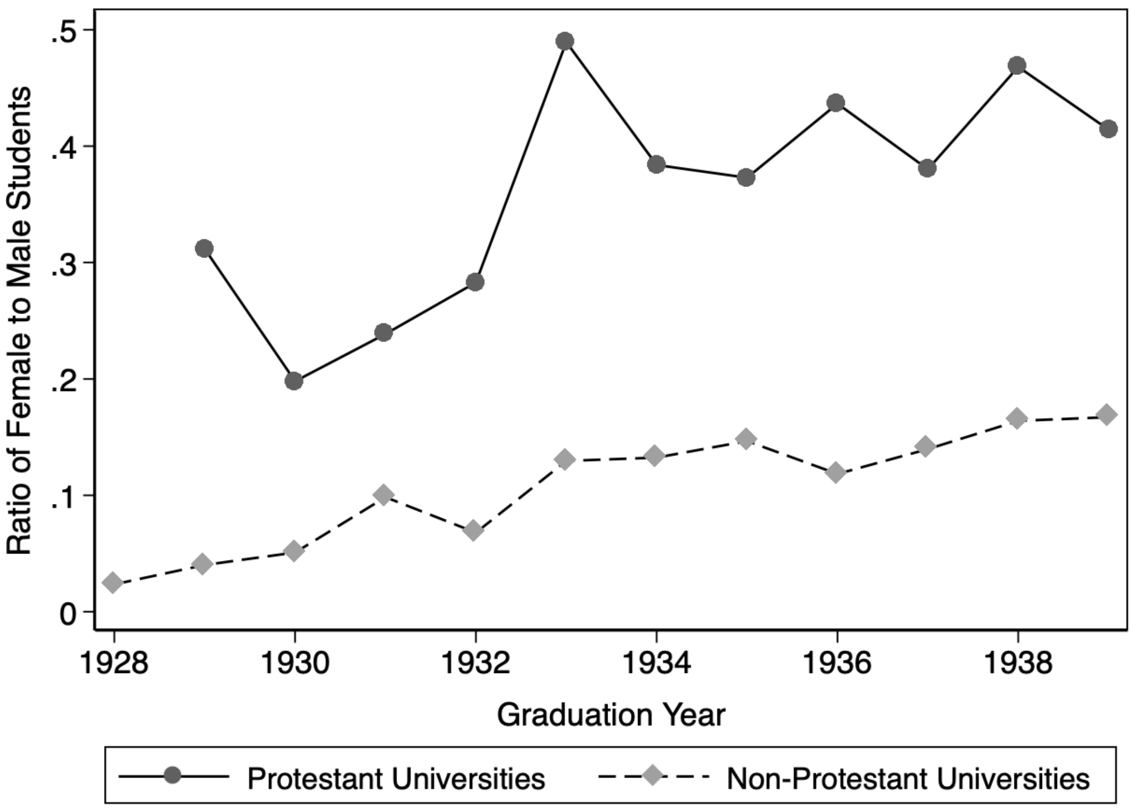
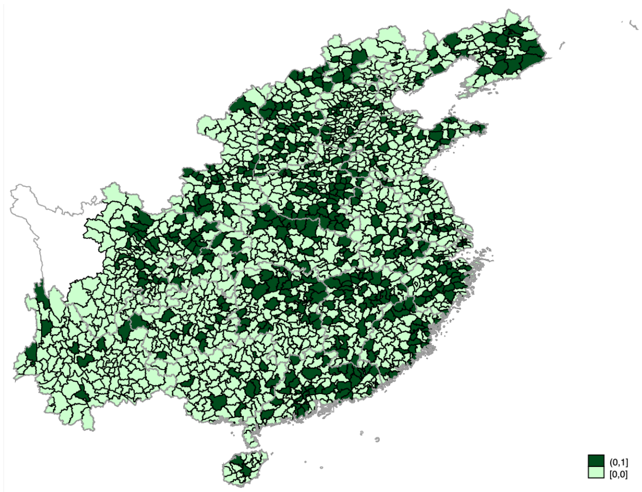


Figure 1: Gender Ratio in Protestant Universities and Non-Protestant Universities

Note:This graph depicts the ratio of female to male students in Protestant universities and other universities in each graduation year. A student is counted in graduation year t if he graduated from university in year t. Considering the extremely high share of women in Normal school, we exclude the samples in Peking Normal University.
Data source: the students yearbook sample.

(a) Protestant Station Presence



(b) Protestant Coverts' Density

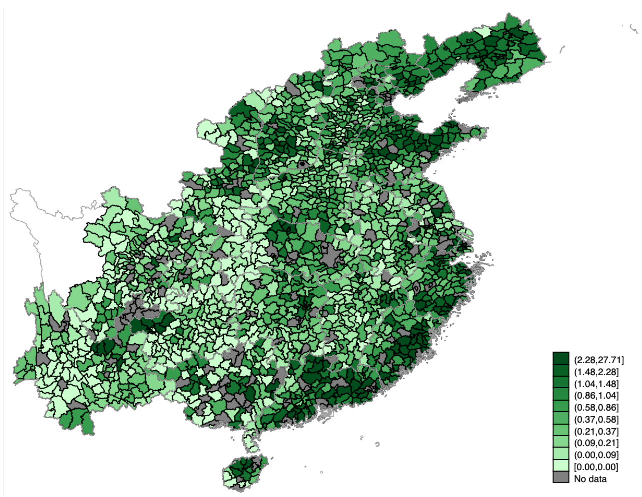


Figure 2: Locations of Protestant Missions

Note: Protestant station presence is an indicator variable of whether this county had Protestant station in 1920. Protestant convert's density is measured by converts per 1000 people.

Data source: the *Directory* and the *COC*.

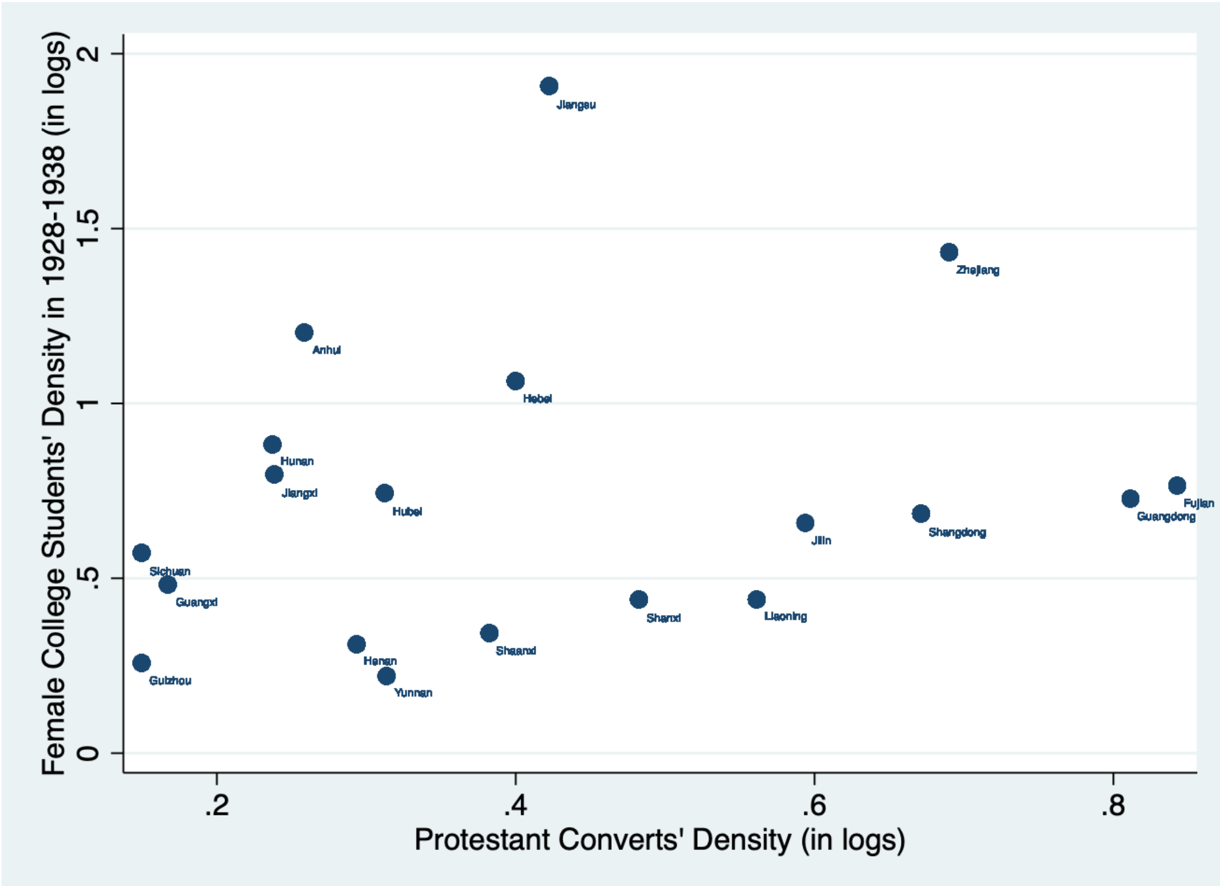


Figure 3: Density of Protestant Converts and Female College Students

Note: The female college students' density (in logs) is the logarithmic form of female students with higher education per million people between 1928 and 1938 in this province. Protestant converts' density is measured by the logarithmic form of Protestant converts per 1000 people in 1920.
Data source: the the students yearbook sample and the *COC*.

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A Appendix

Table A1: Settlement of Protestant and Catholic missions

	Selection on Catholic Mission	Selection on Protestant Mission
	(1)	(2)
main		
Latitude	-0.0445	0.0466
	[0.0321]	[0.0502]
Longitude	-0.0346	-0.00555
	[0.0528]	[0.122]
Distance to Coastal Line (in logs)	-0.00119	0.259
	[0.150]	[0.146]
Distance to Treaty Port (in logs)	0.0836	-0.552*
	[0.257]	[0.272]
Number of Jinshi per capita (in logs)	0.627	2.478*
	[0.831]	[1.233]
Distance to Yangtze River (in logs)	0.170	0.0211
	[0.192]	[0.172]
Distance to Grand Canal (in logs)	0.166	0.444*
	[0.215]	[0.217]
ln_dist_provcap_local	-0.302	-0.458
	[0.167]	[0.301]
ln_elevation	-0.271**	-0.112
	[0.0837]	[0.0907]
ln_pc_chastity_wid_tot	0.508***	-0.158
	[0.151]	[0.305]
ln_dist_SJ	-0.166	-1.675
	[0.436]	[1.349]
Observations	232	232

Standard errors in brackets

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A2: Compare the Mean Value of Variables between Treaty and Non-treaty Counties

	(1)	(2)	(3)
	Treaty port	Non Treaty port	Diff
Ln(Female College Students per capita in 1930+1)	1.228	1.233	0.00518
	(13.43)	(13.86)	(0.04)
Ln(Male College Students per capita in 1930+1)	2.936	2.854	-0.0819
	(27.63)	(28.70)	(-0.56)
Ln(Female Protestant College Students per capita in 1930+1)	0.649	0.518	-0.131
	(8.90)	(7.80)	(-1.32)
Ln(Male Protestant College Students per capita in 1930+1)	1.205	0.989	-0.216
	(13.01)	(12.36)	(-1.76)
Ln(Number of Jinshi per capita+1)	0.109	0.121	0.0118
	(11.92)	(12.04)	(0.87)
Ln(Distance to Nearest University+1)	5.085	4.970	-0.116
	(66.38)	(87.82)	(-1.21)
Ln(Distance to Coastal Line+1)	4.293	4.419	0.126
	(33.57)	(36.64)	(0.71)
Ln(Distance to Yangtze River+1)	4.682	4.188	-0.494
	(26.18)	(24.27)	(-1.99)
Ln(Distance to Grand Canal+1)	5.693	4.901	-0.792
	(40.73)	(32.21)	(-3.84)
Ln(Number of Chaste Women per capita+1)	0.145	0.158	0.0124
	(14.74)	(16.35)	(0.90)
Observations	188	183	371

t statistics in parentheses

Table A3: County-level Analysis: OLS Estimation for Subsample

	Ln(Female College Students per capita in 1930+1)		Ln(Female Protestant College Students per capita in 1930+1)	
	(1)	(2)	(3)	(4)
Ln(Converts per capita+1)	0.215	0.123	0.349**	0.281*
	[0.148]	[0.141]	[0.136]	[0.136]
Ln(Catholic Station per capita+1)	-0.245	-2.416	-18.50	-26.67
	[18.03]	[7.268]	[21.71]	[18.46]
Ln(Number of Jinshi per capita+1)		2.318***		1.368***
		[0.460]		[0.328]
Province FE	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Historical Controls	No	Yes	No	Yes
Observations	371	371	371	371
R-squared	0.397	0.455	0.267	0.318

Standard errors in brackets

+ p¡0.15, * p¡0.10, ** p¡0.05, *** p¡0.01

Table A4: County-level Analysis:OLS Estimation for Long-run

	Share of Women with Higher Education	Years of Schooling for Women	Share of Women in High-skill Sector	TFR	Age at First Marriage
	(1)	(2)	(3)	(4)	(5)
Ln(Converts per capita+1)	0.215***	0.107***	0.128***	-0.00359	0.0376
	[0.0556]	[0.0304]	[0.0333]	[0.0371]	[0.0460]
Ln(Catholic Station per capita+1)	8.697***	0.311*	-0.696***	-0.315*	1.406***
	[0.367]	[0.164]	[0.245]	[0.172]	[0.255]
Ratio of men with higher education	0.756***				
	[0.0126]				
Years of schooling for men		1.088***			
		[0.0358]			
Share of men in sectors requiring higher education			0.602***		
			[0.0495]		
Age at first marriage for men					0.667***
					[0.0275]
Ln(Per capita GDP in 2000+1)	0.123	0.175***	0.0416	-0.0932***	0.0424
	[0.0723]	[0.0419]	[0.0321]	[0.0323]	[0.0435]
Ln(Number of Jinshi per capita+1)	0.0352	0.0173	0.00234	-0.00301	0.0150
	[0.0207]	[0.0102]	[0.0113]	[0.00869]	[0.0189]
Ln(Distance to Nearest University+1)	0.174	0.0718	0.0162	0.0621**	-0.000485
	[0.139]	[0.0759]	[0.0526]	[0.0299]	[0.0839]
Geographic Controls	Yes	Yes	Yes	Yes	Yes
Historical Controls	No	No	No	No	No
Province FE	Yes	Yes	Yes	Yes	Yes
Observations	1707	1707	1707	1707	1707
R-squared	0.937	0.903	0.563	0.400	0.807

Standard errors in brackets

* p¡0.10, ** p¡0.05, *** p¡0.01