

EMRE AMASYALI

*Indigenous Responses to Protestant Missionaries:
Educational Competition and Economic Development in Ottoman Turkey*

Abstract

In recent years, a growing literature has claimed that there is a strong and consistent association between the presence of historic missionary societies outside Europe and positive long-term socio-economic outcomes. Yet, most of these studies fail to specify whether this finding is the result of missionary investment in human capital or of local actors stepping up their educational efforts in reaction to missionary activities. This article uses the example of Protestant missionary activity in Ottoman Turkey to separate these two mechanisms. The Ottoman state and the Armenian population responded to missionary incursions by modernizing and expanding their educational efforts. However, after the foundation of the Republic and of modern Turkey, most of the missionary schools were closed and the Armenian population was dramatically reduced. Using the blockage of direct effects, this study confirms the role that indirect effects or emulation has played in Ottoman Turkey. Results show that places with historically heightened competition between missionary schools and native educational institutions are more likely to have a higher income, as measured by night-time light density.

Keywords: Ottoman Empire; Protestant Missionaries; Human Capital; Historical Development; Historical GIS.

Introduction

HISTORY is universally recognized as “mattering” in some way. The questions of how and why it matters have come under renewed scrutiny from a dynamic new empirical literature that examines historical events as crucial determinants of current social and economic outcomes (see Nunn 2014a for a literature review). A growing number of works within this historical turn highlight a strong and consistent association between the presence of historic missionary societies outside Europe and positive long-term socio-economic outcomes. Much of this scholarship claims that missionaries fostered the accumulation of human capital and affected long-term economic development through their investment in schooling, vernacular texts, and book production. Yet qualitative historical case studies of missionary societies also demonstrate that they spurred local populations to invest more in education as a way of counteracting the influence of those missionaries (e.g., Deol 2000; Sharkey 2013). Hence, it is not clear whether the established relationship in the literature is the outcome of missionary investment in human capital or of local populations who intensified their investment in education as a reaction to missionary endeavours. Separating these two effects is a daunting task, given the scarcity of historical data. Yet, it is not impossible. One way of separating these influences is to explore the long-term impact of missionary

influence in pluralistic educational markets where the direct beneficiaries of missionary education are no longer present.

The educational landscape of Ottoman Turkey presents us with one such situation. American Protestants gained a foothold in the Ottoman Empire in the 1820s and established a notable number of schools catering primarily to the Ottoman Armenian population. However, following the founding of the Turkish Republic, the majority of missionary schools were forced to shut down.¹ Moreover, as a result of the ethnic violence and population movements that took place during the transition from empire to nation-state, the majority of the Armenian population of Ottoman Turkey (Eastern Thrace and Asia Minor) were either killed or displaced. In other words, the two main channels of direct missionary investment—supply of schools and intergenerational transmission of human capital—were blocked, giving us a situation well suited to exploring the indirect effects resulting from Muslim reactions to missionary influence.

For this case study, I construct an original historical Geographic Information System (GIS) dataset containing the geocoded locations of Protestant missions and Armenian community schools alongside the distribution of Ottoman government schools that were operational within the borders of modern-day Turkey between the years 1820 and 1914. In line with recent research, I use the district's average satellite-recorded data on night-time light density (i.e., luminosity) as a proxy for district-level economic development.² Using this novel dataset, I fail to find evidence that missionary involvement in Turkey is associated with economic development. This is not surprising, given that the majority of the missionary schools and the populations they catered to are no longer present. Rather—relying on an index of market concentration as a proxy for educational competition—I find that the places that *historically* had heightened competition between missionary schools and native educational institutions are more likely to have higher income. These findings allow us to interrogate the established assumptions about missionary presence and historical development. They also provide a theoretical framework for examining the strategic

¹ The 1924 Law of Unity of Education (Tevhid-i Tedrisat Kanunu) centralized, nationalized, and secularized schooling, rendering the religious education offered at missionary schools illegal. A subsequent law, passed in 1931, mandated that Turkish citizens were only to attend Turkish primary schools. As a result, all but four of the high schools in Ottoman Turkey connected to Protestant missionaries ceased operating.

² Satellite-recorded data on night-time lights from the surface of the Earth are overwhelmingly generated by human activity. In recent years, satellite images of night-time light density have been used in different socio-economic studies to estimate economic development at the national and subnational levels [e.g., HENDERSON, STOREYGARD and WEIL 2012; MICHALOPOULOS and PAPAIOANNOU 2013]. Several studies examining the legacy of missionary societies have also relied on luminosity as a measure of subnational economic development [e.g., CASTELLÓ-CLIMENT, CHAUDHARY, and MUKHOPADHYAY 2017].

adaptation of indigenous actors to missionary activity, especially in parts of the world that avoided Western colonialism.

The paper is organized as follows. I begin, in Section II, by describing the conceptual framework underlying the article. This section focuses on missionary investment in human capital and its links to economic development. Section III then traces the development of standardized education for different ethno-religious groups in the Ottoman Empire, paying special attention to how their conflicts and interactions with each other shaped this evolution. In so doing, this section offers qualitative evidence into how missionary activities shaped educational expansion through local reactions and competition. In Section IV, I provide a GIS analysis exploring how missionary educational activities affected economic development. I begin by describing my GIS dataset for Ottoman Turkey. This original dataset, which is one of the first rigorous attempts to develop a GIS dataset for the Ottoman Empire and its successor states, combines contemporary survey data, geographic data, and data from historical records. It also includes three separate competition indices calculated for each district using the number of Muslim and Christian schools in Ottoman Turkey. Using this dataset, I report OLS estimates of the relationship between nineteenth-century schooling and economic development today, examining variations across districts. In the final part of Section IV, I turn to the issue of causality and mechanisms. Finally, Section V offers concluding thoughts.

Missionaries, Gender Inequality, and Economic Development

My proposed causal mechanism linking missionary involvement to modern growth draws on studies of human capital and economic development. Economists have long identified human capital as a key driver of economic prosperity [Schultz 1961]. Building on this insight, a growing literature has found that regions with more intense exposure to missionaries have significantly higher levels of economic development [Bai and Kung 2015; Caicedo 2018; Boateng *et al.* 2019; Bolt and Bezemer 2009; Castelló-Climent, Chaudhary, and Mukhopadhyay 2017]. It has been suggested that the educational institutions established by missionaries in the past proliferated human capital and affected long-term economic development. Such arguments find support from studies showing that early educational investments, once established, create substantial persistence in educational levels across several cohorts through a combination of intergenerational transmission of human capital and agglomeration effects [Engerman, Mariscal, and Sokolof 2009; Gallego 2010].

Not all missionary orders had the same impact, though. Several recent studies demonstrate that Protestant missionaries had a greater influence on female education than Catholic missionaries. Following the principle of *sola scriptura*, Protestants sponsored both male and female literacy in order to enable individuals to read the Bible for themselves. Using data from the first Prussian census of 1816, Becker and Woessmann [2008] show that Protestantism was associated with a smaller gender gap in education. Meier zu Selhausen [2019] also demonstrates that enrolment was more equally distributed between the sexes in former British-ruled colonies in Africa, and credits Protestant missionaries for this outcome. This line of thinking is corroborated by Nunn [2014b], who finds Protestant mission presence during the colonial era Africa has benefited the present-day education of women relative to men.

Such findings have important policy implications for contemporary nation-states; not only because they demonstrate the origin of social inequalities, but also because empirical studies recognize that gender parity in education is significantly and positively related to economic growth [Klasen and Lamanna 2009; Knowles, Lorgelly and Owen 2002; Benavot 1989]. Accordingly, one explanation for the established association between Protestant missionary activity and economic development could be evangelical efforts to expand female education. Scholars propose several different mechanisms for the connection between gender parity and development. Knowles, Lorgelly, and Owen [2002], for example, suggest that investment in female and male schooling has declining marginal returns; hence, a more balanced distribution will produce higher GDP per capita. Others argue that reducing gender inequality in education may also cut down fertility [Benavot 1989], the argument being that this leads to a reduction in population growth and an increase in investment, both of which promote economic growth. Finally, women are more likely to devote their resources to the education and health of their children; thus, a mother's education can be much more consequential for the expansion of education for the next generation [Currie and Moretti 2003].

In missionary studies, moving beyond the simple recognition of denominational difference, some researchers have also begun to acknowledge that the rivalry between Catholic and Protestant missionary orders may have played a key role in determining long-term socio-economic outcomes. Trejo [2009], for example, finds that religious competition between Catholic and Protestant orders was a strong predictor of contemporary indigenous mobilization in Mexico. Gallego and Woodberry [2010] illustrate how the educational activities of missionaries were more productive in places where multiple missionary orders were allowed to vie for the conversion of native people. Anecdotal evidence suggests that parents took the quality of mission schools into account when deciding where to send their children [Berman 1974]. As a result, the available evidence suggests

competition fostered innovation, as both sides were incentivized to adopt educational technologies introduced into the schooling system [Bassey 1999].

Although past studies have identified interdenominational rivalry as an important intervening factor, the competition between indigenous actors and missionaries has seldom been addressed in quantitative studies of missionary societies. As a result, scholarship endorses a narrative that characterizes local populations as passive recipients of missionary technologies. One study that accounts for local actors is that of Lankina and Getachew [2013], who demonstrate that competition between different religious groups in Kerala triggered the expansion of the provision of female education by native reformers. This shows that the emulation or reflex dynamic identified in studies of interdenominational Christian competition can similarly be extended to indigenous actors. Single-country case studies of missionary societies in places with long-standing histories of statehood also support this view and draw attention to the conflict between missionaries and indigenous actors. Most such studies recognize that the educational, voluntary, and political organizations established by Protestants encouraged native communities to form their own organizations [Deol 2000; Dunch 2001; Sharkey 2013].

These studies show that competition or emulation is a potentially important and neglected pathway through which missionaries could have given rise to local human capital. Yet, the greater part of the quantitative literature emphasizes what I call direct effects; that is, a range of activities that spawned human capital via immediate contact with missionaries. The arguments falling under this heading most commonly emphasize the diffusion of useful knowledge [Bai and Kung 2015; Cagé and Rueda 2016; Waldinger 2017] and investment in schooling infrastructure [Calvi, Mantovanelli, and Hoehn-Velasco 2019; Bolt and Bezemer 2009; Castelló-Climent, Chaudhary, and Mukhopadhyay 2017; Waldinger 2017; Wietzke 2015] as the two key mechanisms by which missionaries impacted long-run economic development.

As discussed above, a number of studies have also begun to recognize indirect channels, specifically the role of competition or emulation in popularizing the educational innovations introduced by Protestant missionaries for broader segments of the population [Lankina and Getachew 2013; Gallego and Woodberry 2010; Woodberry 2012; Trejo 2009; Woodberry and Shah 2004; Wantchekon, Klašnja, and Novta 2014]. To date, there has been no attempt to measure the effects of these two channels separately. One reason for this is that it is often hard to disentangle the direct effects of missionary education from its indirect effects, due to the scarcity of historical data. One way to do so is to explore the consequences of missionary activities in places where missionaries and their target populations are no longer present.

The present article examines whether educational competition in the Ottoman has left a legacy in terms of the subnational variations in economic development in Turkey today. The competitive Ottoman school system popularized education and incentivized indigenous actors to copy the pedagogic innovations introduced by Protestant missionaries, and thereby could have contributed to the proliferation of human capital and subsequent growth. The Armenian Patriarchate and Ottoman state fought the efforts of Protestant missionaries by expanding their own efforts to modernize their school systems and bring education to the masses. In a similar pattern to that found in other parts of the world, missionaries popularized and advanced the cause of educating women across religious lines [Alan and Bolat 2011]. In improving the gender parity in education, they might also have contributed to greater development.³

A study of missionary activities among Ottoman Armenians provides particularly powerful insight into potential indirect effects because of the subsequent destruction and removal of the Armenian population. Indeed, with the disappearance of the Armenian population, any direct effects missionaries had had on economic development through human capital formation also disappeared. Yet their indirect effects may have persisted, despite the extermination of the bulk of the Armenian population and closure of the majority of missionary schools. Firstly, this is because, similar to the Armenian Patriarchate, Ottoman authorities felt threatened by missionaries, and Ottoman state schools responded to their incursion. Public education was standardized and expanded to the provinces as a reaction to the comparatively superior quality of both missionary and indigenous Christian education [Deringil 1998; Fortna 2002]. A second reason is that, following the episodes of ethnic violence that killed and displaced much of the Armenian population, much of that population's abandoned property was used to compensate for the inadequacies in the educational supply of Muslim schooling.⁴ This included not just school buildings or monasteries, but also school benches, blackboards, book cabinets, and even paper and pens. Thus, many of the Armenian schools that had been built to counter Protestant missionary efforts were, in effect, turned into government schools. In this way, missionary-triggered competition also equipped the Ottoman and Turkish state with additional education resources. I explore these potential causal mechanisms in the historical background and statistical analysis sections that follow.

³ Yumusak, Bilen, and Ates [2013] find that gender inequality in the period 1968–2006 hindered economic development in Turkey. I investigate this link further by taking a longer-term view of the consequences of gender inequality.

⁴ The regulation of 8 November 1915 concerning abandoned property (Emval-i Metruke) stipulated that the Ministry of Education had the right of use of any building or object connected to education that had been left behind by Armenians [Üngör and Polatel 2011].

Historical Background

The Ottoman Empire experienced growing foreign intervention into its domestic affairs throughout the long nineteenth century. Empowered by capitulations and unequal treaties, Western powers penetrated deep into the Ottoman lands and established a staggering number of schools catering to indigenous non-Muslim communities. Among the most significant entrants into this thriving Ottoman educational landscape were the Protestant missionaries of the American Board of Commissioners for Foreign Missions [ABCFM]. Inspired by the evangelical zeal of the Second Great Awakening (1795–1810), the ABCFM opened its Middle Eastern chapter with the aim of converting the Holy Land’s Muslims and Jews. These early attempts, however, were unsuccessful and led to a reappraisal of the Board’s original goals and a reorientation of its evangelizing efforts towards Ottoman Armenians. The American Board concentrated on printing-, educational-, and health-related investments in order to convert local populations. Yet these proselytizing efforts encountered significant obstacles due to mass illiteracy in Ottoman society, and ultimately forced the missionaries to prioritize their educational work [Dwight 1850: 22, 30].

When ABCFM missionaries first started surveying Ottoman territories, they encountered a localized and rudimentary educational system devoid of most contemporary developments in pedagogy [Smith and Dwight 1834: 65]. Schooling for women was practically non-existent, and the few centres of learning that were in operation served to train religious officials. Thus, when the first Protestant missionary school in the capital opened in 1834, it was one of the first institutions to offer a “variety of learning as eastern and western languages, with arithmetic, bookkeeping, geography, zoology, physics, astronomy, and theology” [Arpee 1909: 97]. Over the next few decades, the missionaries introduced a host of educational innovations into the Ottoman education system, such as the Lancaster method, science laboratories, a programme for girls, co-education, and kindergartens [Stone 1984].

The ABCFM began occupying Armenian population centres in the interior of the country in the 1830s and built an expansive network of schools, structured at various levels, over a short span of time. By the turn of the century, the Board had an impressive tally of 132 high-grade and 1,134 lower schools, with a total of 60,964 pupils under instruction in Asiatic Turkey [Dwight, Tupper, and Bliss 1904: 31]. The rapid expansion of missionary schools was met with resistance from both the Armenian Apostolic Church and the Ottoman state. However, evangelical activities also compelled these indigenous actors to step up their educational work in order to match the foreign competition. Commenting on educational development in Asia Minor, Elias Riggs writes:

Armenians, Greeks, and Jesuits vie with one another in setting before ambitious youth

the glittering advantages of their several school systems. Sweeping reforms have been introduced into the national educational organizations, and numerous crude efforts have been made in the line of private schools. But beyond all competition the first place in the scale of excellence and success is assigned, though unwillingly, to the schools established by the American Protestant Missionaries, or under their influence and guidance by natives. This is grudgingly but inevitably acknowledged by even the public officials and jealous ecclesiastics, albeit with sundry grindings of the teeth and muttered imprecations. [Riggs 1886]

Armenian ecclesiastical authorities made sure that missionary influence was counteracted through the construction of new Gregorian schools.⁵ According to a survey conducted by the Armenian Patriarchate, there were only 115 schools located in the provinces in 1834 [Young 2001: 97]. Under the influence of the Tanzimat Reforms, and partially in reaction to the presence of missionaries, this number would quadruple over the next 40 years. As one missionary notes, Protestant schools exerted a “reflex influence on the Armenian schools, increasing both their number and their value” [ABCFM 1861: 304].

Most of these educational institutions have not survived to the present day. On the eve of World War I, the Armenian community possessed 1,996 schools with around 173,000 students [Kévorkian and Paboudjian 2012: 64]. Today, there remain no functional Armenian schools in Turkey outside Istanbul.⁶ After the Armenian Genocide, a good number of Armenian schools were commandeered under the Law of Abandoned Properties (*Emval-i Metruke*) and transferred to the Ministry of Education [Üngör and Polatel 2011].⁷ The Turkish Republic capitalized on the consequences of Armenian–Protestant rivalry by usurping “abandoned” Armenian schools. Hence, missionary-led competition furnished the Turkish state with additional educational resources and accordingly could be said to have resulted in a larger generation of human capital and economic growth. This is one way in which educational competition could have affected the nation’s later development.

⁵ Missionary efforts among the Armenian community were met with concern by ecclesiastical authorities. Protestants were extreme in their theological critique of Gregorian traditions and practices. They challenged the unifying power of the Armenian Church and threatened to cut into its valuable tax base. Thus, beginning in 1839, the Armenian Patriarchate started issuing a series of anathemas against members of the Gregorian Church who were known to have had dealings with Protestant missionaries [DWIGHT 1850: 186–188]. In the context of the ecclesiastic-civil organization of the millet system, these bulls translated into a loss of all rights, legal status, and total banishment for the emergent Protestant community.

⁶ According to a 2012 survey, there are 16 Armenian schools in Istanbul, with approximately 3,000 students [POLATEL *et al.* 2012].

⁷ To give one example, an Educational Inspection Review conducted in the province of Mamuratülaziz in the year 1916 discovered that 13 out of the 62 schools inspected during the period in question had been founded on property left behind by Armenians [GENÇOĞLU 2014]. Due to insufficient data, it is not possible to ascertain the nationwide total of Armenian properties that were converted into Turkish schools. Yet, archival evidence suggests that confiscation and repurposing of Armenian schools as public educational institutions was not an isolated phenomenon and occurred regularly across the country [ÜNGÖR and POLATEL 2011: 70–71, 82–83, 121, 125, 131, 145; DURMAZ 2015: 845].

Rivalry in the school system also had implications for the expansion of Ottoman public education. The Ottoman state was an active player in the educational system and had to adapt to the incursion of Protestant missionaries and the differential rates of modernization in the education of its Muslim and Christian subjects. This next section will outline how the Porte⁸ responded to both challenges.

Ottoman Reactions

During the Tanzimat Period (1839–1876), education took centre stage as a tool with which to reform society and as a way to socialize the population into the newly inaugurated idea of Ottoman citizenship. Despite the financially precarious position the Ottoman Empire found itself in in the nineteenth century, the imperial bureaucracy mobilized a great deal of resources to realize its educational vision. These initiatives culminated in the 1869 Regulation of Public Education (Maârif-i Umûmiyye Nizâmnamesi, RPE), a watershed moment in Ottoman attempts to institute an empire-wide compulsory modern public education system [Somel 2001]. The RPE systematized previous efforts and called for a centrally planned Ottoman education system that separated schooling into five distinct tiers: (1) *sıbyan/ibtidâî* (primary), (2) *rüşdiyye* (upper primary), (3) *idadîye* (secondary school), (4) *sultanîye* (upper secondary), and (5) *âliye* (higher education). According to the plan, schools of the first three levels were to be opened in each village, town, or quarter of a stipulated population, while *sultanîyes* were to be present in each vilayet capital [Evered 2012: 205–246].

The Ottoman public education system that crystallized in the latter half of the nineteenth century was a partial imitation of, and a reaction to, American facilities [Deringil 1998: 112–134; Fortna 2002]. The first generation of missionaries were welcomed by the Ottoman state as respected educators. During the 1830s, missionary Rev. William Goodell aided the establishment of Lancaster-style schools⁹ for the Ottoman military by providing them with the appropriate curriculum, textbooks, and other essential materials [Stone 1984: 47; Aksu 2008]. The amicable relationship between the American Protestants and the Porte began to deteriorate, however, in conjunction with the remarkable missionary expansion that took place over the course of the second half of the nineteenth century. The Ottomans started to suspect these schools of playing a role in inciting local populations to rebel. On top of this, the Ottoman state was worried that Muslims were falling behind non-Muslim subjects in matters of education. The missionary schools provided a higher quality of schooling than other institutions, and thus were successful in attracting many

⁸ The Porte (or Sublime Porte) is a term used to describe the central government of the Ottoman Empire.

⁹ These types of schools were founded in England during the eighteenth century by schoolmaster Joseph Lancaster (1778–1838). The schools operated on the principle of using brighter students as monitors to teach fellow pupils. The Lancaster system was adopted as a cost-effective way of teaching a large number of students.

Ottoman subjects. Provincial governors frequently lamented the incursion of missionaries and urged the central government to intervene to curtail missionary activities. Prominent Ottoman reformer Midhat Pasha's evaluation of the condition of education in Syria is representative of the anxieties of state officials at the time:

Whereas, on the one hand, the non-Muslims acquire a solid knowledge of crafts and literature in the various French, British and American schools, on the other hand, the Muslim population constituting about 80 percent of the population in the province is left in ignorance... In some of the towns there is only an old secondary school, but no primary schools, let alone any higher-level institutions. [quoted in Sakaoğlu 1985: 481]

Following the 1869 Regulation of Public Education, the Ottoman government tried to contain the growing presence of missionary activity in the empire by requiring all foreign schools to carry permits and to submit their curricula and teachers for public inspection [Şahin 2011]. Yet the realization on the part of the government that they could not close down all missionary schools led to a concerted effort to improve the quantity and quality of Muslim schools [Alan 2008: 388; Deringil 1998: 131]. In 1905, the governor of Beirut wrote that the only way to “ensure that Muslim children are saved from the harmful clutches of the Jesuits and Protestants [in this city] is for there to be established a network of modern schools capable of competing with them” [quoted in Deringil 1998: 131]. The next section will investigate whether this rivalrous dynamic has had long-lasting socio-economic ramifications.

Statistical Analysis

To systemically examine how Ottoman-era educational competition may have had long-term impacts on economic development, I construct a district-level dataset that allows me to exploit the spatial variation in the development of education in Ottoman Turkey for the period 1820–1914. I combine this with a competition index that allows me to map the variations in the rivalrous educational environment down to the district level. Spatial analysis techniques have become an increasingly popular method for examining the impact of historical missionary societies on modern society [e.g., Calvi and Mantovanelli 2018; Waldinger 2017; Castelló-Climent, Chaudhary, and Mukhopadhyay 2017]. Specifically, they enable researchers to combine spatial representation of substantive information from various eras, which is critical to understanding the legacies of historical institutions. In the remaining section, I will describe the variables I employ in my empirical analysis.

Data

– 1893 Census and Administrative Divisions

The first step of my data creation process was to transcribe Ottoman census data, creating the geographical component of the administrative boundaries, and linking the census and administrative information through ArcGIS software. My population data was obtained from the Ottoman census conducted between 1881 and 1893 [Karpas 1985]. I exclude regions that fall outside of the modern national boundaries of Turkey as well as the Sanjak of Kars, which was occupied by Czarist Russia between 1878 and 1918.

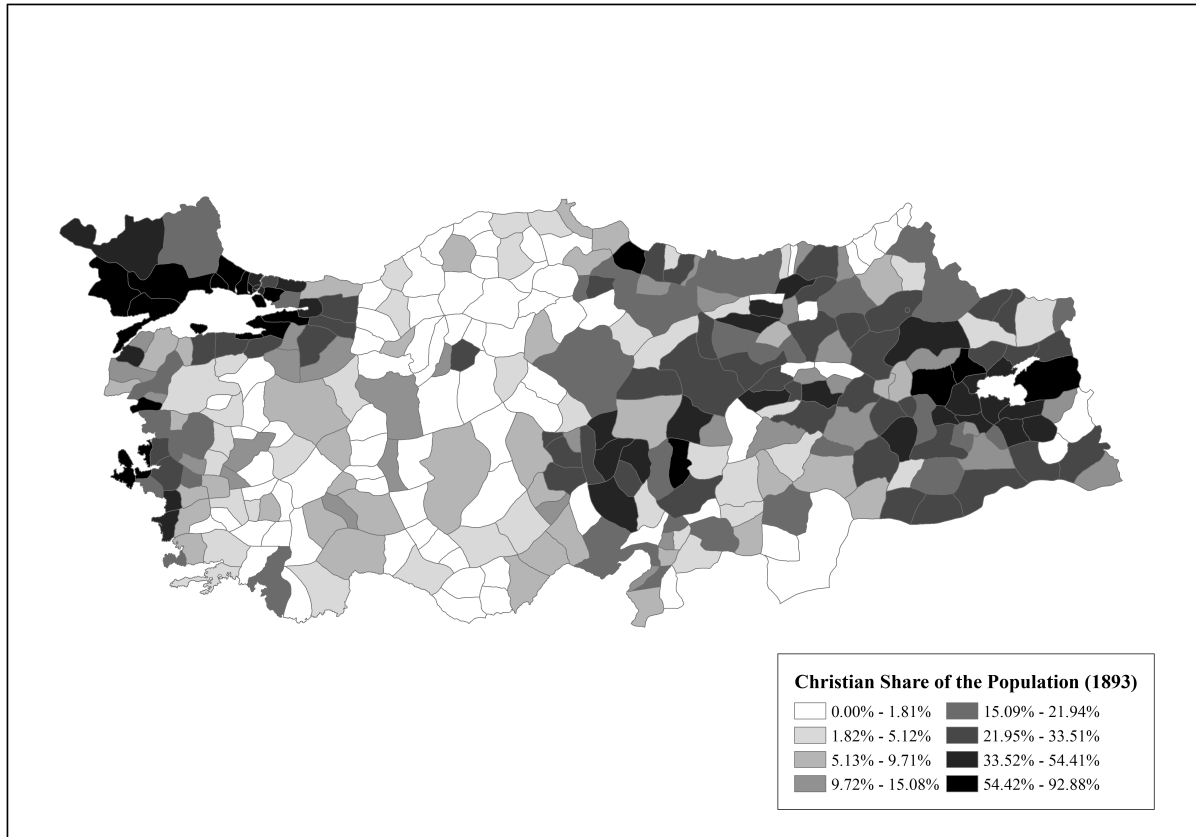
It should be noted that the Ottoman census, like any historical survey, is susceptible to and includes errors made during either tabulation or collection. Yet, despite these errors, the data contained within the 1893 census are recognized as providing the most reliable population figures for the nineteenth century [Elibol 2007; Karpas 1985]. It is the first census to count both males and females and predates the episodes of large-scale violence that drastically altered the ethno-religious make-up of the region. The questions asked by enumerators during these years provide an invaluable demographic resource for the time, detailing the gender and ethno-religious structure of the population within each district or *kaza*.¹⁰ I sort my data into the three spatial levels used in the 1893 census: (1) *vilayet* (province), (2) *sanjak* (subprovince), and (3) *kaza* (district). Arbatlı and Gökmen [2018] find that the Christian share of the population is correlated with economic development in Ottoman Turkey; accordingly, I calculate this measure for each *kaza* and control for this variable in my statistical analysis.

This demographic data is aligned with geographical information from a political map of the Ottoman Empire produced by R. Huber [1899]. The original map was created using modern surveying methods and displays, among other things, administrative divisions, railways, carriageways, and major ports of the Ottoman Empire. I georeferenced the digitized image of the map to the surface of the earth and fitted it to a modified “TUREF / LAEA Europe” coordinate system. Based on this, I manually traced the *kaza* borders in ArcGIS and generated 332 boundary shapefiles linked through an upward hierarchy of census geography to *sanjak* and *vilayet*. Figure 1 presents the share of the Christian population in Ottoman Turkey according to the administrative district boundaries of the 1893 Ottoman census.

¹⁰ There are a few districts in the 1893 census for which the population information is unavailable. To supply this missing information, I rely on *vilayet salnames* (provincial yearbooks) that were produced in around the same period.

FIGURE I

Christian share of the population in Ottoman Turkey (1893)



Source: The 1881–1893 Ottoman Census

Historical School Data

– Protestant Missionary Stations and Schools

The main source of information on the locations of Protestant missions in Ottoman Turkey consists of the annual reports, letters, and diaries housed at the ABCFM archives at Houghton Library. Based on individual station names, I found the exact geographical coordinates of Protestant missions with the help of a few sources. If the mission station had become a present-day locality, I found its geographical coordinates using online geocoding tools. More often, former missions had changed their names or ceased to exist. The missionaries predominantly operated in Armenian villages and the names of these villages were altered during various nation-building attempts in the Late-Ottoman and Turkish Republican periods. In these cases, I consulted Kévorkian and Paboudjian's encyclopedic work – *1915 Öncesinde Osmanlı'da Ermeniler* [Armenians in the Ottoman Empire before 1915] – which includes maps, locations, and names of Armenian villages during the Ottoman era. In addition, I also consulted *Index Anatolicus* (<https://nisanyanmap.com/>), an online map that catalogues current and historic place names within the borders of Turkey. Using

both these sources, I successfully geocoded 420 historical mission stations and out-stations, corresponding to around 97% of the missionary stations referenced in ABCFM annual reports.

In order to separate the impact of missionary educational activities from their evangelical work, I also collected data on the number of missionary schools. The main source of this data was Gülbadi Alan's [2015] work on American Protestant schools in Ottoman Turkey. Based on the information described above I calculated two alternate measures of missionary presence for each *kaza*: missionary schools per capita and missionary stations per capita. In all my school concentration indicators, the reference population is the group of people targeted by each institution.¹¹

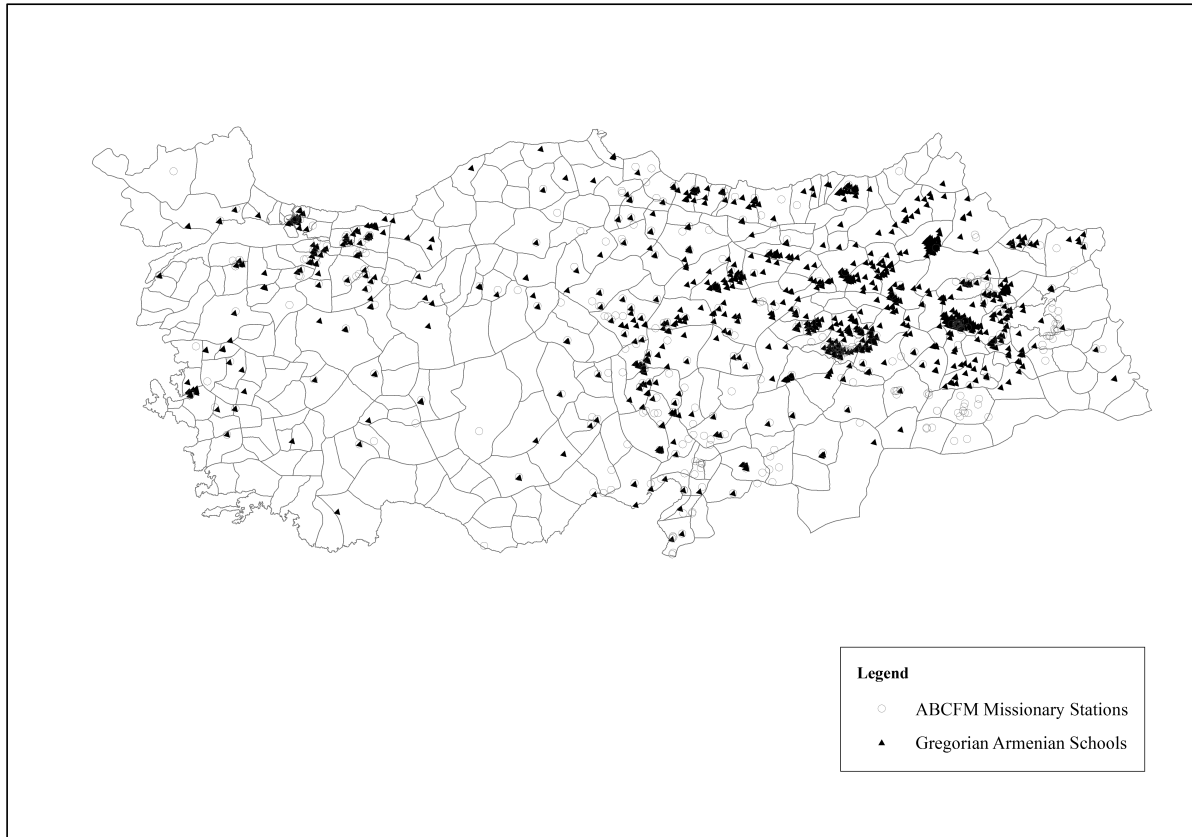
– Gregorian Armenian Schools

The main source of information on locations of Armenian schools comes from the Cultural Heritage Map of Turkey created by the Hrant Dink Foundation.¹² This online map relies on primary and secondary sources to chart the locations of Ottoman-era non-Muslim public buildings, including churches, schools, monasteries, cemeteries, and hospitals. Based on this map, I recorded the geocoded locations of 1,252 Gregorian Armenian schools built during the Ottoman period. Figure 2 shows the locations of all ABCFM missionary stations and Gregorian schools contained within the borders of modern Turkey.

¹¹ This is the non-Muslim population for missionaries, the male and female Muslim population for Ottoman schools, and the Armenian population for Gregorian schools.

¹² <https://turkiyekulturvarliklari.hrantdink.org/en>.

FIGURE 2

Christian Schooling in Ottoman Turkey

Sources : ABCFM Annual Reports ; Hrant Dink Foundation Cultural Heritage Map of Turkey

– Ottoman State Schools

During the late nineteenth century, several models of Ottoman schools emerged. The most widespread state institutions were the *ibtidâî* (modern primary) and *rüşdiyye* (advanced primary) schools. The data for Ottoman state-run schools are drawn from two main sources: (1) The 1914–1915 Ottoman Educational Yearbook, which reports the number of male and female *ibtidâî* schools down to the *kaza* level, and (2) Selçuk Akşin Somel’s [2001] work on the modernization of Ottoman education, which includes data on the distribution of male and female *rüşdiyye* schools for each *kaza* at *sanjak* level. Based on these two sources, I calculate four independent variables: (1) male *ibtidâî* schools per capita (1914), (2) female *ibtidâî* schools per capita (1914), (3) average distribution of male *rüşdiyye* schools (1902–1908), and (4) average distribution of female *rüşdiyye* schools (1902–1908).

– Competition Measure

In order to capture the intensity of competition between different types of schools, I rely on the Herfindahl–Hirschman Index (HHI). The HHI is one of the most commonly used indicators to represent market concentration. It is preferable over other proxies of competition because it accounts for the number of actors in a market as well as their concentration by incorporating the relative market size of all actors in that market. An additional motivation to use this index is that historical records such as the Ottoman Educational Yearbooks do not indicate the precise location of Muslim schools. The HHI is calculated by squaring the market share of all actors in a market and then summing the squares, as follows:

$$H = \sum_{i=1}^N s_i^2$$

Based on this formula, I calculate three indices: one for Christian Competition (Armenian vs. Protestant), one for Imperial Competition (Ottoman vs. Protestant), and a final one for Total Competition (Ottoman vs. Armenian vs. Protestant). Higher numbers on the HHI indicate less competitive or monopolistic market arrangements, while lower numbers indicate more competitive market situations.

– Outcome Measure

A key challenge in conducting subnational analyses of development is the paucity of economic indicators at a highly localized level. To circumvent this issue, I rely on satellite imagery of light density at night (i.e., luminosity), a metric that recent work by Henderson, Storeygard, and Weil [2012] has suggested is a reliable proxy for income. This technique has the added advantage of calculating current economic levels for administrative boundaries that have altered over time. The luminosity data is recorded worldwide by the Operational Linescan System, flown on the Defence Meteorological Satellite Program (DMSP) satellites. The data are available online from the US National Oceanic and Atmospheric Administration (NOAA). I aggregate luminosity in the year 2000 across all pixels within Ottoman *kaza* boundaries. I then divide total luminosity by district area to calculate average light density for each district.

– Controls

An important concern regarding the validity of quantitative studies of missionaries is that numerous factors may have affected both the missionaries' decision to establish a mission in a specific location and the location's long-term developmental potential. I therefore include a host of control variables to account for potential exogenous drivers of subnational development. In my results

tables, control variables can be grouped into four broad categories: geographical, climatic, transportation, and political characteristics.

Geographical controls include distance to the nearest river or to the nearest lake, and altitude. Climatic control variables are the mean temperature and precipitation patterns for the period 1979–2013. Since temperature and precipitation patterns are often correlated, I include them separately in my models.¹³ It is also possible that transportation networks played a significant role in defining the missionaries' location decisions. Areas with well-developed transportation networks were more likely to be targeted by the early missionaries as they were more accessible. To take this into account, I use the information in the Huber map to construct variables measuring the districts' access to railways, carriageways, and major ports as of 1899. I also control for historical trade routes and include a measure for the distance to the Anatolian Silk Road (circa 1200–1400 CE) as well as the distance to Ottoman trade routes (circa 1300–1600 CE). Finally, location relative to places of political importance can affect economic prospects. In the case of the Ottoman Empire, missionaries who had embarked from Istanbul might have been more likely to select a site for their mission based on proximity to the Ottoman capital. In addition, missionaries might have been more likely to establish missions in administrative capitals of subprovinces. I therefore control for these variables. See Table 1 for the descriptive statistics of all variables used in my analysis.¹⁴

TABLE I

Summary Statistics

VARIABLES	N	Mean	SD	Min	Max
(log) Luminosity	330	1.252	0.991	-2.140	4.141
Christian Share of the Population (1893)	332	0.171	0.190	0	0.929
(log) Population Density (1893)	332	2.702	1.104	-8.178	9.120
Number of Missionary Stations	332	1.244	2.461	0	30
Number of Missionary Schools	332	0.916	3.689	0	59
Number of Female Missionary Schools	332	0.105	0.685	0	11
Missionary Schools Per Capita	332	0.188	0.926	0	12.14
Missionary Stations Per Capita	332	0.725	5.274	0	90.91
Male Ibtidâi Per Capita	253	2.385	1.801	0	14.43
Female Ibtidâi Per Capita	253	0.387	0.466	0	3.333
Total Ibtidâi Enrollment (1914)	252	20.10	15.60	0	113.1
Male Rüşdiyye School Concentration (1902-1908)	332	1.187	1.154	0.160	7.500
Female Rüşdiyye School Concentration (1902-1908)	332	0.210	0.725	0	4.500
Christian Competition Index	332	0.924	0.161	0.500	1
Imperial Competition Index	332	0.866	0.171	0.500	1
Total Competition Index	273	0.771	0.224	0.341	1
Number of Male Students at Ibtidâis (1914)	274	699.8	1,014	0	8,847
Number of Female Students at Ibtidâis (1914)	274	183.5	475.3	0	4,005
GPI for Ibtidâi Enrolment (1914)	267	0.213	0.203	0	0.953
GPI for Literacy (1927)	306	0.714	10.05	0	176
GPI for Primary School Enrolment (1937)	319	0.420	0.212	0.0405	1.200
Average Temperature	332	115.7	33.23	30.29	190.9
Average Precipitation	332	646.1	211.8	316.5	2,085
Average Elevation	332	1,029	604.0	12.68	2,569

¹³ Substituting one for the other did not alter my results. Thus, I exclude the models containing average temperature from my result tables.

¹⁴ Data sources are discussed in further detail in the Appendix.

19th Century Road Density	332	0.0131	0.0128	0	0.0637
(log) Distance to Lake	332	3.264	4.430	-0.283	10.95
(log) Distance to River	332	7.054	4.882	0	12.27
(log) Distance to Capital	332	12.85	1.572	0	14.13
(log) Distance to 19th Century Train	332	10.08	4.676	0	13.83
(log) Distance to Port	332	10.83	2.835	0	13.17
(log) Distance to Ottoman Trade Route	332	4.243	4.814	0	11.55
Central Kaza Dummy	332	0.172	0.378	0	1

Endogeneity

Despite the extensive controls included in my models, endogeneity is still a concern for geographical analyses of long-term effects of missionary orders. It is possible, for example, that more developed regions attracted more Protestant activity than others in the past, and that these regions continue to perform better in the present. Scholars have most commonly tried to address this issue by controlling for correlates of development, the use of placebo-type tests, or creating instrumental variables.

Anecdotal evidence suggests that endogeneity is not as significant a problem for Turkey as it is for other parts of the world.¹⁵ Decisions about the locations of missionary stations were primarily driven by opportunities for conversion, which were based most commonly on the number of Christians, especially Armenians, in a given locale [see Smith and Dwight 1834: 101]. Early missionary efforts did focus on more accessible and prosperous coastal towns; however, especially after the 1850s, American missionaries turned their attention to the relatively impoverished Eastern *vilayets*, where the majority of Armenians lived.¹⁶ The Eastern *vilayets* were historically (and continue to be) underdeveloped due to the uneven development of Ottoman and later Turkish capitalism across the country. The landlocked interior had harsh climatic conditions and was devoid of roads and railroads, and thus lacked the means to export the agricultural and mineral goods it produced [Clay 1998: 1].

On the other hand, the most developed and populous maritime provinces, Aydin and Istanbul, occupy only 2.1 and 1.8% of the total number of stations in my sample. Mid-nineteenth-century missionaries lamented that, despite their having spent large sums of money on their proselytizing endeavours in prosperous port cities like Smyrna [Greene 1872], Constantinople [ABCFM 1869], and Trabzon [ABCFM 1853: 105], these efforts had so far borne little fruit. According to missionary archives, efforts to attract and hold converts in these places encountered “powerful obstacles” because of the “worldliness, dissipation and irreligion” [ABCFM 1853: 105] that

¹⁵ My historical data confirms this qualitative account. Using population density in 1893 as my dependent variable, I find that missionary stations were much more likely to be established in relatively sparsely populated regions.

¹⁶ According to the 1893 census, Ottoman Anatolia was divided into 15 provinces. The six Eastern Provinces of 1893 accounted for 52.3% of all stations and outstations in my dataset.

characterized such maritime towns. This stood in stark contrast to the favourable picture they painted of the inhabitants of the rural regions, who were portrayed as more open to the gospel message because they possessed “simplicity of faith, conscientiousness, an eagerness for the truth, and an eagerness to impart it to others” [ABCFM 1859].

OLS Estimates

– Historical Education and Luminosity

In this section, I assess the relationship between historical educational institutions and the log of light density at night as my measure of development. My baseline specification is given by:

$$y_k = \alpha(\text{School}_x)_k + \delta \ln(\text{PD}_{1893})_k + \beta X_k + \epsilon_k$$

Where y_k is the outcome of interest (i.e., log of light density in 2000) in district k . My main variable of interest, $\alpha(\text{School}_x)_k$, captures the distribution of a given school x (Protestant missionary or Ottoman) in the Ottoman *kaza* k .¹⁷ I use the number of schools per 1,000 people in each *kaza* as my main measure of school presence. In all specifications, α measures the long-term link between nineteenth-century schooling and current development outcomes. Population density, PD_{1893} , is included as a proxy for initial economic conditions. Controlling for historical population density is essential to make a meaningful comparison between changes in outcome measures across districts with different levels of distribution of educational institutions. X_k denotes the set of exogenous geographical, climatic, transportation, and political factors that might influence regional economic development. Standard errors are clustered at the level of the Ottoman *sanjak* in 1893.

The results of Table 2 investigate the association between missionary presence and economic development in Turkey. A comparison across columns shows that none of the models identify a significant relationship between missionary schools and higher levels of income. This stands in contrast to the established consensus concerning the legacy of Protestant education for the nation’s economic development. This exceptional finding can in part be explained by the demise of missionary schooling in Ottoman Turkey, which eliminated an important channel for the proliferation of human capital in the region. Interestingly, when I substitute schooling with station presence in Models 5 through 8, I find that a one-unit increase in stations per capita decreases log luminosity by between 0.7 and 0.9%. Missionary stations were largely established in the region Eastern Anatolia and most of their target population were later either killed or displaced during

¹⁷ I also ran models with “Armenian schools per capita” as my main explanatory variable. None of these models identified a significant relationship between schooling and development. This was to be expected, given the removal of the Armenian population from Ottoman Turkey. Due to space restrictions, I have not included these models in my analysis.

various episodes of ethnic violence. This impeded the intergenerational transmission of human capital. In addition, the Muslim populations that were resettled into and now inhabit localities with a historical Armenian presence are more religious today than Muslims in other areas. One study finds that these pious populations resisted the top-down secularization efforts of the Turkish Republic and were less likely to send their children to public schools [Sakallı 2019]. Thus, as a result of the collapse of missionary education alongside radical demographic engineering, missionary presence in Turkey either had no direct effect or a negative effect on economic development in Turkey.

TABLE 2

Missionary Presence and Night-Time Luminosity

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(log) Population Density (1893)	0.322**	0.179*	0.159*	0.132+	0.325**	0.179*	0.159*	0.130+
	(0.121)	(0.072)	(0.065)	(0.067)	(0.121)	(0.072)	(0.065)	(0.066)
Missionary Schools Per Capita	-0.065	-0.043	-0.039	-0.037				
	(0.085)	(0.038)	(0.033)	(0.033)				
Missionary Stations Per Capita					-0.008+	-0.010*	-0.008*	-0.008**
					(0.005)	(0.004)	(0.003)	(0.003)
Christian Share	1.113**	1.060***	0.901***	0.835**	1.100**	1.043***	0.891**	0.821**
	(0.405)	(0.281)	(0.256)	(0.244)	(0.409)	(0.284)	(0.258)	(0.247)
Average Elevation		-0.001***	-0.001***	-0.001***		-0.001***	-0.001***	-0.001***
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
Average Precipitation		-0.000	-0.000	0.000		-0.000	-0.000	0.000
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
(log) Distance to Lake		-0.019*	-0.006	-0.005		-0.019+	-0.006	-0.005
		(0.010)	(0.009)	(0.009)		(0.010)	(0.009)	(0.010)
(log) Distance to River		0.002	-0.001	0.001		0.003	0.000	0.001
		(0.009)	(0.009)	(0.009)		(0.009)	(0.010)	(0.009)
(log) Distance to Port			-0.017	-0.009			-0.017	-0.009
			(0.017)	(0.018)			(0.017)	(0.018)
(log) Distance to Ottoman Trade Route			-0.041***	-0.037***			-0.041***	-0.036***
			(0.008)	(0.009)			(0.008)	(0.008)
(log) Distance to 19th Century Train			-0.026*	-0.022*			-0.026*	-0.022*
			(0.010)	(0.010)			(0.010)	(0.010)
19th Century Road Density			-1.112	-2.020			-0.989	-1.854
			(3.734)	(3.419)			(3.695)	(3.365)
(log) Distance to Capital				-0.018				-0.023
				(0.069)				(0.068)
Central Kaza Dummy				0.329***				0.332***

				(0.095)				(0.095)
Constant	0.205	1.564***	2.131***	2.245*	0.193	1.573***	2.131***	2.306*
	(0.341)	(0.296)	(0.410)	(0.962)	(0.344)	(0.293)	(0.409)	(0.948)
Observations	330	329	329	329	330	329	329	329
R-squared	0.210	0.482	0.528	0.541	0.208	0.483	0.528	0.542
Robust standard errors in parentheses								
**** p<0.001, *** p<0.01, ** p<0.05, +p<0.1								

Table 3 reports the results for the baseline OLS specification but focuses on Ottoman state-run male schools. The results indicate that while *ibtidâi* (primary) schools are not related to contemporary light density, *rüşdiyye* (upper-primary) schools are. A one-unit increase in the average distribution of male *rüşdiyye* schools increases the log luminosity by 23% in Model 8. The relationship between *rüşdiyye* schools and luminosity remains significant even after climatic, geographical, and historical controls are included in the models. These results suggest that early investment in primary education by the Ottoman Empire had substantial long-term consequences. This effect, however, seems to be limited to advanced levels of primary education.

TABLE 3

Male Ottoman Schools and Night-Time Luminosity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES								
(log) Population Density (1893)	0.183	0.107	0.082	0.079	0.206*	0.123*	0.106+	0.105+
	(0.123)	(0.070)	(0.064)	(0.061)	(0.103)	(0.060)	(0.058)	(0.059)
Male Ibtidai Schools per Capita	-0.031	0.017	0.020	0.013				
	(0.033)	(0.027)	(0.025)	(0.023)				
Male Rüşdiyye School Concentration					0.289***	0.168***	0.156***	0.214***
					(0.049)	(0.034)	(0.037)	(0.044)
Christian Share	1.485***	0.941**	0.867**	0.920**	0.997**	0.995***	0.858***	0.848***
	(0.359)	(0.311)	(0.285)	(0.299)	(0.342)	(0.238)	(0.228)	(0.234)
Average Elevation		-0.001***	-0.001***	-		-	-0.001***	-0.001***
		(0.000)	(0.000)	0.001***		0.001***	(0.000)	(0.000)
Average Precipitation		-0.000	0.000	0.000		-0.000	0.000	-0.000
		(0.000)	(0.000)	(0.000)		(0.000)	(0.000)	(0.000)
(log) Distance to Lake		-0.010	0.005	0.002		-0.017+	-0.004	-0.007
		(0.012)	(0.011)	(0.011)		(0.010)	(0.009)	(0.009)
(log) Distance to River		-0.006	-0.011	-0.006		0.001	-0.001	0.003
		(0.009)	(0.010)	(0.010)		(0.009)	(0.009)	(0.009)
(log) Distance to Port			-0.009	0.003			-0.012	-0.007
			(0.018)	(0.019)			(0.016)	(0.017)

(log) Distance to Ottoman Trade Route			-0.042***	-0.034**			-0.041***	-0.034***
			(0.011)	(0.012)			(0.008)	(0.008)
(log) Distance to 19th Century Train			-0.023*	-0.029*			-0.022*	-0.027*
			(0.010)	(0.012)			(0.010)	(0.010)
19th Century Road Density			2.813	1.597			0.730	-1.121
			(3.631)	(3.759)			(3.267)	(3.300)
(log) Distance to Capital				0.144				0.115+
				(0.100)				(0.064)
Central Kaza Dummy				0.362**				0.339***
				(0.110)				(0.090)
Constant	0.649+	1.759***	2.155***	0.230	0.189	1.457***	1.917***	0.388
	(0.361)	(0.305)	(0.409)	(1.304)	(0.258)	(0.241)	(0.364)	(0.891)
Observations	253	253	253	253	330	329	329	329
R-squared	0.160	0.406	0.467	0.497	0.290	0.507	0.549	0.569
Robust standard errors in parentheses								
**** p<0.001, *** p<0.01, ** p<0.05, + p<0.1								

Table 4 reports the results for the baseline OLS specification for Ottoman state-run female schools. A comparison across columns shows that only Model 1 identified a significant relationship between *ibtidâi* concentration and log luminosity. In line with the patterns outlined for Ottoman male schools, this association changes when we consider female *rüşdiyye* schools. Female *rüşdiyye* schools are significantly and positively related to contemporary luminosity in all models. In agreement with the literature on gender inequality and economic growth, the results also indicate that investment in girls' education made a greater contribution to present-day development than investment in boys' education. The size of coefficients for female *rüşdiyye* schools is nearly double that of male *rüşdiyye* schools—with a one-point rise in the average distribution of female *rüşdiyye* schools leading to an increase of 40% in contemporary log luminosity.

TABLE 4

Female Ottoman Schools and Night-Time Luminosity

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(log) Population Density (1893)	0.167 (0.124)	0.107 (0.070)	0.081 (0.064)	0.079 (0.060)	0.240* (0.110)	0.130* (0.058)	0.107+ (0.057)	0.107+ (0.058)
Female Ibtidai Schools per Capita	0.301* (0.097)	0.039 (0.073)	0.013 (0.083)	0.007 (0.080)				
Female Rüşdiyye School Concentration					0.395** (0.071)	0.266** (0.039)	0.255** (0.044)	0.340** (0.064)
Christian Share	1.272* (0.364)	0.924** (0.315)	0.869** (0.295)	0.928** (0.301)	0.909* (0.376)	0.928** (0.238)	0.812** (0.231)	0.789** (0.240)
Average Elevation		-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)		-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
Average Precipitation		0.000 (0.000)	0.000 (0.000)	0.000 (0.000)		-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
(log) Distance to Lake		-0.010 (0.012)	0.004 (0.011)	0.002 (0.011)		-0.016 (0.010)	-0.003 (0.009)	-0.006 (0.009)
(log) Distance to River		-0.005 (0.009)	-0.010 (0.010)	-0.005 (0.009)		-0.001 (0.009)	-0.003 (0.009)	-0.000 (0.009)
(log) Distance to Port			-0.010 (0.018)	0.003 (0.019)			-0.011 (0.016)	-0.005 (0.017)
(log) Distance to Ottoman Trade Route			-0.042** (0.011)	-0.033** (0.011)			-0.039** (0.008)	-0.033** (0.008)
(log) Distance to 19th Century Train			-0.023* (0.011)	-0.030* (0.012)			-0.023* (0.010)	-0.028** (0.010)
19th Century Road Density			3.149 (3.729)	1.833 (3.843)			2.297 (3.451)	0.966 (3.519)
(log) Distance to Capital				0.150 (0.102)				0.113+ (0.064)
Central Kaza Dummy				0.361** (0.111)				0.332** (0.090)
Constant	0.531 (0.338)	1.756** (0.297)	2.169** (0.399)	0.159 (1.326)	0.370 (0.300)	1.617** (0.243)	2.019** (0.355)	0.559 (0.865)
Observations	253	253	253	253	330	329	329	329
R-squared	0.179	0.405	0.465	0.497	0.269	0.508	0.550	0.570
Robust standard errors in parentheses								
**** p<0.001, *** p<0.01, ** p<0.05, + p<0.1								

– Educational Competition and Luminosity

In the following section, I use the dataset and Herfindahl–Hirschman indices described in Section 4 to test whether long-term development outcomes differ among districts that have had educational competition in the past. Based on the historical narrative provided in Section 3, I will consider the three significant relations of competition: (1) competition between Protestant missionary and Armenian schools (i.e., Christian Competition), (2) competition between Protestant missionary and Ottoman state-run schools (i.e., Imperial Competition), and (3) competition between Protestant, Ottoman, and Armenian schools (i.e., Total Competition). My key independent variable is an educational competition index for each district calculated for all three sets of educational competition. The empirical model I estimate is as follows:

$$y_k = \alpha(\text{CompetitionIndex}_x)_k + \delta \ln(PD_{1893})_k + \beta X_k + \epsilon_k$$

Basic statistics show that the estimated relationship of Protestant-native competitiveness and luminosity is significant and positive. In Models 1 through 3 in Table 6, the Christian Competition index is negatively related to luminosity. In other words, *ceteris paribus*, a move from a district that has a monopolistic education market to a district with a highly competitive Christian education market increases log luminosity by 25%. The coefficients for Imperial and Total Competition indices are even higher. Models 4 through 6 run the same models but replace the Christian Competition index with the Imperial Competition index. Results suggest a 45–54% increase in log luminosity moving from a monopolistic education market to a more competitive one. Models 10 through 12 include the Total Competition index and reaffirm the role competition has played in contemporary development, reporting a 50–54% increase in log luminosity for a similar intensification in rivalry. This implies that the most notable competitive relationship was the one that included the Ottoman state, highlighting the importance of indigenous state actors in places that had the relative freedom and resources needed to counteract missionary efforts.

TABLE 5

Competition Indices and Night-Time Luminosity

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Christian	Christian	Christian	Imperial	Imperial	Imperial	Total	Total	Total
(log) Population Density (1893)	0.168*	0.147*	0.119+	0.189*	0.164*	0.133+	0.174*	0.146*	0.110+
	(0.071)	(0.064)	(0.065)	(0.079)	(0.071)	(0.073)	(0.070)	(0.062)	(0.060)
Christian Competition Index	-0.541*	-0.489*	-0.411+						
	(0.223)	(0.203)	(0.213)						
Imperial Competition Index				-0.722*	-0.686*	-0.645*			
				(0.285)	(0.276)	(0.289)			
Total Competition Index							-0.687**	-0.770***	-0.718**
							(0.210)	(0.199)	(0.217)
Christian Share	1.007***	0.863**	0.801**	0.856**	0.729**	0.669**	0.786*	0.706*	0.630*
	(0.279)	(0.252)	(0.239)	(0.268)	(0.241)	(0.228)	(0.300)	(0.272)	(0.258)
Average Elevation	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Average Precipitation	-0.000	0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
(log) Distance to Lake	-0.017	-0.004	-0.003	-0.016	-0.004	-0.003	-0.011	0.002	0.004
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)	(0.012)	(0.012)
(log) Distance to River	0.005	0.001	0.002	0.008	0.004	0.005	0.006	0.002	0.002
	(0.009)	(0.009)	(0.009)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
(log) Distance to Port		-0.016	-0.009		-0.016	-0.009		-0.007	0.001
		(0.016)	(0.018)		(0.017)	(0.018)		(0.018)	(0.020)
(log) Distance to Ottoman Trade Route		-0.040***	-0.035***		-0.038***	-0.034***		-0.040***	-0.035**
		(0.008)	(0.008)		(0.008)	(0.009)		(0.011)	(0.011)
(log) Distance to 19th Century Train		-0.029**	-0.023*		-0.031**	-0.026*		-0.032**	-0.024*
		(0.010)	(0.010)		(0.010)	(0.010)		(0.009)	(0.010)
19th Century Road Density		-0.989	-1.680		-0.756	-1.416		0.966	0.440
		(3.627)	(3.324)		(3.662)	(3.312)		(3.886)	(3.390)
(log) Distance to Capital			-0.030			-0.034			-0.048
			(0.065)			(0.066)			(0.063)
Central Kaza Dummy			0.305**			0.307**			0.296**
			(0.098)			(0.097)			(0.110)
Constant	2.072***	2.588***	2.781**	2.168***	2.705***	2.987**	2.161***	2.635***	3.082**
	(0.385)	(0.420)	(0.908)	(0.347)	(0.440)	(0.994)	(0.332)	(0.412)	(0.919)
Observations	329	329	329	329	329	329	272	272	272
R-squared	0.488	0.532	0.544	0.493	0.537	0.549	0.492	0.547	0.560

Robust standard errors in parentheses

**** p<0.001, *** p<0.01, ** p<0.05, * p<0.1

Causality and Mechanisms

My results show that historical educational competition played a crucial role in shaping regional development patterns in Ottoman Turkey. In light of the literature on Ottoman education, I interpret

my findings as evidence of a human-capital legacy of educational competition. Competition increased both the number and quality of schools, which in turn led to higher levels of human capital and thus economic growth. I argue that competition influenced educational expansion through both supply and demand channels. In what can be considered supply-side influences, educational competition between Armenian and Protestants drove pedagogical innovations and expansion of schooling to broader segments of the Christian population. These changes were not restricted to Christian communities, however. The Ottoman state felt threatened by the growing educational and economic disparity between its Muslim and Christian subjects. The educational competition of the nineteenth century thus generated a reflex effect by spurring the Ottoman state to reform its educational system and increase the number of schools in the provinces.

Rivalry between different schools also triggered changes in the demand for education. Armenians and Muslims living in the provinces petitioned the capital to invest more in education as a way to counterbalance the influence of Protestant missionaries. These efforts did not go unnoticed by missionaries, as they frequently boasted that education was becoming better valued as a result of their efforts [Barnum 1890]. I claim that such changes had positive human-capital spillover effects for the local Muslim population, as they improved the quantity and quality of schooling. Through this reflex dynamic, the inertia created has had a lasting impact on local development, even though the Christian population in question has ceased to exist in these geographies.

To understand why the effects of certain historical events have persisted, particularly in the long run, economists, sociologists, and political scientists have relied on the concept of path dependence. Path dependence is characterized by those “historical sequences in which contingent events set into motion institutional patterns or event chains that have deterministic properties” [Mahoney 2000: 507]. Scholars adopting a path-dependence approach show how a particular outcome at a critical juncture can be subject to self-reproducing mechanisms, causing the outcome to endure across time. The proselytizing efforts of Christian missionaries in the Middle East amounted to an exogenous intervention that marked a critical juncture in Ottoman history—one which pushed the declining empire onto a new educational trajectory that diverged significantly from the old. I claim that through agglomeration effects and international transmission of human capital, the spatial distribution of subnational educational development was preserved.

Emulation and greater demand for education by local populations are two important mechanisms that explain the link between competition and development. Yet, there is another channel that needs to be considered. Following the ethnic violence that displaced much of the Armenian population, many of the properties that had been abandoned by Armenians were usurped by the state, to be

used as schools, prisons, police stations, or hospitals. In the realm of education, the abandoned property of Armenians was used to compensate for the inadequacies in the educational supply of Muslim schooling. Thus, a large number of the Armenian schools built to counter Protestant missionary efforts were in effect turned into government schools. In this way, competition also equipped the Ottoman and Turkish state with additional resources connected to schooling.

To test whether educational competition impacted contemporary economic development through the above-specified mechanisms, we need to examine whether its influence can be observed in the short and medium term. In this section, I take advantage of the precise nature of my geocoded data to account for fixed effects. I also perform a multitude of robustness analyses to demonstrate that regions that had competitive educational environments in the nineteenth century have higher human capital before and after the foundation of Turkey, as proxied by student enrolment, schooling, and literacy. The following section will examine these figures at distinct junctures in Late-Ottoman and Republican Turkey.

1.1.1 Village-Level Data

My district-level analysis in the preceding section makes a strong case for the positive and causal legacy of educational competition in Ottoman Turkey. Higher levels of Christian, Imperial, and Total Competition explain an important variation in current levels of subnational development in contemporary Turkey. I find this result is robust to a rich set of controls. Furthermore, I present archival evidence that reveals that missionary labours in urban centres bore little fruit. Nonetheless, my district-level robustness checks cannot entirely rule out an endogeneity problem. In this section, following the example of Arbatli and Gökmen [2018], I use random points, instead of districts, as my units of analysis. Specifically, I exploit *within-district* variations in the proximity to both Protestant missionary stations and Gregorian Armenian schools across these points, instead of *within-subprovince* variations in the competition indices across districts.

Due to this fragmented approach, I can evaluate historical educational competition patterns' effect on economic activity at a highly localized level. By considering district-level fixed effects, I am able to eliminate potential bias resulting from the selection of educational institutions across district boundaries within a subprovince. Many of the latent variables that could independently shape both the historical distribution of economic activity and the variation in education competition within a subprovince or province become arguably less relevant when I focus my attention on variations across points within a district.

I employ the geocoded locations of Protestant missions and Armenian schools as my measurements of schooling presence. Given that I do not know the exact locations of Ottoman *ibtidâî* or *rüşdiyye* schools, I exclude them from my analysis in this section. Using the geocoded locations of Christian schools, I am able to isolate places where Armenian and Protestant institutions existed within a 5-km radius of one another. This interaction serves as my measurement of Christian educational competition. I regress luminosity on the presence of educational institutions in the close vicinity of 25,708 random points¹⁸ conditional on a large set of potential confounders. My estimating equation is as follows:

$$(AvgLum5km)_i = \eta + \alpha(Competition5km)_i + \theta' X_i + \delta_i + \varepsilon_i$$

Where i is the locality, either urban or rural. $(AvgLum5km)_i$ is the log of mean luminosity in the year 2000 with a 5-km radius of i . $(ChristianCompetition5km)_i$ is a binary variable indicating the presence of both an Armenian school and a Protestant missionary station within a 5-km radius of the district “ i ”. X_i is a vector of geographical attributes as well as historical and contemporary correlates of development. Geographical attributes consist of longitude, latitude, elevation, and distance to the nearest major river or lake. Commercial correlates include an indicator for locations within 15 km of an Ottoman urban centre (circa 1900)¹⁹ and distances to historical trade routes. Contemporary controls are an indicator of locality types (city, hamlet, isolated dwellings, town, or village), distance to a modern railroad network, distance to the nearest province centre, and distance to each of the four biggest commercial/industrial centres (Istanbul, Izmir, Ankara, Bursa).

The detailed nature of the data allows me to account for province or district fixed effects denoted by δ_i , thereby evaluating educational competition legacy using only the variations across points within a given administrative unit. A major advantage of including fixed effects at such a local level is that it reduces the likelihood of selection bias by eliminating large portions of variation thought to contain confounding factors. I effectively discard between-variation and infer the causal effect from locations within an administrative body that are likely to be similar in terms of culture and geography. Therefore, such locations are very unlikely to vary with respect to omitted factors that may confound the causal relationship between the presence of competition and luminosity.

¹⁸ I started with a random sample of 47,933 points in Turkey with a minimum distance of 1 km between them. Some of the districts from the Ottoman era were split between Turkey and its neighbouring states. I exclude the points that fall outside the borders of modern Turkey. Similar to the OLS models in the previous section, I also exclude the Sanjak of Kars from my analysis. This reduced my random sample size to 25,708 locations.

¹⁹ The sample of Ottoman cities comes from Yunus Uğur’s [2018] work on Ottoman cities. See the Data Appendix for a list of the sample cities included in the analysis.

Table 6 summarizes my results. Models 1 through 3 use the entire sample, compiling urban and rural points together, while Models 3 through 6 use rural locations only. I start in Model 1 by introducing my variable of interest together with a dummy variable for location type. The next two columns introduce geographical, climatic, economic, and political controls. Controlling for these variables reduces the coefficients of interest. Adding province fixed effects, in Model 3, further decreases the effect of Christian Competition, but does not affect its significance. Model 3 suggests a location with both a Protestant mission and Armenian school within a 5-km radius will be 104 per cent more lit up than other comparable locations in the same district.

One objection to my conclusions might be that my results are driven by findings from relatively urbanized locations rather than rural areas. It is likely that Christian Competition was more prevalent in historically more urban centres and towns. To address this issue, in Models 4 through 6, I estimate my models based on the sample of villages only. The results are significant and very similar to the findings in the previous models. This suggests that the persistence of the effects of Christian Competition on local development is not merely an urban phenomenon. Even though the mass expulsions of Armenians and closure of missionary schools dealt a serious blow to the viability of selected locations, competitive environments—i.e., places that had both a Protestant and an Armenian school (whether urban or rural)—are significantly more prosperous today. In order to better understand the mechanisms behind this association, the next section will examine human-capital indicators at the end of the Ottoman Empire and in the early Republican period.

TABLE 6

Educational Competition and Luminosity at the Village Level

VARIABLES	Full Sample				Villages Only	
	(1)	(2)	(3)	(4)	(5)	(6)
Competition	0.991*** (0.103)	0.848*** (0.082)	0.715*** (0.063)	0.892*** (0.102)	0.784*** (0.082)	0.681*** (0.065)
Village Dummy	-0.116 (0.079)	-0.276*** (0.077)	-0.264*** (0.049)			
Distance to Lakes		-0.000 (0.000)	0.000 (0.000)		-0.000 (0.000)	0.000+ (0.000)
Latitude		0.013 (0.029)	-0.025 (0.073)		0.002 (0.027)	-0.042 (0.070)
Longitude		0.035*** (0.009)	0.023 (0.095)		0.042*** (0.008)	0.035 (0.080)
Average Elevation		-0.001*** (0.000)	-0.001*** (0.000)		-0.001*** (0.000)	-0.001*** (0.000)
Average Precipitation		0.000	-0.000*		0.000	-0.000*

		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Distance to Ports			-0.000+			-0.000*
			(0.000)			(0.000)
Distance to Roads			-0.000			-0.000
			(0.000)			(0.000)
Distance to Train			0.000*			0.000*
			(0.000)			(0.000)
Distance to Commercial Centers			-0.000			-0.000
			(0.000)			(0.000)
Province Capital			-0.000***			-0.000***
			(0.000)			(0.000)
Constant	0.790***	0.210	3.155	0.682***	0.131	3.188
	(0.108)	(1.147)	(3.453)	(0.053)	(1.099)	(3.208)
Observations	25,708	25,708	25,708	22,297	22,297	22,297
R-squared	0.049	0.245	0.237	0.039	0.226	0.220
Number of Provinces			80			80

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Competition and Human-Capital Indicators

– Ottoman Enrolment & Schooling Figures (1914)

The first reliable and detailed statistics on schooling rates²⁰ in the Ottoman Empire come from the 1914–1915 Educational Yearbooks. These statistical reports contain information on the number of people who have reached the compulsory schooling age, alongside figures on the number of students enrolled at *ibtidâî* schools, all down to the *kaza* level.²¹ Based on these two variables, it is possible to calculate schooling rates for the period in question. Limiting my focus to *kazas* that had at least one Christian institution, I perform a reduced OLS analysis—with control variables limited to physical access—to investigate the relationship between Muslim enrolment and Christian Competition.²² Basic statistics show that a move from a highly competitive educational market (HHI score: 0.5) to a purely monopolistic one (HHI score: 1) decreases the average Muslim enrolment in that *kaza* by around 4.7%.²³ Furthermore, when I substitute the dependent variable with the female–male ratio of enrolled students, I find the Christian share of the population,

²⁰ Schooling rate is defined as the relationship between the actual number of students and the population of that age group.

²¹ The data is incomplete for some *kazas*. Information on the number of eligible students and the number of actual students is only available for 253 of the 332 *kazas* in Ottoman Turkey.

²² I exclude Total and Imperial Competition indices from my analysis because their calculation uses total *ibtidâî* school numbers, which is correlated with total enrolment figures.

²³ When I include Christian share of the population as a control variable, both Christian share and Christian Competition lose their significance. Christian share on its own is significant; a one-unit increase in the population that is Christian corresponds to a 21 per cent increase in total enrolment at *ibtidâî* schools in 1914.

missionary stations, and school presence are all positively and significantly related to the gender-parity index (GPI) at *ibtidâi* schools. This shows that districts with a greater concentration of missionaries and a large indigenous Christian population perform better on the GPI—supporting the view that Ottoman education was modernized and expanded as a reaction to missionary threat. It also shows that the presence of a large indigenous Christian population had a positive influence on the advancement of Muslim female schooling, demonstrating the importance of “peer-group effects” or “neighbourhood effects” in Ottoman Turkey. I also examine the determinants of female *rüşdiyye* school concentration, since these upper-primary schools were singled out as the main human-capital channel for long-run development. The results of this analysis corroborate my earlier findings and show that Christian Competition, Total Competition, and missionary school presence are statistically significant and correlated with female *rüşdiyye* school concentration, with each additional unit increase representing a 2 to 4.5% increase in *rüşdiyye* school concentration.

TABLE 7

Missionary Presence, Competition, and Education in the Late-Ottoman Period

VARIABLES	(1) Ibtidâi Enrolment	(2) Ibtidâi GPI	(3) Ibtidâi GPI	(4) Ibtidâi GPI	(6) Rüşdiyye	(8) Rüşdiyye	(9) Rüşdiyye
(log) Population Density (1893)	1.941* (0.962)	-0.025 (0.016)	-0.026 (0.016)	-0.033+ (0.017)	0.028 (0.035)	0.035 (0.038)	0.029 (0.038)
Christian Share		0.375*** (0.062)	0.367*** (0.065)	0.206** (0.075)	0.285 (0.437)	0.342 (0.437)	-0.042 (0.376)
Missionary Stations Per Capita		0.006*** (0.001)					
Missionary Schools Per Capita			0.033** (0.010)				
Missionary School Presence					0.205*** (0.058)		
Christian Competition Index	-9.317+ (5.243)			-0.107 (0.066)		-0.178+ (0.103)	
Total Competition Index							-0.381* (0.188)
Average Elevation	0.001 (0.004)	-0.000*** (0.000)	-0.000*** (0.000)	-0.000*** (0.000)	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
(log) Distance to River	0.012 (0.274)	0.000 (0.002)	0.001 (0.002)	-0.003 (0.003)	0.008 (0.010)	0.007 (0.010)	0.007 (0.012)
(log) Distance to Port	-0.392 (0.493)	-0.004 (0.006)	-0.004 (0.006)	-0.006 (0.006)	-0.012 (0.016)	-0.010 (0.016)	-0.011 (0.017)
(log) Distance to Train	-0.835+ (0.494)	-0.006** (0.002)	-0.006** (0.002)	-0.009*** (0.002)	0.020* (0.009)	0.022* (0.009)	0.022* (0.009)
(log) Distance to Capital	-4.920 (3.363)	-0.032* (0.013)	-0.036* (0.015)	-0.028+ (0.016)	0.435*** (0.110)	0.437*** (0.114)	0.430*** (0.108)

Central Kaza Dummy	4.135 (3.183)	0.033 (0.024)	0.030 (0.023)	0.039 (0.034)	-0.079 (0.064)	-0.049 (0.057)	-0.026 (0.055)
Constant	95.978* (41.619)	0.832*** (0.200)	0.876*** (0.218)	0.986** (0.293)	5.442*** (1.286)	5.588*** (1.275)	5.815*** (1.372)
Observations	156	251	251	147	316	316	257
R-squared	0.260	0.478	0.464	0.396	0.477	0.471	0.468

Robust standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

Schooling rates can include both supply and demand dynamics. Higher enrolment figures may reflect both a greater number of schools and a greater demand for education, both of which can increase the number of students enrolled in a school. One way to isolate the influence of Christian Competition on the supply side is to look at the expansion of school networks during this period. The 1913–1914 educational statistics detail the number of *ibtidâi* schools built before and after 1908 for each *vilayet* (province), which provides a unique glimpse into the extent of government investment in education during this period. The early twentieth century was when missionary activity reached its height, so we should expect the number of schools built after 1908 to be higher than the number of those built before 1908 in above-average-competition provinces. Overall, I find that provinces with above-median competition built 3.7 times more *ibtidâi* schools after 1908 than they did prior to 1908. However, provinces with below-median competition built only 1.77 times more schools in that period.

– Literacy in the Early Republican Period

The first census of the Turkish Republic was conducted in 1927. According to this census, the total population of Turkey was 13.6 million, 97.4% of those counted registered as Muslim, and the overall literacy rate was reported as 10.58%.²⁴ While these figures are an important source of data for early schooling figures in the Turkish Republic, their use can also be problematic for two main reasons. Firstly, these figures predate the change to a Latin script and are based on the ability to comprehend the Arabic alphabet, and secondly, a significant proportion of the young population educated during the Hamidian period died on battlefronts due to the protracted series of wars that took place at that time (Balkan Wars, WWI, and the Greek–Turkish Wars).²⁵ A more reliable source with which to investigate the legacy of early educational investment is the second Turkish Republican census of 1935. According to this census, the literacy rate of the total population was

²⁴ 17.42% for men and 4.68% for women.

²⁵ When I ran an OLS analysis with 1927 census data that included all environmental and historic controls, I found that a move from a monopolistic Christian educational market to a higher competitive one increased overall literacy by 0.7%.

around 19.25%. Using provincial averages of literacy reported in the census of 1935, I find that the average difference in literacy between high- and low-competition provinces is around 1%. When I break this finding down further, I discover that this contrast is driven by gender variations in literacy, as high-competition provinces have an average female literacy of 7.1%, whereas for low-competition provinces this figure is 5.8. As a final check, I examine enrolment in primary schools in 1935 and find that a one-unit increase in female missionary schools per capita corresponds to a 3 per cent increase in the gender parity in Turkish public primary schools. This shows that the legacy of Protestant investments in women's education persisted even after the closure of missionary schools and removal of the Christian population.²⁶

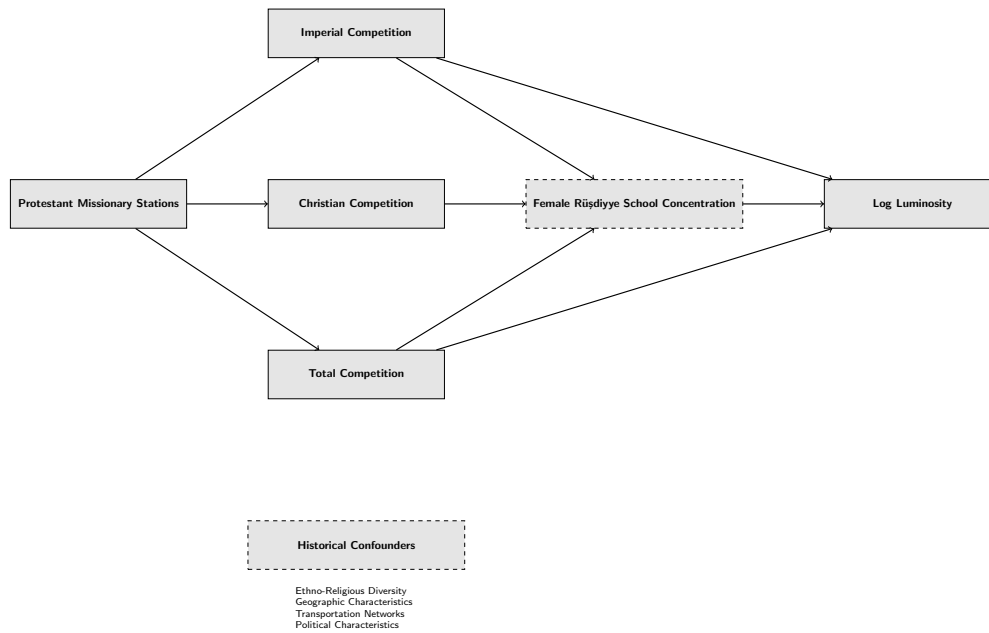
Discussion

Through an original study based on a new dataset, this paper finds that Late-Ottoman-era Protestant missionary activity had mixed effects on the social fabric of the Ottoman Turkey. Protestant missionaries pioneered modern schooling by introducing new types of educational technologies and institutions into the Ottoman Empire. Over time, in what could be regarded as reflex or indirect effects, missionary efforts led to the broadening of educational provision by Gregorian Armenians and Ottoman bureaucrats, leading to a higher social acceptability of and demand for schooling. These actors' combined efforts led to the institutionalization of women's education and facilitated the building of indigenous Muslim and Armenian schools outside major metropolises. I find, in turn, that these early investments in gender parity and human capital became locked in and created positive long-run consequences for economic development in Turkey. I take this as evidence of path dependence because regions that had an educational lead during the Ottoman era preserved their lead even after the factors that initially led to their establishment (Protestant missionaries and native Christian populations) had disappeared. The argument put forward in this paper can be schematically summarized as follows:

FIGURE 3

Educational Competition and Economic Development in Ottoman Turkey

²⁶ The unconditional correlation between GPI for *ibtidâî* schools in 1914 and GPI for Turkish primary schools in 1937 is 44.2%. Spearman's rank coefficient is 65.8 and a test rejects the null hypothesis that the two variables are independent.



1

Previous studies have found that missionary presence correlates with positive contemporary development measures, without clarifying the actual mechanisms through which missionary investments are likely to persist. While some scholars have focused on investment in infrastructure and intergenerational transmission of human capital, others have begun to recognize that emulation and competition might be an important and neglected channel. This study set out to separate these mechanisms and determine how the local Muslim population responded to the expansion of missionary activities. Turkey is a unique case with which to do so because the two direct channels, investment in schooling infrastructure and intergenerational transmission of human capital, are obstructed. Using an original GIS dataset, I find no evidence of a missionary legacy affecting economic development in Turkey. That being said, I am able to confirm the role that indirect effects or emulation have played in Ottoman Turkey by showing that places with historically heightened competition between missionary schools and native educational institutions are more likely to have a higher income, as measured by night-time light density.

The study also examines the mechanisms through which educational competition may have affected long-term development. The results suggest that rivalry between different educational actors has been associated with better quality of and access to education. Competitive districts in the Late-Ottoman period have higher overall *ibtidâî* enrolment and superior gender-parity scores.

The Ottoman state also invested heavily in competitive provinces, as school-building efforts were twice as high in these districts during the Hamidian period. This finding parallels the literature on Ottoman education, which highlights the relative deprivation of Muslim as opposed to non-Muslim subjects of the Empire as a key explanatory factor in the expansion of empire-wide public schooling [e.g., Deringil 1998]. The historical presence of competition is also associated with a higher quality of education during the Republican period. The first two Turkish censuses show that competitive districts report better female literacy rates and better gender-parity figures. A substantial literature claims that gender equality can be beneficial for economic development. The findings in this paper confirm this link over the long term, showing that competition—working through gender parity in education—had positive human-capital spillover effects for the Muslim population, and is a significant factor explaining subnational variations in economic development. The results may help inform our understanding of gender parity as a mechanism through which missionary orders may shape long-term economic effects. They also indicate that emulation or reflex dynamics may impact long-term development.

My empirical study, while drawing on the literature of missionaries, gender, and development, also has implications for theory, as it helps specify the mechanisms behind the strategic adaptation of missionary groups to a non-colonial context where the dominant religion is different from their own. Colonized regions commonly limited the operation of indigenous schooling and relied primarily on European missionaries to educate native populations. In contrast, in non-colonized regions, the state was an active participant in the educational market and had to adapt to missionary incursions. The Ottoman Empire serves as a crucial case for missionary studies because of its non-colonial status, long-standing history of statehood, and well-organized native Christian population. Both the Ottoman state and Gregorian Armenians felt threatened by Protestant missionaries and, as a result, were incentivized to increase the number of their own schools and improve the quality of their educational systems. Failure to do so would have meant losing adherents to their faith or placing them under the pernicious influence of American Protestant missionaries. Future studies of missionary orders might benefit from recognizing the importance of rivalry with indigenous actors, especially in places with long-standing histories of statehood and an absence of colonialism.

- ABCFM (American Board of Commissioners for Foreign Missions), 1853. "Letter from Mr. Powers, December 14, 1852," *The Missionary Herald*, 49 (4): 105.
- , 1859. "Baghchejuk: Letter from Mr. Greene, May 16, 1859," *The Missionary Herald*, 55 (8): 244.
- , 1861. "Arabkir," *The Missionary Herald*, 57 (10): 304.
- , 1869. "Constantinople and New York," *The Missionary Herald*, 65 (6): 189.
- AKSU Ayşe, 2008. "İngiltere – Amerika – Osmanlı Hattında Lancaster Öğretim Sistemi," *Değerler Eğitimi Dergisi*, 6 (16): 29-67.
- ALAN Gülbadi, 2008. *Amerikan Board'un Merzifon'daki Faaliyetleri ve Anadolu Koleji* (Ankara, Türk Tarih Kurumu).
- , 2015. *Osmanlı İmparatorluğu'nda Amerikan Protestan Okulları* (Ankara: Türk Tarih Kurumu).
- ALAN Gülbadi and Gökhan BOLAT, 2011. "The American Board and the Ottoman Women's Education," *History Studies*: 105-17.
- ARBATLI Cemal E. and Güneş GÖKMEN, 2018. "Ethnic Capital and Sub-National Development: Armenian and Greek Legacy in Post-Expulsion Turkey," *SSRN*. doi: 10.2139/ssrn.3273964.
- ARPEE Leon, 1909. *The Armenian Awakening: A History of the Armenian Church, 1820–1860* (Chicago, The University of Chicago Press).
- BAI Ying and James Kai-sing KUNG, 2015. "Diffusing Knowledge While Spreading God's Message: Protestantism and Economic Prosperity in China, 1840–1920," *Journal of the European Economic Association*, 13 (4): 669–98.
- BARNUM Herman N., 1890. "The Work in Turkey," *Christian Union*, 41 (14): 484.
- BASSEY Magnus O., 1999. *Missionary Rivalry and Educational Expansion in Nigeria, 1885-1945* (Lewiston, Edwin Mellen Press).
- BECKER Sascha O. and Ludger WOESSMANN, 2008. "Luther and the Girls: Religious Denomination and the Female Education Gap in Nineteenth-Century Prussia," *The Scandinavian Journal of Economics*, 110 (4): 777–805.
- BENAVOT Aaron, 1989. "Education, Gender, and Economic Development: A Cross-National Study," *Sociology of Education*, 62 (1): 14–32.
- BERMAN Edward H., 1974. "African Responses to Christian Mission Education," *African Studies Review*, 17 (3): 527–40.
- BOATENG Godfred O., Dozie OKOYE, Jonathan AMOYAW and Isaac LUGINAAH, 2019. "Six Decades After Independence: The Enduring Influence of Missionary Activities on Regional Wealth Inequalities in Ghana," *Journal of Economic Geography*, 20 (1): 93–122.
- BOLT Jutta and Dirk BEZEMER, 2009. "Understanding Long-Run African Growth: Colonial Institutions or Colonial Education," *The Journal of Development Studies*, 45 (1): 24–54.
- CAGÉ Julia and Valeria RUEDA, 2016. "The Long-Term Effects of the Printing Press in Sub-Saharan Africa," *American Economic Journal: Applied Economics*, 8 (3): 69–99.
- CAICEDO Felipe V., 2018. "The Mission: Human Capital Transmission, Economic Persistence, and Culture in South America," *The Quarterly Journal of Economics*, 134 (1): 507–556.
- CALVI Rossella and Federico G. MANTOVANELLI, 2018. "Long-Term Effects of Access to Health Care: Medical Missions in Colonial India," *Journal of Development Economics*, 135: 285–303.
- CALVI Rossella, Federico MANTOVANELLI and Lauren HOEHN-VELASCO, 2019. "The Protestant Legacy: Missions and Human Capital in India," *SSRN* [doi:

- 10.2139/ssrn.3354891].
- CASTELLÓ-CLIMENT Amparo, Latika CHAUDHARY and Abhiroop MUKHOPADHYAY, 2017. "Higher Education and Prosperity: From Catholic Missionaries to Luminosity in India," *The Economic Journal*, 128 (616): 3039–3075.
- CLAY Christopher, 1998. "Labour Migration and Economic Conditions in Nineteenth-century Anatolia," *Middle Eastern Studies*, 34 (4): 1–32.
- CURRIE Janet and Enrico MORETTI, 2003. "Mother's Education and the Intergenerational Transmission of Human Capital: Evidence from College Openings," *The Quarterly Journal of Economics*, 118 (8): 1495–1532.
- DEOL Harnik, 2000. *Religion and Nationalism in India: The Case of the Punjab* (New York, Routledge).
- DERINGIL Selim, 1998. *The Well-Protected Domains: Ideology and the Legitimation of Power in the Ottoman Empire, 1876-1909* (New York, St. Martin's Press).
- DUNCH Ryan, 2001. *Fuzhou Protestants and the Making of a Modern China, 1857-1927* (New Haven, Yale University Press).
- DURMAZ Oya G., 2015. "The Distribution of the Armenian Abandoned Properties in an Ottoman Locality: Kayseri (1915–1918)," *Middle Eastern Studies*, 51 (5): 838–853.
- DWIGHT Harrison G. O., 1850. *Christianity Revived in the East* (New York, Baker and Scribner).
- DWIGHT Henry Otis, Henry Allen Jr. TUPPER, and Edwin Munsell BLISS, eds, 1904. *The Encyclopaedia of Missions* (New York, Funk & Wagnalls Company).
- ELIBOL Numan, 2007. "Osmanlı İmparatorluğunda Nüfus Meselesi Ve Demografi Araştırmaları," *Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 12 (2): 135–60.
- ENGERMAN Stanley L., Elisa MARISCAL and Kenneth L. SOKOLOF, 2009. "The Evolution of Schooling Institutions in the Americas, 1800-1925," in David Eltis, Frank Lewis and Kenneth Sokolof, eds, *Human Capital and Institutions: A Long Run View* (New York, Cambridge University Press: 93–142).
- EVERED Emine Ö., 2012. *Empire and Education Under the Ottomans: Politics, Reform, and Resistance from the Tanzimat to the Young Turks* (London, I.B. Tauris).
- FORTNA Benjamin C., 2002. *Imperial Classroom: Islam, the State, and Education in the Late Ottoman Empire* (New York, Oxford University Press).
- GALLEGO Francisco A., 2010. "Historical Origins of Schooling: The Role of Democracy and Political Decentralization," *The Review of Economics and Statistics*, 92 (2): 228–243.
- GALLEGO Francisco A. and Robert WOODBERRY, 2010. "Christian Missionaries and Education in Former African Colonies: How Competition Mattered," *Journal of African Economies*, 19 (3): 294–329.
- GENÇOĞLU Mustafa, 2014. "1916 Maarif Teftişleriyle Mamuratülaziz Sancağı'nın İlköğretim Durumu," *Sosyal Bilimler Dergisi*, 15 (1): 159–193.
- GREENE J. K., 1872. "Smyrna," *The Missionary Herald*, 68 (7): 5.
- HENDERSON J. Vernon, Adam STOREYGARD and David N. WEIL, 2012. "Measuring Economic Growth from Outer Space," *American Economic Review*, 102 (2): 994–1028.
- HUBER R., 1899. "Empire Ottoman: Division administrative [Map]," 1: 1,500,000, *Library of Congress* [<https://www.loc.gov/item/2007633930>].
- KARPAT Kemal H., 1985. *Ottoman Population, 1830–1914: Demographic and Social Characteristics* (Madison, University of Wisconsin Press).

- KÉVORKIAN Raymond H. and Paul B. PABOUDJIAN, 2012. *1915 Öncesinde Osmanlı İmparatorluğun'da Ermeniler* (İstanbul, Aras Yayıncılık).
- KLASEN Stephan and Francesca LAMANNA, 2009. "The Impact of Gender Inequality in Education and Employment on Economic Growth: New Evidence for a Panel of Countries," *Feminist Economics*, 15 (3): 91–132.
- KNOWLES Stephan, Paula K. LORGELLY and P. Dorian OWEN, 2002. "Are Educational Gender Gaps a Brake on Economic Development? Some Cross-Country Empirical Evidence," *Oxford Economic Papers*, 54: 118–49.
- LANKINA Tomila and Lullit GETACHEW, 2013. "Competitive Religious Entrepreneurs: Christian Missionaries and Female Education in Colonial and Post-Colonial India," *British Journal of Political Science*, 43 (1): 103–131.
- MAHONEY James, 2000. "Path Dependence in Historical Sociology," *Theory and Society*, 29 (4): 507–548.
- MEIER ZU SELHAUSEN Felix, 2019. "Missions, Education and Conversion in Colonial Africa Globalization and the Rise of Mass Education," in David Mitch and Gabriele Cappelli, eds, *Globalization and the Rise of Mass Education* (Cham, Springer International Publishing: 25–59).
- MICHALOPOULOS Stelios and Elias PAPAIOANNOU, 2013. "Pre-Colonial Ethnic Institutions and Contemporary African Development," *Econometrica*, 81 (1): 113–152.
- NUNN Nathan, 2014a. "Chapter 7 - Historical Development," in Philippe Aghion and Steven N. Durlauf, eds, *Handbook of Economic Growth* (Amsterdam, Elsevier: 347–402)
- , 2014b. "Gender and Missionary Influence in Colonial Africa," in Emmanuel Akyeampong, James Robinson, Nathan Nunn and Robert H. Bates, eds, *Africa's Development in Historical Perspective* (Cambridge, Cambridge University Press: 489–512).
- POLATEL Mehmet, Nora MILDANOĞLU, Özgür Leman EREN and Mehmet ATILGAN, 2012. *2012 Beyannamesi: İstanbul Ermeni Vakıflarının El Konan Mülkleri* (İstanbul, Hrant Dink Vakfı Yayınları).
- RIGGS Edward, 1886. "Anatolia College, Western Turkey", *The Missionary Herald*, 82 (11): 417.
- ŞAHİN Emrah, 2011. "Responding to American Missionary Expansion: An Examination of Ottoman Imperial Statecraft, 1880-1910," PhD diss., McGill University.
- SAKALLI Seyhun O., 2019. "Secularization and religious backlash: Evidence from Turkey" [<https://sites.google.com/site/sosakalli/research>].
- SAKAOĞLU Necdet, 1985. "Eğitim Tartışmaları," in Murat Belge, ed., *Tanzimat'tan Cumhuriyet'e Türkiye Ansiklopedisi* (İstanbul, İletişim Yayınları: 478–484).
- SCHULTZ Theodore W., 1961. "Investment in Human Capital," *The American Economic Review*, 51 (1): 1–17.
- SHARKEY Heather J., 2013. *American Evangelicals in Egypt: Missionary Encounters in an Age of Empire* (Princeton, Princeton University Press).
- SMITH Eli and H. G. O. DWIGHT, 1834. *Missionary Researches in Armenia* (London, G. Wightman).
- SOMEL Selçuk Akşin, 2001. *The Modernization of Public Education in the Ottoman Empire 1839-1908* (Boston, Brill).
- STONE Frank Andrews, 1984. *Academies for Anatolia: A Study of the Rationale, Program and Impact of the Educational Institutions Sponsored by the American*

- Board in Turkey, 1830-1980* (Lanham, University Press of America).
- TREJO Guillermo, 2009. "Religious Competition and Ethnic Mobilization in Latin America: Why the Catholic Church Promotes Indigenous Movements in Mexico," *American Political Science Review*, 103 (3): 323–342.
- UĞUR Yunus, 2018. "Mapping Ottoman Cities: Socio-Spatial Definitions and Groupings (1450–1700)," *Journal for Early Modern Cultural Studies*, 18 (3): 16–65.
- ÜNGÖR Uğur Ümit and Mehmet POLATEL. 2011. *Confiscation and Destruction: The Young Turk Seizure of Armenian Property* (London, Continuum).
- WALDINGER Maria, 2017. "The Long-Run Effects of Missionary Orders in Mexico," *Journal of Development Economics*, 127: 355–378.
- WANTCHEKON Leonard, Marko KLAŠNJA and Natalija NOVTA, 2014. "Education and Human Capital Externalities: Evidence from Colonial Benin," *The Quarterly Journal of Economics*, 130 (2): 703–757.
- WIETZKE Frank-Borge, 2015. "Long-Term Consequences of Colonial Institutions and Human Capital Investments: Sub-National Evidence from Madagascar," *World Development*, 66: 293–307.
- WOODBERRY Robert D., 2012. "The Missionary Roots of Liberal Democracy," *American Political Science Review* 106 (2): 244–274.
- WOODBERRY Robert D. and Timothy S. SHAH, 2004. "The Pioneering Protestants," *Journal of Democracy* 15 (2): 47–61.
- YOUNG Pamela, 2001. "Knowledge, Nation, and the Curriculum: Ottoman Armenian Education (1853-1915)," PhD diss., The University of Michigan.
- YUMUŞAK Ibrahim Guran, Mahmut BILEN and Hamza ATEŞ, 2013. "The Impacts of Gender Inequality in Education on Economic Growth in Turkey," *Procedia - Social and Behavioral Sciences*, 103: 1093–1103.