# Religious Competition and State Investment in Education: Evidence from the Late Ottoman Empire

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**Abstract**

Why do states invest in public goods provision in regions where non-state actors already provide them? In socially heterogeneous societies, communal and foreign actors, such as churches and missionaries, provide public goods, becoming rivals with states for popular loyalty. Schooling is distinctive among public goods: it shapes citizens' identities and political loyalties. I argue that states invest in school provision precisely where their rivals operate, competing for social and political influence. I test this argument with a newly digitized dataset from the 1903 Ottoman education almanac (Salnâme-i Maârif), covering 7,765 schools across 568 districts, combined with archival evidence on local petitions and provincial officials' justifications for school construction. The quantitative evidence indicates that the state established more secondary schools in districts with a denser presence of minority and missionary schools. Provincial officials justified construction as a response to rival schools, citing the displacement of Muslims from administrative posts and eroding loyalty to the state. The findings challenge theories expecting heterogeneity to depress public goods provision: where rivals contest popular loyalties, states respond in kind.

**Keywords:** state building; education; public goods; Ottoman Empire; missionary schools

# 1 Introduction

Why do states invest in public goods provision in regions where non-state actors already provide them? State formation is a contest between states and societal organizations (Migdal 1988). In socially heterogeneous regions, communal, confessional, and foreign actors build schools capable of shaping citizens' identities and political loyalties. I argue that states invest in public institutions precisely where rivals operate, competing with alternative providers for social and political influence. I test this argument by conducting a statistical analysis on a newly digitized dataset from the 1903 Ottoman Education Almanac (Salnâme-i Maârif) and analyzing archival documents.

The Ottoman Empire historically encompassed territories in the Balkans, the Middle East, and North Africa. It is among the states[1] that bureaucratized educational administration during the eighteenth and nineteenth centuries (Judson, 2016, 65; Kalisman, 2022, 27; Kalyvas, 2015, 41; Paglayan, 2024, 29; Scott, 1998, 51–52; Somel, 2001, 85; Schleunes, 1989). The empire compiled annual almanacs to provide detailed information on the functioning of the state apparatus (Fortna, 2002, 125). The 1903 *Salnâme-i Maârif* covers 7,765 schools across the Empire's districts (*kazas*). I find that the state established more secondary schools in districts with a denser presence of minority and missionary schools. Demographic composition itself does not predict state investment; instead, the density of existing educational institutions does.

The archival evidence from the Ottoman Archives (*BOA*[2]) in İstanbul from the 1850s through 1910 indicates that imperial officials were anxious about competitive displacement of Muslims in the workforce and had concerns about loyalty and subversion deriving from the minority and missionary schools. For instance, a report prepared for the governor of Damascus warned that graduates of minority and missionary schools were filling posts in the fiscal and civil administration while Muslim children remained idle in the streets, and requested a state secondary school as a remedy.

Recent scholarship increasingly treats state capacity and institutional development as endogenous political outcomes rather than fixed structural characteristics. Yet important gaps remain in understanding how ethnic and religious heterogeneity shapes the development and distribution of state institutions (Suryanarayan, 2024, 234). The Ottoman case illustrates that heterogeneity *per se* did not drive state investment; institutional competition for social and political influence did. These findings qualify theories arguing that social heterogeneity reduces public-goods provision by generating divergent preferences, undermining collective action, and weakening state capacity (Alesina et al., 1999; Baldwin and Huber, 2010; Charnysh, 2022; Magiya, 2022).

Yet whether education counts as a public good is not fixed by the technical attributes of schooling; it depends on how a polity values and organizes its provision (Fritz, 2020, 58).It is not a pure public good but a quasi-public, quasi-private one (Aligica et al., 2019, 127). Unlike goods whose benefits diffuse indiscriminately, schooling can be targeted toward particular districts and populations. It plays a central role in the formation of social and political identities, the development of skills, and the strengthening of state capacity (Thelen, 2004; Rokkan, 1999, 166; Singh

[1] Such as Prussia, Greece, and Austria-Hungary.
[2] Devlet Arşivleri Başkanlığı Osmanlı Arşivi.

and vom Hau, 2016). Educational providers also respond strategically to competition (Ansell and Lindvall, 2013, 515). In colonial Africa, missionaries expanded and improved schooling precisely where rival denominations competed for the same populations, whereas protected monopolists underprovided (Gallego and Woodberry, 2010). Protestant missionary activity likewise threatened non-Protestant elites, prompting defensive expansions of mass education to avoid ceding influence to missionaries (Woodberry, 2012, 251); similarly, in colonial India, competing Hindu religious groups countered missionary influence by replicating missionary organizational forms and educational strategies (Lankina and Getachew, 2013, 116; Pillai, 2025, 242).

Building on Paglayan's argument that governments expand education to strengthen political authority (Paglayan, 2022; Paglayan, 2024), I extend this competitive logic to cases where the state itself is the threatened provider: multiethnic empires governing populations divided between a dominant group and minorities served by autonomous communal and missionary schools. In such settings, education becomes an instrument for contesting rival institutions' influence over youth socialization.

This article makes three broad theoretical contributions. First, it qualifies influential arguments that ethnic and religious heterogeneity reduces public-goods provision by showing that the relationship depends on the strategic purposes served by public institutions. Regions where rival institutions contest the state's influence may receive greater rather than lower investment. Empires[3] make the competitive logic analytically visible because the state confronted institutionalized rivals it could neither absorb nor suppress. Similar tensions surrounding minority communities and education appeared in other multiethnic polities, including France and Austria-Hungary (Judson, 2016, 227, 304; Malcolm, 1994, 143; Okey, 1989, 27; Weber, 1976).

Second, the article contributes to theories of state building by demonstrating that the geographic distribution of state institutions reflects not only administrative constraints but also political competition with rival organizations capable of shaping local identities and loyalties. This extends work showing that Ottoman rulers strategically deployed other instruments of rule, such as the rotation of provincial governors, in response to perceived threats to central authority (Magiya et al., 2024). I show that school construction followed the same threat-responsive spatial logic.

Third, the findings contribute to the literature on the long-run legacies of Ottoman rule, which has established that the empire's aggregate underinvestment in education produced enduring developmental consequences (Popescu and Popa, 2022). What empire-level analyses cannot explain, however, is the internal allocation of educational provision: why the state invested more heavily in some districts than in others. To address this question, I introduce the first systematic digitization

[3]The extant literature on comparative school building has largely focused on Western Europe and the Americas (Paglayan, 2022; Paglayan, 2024). Studying the Ottoman case extends these theories to conditions largely absent from the canonical cases. Prussia and the United Kingdom expanded schooling atop relatively stable bureaucracies (Fukuyama, 2013a, 7) and efficient fiscal systems (Hartwell, 1981, 129), while post-1789 France replaced church-dominated universities with state institutions (Makdisi, 1981, 12) within an already religiously and increasingly linguistically homogeneous polity (Scott, 1998, 73). By contrast, the Ottoman Empire lacked direct taxation capacity (Karaman and Pamuk, 2013, 3; Magiya, 2022) and remained a markedly heterogeneous polity (Finkel, 2005, 503–504) still contending with the fundamentals of identity formation—precisely the conditions under which confessional competition should shape school building.

of the 1903 *Salnâme-i Maârif*, the Ottoman Ministry of Education's empire-wide yearbook, yielding district-level data on 7,765 state, communal (minority), and missionary schools across 568 districts. This dataset permits subnational analysis of imperial educational provision that has previously been possible only through case studies or regional aggregates.[4] The competitive logic documented here provides the missing subnational mechanism linking educational investment to institutional competition. Beyond the argument advanced in this article, the dataset offers a foundation for future research on Ottoman state capacity, communal institutions, and educational development.

## 2 A Theory of Educational Competition and State Provision

State building is often characterized as a struggle between the state and society (Scott, 1998; Tilly, 1992, 27). Powerful social actors can limit the state's ability to penetrate society and implement its policies (Migdal, 1988, 33). A large literature holds that ethnically diverse polities provide fewer public goods, as heterogeneous preferences and weak cross-group solidarity undermine collective investment (Alesina et al., 1999). Baldwin and Huber (2010) refine this claim, locating the effect in economic inequality between groups rather than diversity as such. A third strand identifies an administrative obstacle: Charnysh (2022) shows that Muslim communities in the Russian Empire, governed through religious intermediaries and therefore less legible to state officials, received less generous famine assistance than more legible minorities. Magiya (2022) documents a parallel dynamic in the Ottoman case, where diverse populations raised the costs and lowered the returns of investment in local fiscal capacity. Whether the mechanism is preferences, inequality, or information, these accounts converge on a single prediction: provision declines as heterogeneity rises.

Education figures prominently in this literature. It appears among the productive public goods in Alesina, Baqir, and Easterly (1999), in the service measures of Baldwin and Huber (2010), and as the primary outcome in studies of local funding under diversity ((Miguel and Gugerty, 2005)). What it does not receive is distinctive theoretical treatment. Schooling enters these accounts as one component of a public goods index, and the mechanisms generate underprovision. Nothing in them turns on what distinguishes a school from a well. Yet schooling is a distinct type of good. It is targetable: states can site schools in particular districts and admit particular populations, whereas a road or a sewer benefits whoever is nearby. And it is constitutive rather than distributive, transmitting language, history, and claims about loyalty that rival providers contest (Darden and Mylonas, 2016, 1448; Falk, 2015, 20). Where a good produces identity rather than serving preexisting preferences over it, diversity can generate competition to supply the good rather than failure to fund it.

[4]Somel, 2001, 331–336 reports descriptive statistics on the number of schools at the district level. Strohmeier, 1993, 219 relies on aggregate educational data from the Beirut Vilayet to argue that Ottoman educational policies in Lebanon were largely unsuccessful. Fabbe, 2019, 108 uses the *salnames* to examine the religious and secular backgrounds of teachers. Fortna, 2002 analyzes the photographic collections contained in the education almanacs alongside changes in the curriculum, while Somel, 2001, 96 uses the same source to examine the organization and functioning of provincial education councils.

A second literature does treat schooling as contested, showing that missionary and confessional providers expanded education where they competed for adherents (Gallego and Woodberry, 2010; Woodberry, 2012; Lankina and Getachew, 2013; Pillai, 2025). But the competitors in these accounts are non-state actors, and the state is absent, weak, or reactive, a colonial administration tolerating mission schools rather than a sovereign power defending its own populations against foreign-sponsored rivals. The result is that one literature explains levels of provision without theorizing identity, and the other theorizes identity without explaining state provision. Neither anticipates the case where the state itself enters the field as a competitor.

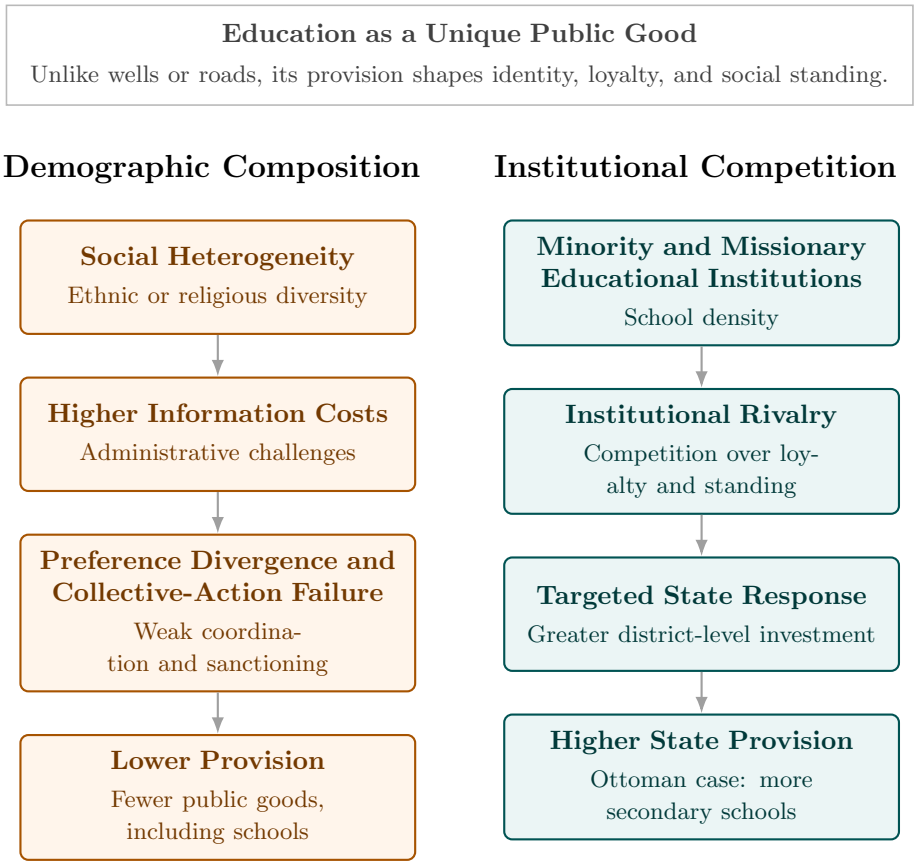



Figure 1: Theoretical Expectations

Figure 1 contrasts the dominant demographic explanation for public-goods provision with the institutional competition mechanism developed in this article. The conventional literature (left) predicts that ethnoreligious heterogeneity reduces provision by increasing administrative and collective-action challenges. I argue that in settings with already existing rival educational institutions (right), education constitutes a distinctive public good whose strategic value encourages state investment.

The Ottoman case illustrates both the competitive field and the state's incentive to enter it. The empire traditionally governed non-Muslim communities through accommodation, incorporating local institutions and granting legitimacy to existing arrangements rather than pursuing full integration (Mardin, 1973, 172), a pattern resembling what Mahoney and Thelen (2010) describe

as institutional layering (Mahoney and Thelen, 2010, 16). Ottoman policymakers did not generally seek to dismantle existing educational institutions (Ortayli, 2019, 194); they added new ones alongside communal networks (Barkey, 2008, 24; Ciftci, 2025, 10). Those networks were substantial. Minority communities obtained education through schools administered by their own religious institutions, frequently in connection with local churches and communal organizations (Heper, 1994, 227–228; Ortayli, 2019, 196). The 1856 Reform Edict formally affirmed the right of recognized religious communities to establish their own schools (Somel, 2001, 42). A parallel network of missionary schools particularly targeted Christian communities (Makdisi, 2008; Ortayli, 2019, 197–198). Capitulatory protection of foreign personnel and property meant that administrative action against missionary schools invited consular and embassy intervention (Ahmad, 2000, 8). Non-Muslim communal schooling was entrenched by the 1856 Reform Edict. Closure and absorption were therefore available only sporadically and at high diplomatic cost.

Ottoman authorities had reason to treat missionary and minority schools as rivals. They feared that minority and missionary schools would facilitate foreign intervention, encourage nationalist mobilization, and strengthen ties between local communities and neighboring states (Fortna, 2002, 8; Finkel, 2005, 497; Kalisman, 2022; Somel, 2001, 98). They were also aware that these schools outperformed Muslim ones (Barkey, 2008, 287;Fortna, 2002, 71), and that Muslim children attending them might become detached from both Islam and imperial loyalty (Ortayli, 2019, 198).

While primary schools formed the foundation of mass education, secondary schools were more closely connected to the Ottoman state's modernization, bureaucratic, and integration projects than primary schools (Baysan, 2025, 53; Somel, 2001, 11, 42–44; Ortayli, 2019, 191). Furthermore, Ottoman policymakers envisioned secondary schools as vehicles for cultivating loyal subjects, training future civil servants, and promoting a shared imperial identity through the ideals of Ottomanism (Cleveland and Bunton, 2025, 94; Emrence, 2015, 60; Karpat, 2001, 100–101; Somel, 2001, 11, 112). Therefore, my hypothesis is:

**Hypothesis:** Ottoman authorities established more secondary schools in districts with denser minority and missionary educational networks.

I examine two outcomes of the secondary school expansion: the number of state secondary schools and the resources (*kurus*) allocated to them. These capture complementary dimensions of state investment, its spread and its depth, and provide two independent tests of the competition logic.

## 3 Historical Background

Starting from the nineteenth century, education became an important instrument of socialization in the Ottoman Empire, promoting religious values, moral conduct, and respect for authority (Baysan, 2025, 32; Fabbe, 2019, 17; Somel, 2001, 59). As the state's role in education expanded, policymakers increasingly viewed schools as tools of state-building capable of cultivating loyal subjects, integrating diverse populations, and producing the bureaucrats and professionals needed to sus-

tain a modern empire (Fortna, 2002, 8–30; Kalisman, 2022, 22–28; Ortayli, 2019; Somel, 2001, 54). This was particularly the case during the reign of Abdulhamid II. Running the Empire for 33 years (1876–1909), the sultan combined modern educational reforms with an emphasis on Islamic instruction and loyalty to the empire (Fortna, 2002, 4; Baer, 2021, 369; Çapar, 2021, 253; Somel, 2001, 4).[5]

Figure 2 provides a schematic representation of the educational institutions outlined in the 1869 Regulation for Public Education, distinguishing between Ottoman state schools, minority community schools, and missionary schools, whereas the complete structure of the system is presented in Appendix Figure 9.

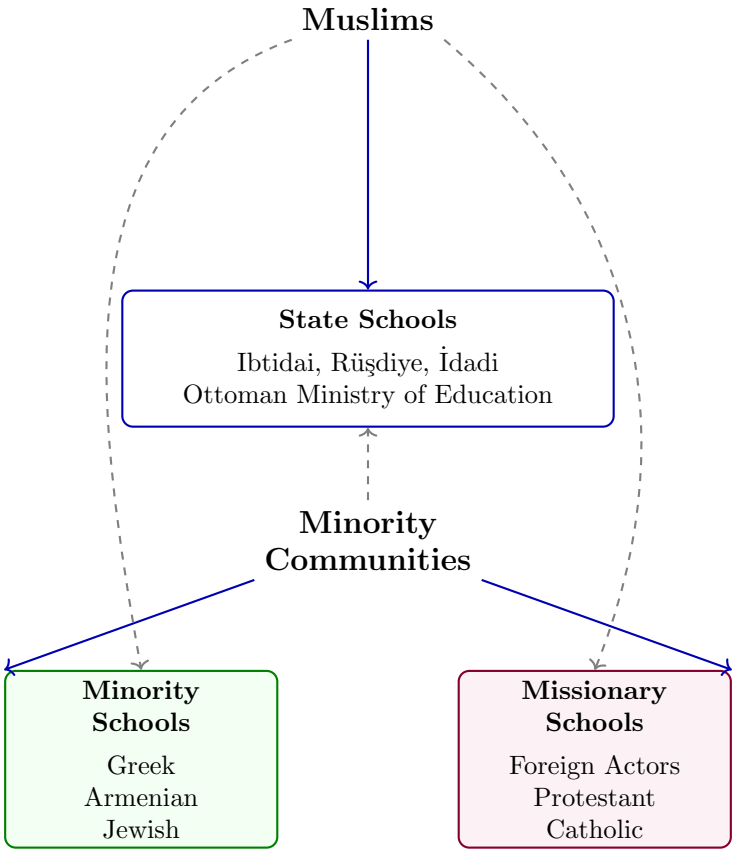



Figure 2: Educational institutions and communities in the late Ottoman Empire.

The 1869 Regulation of Public Education[6] became the principal blueprint for Ottoman state education, formalizing a hierarchical system of *ibtidai* (primary)[7], *rüşdiye* (lower secondary), and

[5]Textbooks and periodicals from the era emphasized loyalty to the sultan, religious devotion, and service to the empire (Çapar, 2021, 253; Fabbe, 2019, 109–110). Consequently, the expansion of modern schooling did not represent a departure from religion but rather an effort to combine religious instruction with state-directed education (Ortayli, 2019, 194).

[6]*Maarif-i Umumiye Nizamnamesi*

[7]Ibtidai schools are the formalized structure of Qur'an schools, where a local religious leader taught the basics of reading, writing, and arithmetic, and students memorized the Qur'an (Kalisman, 2022, 29; Somel, 2001, 74). Until the 1880s, "sibyan mektebi" was referred to as primary school in a general sense. However, beginning from the 1880s, sibyan schools began to designate Qur'anic schools only (Somel, 2001, 109).

*idadi* (upper secondary) schools under the Ministry of Education (Baysan, 2025, 54; Fortna, 2002, 27; Somel, 2001, 86). The law envisioned eight years of elementary and lower-secondary education. Figure 2 depicts the resulting educational field. Solid arrows indicate each community's primary channel of attendance; dashed arrows indicate cross-attendance that was possible. State schools above the primary level were formally open to Muslims and non-Muslims alike (Somel, 2001, 112), yet non-Muslim participation, despite the initial enthusiasm of state officials (Somel, 2001, 240), remained limited: according to the author's own calculations from the 1903 *Salnâme-i Maârif*, Muslims constituted 98 percent of lower secondary students and 94 percent of upper secondary students.

Muslim students, for their part, enrolled predominantly in state schools but could also attend minority or missionary institutions. Madrasas constituted an alternative path for Muslims, where they could obtain advanced Islamic education (İhsanoğlu, 2019, 140; Appendix Figure 9). The educational field was thus contested rather than segmented: each community's children could, in principle, be schooled by rival providers, and it was precisely this overlap that made schooling an arena of institutional competition.

My hypothesis concerns both the spread of state schools and the depth of investment in them. Two features of the Ottoman educational system bear on how it should be contextualized: the regulatory framework governing where schools could be established, and the structure of educational finance. The 1869 Regulation of Public Education mandated the establishment of primary schools (*ibtidai*) in villages, lower secondary schools (*rüşdiye*) in towns with at least 500 households, and upper secondary schools (*idadi*) in cities with at least 1,000 households (Ortayli, 2019, 193; Strohmeier, 1993, 220). These thresholds were not strictly enforced. However, they tie expected school provision to settlement size. Therefore, I will account for population values in my statistical models (Data Section).

The second concern is fiscal. Financing constituted one of the principal weaknesses of late Ottoman educational policy (Finkel, 2005, 499; Ortayli, 2019, 194; Somel, 2001, 139). Although a new education tax was introduced (Fortna, 2002, 118–120; Somel, 2001, 87), limited resources forced policymakers to prioritize, directing investment toward regions deemed strategically important for political, administrative, or social reasons (Somel, 2001, 100). Crucially, this fiscal lever operated unevenly across school levels. Ibtidai (primary) schools were financed largely through local resources, and their expansion depended chiefly on local initiative (Somel, 2001, 105, 116, 144). The secondary schools, by contrast, were more likely to draw on earmarked education revenues and central budgets, reflecting a growing if uneven centralization of educational finance (Fortna, 2002, 120; Ortayli, 2019, 194; Somel, 2001, 113–139). The state thus held the instrument for strategic placement precisely at the secondary level, where, as argued above, its loyalty and socialization concerns were also concentrated.

The dataset for my study primarily comes from the 1903 yearly almanac (*Salnâme-i Maârif* ) on Education, the latest Education Almanac from the Ottoman Empire which survived to the

contemporary era.[8] I provide a detailed discussion on coding and example pages of the Almanac in the appendix (Figures 10 and 11). I manually coded the information on the almanac, which included details such as the type of school, number of students, year of funding, and financial expenses incurred.

To construct both my dependent and main independent variables, I calculate the total number of residents and non-Muslim residents in each district's population. I draw these figures from the closest available Governorate Almanac (*Vilayet Salnamesi*) to 1903.[9] When population information is unavailable in the Almanacs, or when no surviving Almanac exists for a given province and year, I rely on Karpat (1978), who reconstructs population figures from the 1881–1893 Ottoman census; where Karpat (1978) is also unavailable, I turn to Karpat (1985), which reports estimates from the 1914 census. I prioritize the Almanacs because they are the direct source temporally closest to my outcome measure. Although these sources span different years, the resulting measurement error is likely conservative.[10]

Through this cascading procedure, I recover Muslim and non-Muslim population data for 90% of the districts listed in the 1903 Education Almanac (510 of 568 kazas). This represents broad coverage of the empire: according to Karpat (1985, 210), the Ottoman Empire contained 568 kazas in 1900, the same number that I obtained based on the 1903 *Salnâme-i Maârif*. The districts without comparable population data are concentrated primarily in Yemen, the Hijaz, and Ottoman Libya, where the provincial almanacs do not report district-level census results, with only a small number scattered across other provinces. Because the main explanatory variable measures minority and missionary schools per 10,000 non-Muslim inhabitants, the estimation sample is further restricted to 475 districts with a non-zero non-Muslim population.

To provide the descriptive statistics of key variables, I constructed Ottoman Empire's approximate maps in 1903, where each point represents an Ottoman kaza. Borders exclude Libya, the Hejaz, and Yemen because comparable district-level population data are unavailable. Figure 3 displays the distribution of the non-Muslim population across the Empire:

[8]The 1903 Almanac had a separate section that listed the number of schools built since Abdulhamid the Second ascended to the throne, the final Ottoman sultan with extensive powers, who ascended to throne in 1876. The sheer number of schools built during his tenure enables me to leverage spatial and temporal variation in school buildings across the empire. Third, the 1903 Almanac provided other critical details, such as the number of pupils per school and the school construction date for both minority and Muslim schools. The almanac also listed the expense for school constructed for a significant number of schools, enabling further analysis.

[9]For Almanacs, I refer to ISAM (İslam Araştırmaları Merkezi [Center for Islamic Studies])'s online archive. The Ottoman Empire conducted several censuses in the late nineteenth and early twentieth centuries (1881–1893; 1905–1906; 1914), but complete census tabulations were rarely made public; provincial yearbooks (*Vilayet Salnamesi*) are among the administrative sources used to reconstruct population figures (Karpat, 1978, 240). Population information reported in the *Vilayet Salnamesi* is not fully consistent across time and space: some Almanacs list detailed population statistics, while others omit them entirely.

[10]To the extent that a district's religious composition changed between the census year and 1903 in ways uncorrelated with school provision, using earlier or later population figures introduces noise into the population measure that enters the per-capita school density for both total population and non-Muslim population. The measurement error of this kind is likely to attenuate rather than inflate estimated relationships, making support for the hypothesis harder to detect.

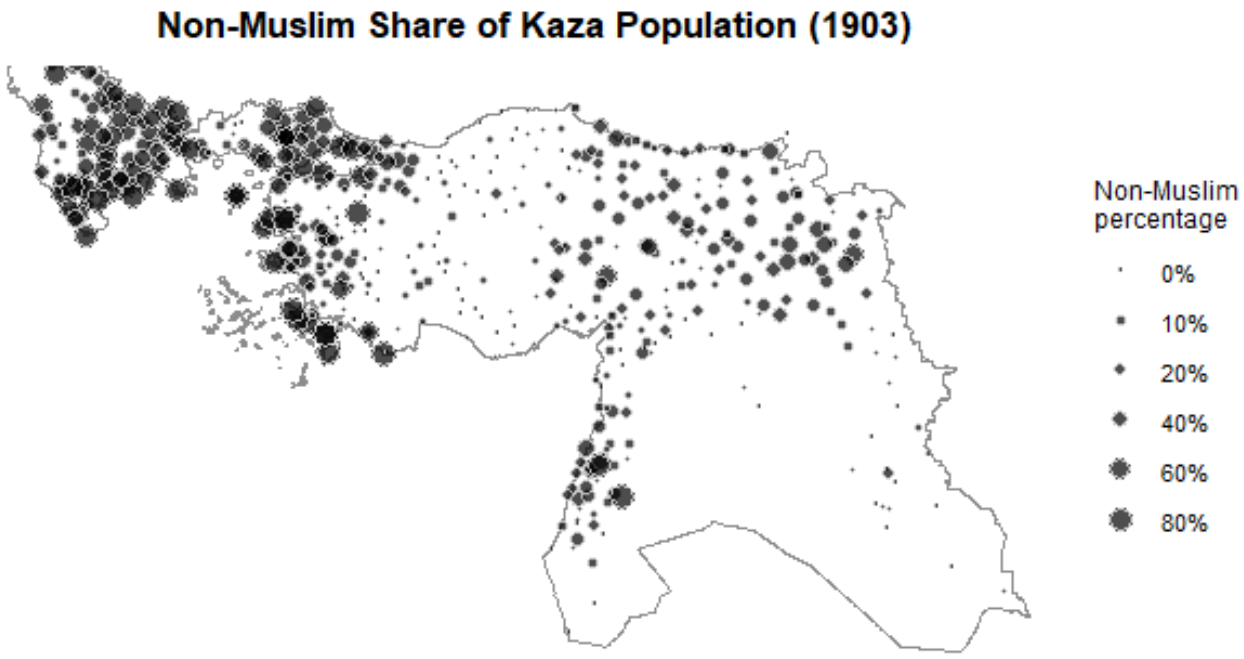



Figure 3: Non-Muslim Share of District Population

Figure 3 maps the spatial distribution of the non-Muslim share of the population across Ottoman districts in 1903. Non-Muslim populations were unevenly distributed throughout the empire, with the highest concentrations located in the Balkans, western Anatolia, and parts of the Levant.

I employ two measures of Ottoman educational investment as dependent variables. The first is the number of state secondary schools (lower and upper secondary schools combined) per 10,000 inhabitants in a given kaza. The second is educational expenditure, measured as the amount of resources (*kuruş*) allocated to secondary schooling per 10,000 inhabitants. Expressing both measures per 10,000 inhabitants ensures that they capture the intensity of educational provision rather than simply reflecting differences in population size across districts. Figure 4 shows the distribution of state secondary schools per 10,000 inhabitants across districts.

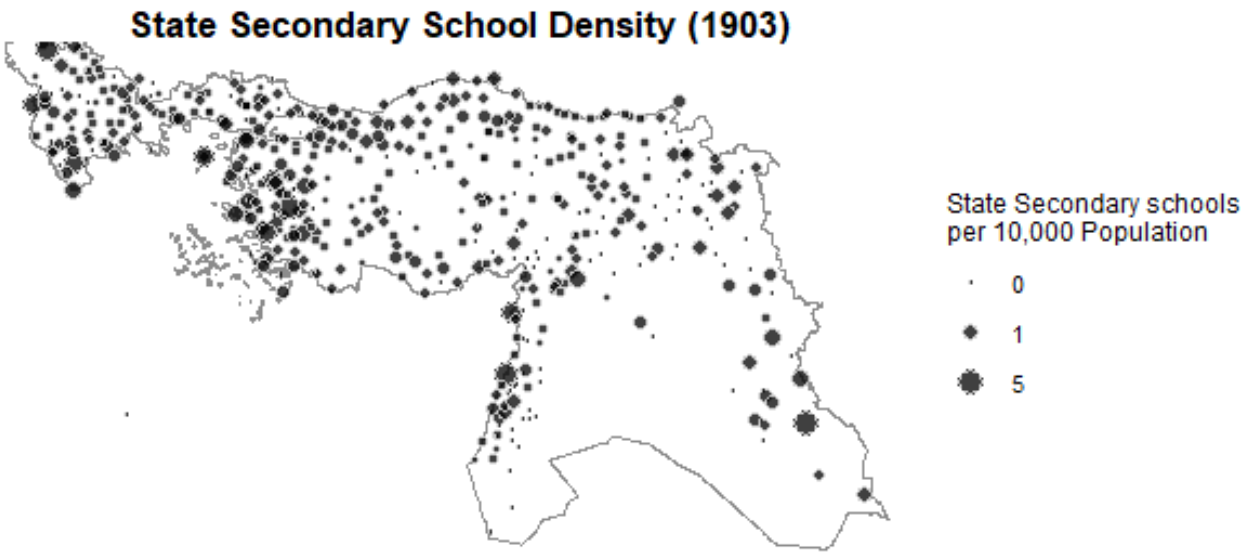



Figure 4: State Secondary School Expansion

Figure 4 indicates that the density of state secondary schools (*rüşdiye* and *idadi*) was higher in the Balkan regions, western Anatolia, and the Levant, where the density of minority and missionary schools was also high. It is also notable that state secondary schools were more widespread, with a presence across Anatolia and parts of the Arab lands.

To evaluate the hypothesis, I calculate the number of minority and missionary schools per 10,000 non-Muslim inhabitants in each district. This measure captures the density of alternative educational institutions available to non-Muslim communities. To construct this variable, I count all minority and missionary secondary schools [11] listed in the 1903 *Salnâme-i Maârif* within each kaza and divide the total by the local non-Muslim population, multiplying the final value by 10,000.[12] I also calculate the standardized number of students enrolled in these schools, which I use in robustness analyses as an alternative measure of the strength of minority educational networks. Figure 5 shows the density of minority and missionary schools, where point size indicates the number of minority and missionary secondary schools per 10,000 non-Muslim inhabitants.

[11] Both *rüşdiye* (lower secondary) and *idadi* (upper secondary).

[12] In some cases, the *Salnâme-i Maârif* lists a *nahiye* (subdistrict) rather than a kaza. I refer to Akbayar, 2023 to identify the corresponding district for these subdistricts.

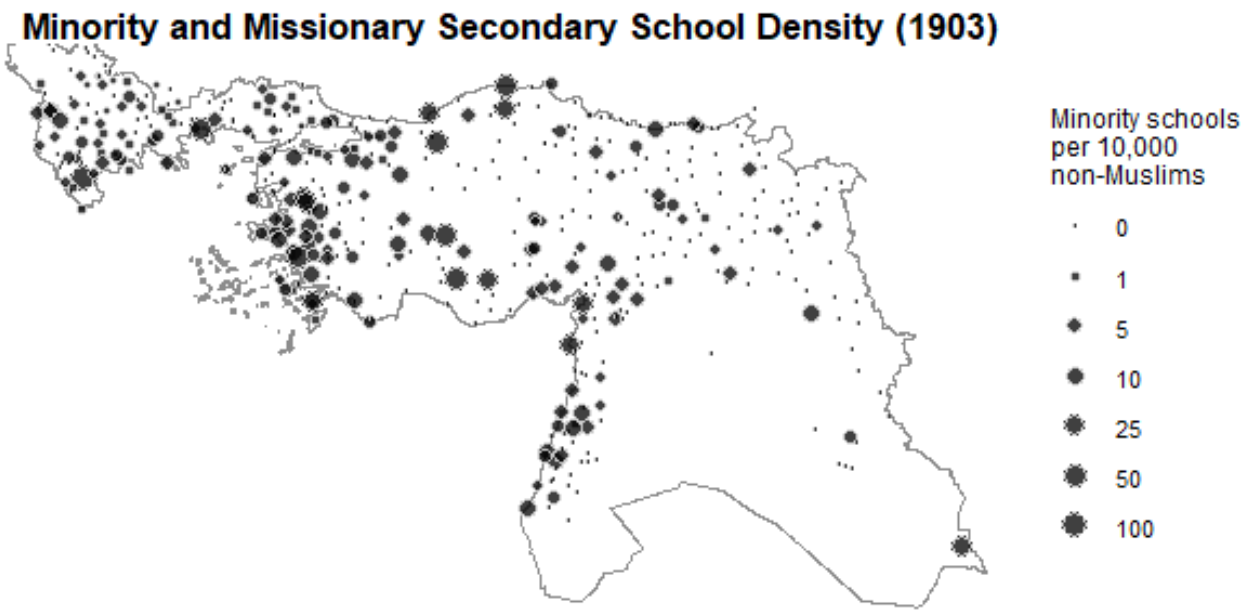



Figure 5: Minority and Missionary School Density (1903)

Figure 5 indicates that the minority and missionary school density is concentrated around the Balkans, Western Anatolia, and parts of the Levant. It is important to note that the denominators for Figure 5 and Figure 4 are different. While Figure 5 focuses on per 10,000 non-Muslims, Figure 4 captures schools per 10,000 population. The descriptive statistics for the principal variables (including the expenditure) are available in the Appendix Table 2.

## 4 Research Design

I estimate the following ordinary least squares model to examine the determinants of state educational provision. The outcome variable, $y_i$ is alternatively measured as the number of state secondary schools per 10,000 inhabitants or state educational expenditure per 10,000 inhabitants in a given district:

$$y_i = \beta_0 + \beta_1 MinoritySchools_i + \mathbf{X}_i'\boldsymbol{\gamma} + \varepsilon_i, \tag{1}$$

The coefficient of primary interest is $\beta_1$, which captures the association between the density of minority and missionary secondary schools and state educational provision. The vector $\mathbf{X}_i$ includes a comprehensive set of control variables designed to account for alternative explanations.

### 4.1 Alternative Explanations ($\gamma$)

*Demographics:* An influential literature expects ethnic and religious heterogeneity to depress public goods provision, whether through divergent preferences (Alesina et al., 1999), inter-group inequality (Baldwin and Huber, 2010), or reduced legibility of diverse populations to the state (Magiya, 2022). The Ottoman case admits the opposite prediction as well: the secession of Greece and the emergence of Balkan nation-states demonstrated that religious and linguistic difference could be transformed into demands for autonomy (Mazower, 2021; Vacalopoulos, 1973), giving authorities reason to invest precisely where non-Muslims were numerous . Therefore, I account for non-Muslim population share $[0, 1]$.

*Modernization:* Modernization theories suggest that educational expansion accompanies economic development and industrialization (Bourguignon and Verdier, 2000; Galor et al., 2009; Gellner, 1983). For instance, industrialization may require more skilled workers (Paglayan, 2021, 183). The closest proxy available for market integration and industrialization is technological infrastructure, particularly access to rail transportation. I calculate the distance to the nearest railway for each district based on the 1900 railway coordinates provided by Hanedar and Uysal (2020). I expect schooling investment to decrease with increasing distance from railroads.

*Schooling Demand and Infrastructure:* Another explanation is that educational expansion simply reflects broader local demand for schooling (Paglayan, 2022, 1253), independent of the presence of minority institutions. To account for this possibility, I control for the density of state primary schools (per 10,000 inhabitants), which captures the broader expansion of state schooling, and the density of madrasas (per 10,000 inhabitants), which captures the presence of existing Islamic educational institutions. If minority and missionary school density remains associated with Ottoman educational investment after accounting for these measures, this would provide stronger evidence that the state responded specifically to rival educational networks rather than to educational development in general.

*Administrative Capacity:* The state's infrastructural power, its ability to implement decisions throughout its territory, can vary substantially across regions (Mann, 1984; Fukuyama, 2013b; Harbers and Steele, 2020; O'Donnell, 1993). To account for differences in administrative capacity and state penetration, I include a binary indicator for whether a district was a *sancak* center (1 = yes, 0 = no). In the Ottoman context, sancaks were subunits of governorates, which were further divided into kazas. The secondary educational institutions were concentrated in urban areas (Kalisman, 2022, 22), particularly sancak centers. One reason may have been the presence of educational councils, which played an important role in mobilizing resources for schooling. Their presence and effectiveness varied considerably across the empire and were weaker in peripheral and tribal regions (Somel, 2001, 9). I therefore expect *sancak* centers to receive greater state educational investment.

*Interstate Conflict:* Cross-national research finds that interstate warfare contributed to the expansion of primary schooling by increasing states' incentives to build national cohesion and mobilizational capacity (Aghion et al., 2019). A related dynamic may have operated within the

Ottoman Empire: educational expansion may have been greater in border regions, where concerns about territorial control, political loyalty, and external threats were particularly acute (Somel, 2001, 75; Baer, 2021, 372). To account for this possibility, I include an indicator coded 1 for governorates located along an international border and 0 otherwise.

*Additional Controls:* Additional controls account for features specific to the Ottoman context. I include binary indicators for governorates located in Europe, where educational development may have followed distinct patterns, and for port governorates. I also include indicators for governorates in which population statistics either undercounted women or separately enumerated tribal populations in the provincial almanacs, accounting for potential differences in the comparability of population figures. At the district level, Missionary indicates whether at least one missionary school was present, separating the extensive margin of missionary presence from the density of rival educational institutions. *Population* captures the district's total population.

# 5 Results

Table 1 presents the results for the spread of state secondary schools. Because the main explanatory variable measures minority and missionary schools per 10,000 non-Muslim inhabitants, the main estimation sample is restricted to 475 districts. Districts with no non-Muslim inhabitants are excluded because calculating the density measure would require division by zero and is therefore mathematically undefined. The fully specified model includes 465 districts, excluding an additional ten cases for which railway distance cannot be calculated because of geocoding limitations.

Table 1: OLS Estimates of State Secondary School Density

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | State Secondary Schools per 10,000 (log1p) | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Minority and Missionary School Density (log1p) | 0.059*** | | 0.059*** | 0.050*** | 0.040*** |
| | (0.013) | | (0.013) | (0.013) | (0.014) |
| Non-Muslim Population Share | | 0.034 | 0.023 | −0.022 | −0.077 |
| | | (0.046) | (0.045) | (0.043) | (0.049) |
| Sancak Center | | | | 0.126*** | 0.150*** |
| | | | | (0.033) | (0.034) |
| Population (log1p) | | | | −0.115*** | −0.154*** |
| | | | | (0.016) | (0.017) |
| State Primary School Density | | | | | −0.002 |
| | | | | | (0.010) |
| Madrasa Density | | | | | −0.002** |
| | | | | | (0.001) |
| European Governorate | | | | | −0.004 |
| | | | | | (0.045) |
| Tribal Zone | | | | | −0.126*** |
| | | | | | (0.040) |
| Railway Distance (100 km) | | | | | −0.010 |
| | | | | | (0.007) |
| Port Governorate | | | | | 0.102*** |
| | | | | | (0.026) |
| Border Governorate | | | | | 0.080** |
| | | | | | (0.038) |
| Missionary Presence | | | | | 0.049 |
| | | | | | (0.049) |
| Constant | 0.254*** | 0.281*** | 0.248*** | 1.420*** | 1.815*** |
| | (0.014) | (0.017) | (0.019) | (0.162) | (0.179) |
| Observations | 475 | 510 | 475 | 475 | 465 |
| $R^2$ | 0.041 | 0.001 | 0.041 | 0.142 | 0.211 |
| Adjusted $R^2$ | 0.039 | −0.001 | 0.037 | 0.134 | 0.190 |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Minority and missionary school density within a kaza is positively and statistically significantly associated with state secondary school density across all specifications. The relationship remains statistically significant after accounting for demographic composition, administrative capacity, modernization, broader educational development, and other Ottoman-specific characteris-

tics. These findings provide strong support for the hypothesis that Ottoman authorities established more secondary schools in districts with denser minority and missionary educational networks. Figure 6 presents the post-estimation predicted values associated with minority and missionary school density based on the fully specified model.

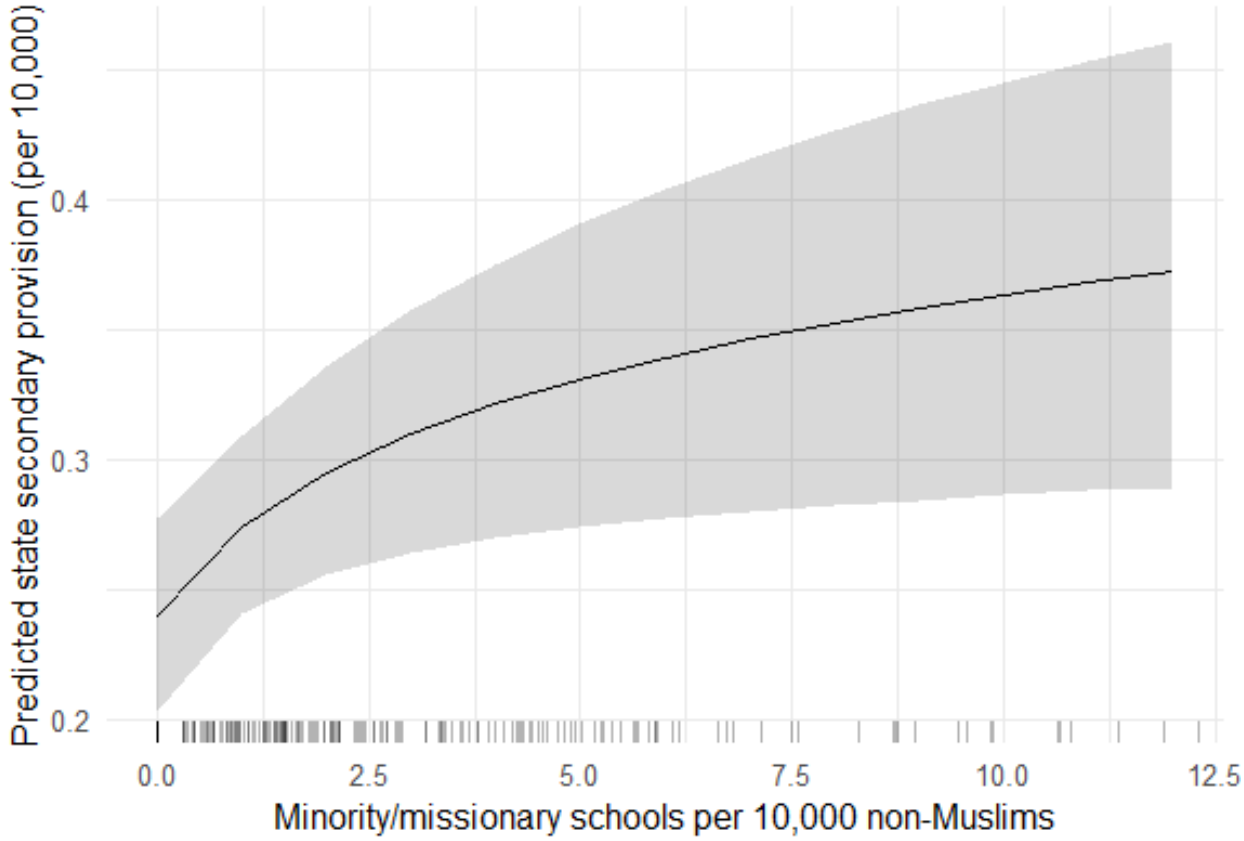



Figure 6: Post-estimation predicted values (Model 5), back transformed

As Figure 6 indicates (back log-transformed), predicted state secondary school provision increases from about 0.25 schools per 10,000 in districts with no minority or missionary schools to roughly 0.38 in districts with the highest densities. The increase is strongest at lower levels of minority and missionary school density and becomes smaller as density rises. The relationship between investment per capita and secondary school density (Table 3 in Appendix) is also statistically significant ($\alpha < 0.1$) and positive. Therefore, the minority and missionary school presence is associated with both the expansion and investment of Ottoman secondary schools.

### 5.1 Alternative Explanations

Among the alternative explanations, state secondary school density is higher in administrative centers, consistent with the possibility that greater state capacity facilitated educational provision. School density is also higher in border and port governorates and lower in tribal regions. Railway distance, which is a proxy for market integration and technological development, is not statistically

significant.

Evidence for broader educational demand is more mixed. Madrasa density is negatively associated with state secondary school density in the main models, but this relationship disappears in the robustness checks. Primary school expansion is not statistically significant, suggesting that the expansion of state secondary schools did not simply follow the expansion of primary education. School density is also lower in more populous districts. The madrasa coefficient is sensitive to changes in model and dropping of influential observations. I therefore treat it as a control and do not interpret its sign substantively. Importantly, the positive relationship between minority and missionary school density and state secondary school provision remains statistically significant after accounting for these alternative explanations.

Although the State Primary School Density coefficient is not significant, I still examine whether the result simply reflects a general expansion of state schooling rather than a strategic response. I replace the dependent variable with State Primary (ibtidai) Schools per 10,000 Muslim residents. Minority-school density does not significantly predict primary-school provision (Table 4 in Appendix). The contrast between the secondary and primary school results is consistent with the theoretical expectation that state secondary education represented a targeted institutional response to confessional competition rather than part of a uniform expansion across educational levels.

I evaluate whether the result depends on measuring confessional educational activity. Using kaza-level enrollment data, I replace minority schools per 10,000 minority residents with minority students per 10,000 minority residents. This alternative measure captures the scale of minority education based on attendance. The relationship remains positive and statistically significant, suggesting that the finding is not produced by a single independent variable choice (Appendix Table 5).

### 5.2 Robustness Checks

I subject the models to several robustness checks. I estimate a negative binomial model using the count of state secondary schools as the dependent variable and the log of district population as an offset, thereby accounting for differences in district population while modeling school counts directly. The coefficient on minority-school density remains positive and statistically significant (Table 7 in Appendix), indicating that the findings are not an artifact of modeling a population-standardized rate. Because districts within the same administrative units were exposed to shared provincial institutions, policies, and reporting practices, I re-estimate the models with standard errors clustered alternately at the governorate and sancak levels. The substantive conclusions remain unchanged across these specifications (Table 10 in Appendix).

To assess sensitivity to omitted-variable bias, I employ (Oster, 2019)'s coefficient-stability approach (Table 11). Following the recommended benchmark, I set the maximum attainable $R^2$ to 1.3 times the $R^2$ of the controlled model. Under the assumption that selection on unobserved factors is as strong as selection on the observed covariates ($\delta = 1$), the bias-adjusted coefficient on minority and missionary school density remains positive at 0.030, compared with the observed coefficient of

0.041. Moreover, the estimated value of $\delta$ required to reduce the coefficient to zero is 2.64. Thus, under the assumptions of the sensitivity analysis, selection on unobserved factors would need to be approximately 2.6 times as strong as selection on the included covariates to explain away the estimated relationship.

To account for the influential observations, I calculate Cook's distance for each observation. This diagnostic identifies an influential observation with a Cook's distance of 39.4, compared with less than 0.1 for the next-highest observation [13]. I re-estimate the model without the influential case. The coefficient on minority-school density remains positive and statistically significant at $\alpha = .05$, indicating that the institutional-competition finding is not an artifact of this single case (Table 9 in Appendix). I also estimate robust regressions using an MM estimator, which retains the available estimation sample while downweighting observations with disproportionate influence. The positive association between minority-school density and state secondary schooling remains substantively similar (Table 8 in Appendix).

### 5.3 Accounting for Reverse Causality

The institutional-competition mechanism implies a specific temporal ordering: where the state responded to confessional competition, minority secondary schools should predate the state secondary schools built alongside them.[14] The alternative is also possible: state schools arrived first, and minority communities and missionaries responded by building their schools where the state was schooling. As a descriptive check, I examine the subset of districts for which establishment years are recorded for both Muslim state and non-Muslim secondary schools:

Figure 7 plots these intervals. Among the 57 districts recording founding dates for both school types, minority schools opened first in 48 cases (84 percent) and state schools in nine, with a mean lag of 23.7 years. State provision, in other words, overwhelmingly trailed rather than anticipated minority and missionary expansion. Figures 21 and 22 in the Appendix report the temporal breakdown within each group.

I further address reverse causality by exploiting a feature of the source itself. The Almanac lists separately, at the end of each governorate's entry, the schools constructed during the reign of Abdülhamid II (1876–1903[15]). Because these listings overlap with the general school registers, I excluded them from the construction of the main outcome variable to avoid double-counting; here I use them directly, restricting the outcome to Hamidian-era construction. This restriction addresses a limitation of the stock measure: that schools standing in 1903 include Tanzimat-era foundations predating the expansion of minority and missionary networks. The association between rival school density and state secondary construction holds in this restricted sample (Table 6), indicating that

[13] The influential observation is Mikri in the Menteşe sancak of Aydın. Mikri is a low-population district in which a single state secondary school produces an extreme per-capita rate.

[14] Somel (2001, 42) argues that the rapid expansion of minority schools following the 1856 Reform Edict increased Ottoman officials' desire to expand educational opportunities for Muslims.

[15] Although the reign of Abdulhamid II continued until 1909, the Hamidian construction section can only cover 1876-1903.

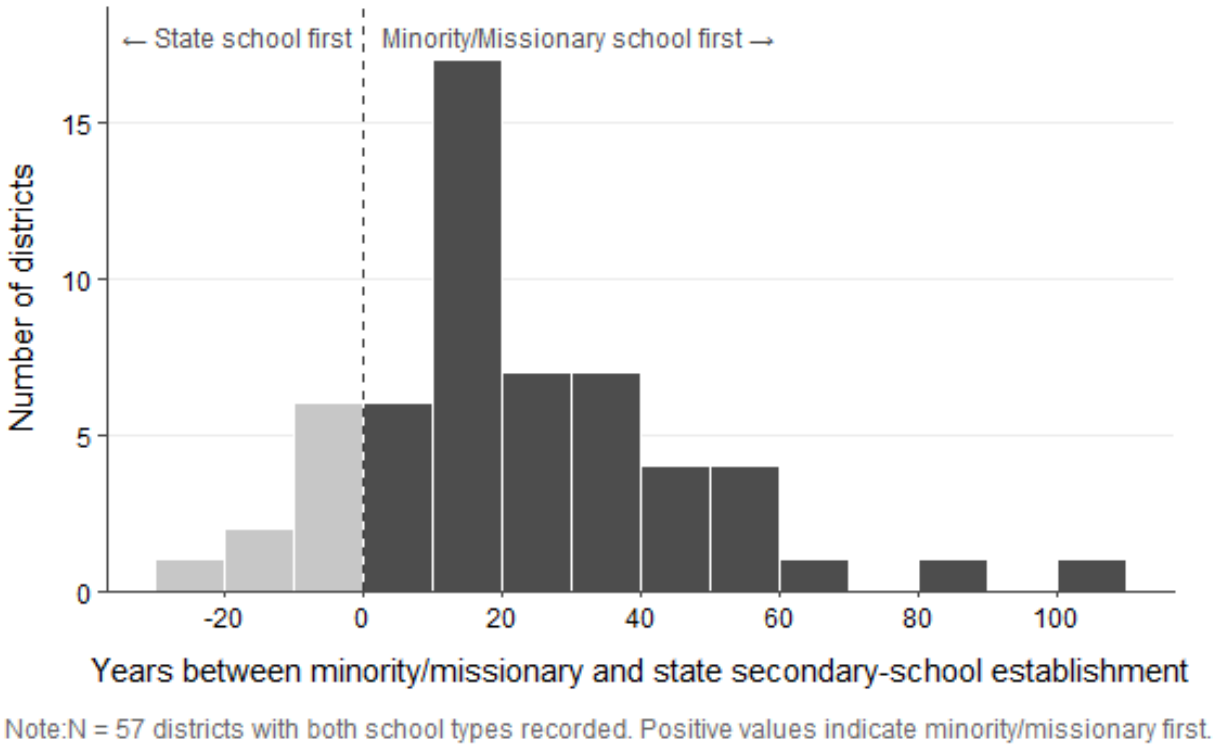



Figure 7: Temporal Ordering of Minority/Missionary and State Secondary Schools

the effect is present in the era when the competitive logic was most clearly state policy (Fortna, 2002).

While the quantitative analysis identifies a relationship between minority institutions and educational investment, archival evidence provides insight into the processes linking these variables, illuminating how the causal mechanism operated in practice (George and Bennett, 2005, 34, 224). The next section examines the archival evidence.

## 6 Archival Evidence

Following the nested-analysis framework of Lieberman (2005), case selection proceeds from the results of the large-$N$ analysis. Because the statistical model provides consistent support for the proposed relationship, the principal case studies are model-testing cases: they are selected from observations that the model predicts well while maximizing variation on the central explanatory variable, minority-school density (Lieberman, 2005, 444).Figure 8 situates these cases within the full sample of Ottoman districts, illustrating the variation in minority-school density that guides case selection.

Beirut is a case with high minority-school density, Damascus is in the mid-range, and Tekirdag

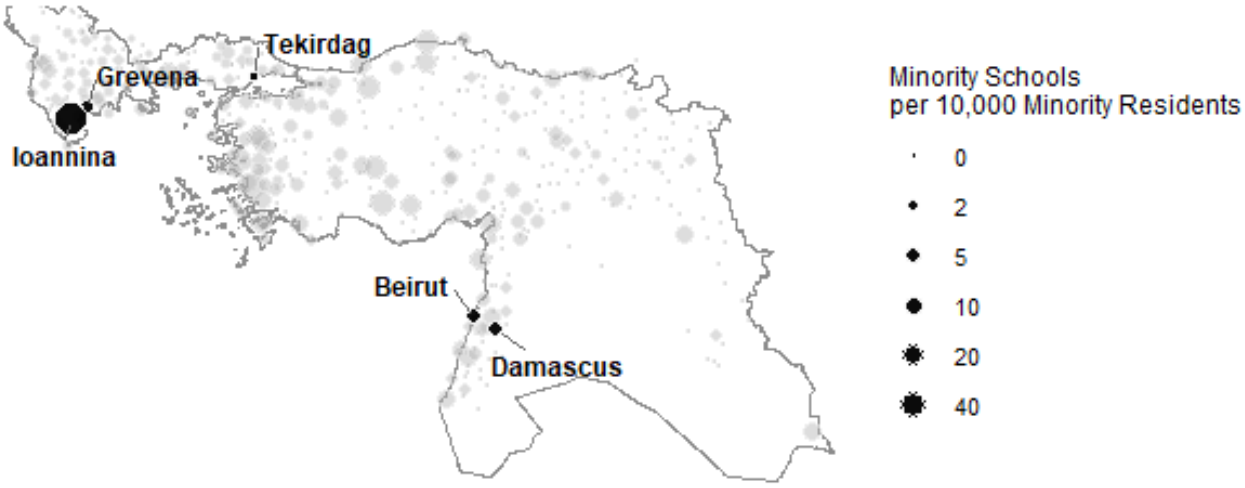



Figure 8: Case Selection for Archival Evidence

is a low-density case. Ioannina and Grevena constitute high-and low-density model-testing cases, respectively.

The documents examined below were located through the author's own research in the Ottoman Archives (Devlet Arşivleri Başkanlığı Osmanlı Arşivi, BOA) in İstanbul, supplemented by tracing archival citations in Somel (2001, 71–73) and Fortna (2002, 51–57) back to their original sources.[16] Read together, they recover the reasoning Ottoman officials themselves offered when they requested, or declined to provide, a secondary school, and that reasoning shares a common structure: the animating concern is institutional competition for the loyalty of a population officials understood as contestable. Decayed Muslim schools, advancing rival communities, graduates formed by foreign institutions, and the circulation of subversive literature appear across these reports not as a single condition but as varied local triggers of that same underlying apprehension.

*Competitive displacement:* In Damascus (1278/1861, Figure 12 )[17], a draft report to the Governor and the Finance Minister traced a chain of institutional decay: the endowed Muslim schools had been decaying, leaving the education conditions of Muslim children difficult. The non-Muslim population, by contrast, was well served by schools run by the communities themselves and by

[16]BOA BEO 3809/285650; BOA TFR.I.MN 117/11610;BOA A.MKT.MVL., 134/33; BOA Y.MTV 32/45.
[17]BOA A.MKT.MVL., 134/33

foreigners[18]. Christian graduates were filling the fiscal and civil administration, while Muslim kids were lingering in the streets[19]. The remedy urged was the construction of a lower secondary school, which would become the first of its kind in an Ottoman Arab town (Somel, 2001, 71).

In Tekirdağ (1270/1854, Figure 13)[20], noted as a commercial and agricultural town, the administrative council itself observed that "the other communities"[21] had advanced to a degree that should "stir the veins of effort"[22], and proposed converting the mosque-adjacent school into a lower secondary school with financial contribution from local notables. The school construction was approved (Figure 14).

*Loyalty and Subversion:* In Beirut(1305/1887, Figure 15)[23], the governor emphasized that education of children is one of the upmost political matters[24], and identified that Muslim graduates of foreign schools were said to emerge "devoid of Islamic formation"[25] and non-Muslims devoid of Ottoman morals[26]. The students were becoming naturally attached to the foreign state to which their school belonged. In some missionary schools, Muslim students were obliged to participate in Christian prayers and eat non-halal food(Mansel, 2011, 149). Two lower secondary schools were proposed and, per the 1903 Salnâme-i Maârif, two were duly constructed. In the Ioannina petition (1283/1866, Figure 16)[27] it is susceptibility to subversion: because literacy among the Albanian population was overwhelmingly in Greek, officials feared the reach of the seditious newspapers[28] circulating from Greece and cast secondary schooling as inoculation.

*Scope conditions:* The state did not answer perceived competition with a secondary school wherever it arose, it matched the level of provision to local capacity, and the archive preserves the calibration. Responding to the Ioannina petition, the center declined the secondary school outright, reasoning that the conditions for Turkish-language instruction had never been established and that a secondary school would therefore "bring no benefit"[29]; it approved instead the thirty primary schools that had been additionally requested (Figure 17).

Grevena shows the same calibration. A provincial report on the opening of ibtidai schools in the kaza (1328/1911)[30] begins by specifying that of its 115 villages only 15 were Muslim. The Greek-speaking Muslims of Grevena (Vacalopoulos, 1973; Kotzageorgis, 2015, 346), could not speak the Turkish that the state regarded as their proper "mother tongue"[31][32], a deficiency the report

[18]milel-i sâire çocukları kendi taraflarından ve ecnebîler canibinden yapılmış olan mekteplerde her nev' tahsîl ettiklerinden

[19]umûr-ı mâliye ve mülkiye kalemleri Hristiyân ile dolmuş ve etfâl-i müslime sokaklarda sürünmekte.

[20]BOA İ.DH 302/19173

[21]milleti saire

[22]tahrîk-i uruk-u gayret.

[23]BOA Y.MTV 32/45

[24]terbiye-i etfâl kaziyyesi mevâdd-ı siyâsiyyenin başlıcalarından birisidir.

[25]adâb-ı islâmiyeden ârî

[26]adet ve terbiye-i Osmaniyeden ârî

[27]BOA İ.MVL 556/24964

[28]muhrik el-fesad ceriydeleri

[29]faide veremeyeceğine binaen

[30]BOA BEO 3809/285650

[31]lisân-ı mâder-zâd

[32]The Turkish language was one of the pillars of Ottoman bureaucracy, and its diffusion among non-Turkish Muslim

attributed to the absence of schools and one that repeated petitions had failed to remedy. Constrained by budget, the center nonetheless authorized an exceptional measure: an additional teacher salary allocated "in view of the particular characteristics of the locality"[33]. In a separate matter (1325/1907)[34], the gendarmerie reorganization, whose officer corps included European personnel (Ercin, 2022, 167), sought village-level returns on Christians' schooling in Grevena, and particularly on the villages "Hellenized from among the Vlachs"[35]. The Rumelia Inspectorate recommended the request be denied. That such a map was judged too sensitive to surrender to a foreign-supervised body suggests how far the schooling-and-assimilation status of ambiguous populations had become a strategic asset in contested regions, one in which Greek pulled on Vlach and Muslim alike.

The Ioannina and Grevena cases, in which the center extended primary schooling, mark the boundary of the mechanism rather than breaching it. Where the schooling base for Muslims was thin, the state supplied primary instruction; secondary provision was reserved for settings where a competitive contest over an educated stratum was already underway. Officials justified secondary expansion in terms of competition over Muslim education, administrative opportunity, and political loyalty. However, where the educational foundation remained too weak to sustain such a contest, they directed central support toward primary schooling instead, a pattern consistent with the center's occasional financing of primary schools in politically sensitive or underdeveloped regions (Somel 2001, 155–159). The archival record therefore does more than corroborate the statistical association: it illuminates the mechanism linking minority educational competition to school expansion, particularly at the secondary level.

Taken together, these documents indicate that officials repeatedly linked educational investment to concerns about foreign and minority influence, Muslim educational and economic disadvantage, and the integration of strategically important populations. Although the immediate concerns varied across local contexts, they correspond to the institutional-competition framework developed above: minority and missionary schools constituted alternative institutions capable of shaping the education and loyalties of local populations, prompting Ottoman officials to strengthen the state's own educational presence. The archival evidence thus provides evidence for the mechanism depicted in Figure 1: the organization of minority communities and foreign actors through competing educational institutions created incentives for the state to respond through its own schools. In this sense, the qualitative evidence complements the large-$N$ results by showing how institutional competition was translated into decisions about state educational provision.

# 7 Conclusion

Why do states invest in public goods provision in regions where non-state actors already provide them? In this study, I employ the case study of late Ottoman Empire to answer this question.

populations was regarded as a political necessity. (Somel, 2001, 274)

[33] hususiyet-i mevki nazar-ı dikkate alınarak

[34] BOA TFR.I.MN 117/11610

[35] Ulahlardan Rumlaşmış

Conducting a quantitative analysis on the 1903 Education Almanac, I find that the Ottoman Empire's school building strategy was a response to the density of existing minority and missionary education institutions. The state built more schools in districts where minority and missionary schools were dense. Where a good produces identity rather than serving preexisting preferences over it, diversity can generate competition to supply the good rather than failure to fund it.

The archival evidence, drawing on petitions, gubernatorial correspondence, and ministerial deliberations from the 1850s through 1910 indicates that Ottoman officials viewed minority and missionary schools not merely as educational institutions but as competitors for administrative positions, political loyalty, and the socialization of future generations. The archival evidence also clarifies the scope conditions of the argument. The absence of a comparable relationship for primary schooling (Appendix) does not imply that educational competition was irrelevant in districts with weaker educational foundations. Rather, the cases of Ioannina and Grevena suggest that Ottoman authorities calibrated the level of educational investment to local capacity. Where a competitive secondary-school environment had not yet emerged, officials prioritized expanding primary education before investing in secondary institutions.

My study responds to a recent call to analyze how ethnic and religious heterogeneity shape the development and distribution of state institutions (Suryanarayan 2024, 234). Existing theories largely treat social heterogeneity as a constraint on public-goods provision because diversity weakens social cohesion and collective action. What matters is the type of public good involved. Schooling carries content, language, history, and loyalty that rival providers could contest. When schools function not merely as providers of education but also as instruments for cultivating loyalty, shaping identities, and improving socio-economic status, regions with a greater density of rival institutions may lead to higher state investment to counter their influence.

The mechanism identified in this article therefore applies most directly to settings in which rival educational networks had already produced an educated stratum over which the state sought to compete. In the Ottoman Empire, closure and absorption of rival schools were available only sporadically and at high diplomatic cost, whereas parallel provision was not. Whether and why states responded to such competition by absorbing, supervising, or outbuilding rival networks remains a promising avenue for comparative research. In France, authorities used schools, military service, and standardized language instruction to assimilate peripheral populations into a common national identity (Weber, 1976). In Austria-Hungary, imperial authorities sought to cultivate loyalty through state schools while accommodating competing confessional and nationalist educational networks, allowing religious communities to maintain their own schools under varying degrees of state supervision and support (Judson, 2016, 227, 304); (Malcolm, 1994, 143); (Okey, 1989, 27).

## 8 Acknowledgement

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Presidency State Archives (BOA) in Istanbul. The views expressed are those of the author.

# A Appendix

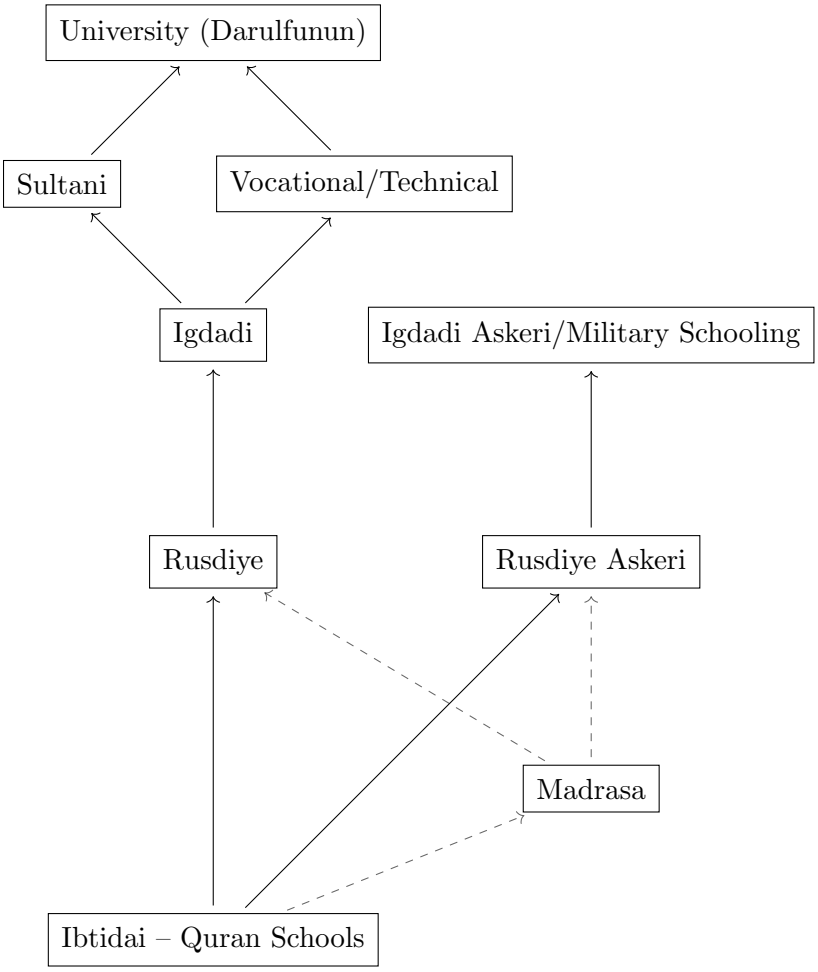



Figure 9: Structure of the Ottoman education system for Muslims

Figure 9 illustrates the structure of the Ottoman educational system available to Muslim students. Children typically entered the system through *ibtidai* (primary) schools and could then progress to *rüşdiye* (lower secondary) or *rüşdiye askeri* (military lower secondary) schools. From *rüşdiye*, students could continue to *idadi* (upper secondary) schools, which in turn provided access to *sultani*,the empire's most academically advanced general secondary schools, or to vocational and technical schools. Graduates of *sultani*s and some vocational institutions were eligible to continue to the *Darülfünun* (university). Students pursuing a military education followed a parallel track through *rüşdiye askeri* and *idadi askeri*.

Although *ibtidai* schools constituted the standard entry point into the state educational system, attendance at a state primary school was not a prerequisite for admission to higher levels of education. Muslim children also attended minority and missionary primary schools, and qualified students could subsequently enter state secondary schools.

## A.1 Descriptive Statistics

Figure 2 displays the descriptive statistics for dependent and key independent variables:

Table 2: Descriptive Statistics

| Variable | N | Mean | SD | Max |
|---|---|---|---|---|
| State secondary schools per 10,000 people | 511 | 0.40 | 0.56 | 6.23 |
| State secondary-school expenditure per 10,000 people | 139 | 42,021 | 95,303 | 894,027 |
| Rüşdiye expenditure per 10,000 people | 113 | 20,034 | 42,330 | 330,337 |
| İdadi expenditure per 10,000 people | 40 | 89,427 | 144,573 | 873,940 |
| Non-Muslim population share | 510 | 0.26 | 0.27 | 1.00 |
| Minority and missionary schools per 10,000 non-Muslims | 475 | 2.58 | 9.48 | 158.69 |
| Total population | 511 | 36,288 | 52,453 | 1,059,000 |
| Muslim population | 510 | 26,836 | 34,026 | 612,000 |
| Non-Muslim population | 510 | 9,435 | 22,727 | 447,000 |

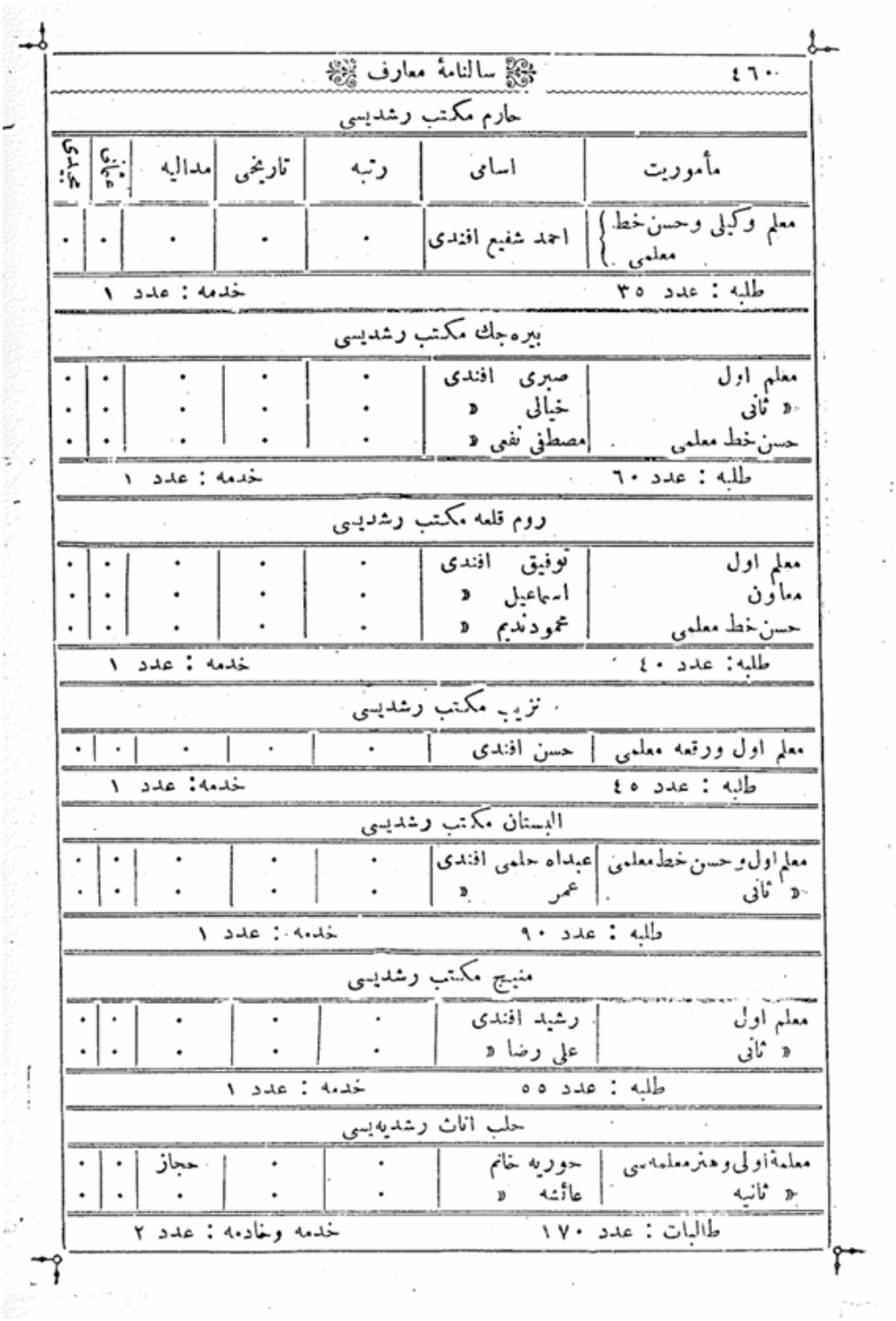
As Table 2 indicates, considerable variation exists in both the demographic composition of districts and the provision of secondary education. The average *kaza* contained 0.40 state secondary schools per 10,000 inhabitants and 2.58 minority or missionary schools per 10,000 non-Muslim inhabitants. Educational expenditures also varied substantially, particularly for upper secondary schools: average *idadi* expenditure per 10,000 inhabitants was more than four times that of *rüşdiye*s.[36] These patterns demonstrate substantial cross-district variation in the demographic conditions and educational investments examined in the analysis.

## A.2 Coding

The 1903 *Maarif Salnamesi* reports educational information separately for each governorate. Within each governorate, it first lists upper-level state schools and then provides separate sections on madrasas, primary (*ibtidai*) schools, minority schools, and, finally, schools established during the reign of Abdülhamid II (*Cülûs-ı Hümâyûn Hazret-i Padişahî Yevm-i Mes'ûdundan Beri İnşa ve Küşâd Olunan Mekâtib*).

To ensure consistent coding across all governorates, I adopt a uniform coding rule based on the organization of the source. Including schools from both the initial list and the final section would risk double counting, since schools established during Abdülhamid II's reign may also appear in the initial inventory of operating schools. Therefore, I count upper-level state schools exclusively from the initial list and do not use the later section when constructing school-count variables (see Figure 10.

[36]This difference reflects the substantially greater financial commitment required to establish an *idadi*. School-level data indicate that the average construction cost of an *idadi* was approximately 546,277 kuruş, compared with 46,320 kuruş for a *rüşdiye*. The average *idadi* enrolled 161 students, compared with 90.7 students in the average *rüşdiye*. Thus, establishing an *idadi* represented an investment nearly twelve times larger than establishing a *rüşdiye*.



٤٦٠ سالنامهٔ معارف

حارم مکتب رشدیسی

| مأموریت | اسامی | رتبه | تاریخی | مدالیه | بنجی | مجیدی |
|---|---|---|---|---|---|---|
| معلم وکیلی وحسن خط معلمی | احمد شفیع افندی | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه : عدد ۳۵ خدمه : عدد ۱

بیره‌جك مکتب رشدیسی

| | | | | | | |
|---|---|---|---|---|---|---|
| معلم اول | صبری افندی | ۰ | ۰ | ۰ | ۰ | ۰ |
| « ثانی | خیالی « | ۰ | ۰ | ۰ | ۰ | ۰ |
| حسن خط معلمی | مصطفی نفمی « | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه : عدد ٦۰ خدمه : عدد ۱

روم قلعه مکتب رشدیسی

| | | | | | | |
|---|---|---|---|---|---|---|
| معلم اول | توفیق افندی | ۰ | ۰ | ۰ | ۰ | ۰ |
| معاون | اسماعیل « | ۰ | ۰ | ۰ | ۰ | ۰ |
| حسن خط معلمی | محمود ندیم « | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه: عدد ٤۰ خدمه : عدد ۱

تزیب مکتب رشدیسی

| | | | | | | |
|---|---|---|---|---|---|---|
| معلم اول ورقعه معلمی | حسن افندی | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه : عدد ٤٥ خدمه: عدد ۱

البستان مکتب رشدیسی

| | | | | | | |
|---|---|---|---|---|---|---|
| معلم اول وحسن خط معلمی | عبداه حلمی افندی | ۰ | ۰ | ۰ | ۰ | ۰ |
| « ثانی | عمر « | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه : عدد ۹۰ خدمه : عدد ۱

منبج مکتب رشدیسی

| | | | | | | |
|---|---|---|---|---|---|---|
| معلم اول | رشید افندی | ۰ | ۰ | ۰ | ۰ | ۰ |
| « ثانی | علی رضا « | ۰ | ۰ | ۰ | ۰ | ۰ |

طلبه : عدد ٥٥ خدمه : عدد ۱

حلب اناث رشدیه‌سی

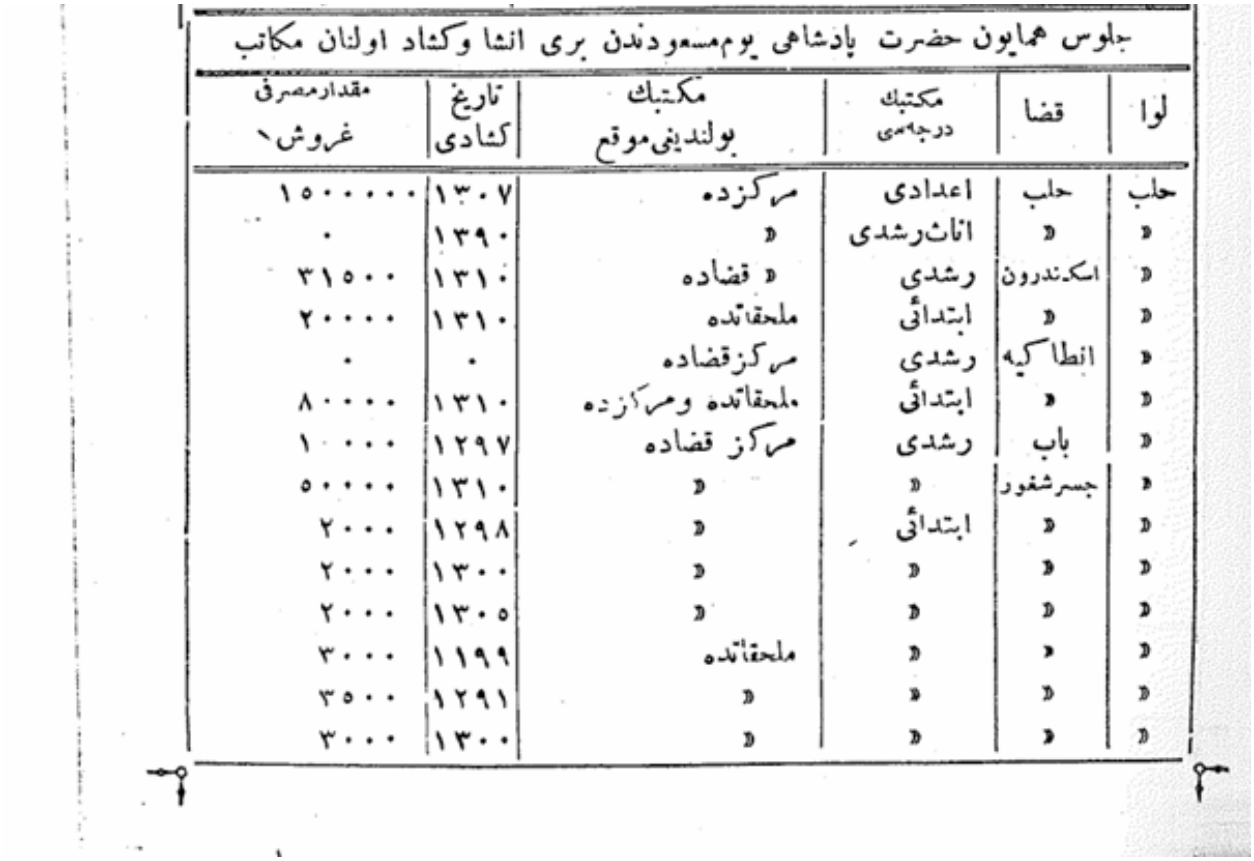
| | | | | | | |
|---|---|---|---|---|---|---|
| معلمهٔ اولی وهنرمعلمه‌سی | حوریه خانم | ۰ | ۰ | حجاز | ۰ | ۰ |
| « ثانیه | عائشه « | ۰ | ۰ | ۰ | ۰ | ۰ |

طالبات : عدد ۱۷۰ خدمه وخادمه : عدد ۲

Figure 10: A section from the upper-level schools in Aleppo governorate, 1903 Education Almanac, page 460.

The initial list, however, does not report information on construction costs or years of establishment. These details are provided only in the final section covering schools established during Abdülhamid II's reign. Accordingly, when analyzing construction costs and founding years, I draw

these variables from the latter section rather than the initial inventory (see Figure 11.



جلوس همايون حضرت پادشاهي يوم‌مسعودندن بري انشا وكشاد اولنان مكاتب

| لوا | قضا | مكتبك درجه‌سي | مكتبك بولندبغي موقع | تاريخ كشادي | مقدار مصرفي غروش |
|---|---|---|---|---|---|
| حلب | حلب | اعدادي | مركزده | ١٣٠٧ | ١٥٠٠٠٠٠ |
| » | » | اناث رشدي | » | ١٣٩٠ | ٠ |
| » | اسكندرون | رشدي | » قضاده | ١٣١٠ | ٣١٥٠٠ |
| » | » | ابتدائي | ملحقاتده | ١٣١٠ | ٢٠٠٠٠ |
| » | انطاكيه | رشدي | مركز قضاده | ٠ | ٠ |
| » | » | ابتدائي | ملحقاتده ومركزده | ١٣١٠ | ٨٠٠٠٠ |
| » | باب | رشدي | مركز قضاده | ١٢٩٧ | ١٠٠٠٠ |
| » | جسرشغور | » | » | ١٣١٠ | ٥٠٠٠٠ |
| » | » | ابتدائي | » | ١٢٩٨ | ٢٠٠٠ |
| » | » | » | » | ١٣٠٠ | ٢٠٠٠ |
| » | » | » | » | ١٣٠٥ | ٢٠٠٠ |
| » | » | » | ملحقاتده | ١١٩٩ | ٣٠٠٠ |
| » | » | » | » | ١٢٩١ | ٣٥٠٠ |
| » | » | » | » | ١٣٠٠ | ٣٠٠٠ |

Figure 11: A page from the section on schools constructed since Abdulhamid II ascended to throne from Aleppo governorate. 1903 Education Almanac, page 469.

Finally, in the governorates of Bursa and Konya, the organization of the Almanac suggests that officials classified some *ibtidai* schools together with madrasas rather than listing them in the primary-school section. Consequently, the estimated coefficient for the madrasa variable in analyses including these governorates likely captures the effects of both madrasas and a subset of *ibtidai* schools.

## A.3 Archival Documents

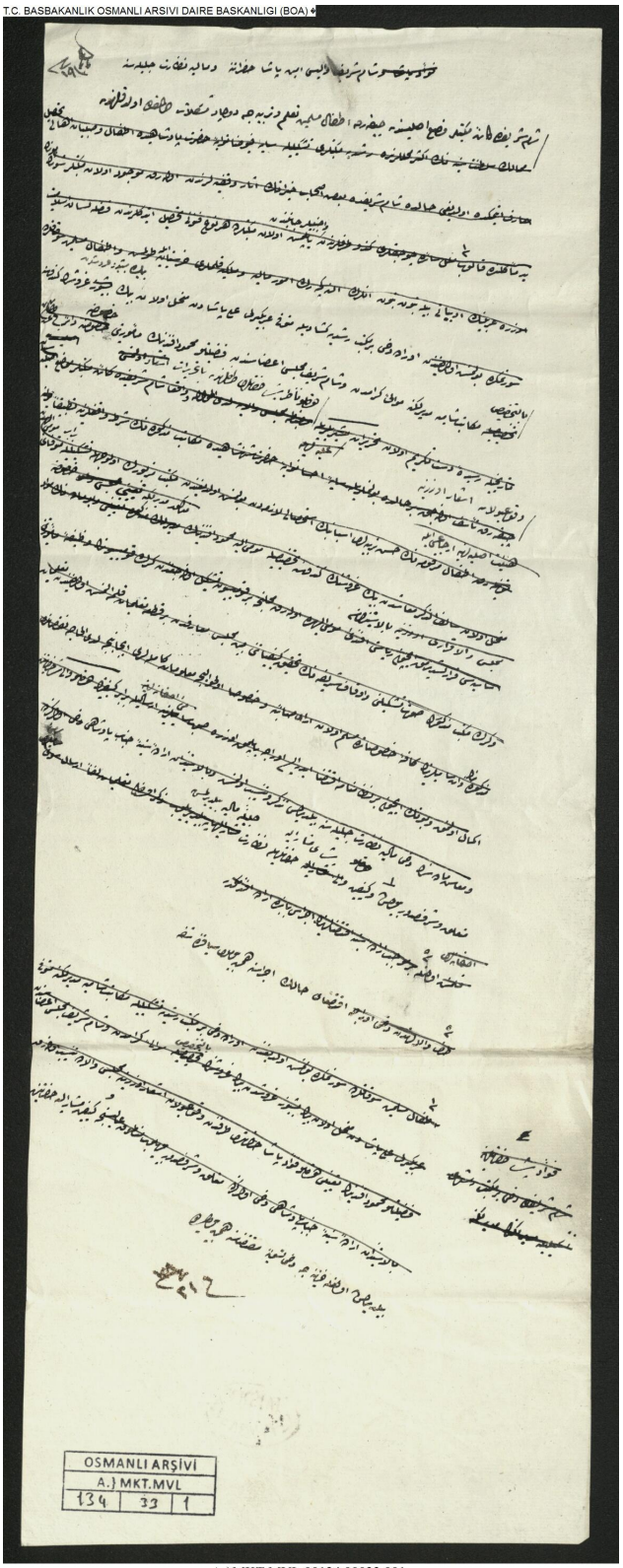
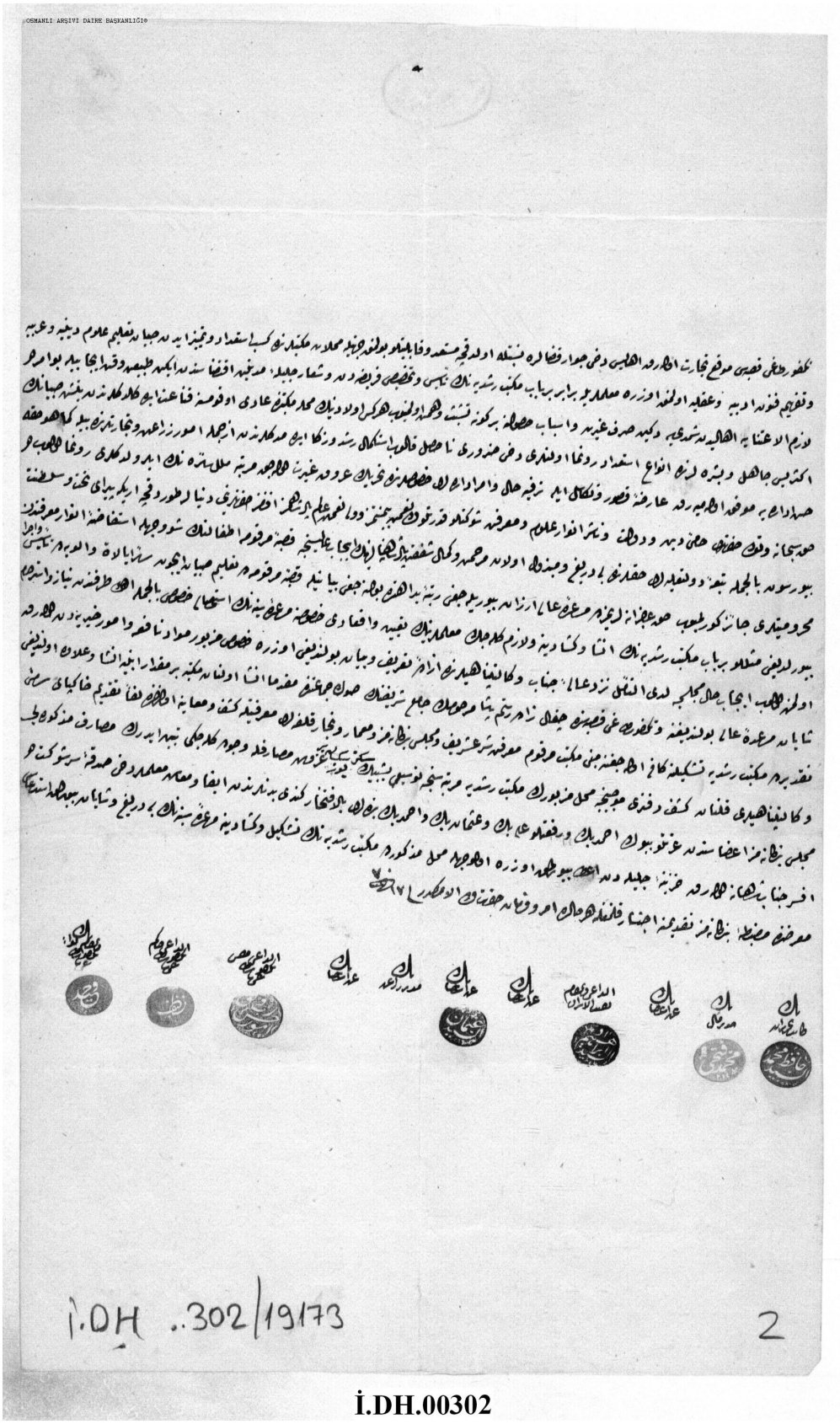
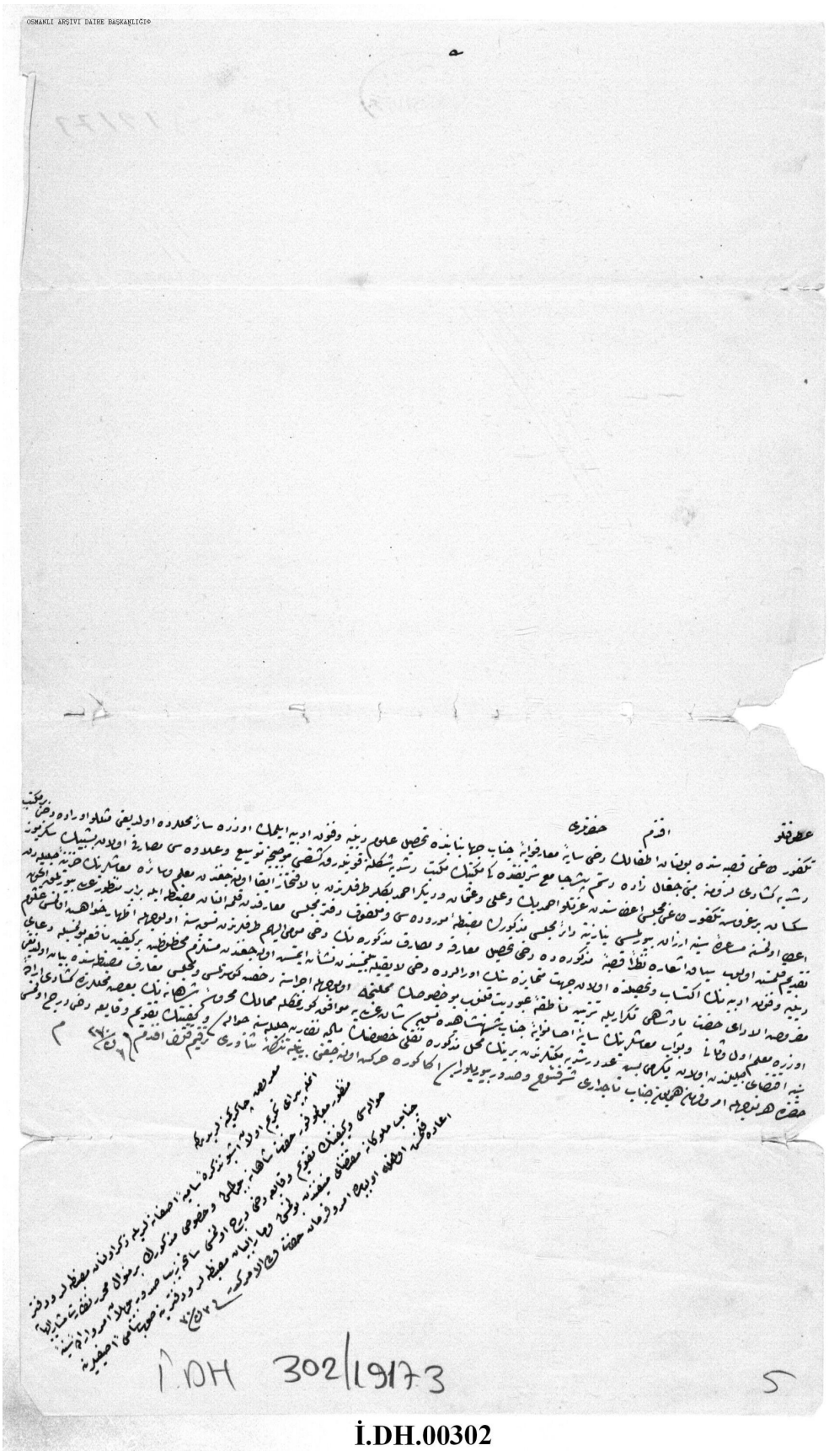



Figure 12: BOA A.MKT.MVL., 134/33 (Damascus, 1278/1861)



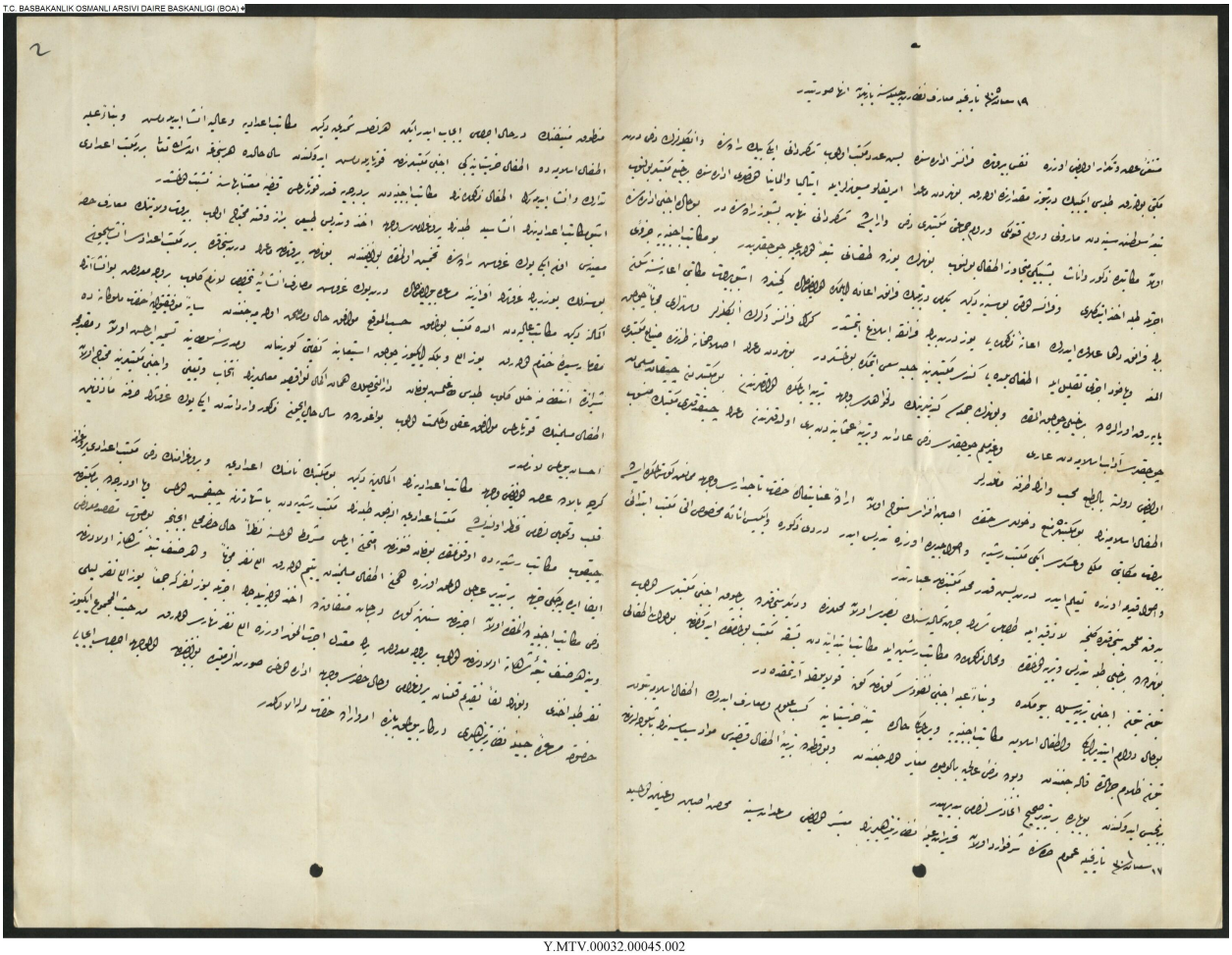

**İ.DH.00302**

Figure 13: Tekirdag (1270/1854, BOA İ.DH 302/19173),page 2



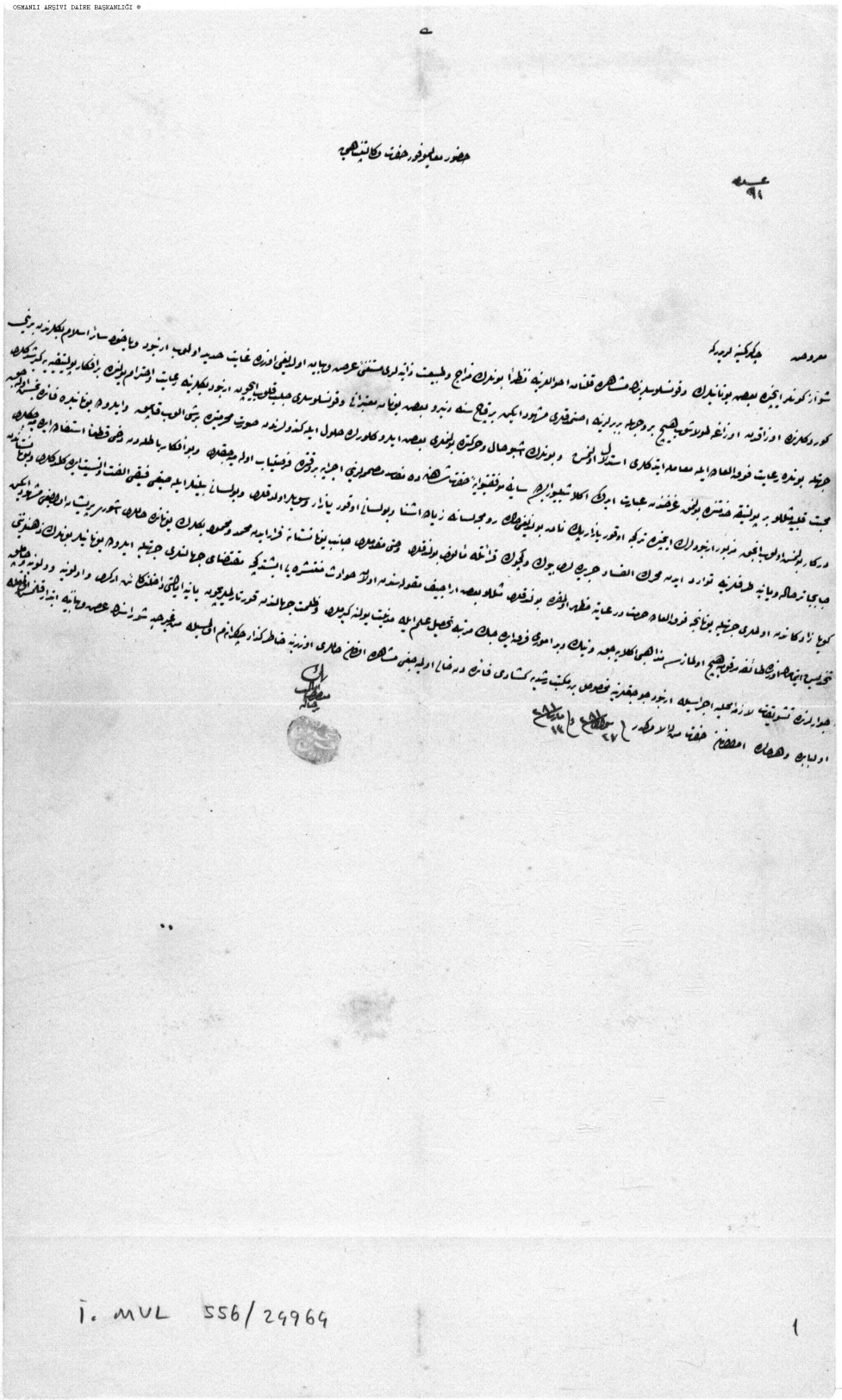

**İ.DH.00302**

Figure 14: Tekirdag (1270/1854, BOA İ.DH 302/19173),page 6


T.C. BASBAKANLIK OSMANLI ARSIVI DAIRE BASKANLIGI (BOA)

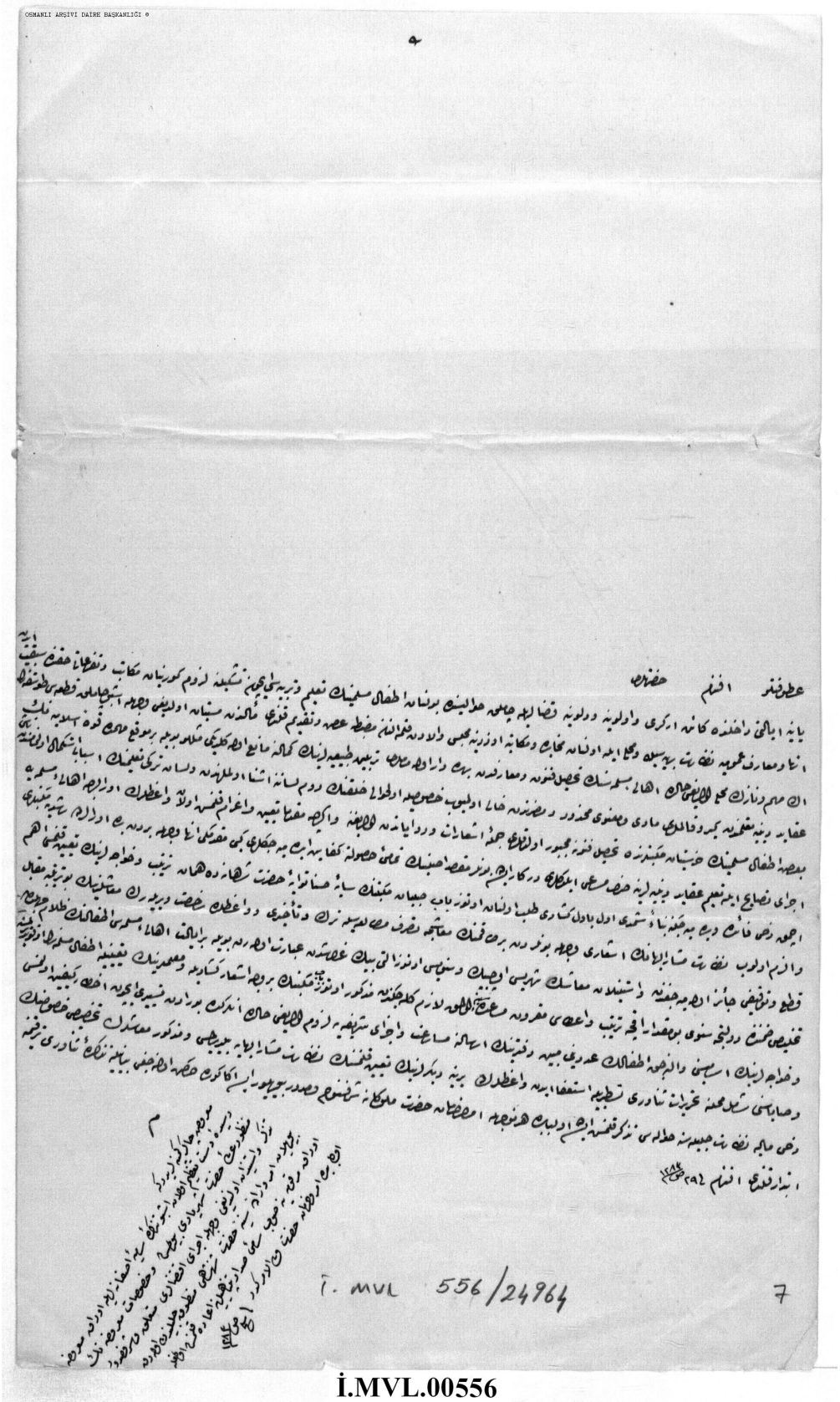
Y.MTV.00032.00045.002

Figure 15: Beirut (1305/1887, BOA Y.MTV 32/45)




**İ.MVL.00556**

Figure 16: Ioannina (1283/1866, BOA İ.MVL 556/24964), page 1


OSMANLI ARŞİVİ DAİRE BAŞKANLIĞI ©
İ. MVL 556/24964

**İ.MVL.00556**

Figure 17: Ioannina (1283/1866, BOA İ.MVL 556/24964), page 10

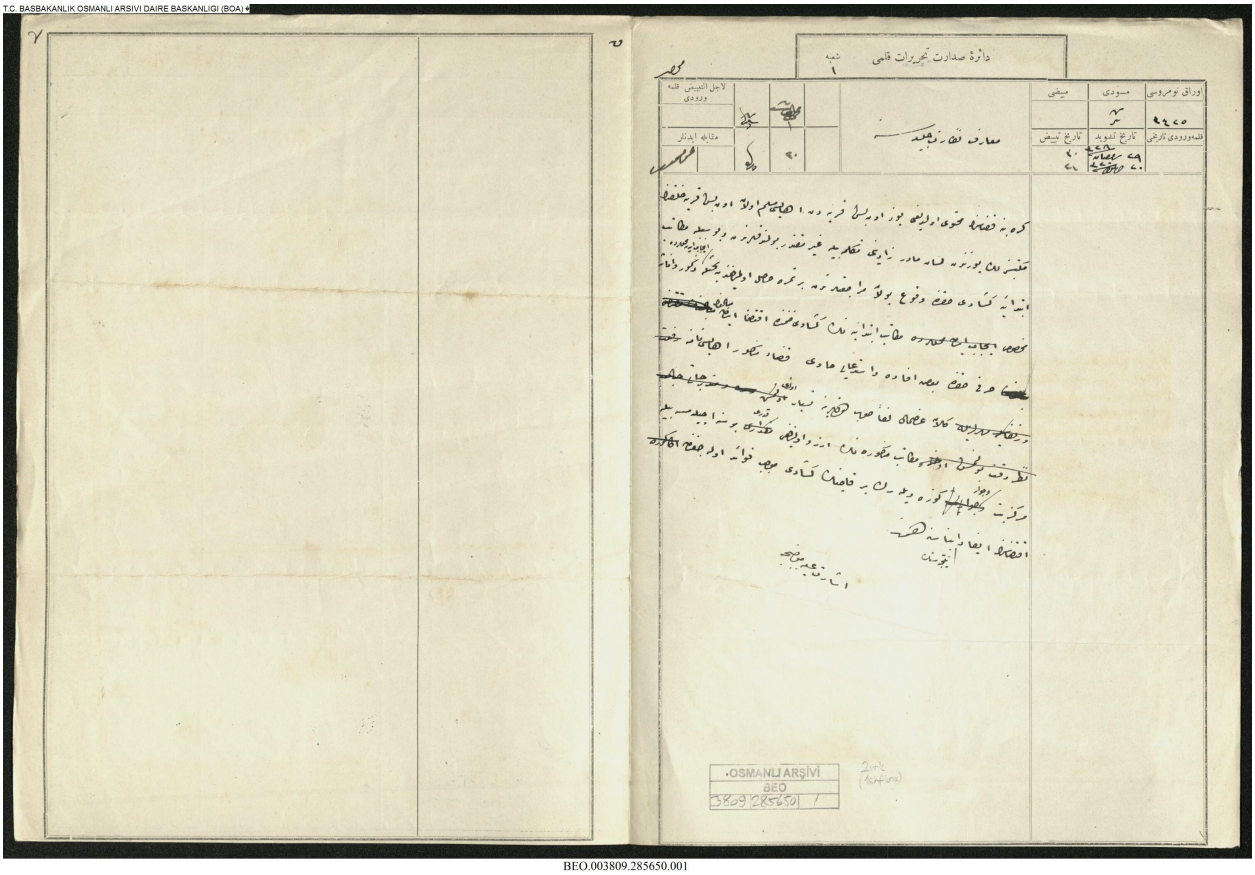
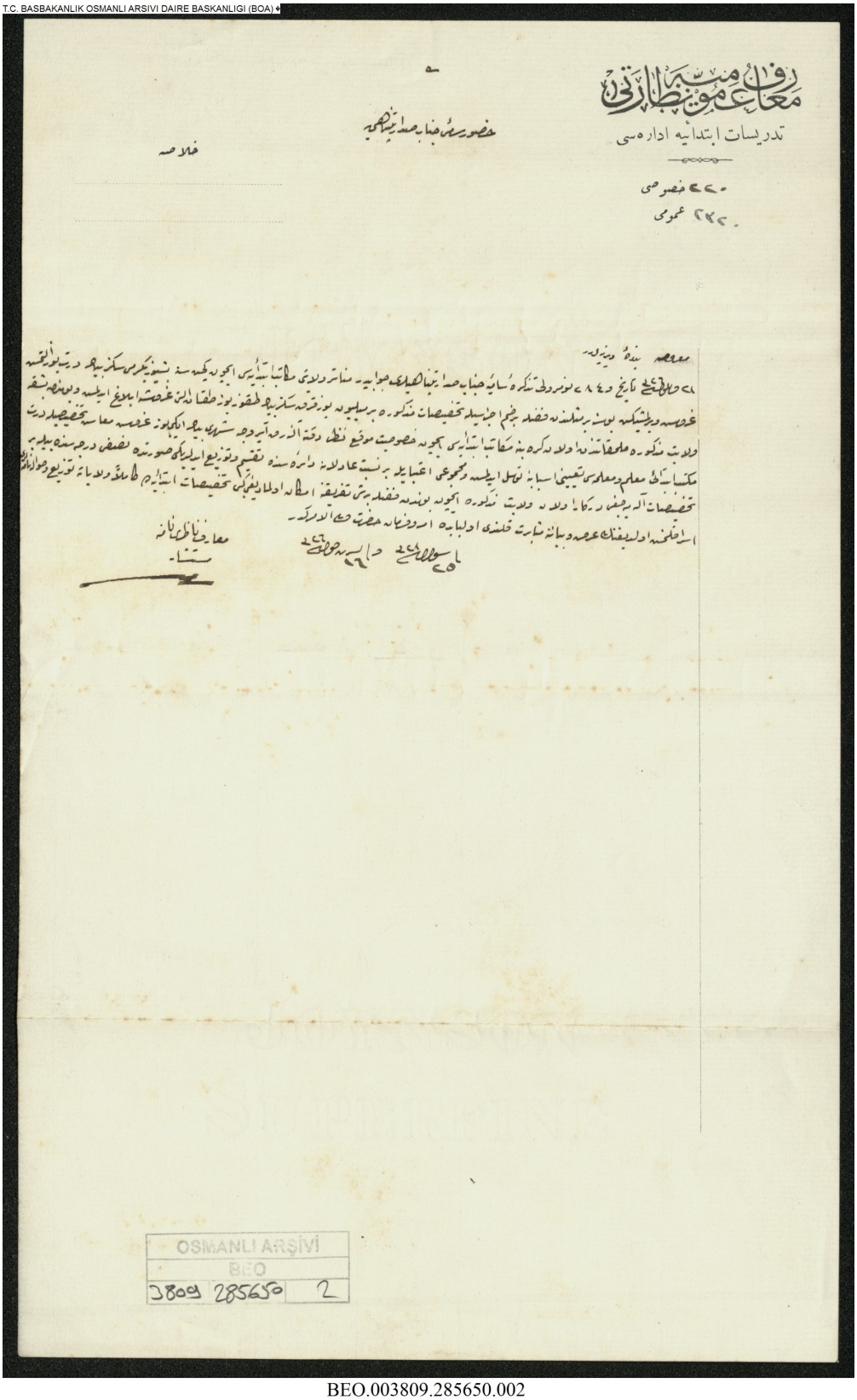



Figure 18: Grevena, (1328/1911, BOA BEO 3809/285650 (page 1))

T.C. BASBAKANLIK OSMANLI ARSIVI DAIRE BASKANLIGI (BOA)



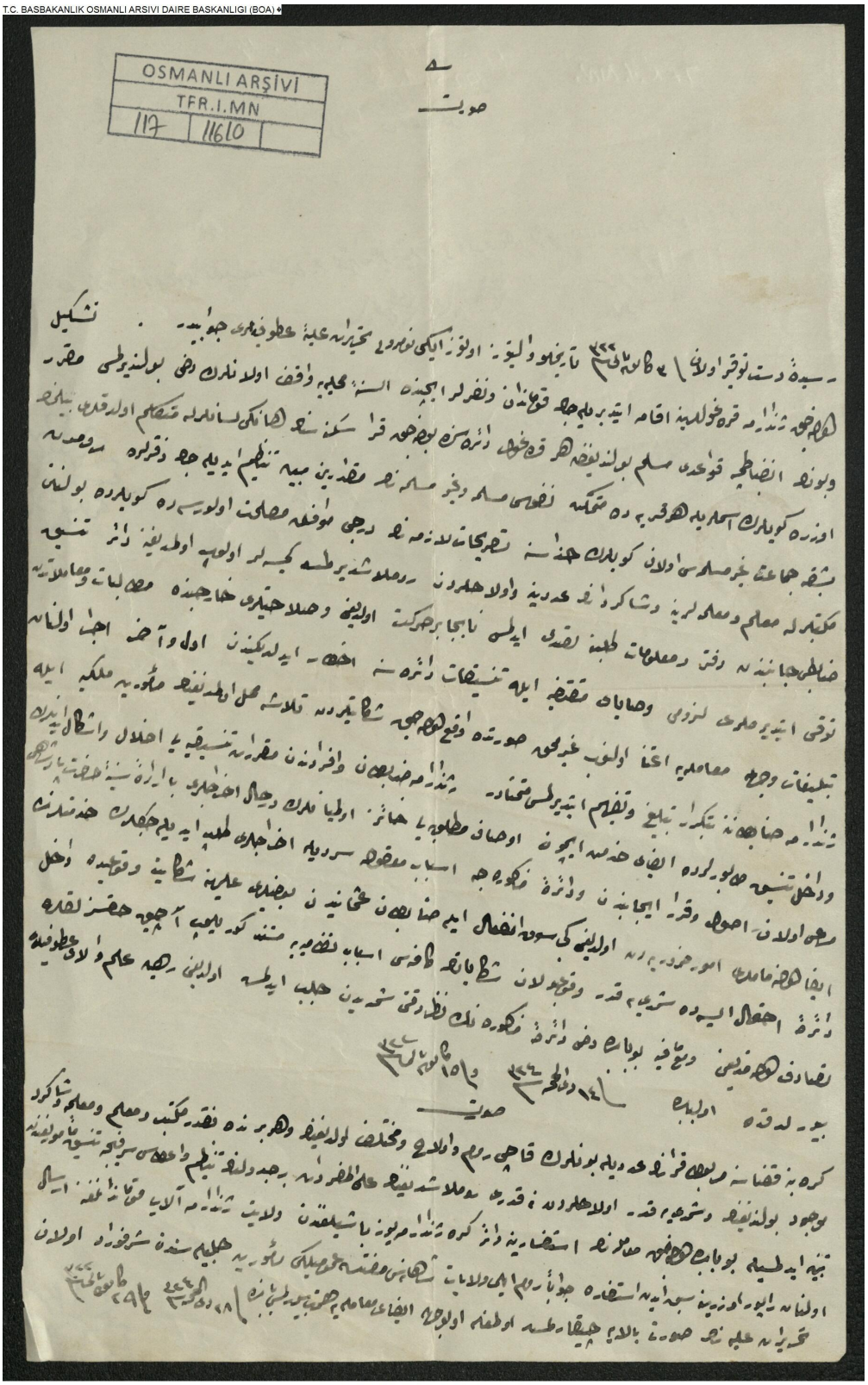
OSMANLI ARŞİVİ
BEO
3809 285650 2

BEO.003809.285650.002

Figure 19: Grevena, (1328/1911, BOA BEO 3809/285650 (page 3))

T.C. BASBAKANLIK OSMANLI ARSIVI DAIRE BASKANLIGI (BOA)

OSMANLI ARŞİVİ
TFR.I.MN
117 | 11610



TFR.I.MN.00117.11610.001

Figure 20: Grevena, (1325/1907, BOA TFR.I.MN 117/11610)

## A.4 Additional Results

The expenditure analysis relies on a more restricted sample than the analysis of school density. As described in Appendix Coding Section, the *Salnâme-i Maârif* reports construction expenditures only in the section at the end of each governorate's entry listing schools established during the reign of Abdülhamid II, and even within that section expenditure is not recorded for every school. Table 3 therefore estimates the relationship between minority and missionary school density and state educational expenditure among the districts for which expenditure data are available. Two features of this sample warrant note. First, it is restricted to Hamidian-era construction, which overlaps with the period in which the competitive logic was most clearly articulated as state policy (Accounting for Reverse Causality). Second, because reporting is incomplete within that section, the sample may over-represent districts whose schools drew central attention. The estimates should therefore be read as describing the districts the state documented most fully rather than the full population of kazas.

The expenditure results provide additional support for the institutional-competition argument. Minority and missionary school density is positively associated with state secondary-school expenditure across all specifications. The relationship is statistically significant at the 1 percent level in Models 1, 3, and 4, and remains positive and significant at the 10 percent level after the full set of controls is introduced in Model 5. In contrast, the non-Muslim population share is not statistically significant in any specification, including when entered by itself in Model 2. Thus, even within the more restricted sample for which expenditure data are available, state investment is more consistently associated with the density of competing educational institutions than with demographic composition alone.

Table 3: OLS Regression Results on Educational Expenditure

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | State Secondary-School Expenditure per 10,000 (log1p) | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Minority and Missionary School Density (log1p) | 0.510*** | | 0.505*** | 0.498*** | 0.188* |
| | (0.119) | | (0.119) | (0.119) | (0.110) |
| Non-Muslim Population Share | | 0.771 | 0.567 | 0.530 | 0.182 |
| | | (0.510) | (0.505) | (0.504) | (0.464) |
| Population (log1p) | | | | −0.185 | −0.665*** |
| | | | | (0.138) | (0.144) |
| Madrasa Density | | | | | 0.003 |
| | | | | | (0.004) |
| Sancak Center | | | | | 2.193*** |
| | | | | | (0.287) |
| European Governorate | | | | | −0.814* |
| | | | | | (0.428) |
| Tribal Zone | | | | | −0.310 |
| | | | | | (0.422) |
| Railway Distance (100 km) | | | | | −0.230*** |
| | | | | | (0.068) |
| Port Governorate | | | | | 0.470* |
| | | | | | (0.240) |
| Border Governorate | | | | | 0.999*** |
| | | | | | (0.366) |
| Missionary Presence | | | | | 0.293 |
| | | | | | (0.390) |
| Constant | 9.080*** | 9.268*** | 8.928*** | 10.868*** | 15.702*** |
| | (0.163) | (0.182) | (0.211) | (1.463) | (1.500) |
| Observations | 127 | 138 | 127 | 127 | 125 |
| $R^2$ | 0.127 | 0.017 | 0.136 | 0.148 | 0.484 |
| Adjusted $R^2$ | 0.120 | 0.009 | 0.122 | 0.128 | 0.434 |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 4: OLS Estimates for State Primary School Density

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | State Primary Schools per 10,000 (log1p) | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Minority and Missionary School Density (log1p) | 0.018 | | 0.020 | 0.014 | −0.010 |
| | (0.017) | | (0.017) | (0.017) | (0.019) |
| Non-Muslim Population Share | | −0.077 | −0.081 | −0.093 | −0.101 |
| | | (0.057) | (0.057) | (0.057) | (0.065) |
| Sancak Center | | | | 0.065 | 0.024 |
| | | | | (0.043) | (0.045) |
| Population (log1p) | | | | −0.032 | −0.048** |
| | | | | (0.021) | (0.023) |
| Madrasa Density | | | | | −0.0004 |
| | | | | | (0.001) |
| European Governorate | | | | | 0.001 |
| | | | | | (0.060) |
| Tribal Zone | | | | | −0.133** |
| | | | | | (0.054) |
| Railway Distance (100 km) | | | | | 0.001 |
| | | | | | (0.009) |
| Port Governorate | | | | | −0.061* |
| | | | | | (0.035) |
| Border Governorate | | | | | −0.084* |
| | | | | | (0.051) |
| Missionary Presence | | | | | 0.244*** |
| | | | | | (0.065) |
| Constant | 0.053*** | 0.085*** | 0.075*** | 0.397* | 0.621*** |
| | (0.018) | (0.021) | (0.023) | (0.214) | (0.239) |
| Observations | 474 | 509 | 474 | 474 | 465 |
| $R^2$ | 0.002 | 0.004 | 0.007 | 0.014 | 0.069 |
| Adjusted $R^2$ | 0.0003 | 0.002 | 0.002 | 0.005 | 0.046 |

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 5: OLS Estimates for State Secondary School Density: Student-Density Robustness

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | State Secondary Schools per 10,000 (log1p) | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Minority and Missionary Student Density (log1p) | | 0.013*** | 0.013*** | 0.014*** | 0.011** |
| | | (0.004) | (0.005) | (0.005) | (0.005) |
| Non-Muslim Population Share | 0.034 | | 0.007 | −0.044 | −0.100** |
| | (0.046) | | (0.047) | (0.045) | (0.050) |
| Sancak Center | | | | 0.135*** | 0.154*** |
| | | | | (0.032) | (0.034) |
| Population (log1p) | | | | −0.122*** | −0.160*** |
| | | | | (0.016) | (0.017) |
| State Primary School Density | | | | | 0.00003 |
| | | | | | (0.010) |
| Madrasa Density | | | | | −0.001* |
| | | | | | (0.001) |
| European Governorate | | | | | −0.002 |
| | | | | | (0.045) |
| Tribal Zone | | | | | −0.130*** |
| | | | | | (0.040) |
| Railway Distance (100 km) | | | | | −0.011* |
| | | | | | (0.007) |
| Port Governorate | | | | | 0.100*** |
| | | | | | (0.026) |
| Border Governorate | | | | | 0.082** |
| | | | | | (0.038) |
| Missionary Presence | | | | | 0.064 |
| | | | | | (0.049) |
| Constant | 0.281*** | 0.264*** | 0.262*** | 1.496*** | 1.891*** |
| | (0.017) | (0.015) | (0.019) | (0.163) | (0.177) |
| Observations | 510 | 475 | 475 | 475 | 465 |
| $R^2$ | 0.001 | 0.019 | 0.019 | 0.133 | 0.206 |
| Adjusted $R^2$ | −0.001 | 0.016 | 0.014 | 0.125 | 0.184 |

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 6: OLS Estimates for Hamidian-Era State Secondary School Density

| | *Dependent variable:* | | | | |
|---|---|---|---|---|---|
| | Hamidian-Era State Secondary Schools per 10,000 (log1p) | | | | |
| | (1) | (2) | (3) | (4) | (5) |
| Minority and Missionary School Density (log1p) | | 0.051*** | 0.052*** | 0.044*** | 0.026** |
| | | (0.013) | (0.013) | (0.013) | (0.013) |
| Non-Muslim Population Share | −0.021 | | −0.011 | −0.049 | −0.086* |
| | (0.044) | | (0.043) | (0.042) | (0.045) |
| Sancak Center | | | | 0.111*** | 0.103*** |
| | | | | (0.031) | (0.031) |
| Population (log1p) | | | | −0.100*** | −0.084*** |
| | | | | (0.015) | (0.016) |
| State Primary School Density | | | | | −0.002 |
| | | | | | (0.009) |
| Madrasa Density | | | | | 0.006*** |
| | | | | | (0.001) |
| European Governorate | | | | | 0.053 |
| | | | | | (0.041) |
| Tribal Zone | | | | | 0.005 |
| | | | | | (0.037) |
| Railway Distance (100 km) | | | | | 0.004 |
| | | | | | (0.006) |
| Port Governorate | | | | | 0.055** |
| | | | | | (0.024) |
| Border Governorate | | | | | 0.019 |
| | | | | | (0.035) |
| Missionary Presence | | | | | 0.030 |
| | | | | | (0.046) |
| Constant | 0.158*** | 0.115*** | 0.118*** | 1.129*** | 0.933*** |
| | (0.017) | (0.014) | (0.018) | (0.157) | (0.166) |
| Observations | 510 | 475 | 475 | 475 | 465 |
| $R^2$ | 0.0004 | 0.033 | 0.034 | 0.117 | 0.261 |
| Adjusted $R^2$ | −0.002 | 0.031 | 0.030 | 0.109 | 0.241 |

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

## A.5 Robustness Checks

Table 7: Negative Binomial Model with Population Offset

| | *Dependent variable:* |
|---|---|
| | State Secondary School Count |
| Minority and Missionary School Density (log1p) | $0.203^{***}$ |
| | (0.055) |
| Non-Muslim Population Share | 0.313 |
| | (0.215) |
| Madrasa Density | 0.006 |
| | (0.005) |
| Sancak Center | 0.064 |
| | (0.108) |
| European Governorate | $-0.084$ |
| | (0.167) |
| Tribal Zone | $-0.448^{**}$ |
| | (0.190) |
| Railway Distance (100 km) | 0.009 |
| | (0.028) |
| Port Governorate | $0.185^{*}$ |
| | (0.097) |
| Border Governorate | 0.112 |
| | (0.143) |
| Missionary Presence | 0.103 |
| | (0.149) |
| Constant | $-10.716^{***}$ |
| | (0.118) |
| Observations | 465 |
| Log Likelihood | $-589.318$ |
| $\theta$ | 17.741 |
| AIC | 1,200.636 |
| Population Offset | Yes |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 8: Robust Regression Results Using an MM Estimator

| | *Dependent variable:* |
|---|---|
| | State Secondary Schools per 10,000 (log1p) |
| Minority and Missionary School Density (log1p) | $0.045^{***}$ |
| | (0.011) |
| Non-Muslim Population Share | 0.012 |
| | (0.039) |
| State Primary School Density | $-0.030^{***}$ |
| | (0.008) |
| Madrasa Density | $-0.003^{***}$ |
| | (0.001) |
| Population (log1p) | $-0.254^{***}$ |
| | (0.014) |
| Sancak Center | $0.146^{***}$ |
| | (0.027) |
| European Governorate | $-0.076^{**}$ |
| | (0.036) |
| Tribal Zone | $-0.074^{**}$ |
| | (0.032) |
| Railway Distance (100 km) | $-0.008$ |
| | (0.005) |
| Port Governorate | $0.041^{*}$ |
| | (0.021) |
| Border Governorate | $0.083^{***}$ |
| | (0.030) |
| Missionary Presence | 0.050 |
| | (0.039) |
| Constant | $2.891^{***}$ |
| | (0.143) |
| Observations | 465 |
| Residual Std. Error | 0.136 |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

The main results are also robust to the use of an MM estimator, which reduces the influence of outlying observations. As Table 8 shows, minority and missionary school density remains positively and statistically significantly associated with state secondary-school density ($\beta = 0.045$, $p < 0.01$). The results therefore do not appear to be driven by a small number of influential districts.

Table 9: Regression Results with the Outlier (Mikri) Removed

| | *Dependent variable:* |
|---|---|
| | State Secondary Schools per 10,000 (log1p) |
| Minority and Missionary School Density (log1p) | $0.029^{**}$ |
| | (0.014) |
| Non-Muslim Population Share | $-0.062$ |
| | (0.047) |
| Madrasa Density | $0.015^{***}$ |
| | (0.003) |
| Population (log1p) | $-0.133^{***}$ |
| | (0.017) |
| Sancak Center | $0.130^{***}$ |
| | (0.033) |
| European Governorate | 0.012 |
| | (0.043) |
| Tribal Zone | $-0.096^{**}$ |
| | (0.039) |
| Railway Distance (100 km) | $-0.009$ |
| | (0.006) |
| Port Governorate | $0.069^{***}$ |
| | (0.026) |
| Border Governorate | $0.071^{*}$ |
| | (0.036) |
| Missionary Presence | 0.046 |
| | (0.047) |
| Constant | $1.590^{***}$ |
| | (0.176) |
| Observations | 464 |
| $R^2$ | 0.265 |
| Adjusted $R^2$ | 0.247 |
| Residual Std. Error | 0.235 |
| F Statistic | $14.793^{***}$ |

$^{*}p < 0.1$; $^{**}p < 0.05$; $^{***}p < 0.01$

Table 10: Regression Results with Cluster-Robust Standard Errors

| | *Dependent variable:* | |
|---|---|---|
| | State Secondary Schools per 10,000 (log1p) | |
| | (1) | (2) |
| | Governorate | Sancak |
| Minority and Missionary School Density (log1p) | 0.040** | 0.040** |
| | (0.019) | (0.018) |
| Non-Muslim Population Share | −0.077 | −0.077 |
| | (0.060) | (0.062) |
| Madrasa Density | −0.002** | −0.002 |
| | (0.001) | (0.001) |
| Population (log1p) | −0.153*** | −0.153*** |
| | (0.037) | (0.036) |
| Sancak Center | 0.150*** | 0.150*** |
| | (0.036) | (0.037) |
| European Governorate | −0.005 | −0.005 |
| | (0.054) | (0.047) |
| Tribal Zone | −0.125** | −0.125** |
| | (0.055) | (0.049) |
| Railway Distance (100 km) | −0.011 | −0.011 |
| | (0.009) | (0.007) |
| Port Governorate | 0.102*** | 0.102*** |
| | (0.033) | (0.027) |
| Border Governorate | 0.081* | 0.081** |
| | (0.045) | (0.041) |
| Missionary Presence | 0.047 | 0.047 |
| | (0.049) | (0.049) |
| Constant | 1.811*** | 1.811*** |
| | (0.391) | (0.375) |
| Observations | 465 | 465 |
| SE Clustering | Governorate | Sancak |

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$

Table 11: Sensitivity to Omitted Variable Bias

| | Minority and Missionary School Density |
|---|---|
| Uncontrolled coefficient | 0.060 |
| Controlled coefficient | 0.041 |
| Bias-adjusted coefficient ($\delta = 1$) | 0.030 |
| Uncontrolled $R^2$ | 0.041 |
| Controlled $R^2$ | 0.211 |
| Maximum $R^2$ | 0.274 |
| $\delta$ required for $\beta = 0$ | 2.64 |

*Note:* Sensitivity analysis following Oster (2019).

Maximum $R^2$ is set to 1.3 times the controlled $R^2$.

## A.6 Plots on Temporality

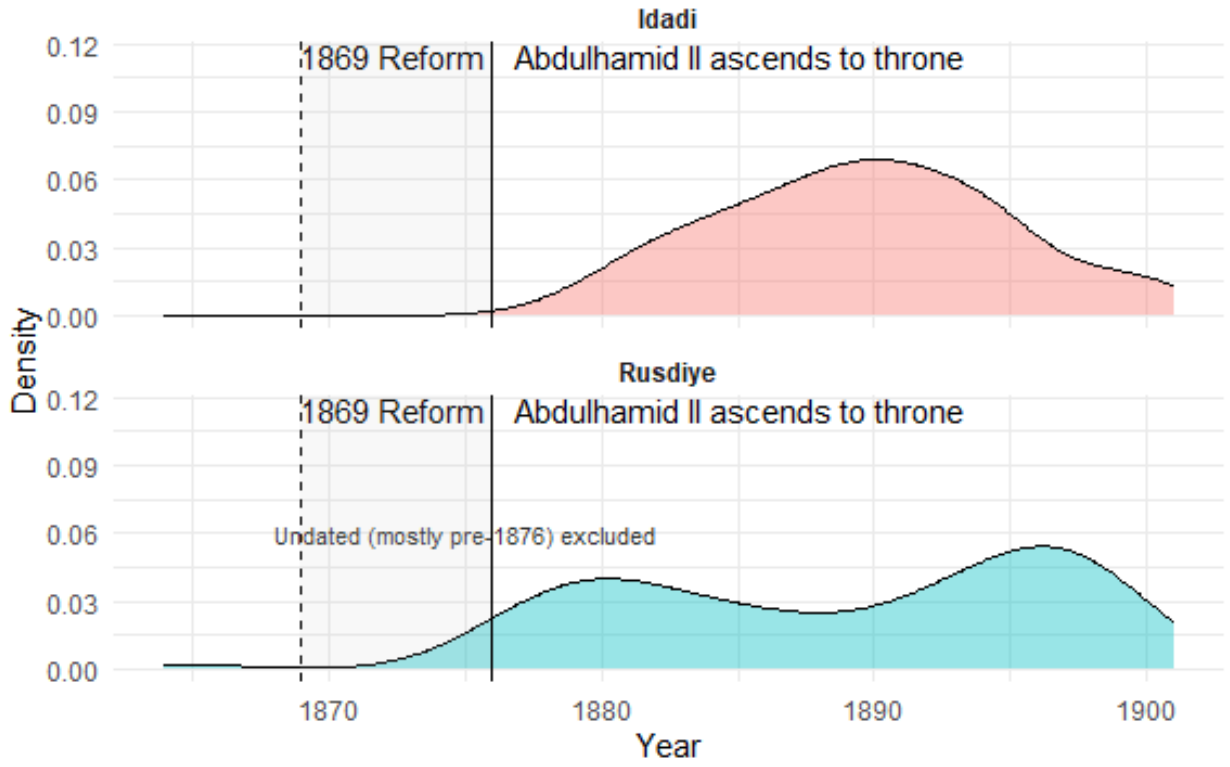



Figure 21: Founding Years of Idadi and Rusdiye Schools

Figure 21 shows the founding years of idadi and rüşdiye schools. Of the 889 state secondary schools listed in the 1903 Almanac, 270 (30.3%) have recorded founding dates. Date coverage is substantially higher for schools established during the reign of Abdülhamid II: among the 285

schools identified as having been founded during this period, 246 (86.3%) have recorded opening dates.

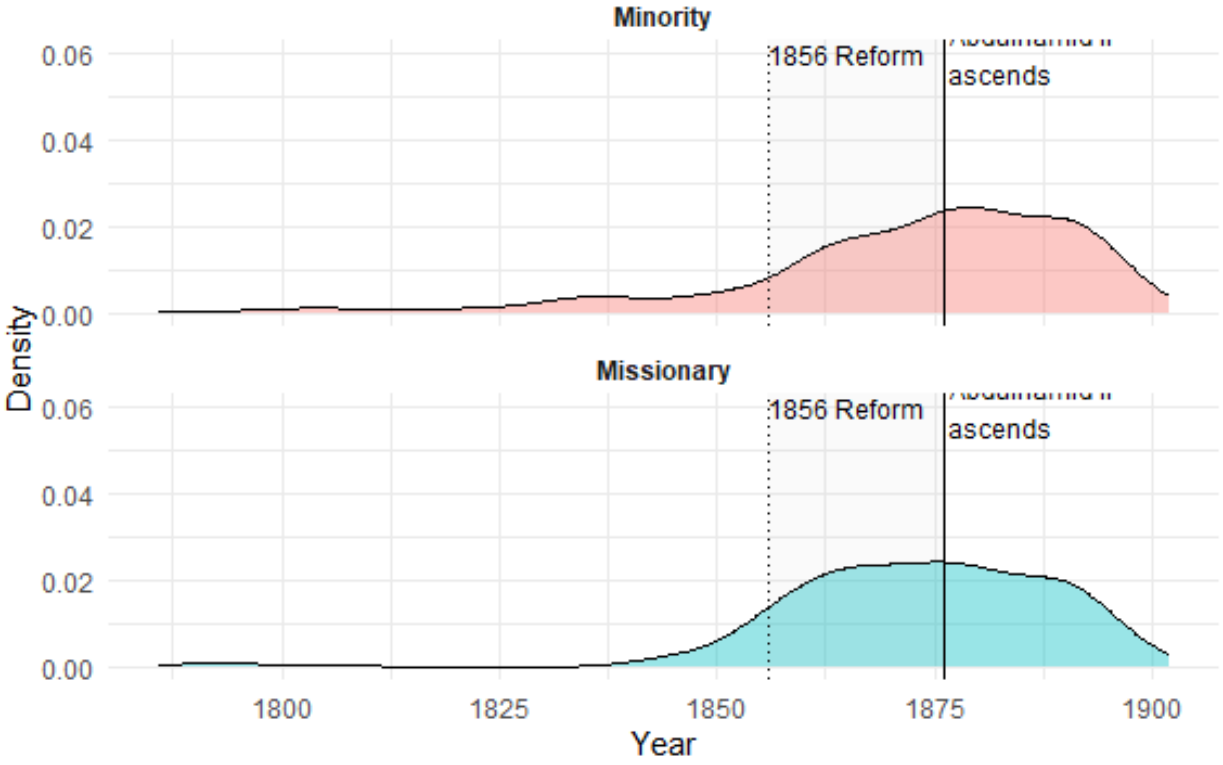



Figure 22: Founding Years of Minority and Missionary Schools

Figures 21 and 22 provide descriptive evidence consistent with the temporal ordering implied by the institutional-competition argument. Minority and missionary secondary schools began expanding before the principal wave of Ottoman state secondary-school construction. Their growth accelerated particularly after the 1856 Reform Edict. Both missionary and minority schools were already well established by Abdülhamid II's accession in 1876. The expansion of state secondary education followed: rüşdiye construction increased after the 1869 Education Regulation and again during the Hamidian period, while the expansion of idadis was concentrated overwhelmingly after 1876, peaking around 1890. The aggregate temporal pattern therefore suggests that the major expansion of Ottoman state secondary schooling followed, rather than preceded, the emergence of competing educational networks.

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