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Parental Religiosity and Missing School-Girls in Turkey

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Abstract

Does parents' religiosity affect their female offspring's education and other life-long outcomes? I address this question by focusing on Turkey and exploiting Ramadan as a quasi-natural experiment for increased active religiosity. I find that the occurrence of Ramadan at the enrollment time in primary schools reduces girls' chance to access primary education. This result arises from the salience of traditional gender norms that religiosity engenders. I further show that parental religiosity at the primary school enrollment has persistent effects on females' labor market outcomes. They become less likely to participate in the labor market, less likely to be income-earners, and less likely to work in professional jobs. Instead, increased religiosity at the critical age of schooling increases fertility and the probability of women being out of the labor force due to household responsibilities. These results are robust to different specifications and an alternative empirical strategy that uses average daylight hours during Ramadan in the year of primary school enrollment as a shock to religiosity.

Keywords: Islam, Gender Equality, Ramadan, Social Norms, Illegal Behavior
JEL Codes: Z12, J16, I24, I25, J12, J13, D91, J12, J13, K38, K42

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1 Introduction

Does parents' religiosity affect their female offspring's education and life-long outcomes? Parents are important for the skill formation of the next generations. They shape their siblings' skills mainly by genetically transmitted abilities (Plug and Vijverberg, 2003; Bjorklund et al., 2006), parental inputs and social capital (Borjas, 1992; Fagereng et al., 2021), the neighborhood that they live in (Chetty et al., 2014, 2016), and transmission of their preferences and traits (Bisin and Verdier, 2001; Lindbeck and Nyberg, 2006; Dohmen et al., 2012). Yet, the role of parental religiosity in educational attainments of siblings has attracted less attention in the literature. On the other hand, the education levels across much of the developing countries are in a rising trend today, but the gender disparities in many education levels remain persistent (UNESCO, 2010). Regarding these prevailing inequalities, social norms are regarded as important as economic development (Jayachandran, 2015). Consistent with the negative association of female education with Islam (Norton and Tomal, 2009; Cooray and Potrafke, 2011), most of the Muslim-majority countries including Turkey persistently rank today at the bottom of the Global Gender Gap Index (see Figure 1a).

In this study, I focus on the Turkish Republic, which has been the first secular Muslim-majority country and I investigate to which extent parental religiosity has resulted in missing school-girls in Turkey. Despite the secular constitutional setting, the subjugation of women under Islam is often argued to prevent the full implementation of women's rights enshrined in the legal code, including equal access to education (Arat, 1989; Toprak, 1995; Rankin and Aytaç, 2006). Turkish culture is often described with a rigid gender-based division of labor (Kandiyoti, 1977; Ozyegin, 2001). The high share of females who are neither in employment nor in education (NEET) presented in Figure 1b well-pictures the patriarchal culture in Turkey that obstacles the construction of female identity other than wife and mother.[1] In addition to that, Islamic disapproval of working women in paid jobs exacerbates the low participation of women in the labor market (Guner and Uysal, 2014; Dildar, 2015), and hence discouraging female education in line with the

[1] Misogyny in Turkey through the speeches of the pro-Islamist political elites is articulated in Gülel (2020).

Acting Wife hypothesis of Bursztyn et al. (2017). To many religious families in Turkey, schools pose a threat to their daughters' safety and modesty, and thus to family honor (Rankin and Aytaç, 2006). Despite the evidence pointing out the negative association of religiosity in Turkey with education levels of females and participation decisions of females in labor force, disentangling individuals' religious beliefs from the confounding factors had remained an empirical challenge. On the other hand, the secular setting of the state as well as the public officials' well-acknowledged ambitiousness for establishing the secular state build an eligible environment for an empirical study in the sense of ruling out possible supply-side effects on females' schooling.

To analyze the effect of parents' religiosity at the critical age of schooling on females' access to education, I use Ramadan as an exogenous shock to religiosity, as Ramadan increases religious practicing at both extensive and intensive margins. The exogenous variation in parental religiosity arises in two ways: The first one exploits the idiosyncratic variation of Ramadan dates, as in Van Ewijk (2011); Colussi et al. (2021) and it defines the treated group as the birth-cohorts for which the school registration occurred in Ramadan and in the following two months. To examine the effects on females' chance to access in education, the specification includes the treatment variable interacting with gender of individuals. I argue that the distance of their enrollment dates to Ramadan is orthogonal to the individuals' observable and unobservable characteristics, especially after considering the fixed effects by birthplace and birthyear as well as provinces' gender gap trend in the education outcomes. The second strategy exploits the variation of fasting duration in the registration year, which exogenously vary over time and the latitude, as in Campante and Yanagizawa-Drott (2015); Hornung et al. (2018); Aksoy and Gambetta (2020); Mehmood and Seror (2020), and it defines the treated groups as those who must enroll in primary school where and when the fasting durations are longer. I plausibly argue that the variation of fasting durations after controlling for the regional-specific birth cohort fixed effects as well as for province-specific trend of the gender gap in education exerts exogenous variation in parental religiosity. As for data, I use the population censuses conducted in 1985, 1990, and 2000.

I focus on the first generation of the Turkish Republic for several reasons. First of all, the secular setting of the state ensures that the school calendars are

orthogonal to varying dates of Ramadan. At the same time, the state officials' well-acknowledged ambitiousness for establishing the secular Turkish state rules out the possible effects on the preferences of the suppliers of the education. Secondly, the first generations are also the first cohorts of disseminated mass education in Turkey. For instance, in 1929, the share of male adults who can read in Arabic letters in 1929 was 12.9% vs 3.7% for females. Therefore, relatively less heterogeneity existed among parents regarding their beliefs on females' education due to the degree of educational attainment. Last but not the least, for the individuals born in 1923-1955, every six-year-old kid shall get 5-year primary education in state-run schools, however, the Constitutional Law introduced after the military coup in 1960 made the non-compliance of kids to compulsory education more deterred by introducing fines to parents. Since the new constitutional law affects the parental decision mechanism on enrollment and brings the public officials an additional actor in school registrations, I investigate the effects of parental religiosity on missing school-girls and its consequences for their labor market outcomes among the group of individuals whose enrollment process is the same.

Results reveal that parental religiosity constitutes an impediment to girls' educational attainment in Turkey. Girls' chance to complete the compulsory schooling decreases by 4.3pp when the enrollment dates in primary school are within three months since the start of Ramadan. The effect of increased parental religiosity is economically important: it corresponds to 8.8 percent of a standard deviation. The hindering effect of parental religiosity on females' enrollment in schooling is still evident when I estimate the impact on different educational outcomes, such as literacy status and year of completed schooling. Women's chance to be able to read and write decreases by 2.7pp when their enrollment dates to primary education coincide with the three months following the start of Ramadan. In addition, Ramadan has no effect on males' educational outcomes. Such results are qualitatively robust to alternative specifications.

Parents' religious belief is not a negligible element for the education of females. Policymakers should reckon with the long-term aspects of their policies that enhance the religiosity of their citizens and should be well-acknowledged that the increased religiosity causes families to acquire more traditional gender norms, which unfortunately leads them to underestimate females' educational returns, hence

lowering girls' enrollments in schools. I observe significantly lower levels of female educational attainment while their starting dates of new school years had coincided with Ramadan more frequently and when their parental religious beliefs were more strengthened during their starts to the first three grades. These results suggest that the missing school-girls in Turkey due to their parents' stronger religious beliefs are less likely to be driven by the secular school dress codes, given that the women in Turkey customarily wear headscarves after they reach puberty.

The increased parental religiosity at the critical age of schooling causes considerable gender inequalities in the labor market and exerts significant inefficiencies in the Turkish economy. I find that the labor force participation of women in Turkey is not only lowering, parents' religious beliefs also reduce the shares of female income-earners and female professionals in Turkey and it increases women's fertility and the share of women who are out of labor force due to the household chores.

This study relates to a broader literature analyzing the role of religion in the development and accumulation of human capital.[2] Becker and Woessmann (2009); Botticini and Eckstein (2012) argue that Protestants and Jews compared to Catholics have better economic outcomes due to the investment in literacy. Becker and Woessmann (2008) shows that Protestantism had a positive influence on gender equality in primary education. Squicciarini (2020) shows more religious locations had lower economic development after Catholicism in France during the Second Industrial Revolution. Differently than the previous studies, I find male education and literacy are not affected by Muslim religiosity. However, it undervalues the female education due to the relationship between religion and gender in Islam.

This study also contributes to the role of religion in gender equality and the origins of gender norms. Guiso et al. (2003) shows that religion is an important determinant of the preferences significant for the economic development. Alesina et al. (2013) shows that in societies where plough had used for the agricultural production, traditional gender norms are more salient and female labor force

[2] Iannaccone (1998) and Iyer (2016) overview of the literature on the economics of religion. Basedau et al. (2018) also reviews the studies on the causal effects of religion on socioeconomic outcomes. Kuran (2004) discusses the role of Islam in the underdevelopment of the Middle East and Kuran (2018) reviews and discusses the recent findings on Islam with the methodological strains of them and aspects of future research.

participation rates are lower today. Gay et al. (2018) shows that women who speak a language that marks gender more intensively are less likely to supply labor. I add to this literature that religious beliefs engender favorable preferences toward males on attaining advanced level of education and unfavorable preferences regarding women's working outside home.

This paper is also closely related to the literature on the importance of family ties in attitudes and beliefs play in promoting or hampering women's agency.[3] Fernández et al. (2004); Farré and Vella (2013) show that a mother's attitudes regarding the participation are culturally transmitted to her children. Alesina and Giuliano (2010) finds that families with stronger ties have lower labor force participation of women. I show that parental religiosity ultimately leads Muslim women to be dependent on their families, even when they become an adult. Women who could not attend any primary school by increased religiosity become less likely to participate in the labor force, less likely to be income-earners, and less likely to work in professional jobs. Instead, increased religiosity at the starting year of schooling increases the probability of women being married and being out of the labor force due to household responsibilities, in addition to the increased fertility.

This study also adds to the literature on the role of religion on education in Turkey. In the seminal paper, Meyersson (2014) shows that Islamic rule increased educational levels and reduced early marriages in the areas where religiosity is more salient. Sakalli (2020) adds that the pious people backlashed to the secularization policies of the republic. Erten and Keskin (2019) finds that girls in more religiously conservative regions constitute the largest group of compliers of the policy change that has increased compulsory year of schooling from 8 to 12 in 2012. This literature only focuses on the supply-side of the education in Turkey, and I examine the effects of the variations related to the demands for compulsory primary education, while keeping the factors related to the supply for secular education as constant. Policymakers in Turkey should be cautious while implementing the policies that will enhance religiosity of individuals, such as adding religious courses extensively into school curriculums.[4] Such policies may result in inconducive beliefs towards

[3] The economics of culture is elaborated in Guiso et al. (2006)

[4] See an article discussing the implemented educational policies during the pro-Islamist era of Turkey

gender equality and aggravated effects on the dire gender equality in Turkey that can persist over generations.

The remainder of this paper proceeds as follows. Section 2 outlooks the primary education system in the late periods of Ottoman Empire and the relevant policies enacted after the proclomation of the republic. It also discusses the evidence from Turkey showing the role of religiosity. Section 3 explains the rules on enrollment process in primary schools, the data and the identification strategies employed in this study, as well as a discussion on how Ramadan changes the beliefs of individuals. The final part of this section explains the empirical strategy. Section 4 is allocated to main findings along with their discussion. Finally, Section 5 presents the concluding remarks.

2 Background

Right after the proclamation of the republic, the new state implemented modernization reforms in many areas including education, though most of them were a following of the state ideology diffused since *Tanzimat* Edict. Before the *Tanzimat* Edict, girls from Muslim families were only able to attend courses in primary schools. After that, primary education –religious or liberal– was compulsory for all kids from different religions; however, every religious community had to provide education for their own people. Coeducation in these schools was uncommon and only possible if there is only one school in the neighborhood (Akyüz, 1982; Gelisli, 2004).[5] Over time, liberal schools specific to females where they can pursue the further levels of education were opened.[6]

Education in the Context of Nation-Building. The political elites of that time reached the consensus that the decentralized system in education was one of the reasons behind Ottomans to become a failed state (Lewis, 1961; Alkan, 2000; Çiçek, 2012). They perceived that the education delivered by their own

[5] The other exception is that co-education was started in *Darülfünun* in 1921 after female students boycotted the courses at universities for female *Inas Darülfünun*.

[6] The first female lower-middle school, *İnas Ruşdiye*, was opened in 1859 (Somel, 2001). Upper-middle schools,*İnas İdadî*, and high schools, *İnas Sultanîye*, and a university for females, *Inas Darülfunun*, were opened in 1911, 1913, and 1915, respectively (Akyüz, 1982).

community enabled the communities to build their national identities and escalated the secessionist movements. Plus, the cultural divide between schooled and non-schooled generations among Muslims was another motive to design a countrywide education policy. On the other hand, the mass execution and deportation of non-Muslim populations in the 1910s resulted in the absence of a large number of skilled labor. As such, according to the official statistics of Central Statistics Office of Turkey (1927) the share of male individuals that can read in Arabic letters in overall population aged +7 was 12.9%, and this ratio drops to 3.7% for females. Even in Istanbul, the former capital city as well as the exempted city from the 1923 population exchange program between Greece and Turkey, being able to read in Arabic letters was at 45.5% among males and 36.9% among females. Besides, Istanbul was only 5% of the Turkish population at that time. In consequence, the transformation of the remained population from pre-modern society to the modern one was essential (Pamuk, 2018). And, education became an integral part of Atatürk's nation-building policies. After abolishing the Sultanate, a series of top-down policies including educational reforms were implemented.

Five months after the proclamation of the republic, the education system of the Republic took its conventional form, i.e., unified, centralized, national, and secular (Unal, 2015; Gazette, 1924). The managerial authority of schools was given to the Ministry of National Education, and all religious education institutions were terminated. According to the law, kids completed the age of 6 have become obliged to get 5-year primary education, regardless of their gender.[7] Therefore, coeducation in primary schools was guaranteed. In 1927, gender-mixed education was established in all the secondary schools (Başgöz, 2005). The curriculum of primary education contained some religious courses until 1933 (Özdalga, 2018). From 1938 to 1950, it was entirely out of the regular program, and then they became voluntary in primary schools.

[7] A regulation passed in following years also states that primary schools in villages can track *at least three years of schooling*. In contrast, the schools in other classifications should follow the 5-year track. However, the law re-regulated in in a short of time, and they became equalized at five-year. As the focus of this study is enrollment decisions of parents in compulsory education and given that village schools could last for five years, according to the prior law, I assume that primary school education in these years is for five years.

Building Laïcité in the Republic. Islamic elements in every state institution were predominantly erased. Sharia courts were abolished, and the civil marriage law was introduced. The new civil code prohibited polygamy, subjected marriage to secular law, outlawed unilateral divorce, and recognized gender equality in children's inheritance and guardianship. Adopting a new civil code allowed women in Turkey to be liberated from the restrictions that traditional Islamist interpretations had imposed on them (Arat, 2010).

Although most of the language reforms mainly aimed at fostering literacy among ordinary people, these reforms complement the other nation-building policies in the sense of signifying the secular aspect of the new nation. For instance, more than 80% of the Ottoman vocabulary were either Arabic or Persian words (Assouad, 2020). Turkishification attempts of the language, converting the alphabet and the numbering system from Arabic to Latin, translating the Quran to Turkish, and initiating the recitation of call to the prayer in the Turkish language are some social engineering practices to curb the Arab civilizations' cultural influences.

Resistance of Pious People to the Reforms. Despite a more gender-egalitarian environment provided by the Republic than the Empire, most Turkish families still acquire traditional values, and the gender disparity in education remains a serious problem of Turkey. For instance, Erten and Keskin (2019) finds that girls in more religiously conservative regions constitute the largest group of compliers of the policy change that has increased compulsory year of schooling from 8 to 12 in 2012. Moreover, their inclusion into the education substantially reduced female NEET rates there.

Individuals with strong religious beliefs resisted secularization reforms (Sakalli, 2020). To many families in Turkey, schools pose a threat to their daughters' safety and modesty, and thus to family honor (Rankin and Aytaç, 2006): They prefer her early marriage rather than her schooling. The incompatibility of the secular environment in units of state institutions with individuals' religious beliefs is another dimension of this resistance. Especially more impoverished (and pious) parents hesitated to send to school their daughters without wearing a headscarf (Çarkoğlu

and Toprak, 2007).[8] Likewise, Meyersson (2014) finds Islamic rule increased the education level of females in the areas where Islamic values are more salient and it reduced adolescent marriages as well as increased female political participation there. On the other hand, longer periods of exposure to the secular education in Turkey reduced religious preferences of individuals (Meyersson, 2014; Gulesci and Meyersson, 2015; Cesur and Mocan, 2018).

3 Empirical Framework

Here, I first elaborate how the kids entering the schooling age are enrolled in primary schools in Turkey since the republic and how the rules on their registration have changed over time. In the part 3.2, I present the data used in this study, with a detailed information on how I construct the main variables of interests. I allocate the part 3.3 to explain the two identification strategies that I leverage in this study. Also, I here discuss and present the potential effects of Ramadan on the beliefs of individuals. In the final part 3.4, I explain the specifications that I use to estimate the effects.

3.1 Enrollments in Primary Schools

Despite the strenuous efforts exerted for building a modern Turkish nation, the state completely guaranteed the compliance of the citizens to compulsory education rules by the introduction of the 1961 Constitutional Law that came after the military coup. For example, It includes a well-defined monitoring system of schooling aged kids regarding their schooling and a deterrence mechanism for citizens who take the education rights away from their kids. Education Section numbered 222 of the Law has appointed the roles of monitoring to elected neighborhood representatives,

[8] Veiling as a strategical choice of women enabling them to take up outside economic opportunities while preserving their reputation within the community is showed theoretically by Carvalho (2013) and empirically by Aksoy and Gambetta (2016); Shofia (2021).

provincial directorates of education, and school principals.[9] Furthermore, the law allowed to launch legal action against parents in the case of non-attendance to the courses. By Constitution Law, the fines to parents could be up to 2 TL $\approx$ 2 \$ per non-attended day. Figure A.1 shows the predictions of the gender gap in the share of formal degree holders in provinces over time. The estimates indicate that the Kemalist education reform slightly increased the gender gap. In other words, despite the increase of schools that females are eligible to get an education, we observe an equilibrium resulting in a higher level of gender gap in education. At the same time, when parents are discouraged regarding not enrolling their siblings, a substantial reduction in the gender gap occurs.

3.2 Data

I use the pool of samples of Turkish population censuses collected in 1985, 1990, and 2000. The censuses were carried out by imposing one-day curfews at the country level on 20 October 1985, 21 October 1990, 22 October 2000. It includes all the face-to-face interviews conducted through census-takers' visits to all existing places serving as households or non-households, including dormitories, hospitals, prisons, and the military districts. The census samples that I employ involve 5% of the population randomly selected by province of residence, and all subgroups within the sample are representative.[10]

The survey instruments include some universally asked questions as well as birth information, e.g., age of individuals during census and their province of birth. Also, I can retrospectively observe whether the individuals completed the primary school as well as their literacy status. 48% of the respondents are female; their average

[9] See the original version of the Law on Primary Education and Education here. By the introduction of the law into the new constitution, the elected representatives and the provincial directorates of education have become responsible for making sure that the parents of kids at the school-starting age enrolled them to schools. Besides, every year, the elected representatives have become liable to prepare a list of children living in the neighborhood at the respective period. They have been also obliged to present them to the provincial directorates of education before 15 days of school openings. Moreover, in non-registrations of kids, school principals had owned the right to register the kids and inform the parents on students' compulsory attendance by the law.

[10] Given that Turkey's administrative boundaries changed slightly over time, the number of provinces in 1985-2000 period expanded from 67 to 81. I discuss its potential implications in Section 4.1.

year of birth is 1942 (Table B.3). 70% of the individuals born in 1923-1955 can read and write in Turkish and 61% completed primary school. Note that I cannot directly measure when individuals enrolled or when they completed primary school; therefore, the enrollment rates in primary school are lower than these statistics given that individuals may attain primary education after their schooling age. I also measure the year of completed schooling, considering the 5+3+3 pre-tertiary tracking system in Turkey, and assuming literacy skills are gained with one year of education.

I generate some labor market outcomes that are in line with the sub-indicators of Global Gender Gap Index in order to well-picture the contributions of parental system of beliefs to gender equality in Turkey. These are labor force participation status of the individual, whether the individual is an income-earner or not, and whether the person works in professional or technical jobs.[11] Having professional and technical jobs refers to working in the reference period as the following occupations: physicians, chemist or other related occupations; architects, engineers or other-related technicians; pilots, warrant officers, maritime engineer; biologists, agnoroms or related technicians; medicine-related occupations; statisticians, mathematics, system analysts or related technicians; economists; financial advisor and accountants; teaching-related occupations, religious clerics or related; writer or literature-related occupations; sculptor, painter, photographer or other fine-artists; sport persons or other related occupations; unclassified scientific or technical occupations.

In addition to labor market conditions of the individuals, I measure their marital status and the number of children that the female respondent has given birth. To better understand the reason behind their participation decision on labor force, I also generate an outcome showing whether the woman is a housewife, which is

[11] I predominantly rely on the definitions and indicators of Global Gender Gap Index, though with some exceptions. The index uses the estimated gender gap in income and wage, however, I use the status showing that the individual earns an income from a job or not. Regarding the advancement gap between women and men, they use the ratio of women to men among legislators, senior officials and managers, and the ratio of women to men among technical and professional workers. I only focus on the professional and technical jobs. The index's occupations are classified in ILO's standard classifications. As the index and census' occupational classifications are different (ISCO-08 and ISCO-68, respectively), they are harmonized using the respective correspondence tables.

detected through that the main reason for her to be out of the labor force is being busy with the household chores. 62% of the sample are in the labor force, the income earners constitute 42% of the overall sample, and 6% of the individuals work in professional or technical jobs. Marriage is almost universal: 89% of them are married (Table B.3). Note that the census collects fertility information only from females, whereas housewife status is captured from a question asked to everybody out of the labor force, in order to know why they are not looking for a job. However, I only focus on females given the strictly gendered division of household labor in Turkey, particularly among these birth-cohorts. Average birth per woman is 4.8 and 53% of women are not seeking jobs due to their responsibility on household chores.

To estimate the effect of parental religiosity on females' enrollment in primary schools, I mainly use two exogenous variation related with Ramadan fasting. First, I exploit the time distance of the enrollment dates to the starting date of last Ramadan. To measure it, I rely on the current educational regulations had been applying in the past and I choose the mid-day of the enrollment period to minimize the measurement error in calculating its distance to the most recent Ramadan's starting date: Per the current regulation, the registrations of kids start in the first official day of July. Although the ending period is not certain in the regulation, the schools usually start in the second week of September. Therefore, I use 5 August as the mid-day of this period to calculate the distance measure. As the starting age to school is fixed to 6, I match this distance variable using the birth year information of individuals in the sample. By doing so, I identify the birth-cohorts whose enrollments fall into the three months following Ramadan's starting date. I discuss the potential measurement error and its implications on the main findings in Section 4.2. I show there that the results remain similar in qualitative terms when I alternatively use the dates within 5 July-15 September period as an enrollment date.

The second variation that I use to estimate the effect of parental religiosity is the duration of religious fasting. After retrieving the coordinates of districts from the open-source data, I use *datetime* package of Python and beginning and ending dates of Ramadan to calculate fasting durations of districts for each year, proxied by time duration between sunset and sunrise of the date in Ramadan month. To

estimate it at province level, I weight them with the population size of the district. Birthplace and birthyear information are the identifiers that I use to match these variables of interest with the census data. Table B.3 displays that 26% of the individuals' enrollment date was no more 90 days after the beginning of Ramadan month. The average daily fasting hour in the year that an average individual in the sample must enroll in primary school was 12.5 hours with a 1.8 hour of standard deviation. Note that as Ramadan fasting lasts for roughly 30 days, the variation across provinces is considerable: one standard deviation of total hourly fasting duration corresponds to 55.6 hours.

In order to consider the economic conditions in the enrollment year, I use the historical national income per capita retrieved from 2010 Maddison Project as well as the estimates of Asik et al. (2020) for the historical administrative units on their level of provincial disparities from the national per capita income. They calculate an index starting from 1913 and showing the evolution of the spatial disparities in Turkey, using Ottoman statistics and other sources of data for the decades before World War I as well as the official statistics and other data from modern Turkey since the 1920s. Since the two of the income statistics that I use in this study are calculated for some benchmark years, I use linear interpolation of these disparities to have it at year and province level. In addition, because there are some changes in administrative boundaries over time, for the new units, I impute the same value of which the historical 56 administrative units contain this new administrative units. The income per capita of the province that an average person in the sample was born in their enrollment year in primary school was 10pp lower than the country-level income per capita (Table B.3).

3.3 Identification Strategies

The role of religions and religiosity on women's abilities and the ideal roles that define to women and men in the economy has been prolongedly debated in the literature.[12] However, the literature has some challenges to reveal a causal effect of

[12] Holm and Bowker (1994) examines gender perspective of most of the religions prevalent around the world. Iyer (2016); Basedau et al. (2018); Iyer (2019) review the literature on the effects of religion on economic development and demography. Kuran (2018) focuses on the same literature specific to Islam.

religiosity on women empowerment. This arises from the fact that the the extent which individuals participate in religious activities is a choice where they allocate their limited time among religious and secular activities while maximizing their lifetime and afterlife utility (Azzi and Ehrenberg, 1975).[13] In addition to that, empirically speaking, pious people mostly live in poor areas of Turkey, as well-shown in Meyersson (2014). So, reverse causality is an example for the sources of this endogeneity and an analysis on its impacts requires an exogenous instrument that increases the religiosity. In this aspect, Ramadan constitutes a relevant natural experiment.

In Figure 2, I present the weekly data of Google search trends of some terms closely related to religiosity over 14/12/2014-01/12/2019 period and their spikes occurring in the weeks of Ramadan months. People in Turkey search on Quran more extensively in Ramadan weeks, meaning that the religious practices that are carried out through digital means are at higher intensity in the holy month. Likewise, individuals raise questions on Google about the spiritual implications of their daily-life actions, more frequently during Ramadan month. The use of Ramadan as a natural experiment in the economics literature is not new though; the previous studies exploited it to address many research questions, varying from economic growth, health, education to political economy. When methodologically classified, one can group them into two: the studies using the rotating property of the Islamic calendar, hence varying Ramadan dates over time, and the ones using fasting hours, which change over time and the latitude. Among the first group of studies, Ramadan months are exploited as a treatment to minority salience in Germany (Colussi et al., 2021); as exposure to prenatal malnutrition (Van Ewijk, 2011; Schultz-Nielsen et al., 2016; Greve et al., 2017). Besides, Oosterbeek and van der Klaauw (2013) estimates the effect of Ramadan fasting on student performance using the diff-in-diff framework. Studies in the latter group use the fasting hour to evaluate its impact on economic growth & subjective well-being (Campante and Yanagizawa-Drott, 2015), on student performances (Hornung et al., 2018); on the support for Islamist parties in Turkey (Aksoy and Gambetta, 2020); finally on

[13] Bentzen (2019) discusses why some societies are more religious than others, presenting the existing approach on religiosity in theoretical frameworks. The demand- and supply-side factors that causes differences in religiosity across societies are also presented.

judicial behavior in Pakistan (Mehmood and Seror, 2020). In this study, I leverage the two exogenous variations in this study, sometimes as a robustness check of the other's findings.

In Figure 3a, I show the varying distance of the enrollment dates to the first day of the holy month over time. The enrollment dates, denoted by blue hollow circles, are fixed to 5th of August due to the secular order in Turkey whereas the first Ramadan day, denoted by red solid circles, move backward by around 10 days each year due to its idiosyncratic variation. Consequently, the distance between the enrollment dates and the starting date of Ramadan induces as good as random variation in families' religiosity. Note that Muslim kids do not usually observe religious fasting, especially at age 6, therefore, in this context, we elicit an increased level of religiosity arising from the adults, including parents. Besides, the state officials' well-acknowledged ambitiousness for establishing the secular Turkish state rules out the possibility of its effects on state official's preferences. The vertical green lines in Figure 3a displays the daily distances of the enrollment date to Ramadan for each school year in vertical green lines. I first consider the treated group as the birth-cohorts that are required to enroll in a primary school in Ramadan month or the following two months. Given that registration dates fall just after Ramadan in 1946, the treated birth-cohorts start with individuals born in 1940.

The identifying assumption is that the distance of enrollment dates to Ramadan is orthogonal to the individuals' observable and unobservable characteristics. I also assume that the variation only induces an exogenous variation in parents' religious beliefs. Given that I compare here a group of individuals born in same places but different years, the year-specific incidences may lead the violation of the identifying assumption. I discuss the plausibility of the assumption in Section 4.2. Nonetheless, I use an alternative exogenous shock to religiosity, which varies over time and across provinces: the length of fasting durations. The variation in the length across localities is due to the interaction between the rotating Islamic calendar and a province's latitude. I present in Figure 3b the variation of yearly fasting durations in the provinces within their region. Due to the geolocations of the provinces, the northern provinces' fasting durations change more substantially over time whereas the one for the southern provinces relatively vary less. Besides, the timing of

Ramadan determines to what extent the fasting durations vary across provinces within the same region. When Ramadan in winter, the deviations within a region almost disappear. When Ramadan coincides in summer seasons, the variations across provinces in the deviations of provinces' duration from the regional average may increase from 0 and up to around 400 minutes. Identifying assumption here is that the religious fasting durations of provinces over time are orthogonal to the individuals' characteristics and it exerts an exogenous variation in parents' religious beliefs, especially after controlling for some spatial and time fixed effects.

Ramadan and Beliefs of Individuals. Allocating a longer duration to the religious activities in Ramadan means increases in religiosity at individual level, and the changing patterns of religious engagement may induce some changes in their beliefs. At the same time, the easily-screening nature of this kind of religious practice increases the number of participants in religious fasting. Higher compliance may reshape group boundaries, whereby a larger group's beliefs may mimic the religious doctrine. Previous studies find that Ramadan fasting may induce lower generalized trust (Campante and Yanagizawa-Drott, 2015), higher tolerance of judges in Pakistan (Mehmood and Seror, 2020), and lower prosocial behavior of observants towards non-observants (Haruvy et al., 2018).

I estimate the effects of Ramadan on religiosity and gender norms, using 2008 and 2013 years of Demographic and Health Survey of Turkey by the following equation:

$$\text{Beliefs}_{ipt} = \beta_m \text{ Monthly Distance}_{pt} + \theta_p + \mu_u + + \lambda_t + \varepsilon_i \tag{1}$$

where Beliefs is the vector consists of gender norms as well as the religious practices of the woman i living in province p at time t. Given the few variations of interview dates with respect to Ramadan (Figure B.1), I group the interviews monthly to estimate the effect of the distance of interview dates from Ramadan on gender norms. Identification relies on that the arguably exogenous variation of interview dates from the end of the most recent Ramadan, and consequently, it induces as good as random variation in religiosity. Table B.2 in Appendix supports this argument and reports whether the daily distance from Ramadan is

associated with women's demographic characteristics. Despite some of the estimated coefficients to be statistically significant, they remain economically insignificant. I include some personal characteristics as controls to increase the precision of estimates and to absorb the slight differences in demographic characteristics by distance to Ramadan. Keeping the most recent month, i.e., the first month after Ramadan as the reference group, I estimate to what extent the beliefs of women change in the second, third, the fourth, and the fifth months after Ramadan. β_m where m denotes these monthly distances reflects the estimated effect of monthly distances from Ramadan on religiosity and gender norms of individuals compared to the reference group.

Praying, wearing headscarf, and fasting are the outcomes for religiosity. Since three-fourth of the women wear headscarf and three-fourth of the individuals observe religious fasting, according to Çarkoğlu and Toprak (2007), headscarf and fasting questions act as a kind of balancing test and aim to analyze whether the prevailing level of religiosity is stable over the distance groups. Table 1 shows that the women interviewed in dates with different distances to Ramadan are statistically similar in the sense of participating such religious practices. On the other hand, I find that the number of reports saying that they perform prayer regularly or irregularly decreases in Ramadan's subsequent months. At the same time, in more distant months from Ramadan, I find that women's voices over egalitarian family decisions, female education, and women's participation in politics raise. Hence, it appears the closer the interview date to Ramadan, the more conservative and the more religious the response by the women interviewed. As a result of this, the traditional gender norms that become more salient by Ramadan may result in that families underestimate female offspring's educational returns, hence engendering missing school-girls by lowering their chance to enroll in primary schools.

3.4 Empirical Strategies

The causal effect of religiosity during enrollment period is captured by the following estimating equation:

$$\mathrm{Y}_{i,p,c,t} = \beta_1 \mathrm{Fem}_i{*}\mathrm{Ramadan}_{t+6} + \theta_{p,t} + \lambda_{c,\mathrm{Fem}} + t * \mathrm{Fem}_{i,p} + \varepsilon_{i,p,t,c} \qquad (2)$$

where Y denotes the education and labor-market-related outcomes for individual i that are observed in the census year c and born on province p in year t. Ramadan_{t+6} refers to whether individual i in birth-cohort t has to register to a primary school in Ramadan month or the following two months. I estimate the effect among those born in 1923-1955 because, as explained in Section 2, the Turkish education system available for this group of people was predominantly the same for all, regardless of gender. As the new constitutional law is very likely to affect the parental decision mechanism on enrollment as well as it brings the public officials an additional actor in school registrations, I focus on the individuals born before the introduction of this law.

$\theta_{p,t}$ absorbs any local and time-variant characteristics that affect the enrollment decisions for boys and girls in the same manner. Therefore, it includes the socioeconomic conditions of provinces where the kids in the same birth-cohorts are challenging. For instance, school resources, economic conditions, land productivity, and the attitudes toward educational attainment are the characteristics that I control for by this fixed effect. $\lambda_{c,\text{Fem}}$ captures for any improvements in literacy skills in the years between 1985 and 2000 through the campaigns that aim to eliminate adult women's illiteracy in Turkey, as well as, changing population over time. Given that the gender gap may vary differently across the regions and over time, $t * \text{Fem}_{i,p}$ takes into account of the provincial time trend of the gender gap in the outcome variables. Although the inclusion of time-specific fixed effects absorbs the Ramadan effect for individuals, regardless of their gender, it pays off greatly, because it allows to capture the crucial factors in parents' decision on human capital investment of their kids. As I aim to estimate the effect unique to girls, β_1 constitutes the parameter of interest. Hence, I argue that the deviation in the treated years from the gender-gap trend presents the causal effect of religiosity on girls' educational attainment. Since the errors can be correlated within the province, I cluster the standard errors at province-level (N=81).

The previous specification does not estimate its effect for males; on the other hand, the impact of religiosity on males' educational attainment level may be still substantial, given that Sakalli (2020) finds that the secularization in Turkey lowers the educational levels in localities where religiosity was higher before the secularization. To directly investigate the impact of parental religiosity for both

males and females, I use an alternative instrument, for which parental religiosity varies over time and across provinces, that is, province-specific total fasting duration when the birth cohorts must register in a primary school. By doing so, I can also assess the robustness of my previous results. Exploiting the variation of fasting duration within a year, I estimate the effect of religiosity on the probability of boys and girls holding a formal education diploma by the following equation:

$$\mathrm{Y}_{i,r,p,c,t} = \beta_1 \mathrm{FastHour}_{p,t+6} + \beta_2 \mathrm{Fem}_i \mathrm{X}\ \mathrm{FastHour}_{p,t+6} + \theta_{r,t} + t * \mathrm{Fem}_{i,p} + \lambda_{c,\mathrm{Fem}} + \varepsilon_{i,r,p,c,t} \tag{3}$$

where $\mathrm{FastHour}_{p,t+6}$ is log of total fasting duration in the birth-province p in year $t+6$, when birth cohort t is registered to primary school. I interact the fasting hours with the gender of individuals; therefore, β_1 & β_2 are the coefficients of interest in this estimation strategy. The fixed effects and the controllers are mostly in line with Equation 2, despite one exception: As fasting durations given a year only vary across provinces (corresponding to NUTS-3 level), I instead use NUTS-2 level of spatial fixed effects not to discriminate boys from girls.

4 Empirical Findings

This section starts with the main findings on the causal effects of parental religiosity on educational outcomes of females and males. Then, I discuss the plausibility of my identifying assumptions in the part 4.2. After that, I elaborate in the part 4.3 to which extent individuals were exposed to increased parental religiosity during their schooling age affects the educational outcomes of females. In the end, I show the consequences of parental religiosity regarding the other dimensions of gender equality.

4.1 Main Findings

Table 2 shows the estimated causal effects of parental religiosity on the educational attainment levels of women and men, whenever possible. Column 1 reports the mean difference in completing an educational degree between males and females

conditional on province-specific birth-cohort fixed effects and the variation in the outcome across census years. The gender gap is extremely large: the estimated difference for individuals born in 1923-1956 equivalent to 32.3pp in favor of males, reflecting 66% of one standard deviation.

I introduce my benchmark treatment in the second column, and the results are based on the specification as displayed in the equation 2. In other words, the estimated effect here on females to be a degree-holder in their adult life obtained after the inclusion of province-specific time fixed effects, the census-year fixed effects, and the province-specific trend of the gender gap in the share of individuals holding any types of formal degree. It reveals that parental religiosity constitutes an impediment to girls' educational attainment and brings a significant group of the missing school-girls in Turkey: Girls' chance to complete their compulsory education decreases by 4.3 pp when the registration date to primary schools is within three months since the start of Ramadan. In relative terms, the causal effect of increased religiosity on generating missing school-girls by 8.8 percent standard deviation of the share of individuals with any type of formal degree. By the same token, the estimate reflects one-seventh of the prevailing gender difference in holding a formal degree presented in the first column.

The third column shows the estimates calculated with the alternative instrument, which exploits the variation in total fasting duration across provinces and over time. Note that I instead control for spatial-related fixed effects at NUTS-2 level, therefore, the estimates exploit within-region variations of provinces' fasting duration from the region's average duration at the same year, as depicted in Figure 3b. Also, I consider the potential variations in the gender gap at the province over time, by taking a linear trend of the gender gap. The effect of fasting durations at the enrollment year in primary schools for the males' chance to be schooled is negative on average, but statistically insignificant ($\beta_1 = -0.267$, $p = 0.573$). However, its effects for females are negative as well as statistically and economically significant. I find one standard deviation increase in the yearly fasting duration ($\mu = 387.2$ $\sigma = 55.6$) lowers girls' chances to hold any type of formal degree by 20pp. Realistically speaking, 5.6 hours of positive deviation from the regional average (10% of one standard deviation) lowers girls' chance to hold any type of formal degree by 2pp. So, it is an equivalent of 6.1% of the conditional gender difference

in completion rates, as shown in the first column of the same table.

To better understand if kids are enrolled but then they dropped out later than the first grade, I use literacy status of individuals as such skills are acquired during the first grade of schooling. The estimated mean difference in literate rates between males and females conditional on birthplace and birth-year-specific cohort fixed effects and census-year fixed effects is 32pp, as shown in the column fourth of Table 2. I find that women's chance to read and write in Turkish during their adulthood decreases by 2.7 pp when their enrollment dates in primary school coincide with the three months following the start of Ramadan. The results regarding the fasting durations show that its effects on males' literacy status are again negative and statistically insignificant ($\beta_1 = -0.11$, $p = 0.801$). For females, I find 5.6 hours of positive deviation from the region's yearly fasting duration in the school-registration year of kids lowers females' chances to be able read and write by 1.1pp. It corresponds to 3.4% of the conditional gender gap in literacy status, as depicted in the fourth column.

The differing magnitudes for the estimated effects on females' literacy rates and the share of them who completed at least primary school may mainly arise from what these outcome variables measure. I basically attribute this difference to what the outcome variables measure: Kids gain literacy skills in the first grade, therefore, the results on literacy status show the effects of Ramadan on females' chance to start and complete the first grade of primary school. By the same token, the estimates on having completed primary school may reflect the aggregated effects of parental religiosity to which females have been exposed during their entire primary schooling age. Yet, due to the nature of dataset, I am unable to capture to what extent mass literacy campaigns, that had run before the earliest census-year, particularly the ones targeting women lowered the literacy rates. For instance, a law passed in 1983 by Kenan Evren's regime addressed the literacy courses as mandatory and introduced penal regulations. The campaign also had given priority to some groups, including women (Sayilan and Yildiz, 2009). In this sense, the estimates above underestimate the number of missing school-girls due to parents' religious beliefs.

In the resting columns of Table 2, I show the results for the completed year of schooling. The conditional average years of completed schooling is lower for

females than males by 66.9%. Having to enroll in primary schools in the first three months since the start of Ramadan month reduces females' average completed year of schooling by 6.9%. In just the same way as the previous results, I do not find any significant changes in males' completed years of education due to the exogenous variation in fasting durations. Still, I find that 5.6 hours of longer fasting durations in a year lowers females' average completed years of schooling by 2.9%.

4.2 Concerns over Identifying Assumptions

Enrollment Period. The previous results assume that the regulation for 1923-1955 borners regarding school enrollments was the same as the present one. However, it is not certain, and this uncertainty may cause my definition to falsely regard non-treated groups as treated, and vice versa. In addition to that, even if true, using the middle day of a period may give an average effect within the interval, but the estimated effects for the two most distant date may differ in terms of both sign and magnitude.

In this regard, I employ every possible day within the enrollment period as the enrollment date to re-estimate the effect for all. Figure A.2 displays the previous results on all educational outcomes along with separate estimations for each enrollment date within the period. It shows that the estimates are still negative and statistically significant, no matter the date chosen within the enrollment period. Moreover, the estimates for each day are not statistically different from the presented results in Table 2, at 95 confidence level. Despite the results being statistically similar across different treatment definitions, I find the negative effects are slightly lower when enrollment dates are between the second half of July and the end of this month as well as after 1st of September.

Differing Characteristics of Localities within Provinces. Available schools for kids, attitudes towards schooling, the number of teachers, quality of education, or economic conditions and structure may vary across localities, even within provinces. When considered this heterogeneity, the previous results are the average of the effects for the localities with different characteristics within a province. If the data had contained a lower level of the spatial information regarding individuals'

birthplaces, we could have better captured these heterogeneities, and the precision of the estimates could have been much better. Yet, leveraging the increasing number of provinces over the time span of the data, I show in Table A.1 that the estimates are the highest in 2000 of census year, when there are 81 provinces, and the lowest in 1985 when the number of administrative units as province was 67. When considered the life expectancy for more educated groups to be higher, and treated groups to be less educated, the issue of mortality would imply a higher coefficient than the estimated ones. On the other hand, even after increasing the precision of the estimates, I still find statistically insignificant results regarding the effects on males' education.

World War II. During the second World War, Turkey remained neutral until the final stages and tried to maintain an equal distance between the Axis and the Allies until February 1945. Yet, the subversive effects of the war were salient through the economic distress. As such, in the presence of the gendered views of families about their offspring's education, such budget constraints may lead to an equilibrium where families prefer a higher investment to the ones that they believe to have a higher educational return among their siblings. Therefore, such hardships may deepen the gender gap in education, and may be a violation of the identifying assumption given that the treatment group assigned based on distances of the dates correspond to a particular group born in the certain years. Note that the exogeneity of fasting durations still seems plausible.

I tackle this issue in two ways: First, I include the interaction term of gender with the following income indicators: per capita income at both national and provinces' deviations from the national level when the birth cohorts enroll in primary schools. Therefore, I take into account the economic conditions at local and macro level when kids must enroll in primary school. The first and second columns of Table 3 report the results after controlling for such income effects, and the estimates are still consistent with the previous results. I find that Ramadan lowers girls' chance to pursue their education by 3 pp, equivalent to 6.5% of one standard deviation (reported in the first and second columns). At the same time, the negative estimated effects for males slightly scale up, and the ones for females slightly scale down. These changes in magnitudes are in line with the argument

mentioned above. However, controlling for such concerns result in a lower bound of the estimates in the main results section. The other way that I address the concern by estimating the effect within the five-year interval of birth cohorts that are from the same region. The results remain consistent with the previous findings.

Income Effects of Religious Fasting. As found in Campante and Yanagizawa-Drott (2015), religious fasting may induce lower labor productivity and decreases in income per capita as physical consequences of longer hours of absenteeism. Therefore, families may prefer male siblings over female ones to get an education in times that the household earn less. Note that the previous findings are based on the variation of fasting durations within a region, therefore the marginal effects of physical strains on the labor productivity will be limited.

I provide an evidence that supports this argument in Table A.3. The first two columns shows the effect of fasting durations (in log) on the deviation of provincial income from the country-level income (in log). In the first column presents the unconditional effects of the duration on the income. The second column additionally controls for the time trend of provinces' incomes. Despite the two results being statistically insignificant, I find that the duration of fasting hours causes provinces to deviate from the national income per capita by 4.9%. This finding is in line with the evidence of Campante and Yanagizawa-Drott (2015). However, when the duration variation comes from the same year within the region, the negative effects turns positive, and the standard error of the estimate gets bigger enormously. Therefore, the assumption that the fasting durations after controlling for the fixed effects only increase parents' religiosity seems plausible.

4.3 Religiosity during Schooling Age

I next address whether the exposure to parental religiosity at earlier ages matters for females' level of education. To compare the relative effects, I now use starting date of education given that the school enrollments in Turkey automatically renew every year, and parents make their kids registered only once before the first grade. For the estimation, now I use the distance measure from the first day of Ramadan month to the 15th of September, given that the second week of this month is the

usual starting week. Considering the potential collinearity, I estimate the effects separately for each grade, relying on the equation 2 and present the results on females' average completed years of schooling in Figure 4. The estimated effect for the first grade is the largest and the hindering effect slightly diminishes by the fourth grade. The estimates regarding the grades after 4, an equivalent to the sample's average years of schooling, substantially vanish away. Besides, the estimated effect of the exposure at the eighth grade turns positive, potentially given the fact that the female cohorts that reach eighth grade is selective.

I then examine whether the intensity of parental religiosity during the schooling age matters for females to acquire their education. Recall that the variation in average daily fasting hours measures it at the intensive margin, but exactly when the kids enter primary schooling age. This exercise addresses the intensity that females had encountered during the entire schooling age. I estimate it for the girls on their chance to complete at least primary school and on their completed year of schooling, relying on the equation 2 and I illustrate them in Figure 5a and Figure 5b, respectively. The results reveal that a greater intensity of parental religiosity of parents that girls have experienced during the entire schooling age exacerbates the risk for females on not completing the primary school. Also, the intensity significantly lowers educational level of females. Table A.2 shows at which ages (or grades) females are further vulnerable in the sense of pursuing their primary education, while keeping the extent of exposure to Ramadan fixed. It appears that females are more likely to end up with worse educational outcomes if their parents are more religious during the first three grades. Considering the age that females are most unfortunate to be schooled, being unable to wear a headscarf in schools least likely drives these results. At the same time, the state officials including teachers, particularly of that time, are known as loyal to the Kemalist ideology. Therefore, the most possible channel is parents' beliefs on gender. Otherwise, we would not find the positive effects when the females experience a higher exogenous variation in religiosity at their eighth grade of age.

4.4 Long-term Effects of Parental Religiosity

I now discuss the consequences of religious beliefs on women's adult outcomes, with a particular interest in the gender gap in the labor market so that we can assess the implications for gender equality in Turkey. For the estimation, I rely on the specification as in equation 2 and 3, however, I additionally include the covariates that is introduced in the third column of Table 3, given the fact that labor market decisions are a determinant of age, labor market characteristics, quality of education. Since some of the individuals born in 1923-1955 were out of the working-age population after 1985, I estimate the results employing this year's census data. Note that the results when used the other years' data are mainly similar: The results coming from 1990 data are qualitatively same with the reported one. In addition, I observe that the treated group of women is entering into the labor market in 2000 as unpaid family workers due to the severe economic crisis of Turkey starting in the ending years of 1990s. This outcome is not inconsistent with the main findings, given that they enter labor market as unpaid and family workers, even in times that households face a high risk of income loss.[14]

I report the results using the distance to Ramadan and fasting durations in Table 4 and 5, respectively. They indicate that increased parental religiosity at the critical age of schooling has substantial consequences for women's later life. For instance, I find that the women with a higher level of parental religiosity in their early ages become less likely to participate in the labor market. The estimated effects using the two instruments for parental religiosity are consistent and statistically significant. Females whose enrollment periods coincide with Ramadan are less likely to be in the labor force by 1.2pp. As parental religiosity did not make boys excluded from schooling, I do not find significant effects on their participation in the labor market. A higher degree of parental religiosity, measured by 5.6 hours of increase in average daily fasting hours in the enrollment year to primary school, lowers females' participation rates in their adulthood by 2.2pp. Females' lack of education due to the beliefs of their parents exert significant inefficiencies in the Turkish economy.

Further results reveal that the labor force participation of women in Turkey

[14] I can provide the results by census if asked.

is not only lowering, parents' religious beliefs also reduce the shares of female income-earners and female professionals in Turkey. Given that the coefficients for income-earner rates are considerably higher than those for the labor force participation rates, if these women had access to education, the opportunity cost of their inactivity would have been much higher, and therefore, they would have been more likely to be in the labor force. More importantly, it is least likely that their participation in the labor market would have brought higher unemployment rates or higher number of individuals working as unpaid family workers. Rather, they would have got into jobs that they could have earned an income. The results also point to some increasing effect of female professionals and technicians in the labor market if they would have been schooled. More importantly, they would have flourished female income-earners in the labor market, possible through aspiring other women as well as creating new jobs for the other females.

To further analyze the underlying reason for the missing school-girls to be out of labor force, I examine the effect on their marital status, as a proxy for their fertility, given that the census collects the number of children only from women and enables to observe one individual within a household. Besides that, marital status is one of the universally asked questions. The results on their marital status using the two instruments are still consistent, and I find that the treated females' probability of being married is significantly higher. The result on the fertility of women is again consistent with the latter one. For the regression result among women, I find that the effect of parental religiosity on the female offspring's fertility is substantial, and it points out that 5.6 hours of higher fasting duration in the significant year of schooling result in the increase of the number of children by 8.8%. The higher fertility rates may arise from an earlier age that they get married as well as their lack of information on contraceptive methods due to the lack of ability to read. Given that increased number of children gives much more burden on the shoulders of women in the presence of traditional household division of labor, I find that 5.5 hours of increase in yearly fasting duration increases the probability of females to be out of the labor force due to the household responsibilities by 14.7pp.

5 Concluding Remarks

This study sheds light on the causal effects of parental religiosity on the gender gaps in educational access and labor market outcomes. For the empirical investigation, I focus on the first generation of the Turkish Republic, the first secular Muslim-majority country. The individuals born in 1923-1955 constitute the interested group and 1985, 1990, and 2000 censuses constitute the data.

In this study, I exploit Ramadan as a quasi-natural experiment for increased active religiosity in Turkey, where Muslims constitute 99 percent of the total population. Ramadan increases religious practicing at both extensive and intensive margins. More importantly, starting age to primary school is fixed at 6, and the registrations are only possible in a specified period of summers. Therefore, some birth-cohorts must enroll in primary school when parents are more religious, while the others are relatively less. At the same time, some individuals having to enroll in a primary school where fasting durations were longer than the other places within the region have exogenously encountered with higher parental religiosity.

Results reveal that parental religiosity constitutes an impediment to girls' educational attainment in Turkey. Girls' chance to complete their compulsory education decreases when the registration date to primary school is within three months since the start of Ramadan. The hindering effect of parental religiosity on females' inclusion in schooling is still evident when I estimate the impact on different educational outcomes. On the other hand, exposure to increased parental religiosity is negative but statistically insignificant for males' educational outcomes.

Parents' religious beliefs are not a negligible element for the education of females, and policymakers should reckon with the long-term aspects of their policies that enhance the religiosity of their citizens. The policymakers should be well-acknowledged that the increased religiosity causes families to acquire more traditional gender norms, which unfortunately leads them to underestimate females' educational returns, hence lowering girls' enrollments in schools. I observe significantly lower levels of female educational attainment while their starting dates of new school years had coincided with Ramadan more frequently and when their parental religious beliefs were more strengthened during their starts to the first three grades. These results suggest that the missing school-girls in Turkey due

to their parents' stronger religious beliefs are mostly likely to be driven by the change of parents' beliefs on gender. The increased parental religiosity at age 6 causes considerable gender inequalities in the labor market and exerts significant inefficiencies in the Turkish economy. I find that the labor force participation of women in Turkey is not only lowering, parents' religious beliefs also reduce the shares of female income-earners and female professionals in Turkey.

If these women had an access to education, they would have been more likely to be in the labor force and unlikely to be unemployed or unpaid family workers in the labor force, but they would have got into jobs that they could have earned an income. Furthermore, their inclusion in the labor market would attract the other women possibly through their aspiration to others as well as the new jobs that some of these women create. Since these women have nothing than being housewives, I find a higher fertility for the missing school-girls. Given that a higher number of children gives much more burden on the shoulders of women in the presence of traditional household division of labor, I find that higher probability for missing school-girls to be out of the labor force when they become adults.

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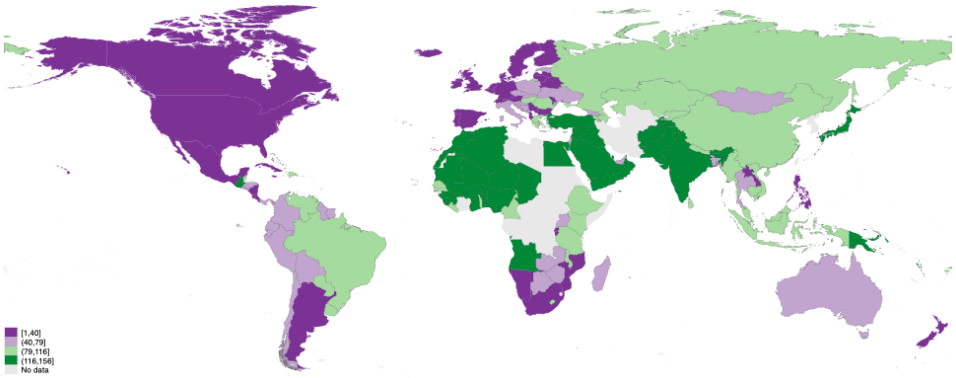
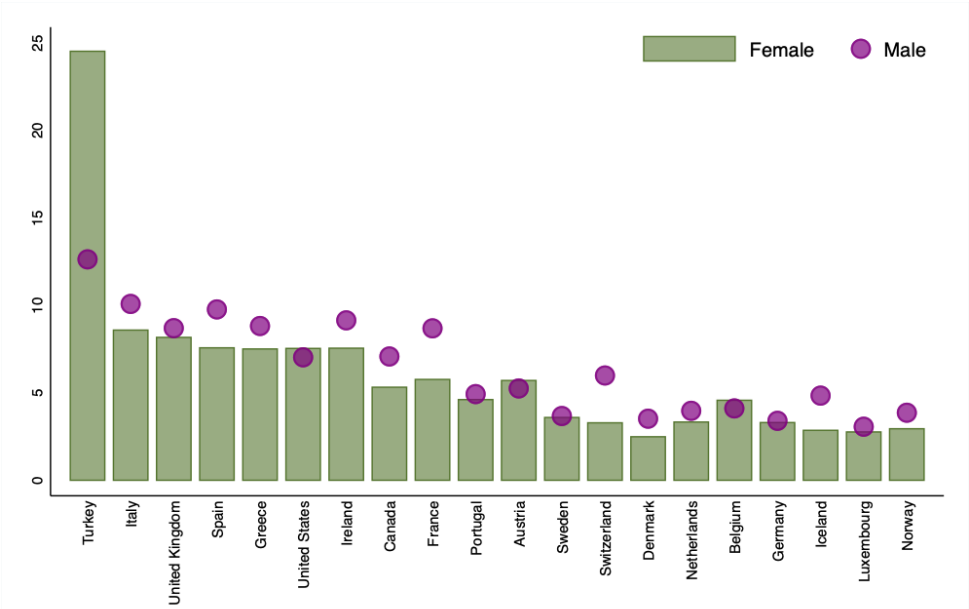
Figures and Tables

Figure 1: Global Gender Gap and NEET Rates among OECD-founding Members

(a) Global Gender Gap Rankings, 2018



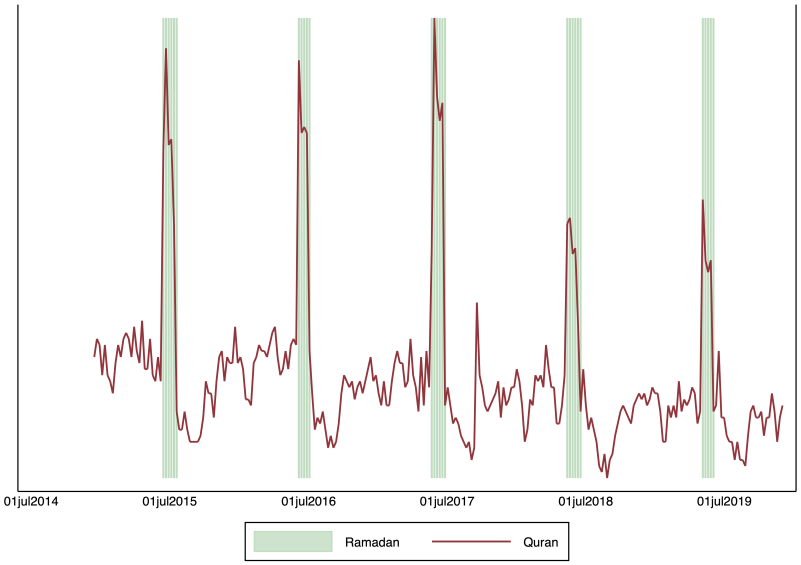
(b) Female and male NEET rates of OECD founding-member countries



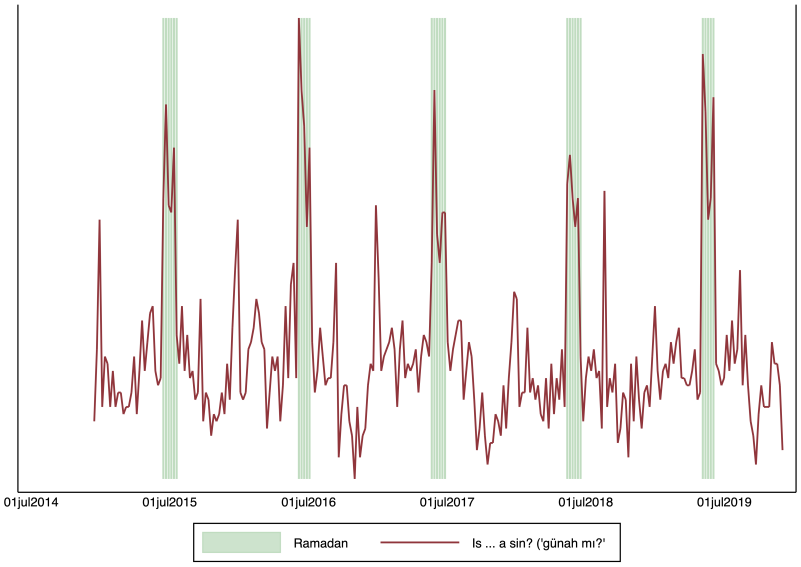
Source: 2018 Global Gender Gap Report of World Economic Forum & OECD Notes: Global Gap Index of World Economic Forum measures gender-based gaps in access to resources and opportunities in countries in order to isolate the actual differences across countries due to the varying degree of economic development. Economic participation and opportunity, educational attainment, health and survival, and political empowerment are the fundamental subcategories of this index. NEET rates present the share of young people who are not in employment, education or training (NEET), as a percentage of the total number of young people in the 15-19 age group, by gender.

Figure 2: Increased Religiosity on Google Trends

(a) Quran (Holy book) as a search term



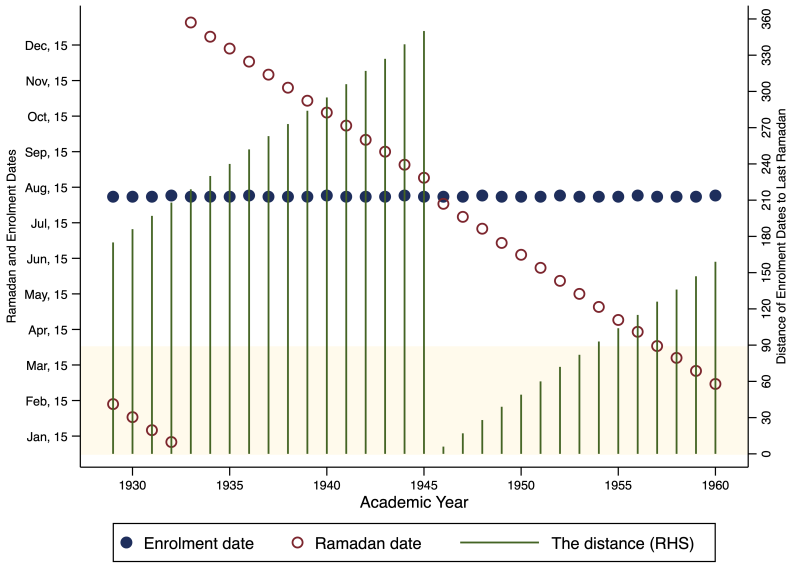
(b) Questions on spiritual implications of acts



Notes: The data is retrieved from Google Trends data specific to searches from Turkey. The time span of the data is chosen considering the potential effects of the pandemic on the religiosity individuals due to the increased uncertainties. The search terms that I present here are exactly "*Kuran*" and "*günah mı*", and I retrieved the data showing to what extent these terms were searched in the weeks of 14/12/2014 - 01/12/2019. The green horizontal lines indicate the weeks of the holy month.

Figure 3: Identification Strategies

(a) Distance of Enrollment Periods to Ramadan



(b) Within-region variations of provinces' yearly fasting durations

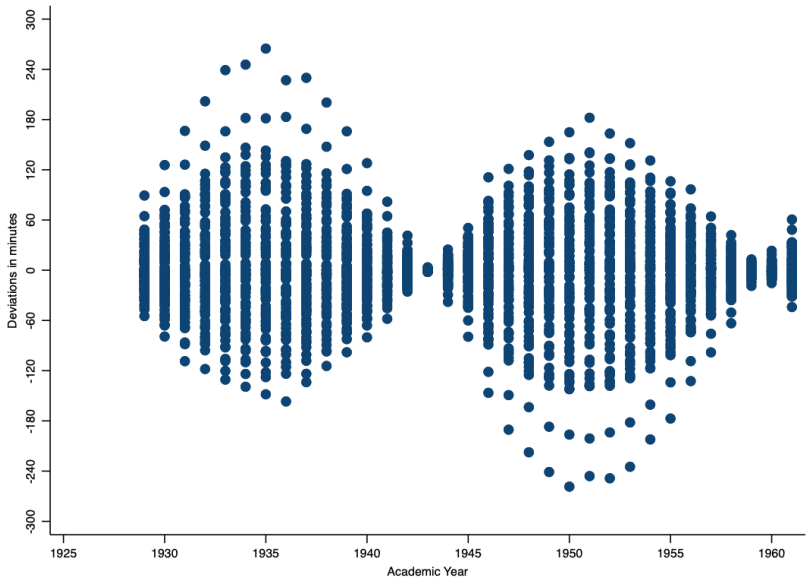
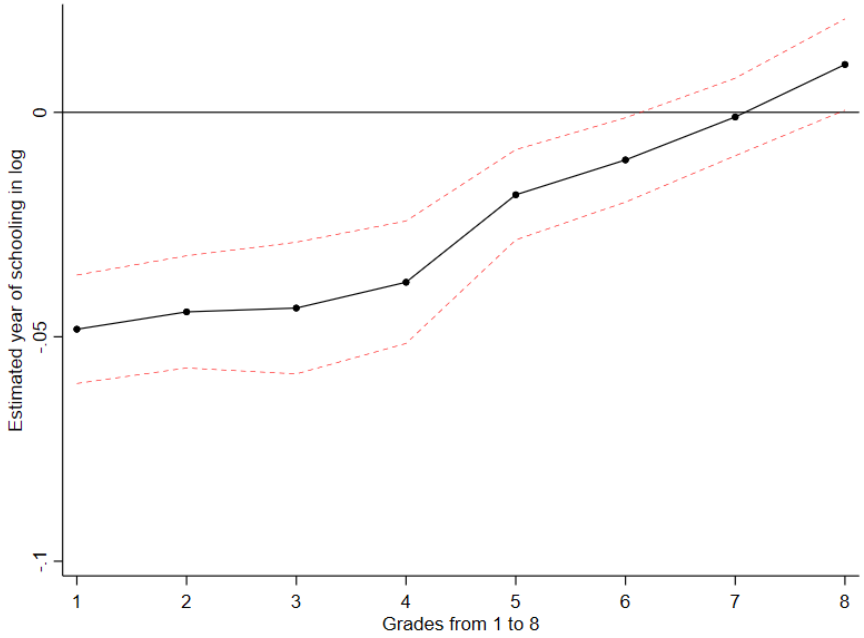


Figure 3a displays the varying distance of the enrolling date to the start day of the most recent Ramadan month over time. The blue circles indicate the mid-day of enrollment periods, i.e., 5 August of the year, while the red circles present the first Ramadan date of the academic year. Finally, the yellow vertical lines show the daily distances of the registration dates to Ramadan, which is mainly exploited in this study. Figure 3b shows the deviation of the provinces' yearly total fasting durations from its regional average of the same year. The fasting durations are in minutes and every dot reflects the observation for each province.

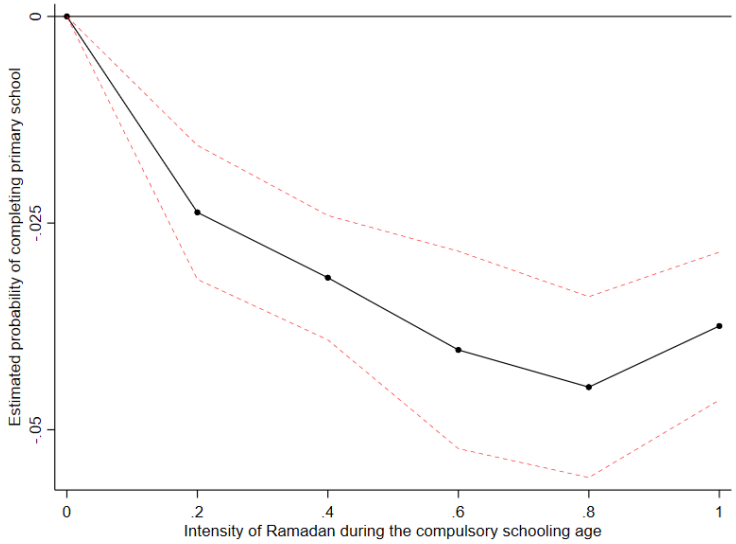
Figure 4: The Effects on Females' Education of Exposure to Ramadan in Different Grades from 1 to 8



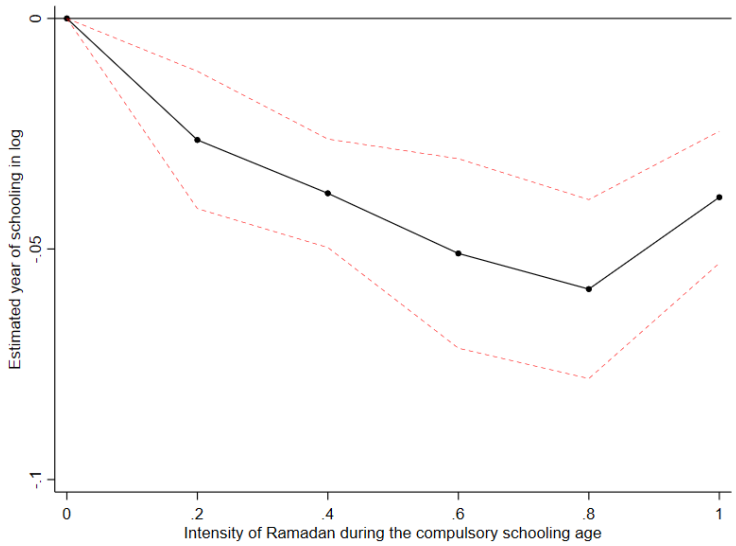
Notes: I apply a non-linear approach by calculating the separate estimates for the effect of Ramadan distances to each school-start dates for the grades from 1 to 8. The estimated effects for the girls on their completed year of schooling in percentage changes rely on the specification presented in the equation 1. The bullets in each value of x-axis present the point estimates of the distance-effect for each school-start dates to Ramadan. The dashed lines indicate the estimates within 95 percent of confidence interval.

Figure 5: Intensity of Exposure to Ramadan during the Schooling Age

(a) Its effects on girls' chance to complete primary school



(b) Its effects on girls' completed year of schooling (in log)



Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: After determining to which extent the individuals were exposed to increased parental religiosity during their schooling age by the calculations of daily distances of their first dates in each academic year to Ramadan, I group individuals by how many times the starting dates were coinciding to 3 month-period since the start of Ramadan. Given the existence of 6 possible degrees of exposure, i.e., never exposed to Ramadan, the exposures to Ramadan by 0.2, 0.4, 0.6, 0.8 times as well as full exposure to Ramadan during the entire compulsory schooling age, I estimate the differential effects of Ramadan by the extent of the exposure. The estimates are relative and compared to the never-exposed individuals (1923-1932 and 1044-1955 borners), given their prevalence in the sample as the highest. The specifications are as in the equation 2. The blue dots show the point estimates for each degree of exposure and the red dashed lines are for their boundaries within 95% of confidence interval.

Table 1: Ramadan, and Salience of Religiosity and Traditional Gender Norms

Gender norm indicators:	Family decisions	Education preferences	Women in politics
2nd month after Ramadan	-0.0396**	-0.0443***	0.00901
	(0.0153)	(0.0132)	(0.0154)
3rd month after Ramadan	-0.0632***	-0.0734***	0.0221
	(0.0226)	(0.0207)	(0.0267)
4th month after Ramadan	-0.0575**	-0.0737***	0.0705**
	(0.0232)	(0.0221)	(0.0271)
5th month after Ramadan	-0.0763***	-0.0677***	0.0728**
	(0.0285)	(0.0238)	(0.0293)
Observations	14,290	14,326	12,891
R-squared	0.130	0.058	0.031
Religiosity indicators:	**Praying**	**Wearing headscarf**	**Fasting**
2nd month after Ramadan	-0.0273*	0.00506	0.0170
	(0.0142)	(0.0134)	(0.0119)
3rd month after Ramadan	-0.0573**	0.00210	0.0214
	(0.0274)	(0.0332)	(0.0241)
4th month after Ramadan	-0.0432*	0.00438	0.0315
	(0.0227)	(0.0221)	(0.0205)
5th month after Ramadan	-0.0885***	-0.0472*	-0.000818
	(0.0263)	(0.0256)	(0.0221)
Observations	14,349	14,361	14,280
R-squared	0.108	0.315	0.082

Source: Demographic and Health Survey of Turkey; 2008, 2013. Notes: The sample consists of ever-married women aged between 15 and 49 years. Gender norms indicators are a dummy variable showing that women agree to the following statements: "*Important family decisions should be made by husbands*", "*University education is more important for males than females*", "*Women should be more involved in politics*". Likewise, religiosity indicators take value of 1 if women carry out the respective religious behavior either regularly or irregularly, as opposed to never. Respondents are monthly grouped by the distance of interview dates to the ending Ramadan, and the reference category is the interviews that are held in the subsequent month of Ramadan. Estimations are conditional on several characteristics, such as age in intervals, mother tongue, education level of the women, parental education levels, marital status, and number of children in categories, as well as spatial characteristics, such as province and type of the residential area. Linear models with many levels of fixed effects are applied and standard errors are clustered at province level. Number of clusters is 81 for all regressions. *** p<0.01, ** p<0.05, * p<0.1.

Table 2: Effects of Parental Religiosity on Education Levels of Men and Women

	Formal degree holder			Literate			Year of schooling in log		
	(1) Baseline	(2) Treatment (Distance)	(3) Treatment (Duration)	(4) Baseline	(5) Treatment (Distance)	(6) Treatment (Duration)	(7) Baseline	(8) Treatment (Distance)	(9) Treatment (Duration)
Female	-0.323***			-0.320***			-0.669***		
	(0.0137)			(0.0145)			(0.0267)		
Religiosity			-0.267			-0.110			-0.594
			(0.473)			(0.438)			(0.875)
Fem*Religiosity		-0.0432***	-0.200***		-0.0272***	-0.106***		-0.0692***	-0.294***
		(0.00385)	(0.0183)		(0.00339)	(0.0150)		(0.00711)	(0.0318)
Provincial Birth-cohort FE	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Region-specific Birth-cohort FE	No	No	Yes	No	No	Yes	No	No	Yes
Census-year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gender-specific census-year FEs	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Trend*Gender*Province	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Observations	2,152,031	2,152,031	2,152,031	2,151,949	2,151,949	2,151,949	2,151,876	2,151,876	2,151,876
R-squared	0.282	0.292	0.291	0.276	0.293	0.291	0.314	0.324	0.323

Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: Share of formal degree holders is 0.61 and the standard deviation is 0.49. Literacy rate of the sample is 0.70 and the standard deviation is 0.46. Distance is a dummy switching on when the individuals' enrollment date coincides to the first three months after the beginning of Ramadan. Duration refers the log of total fasting hours in provinces at the year that individuals must enroll in primary school. Standard errors are in parenthesis, clustered at province level (N=81). *** p<0.01, ** p<0.05, * p<0.1

Table 3: Robustness Checks

	Distance			Fasting hour in log form		
	(1)	(2)	(3)	(1)	(2)	(3)
Religiosity				-0.271	-0.313	-0.276
				(0.473)	(0.476)	(0.476)
Female*Religiosity	-0.0301***	-0.0302***	-0.00857**	-0.192***	-0.192***	-0.222***
	(0.00283)	(0.00287)	(0.00375)	(0.0185)	(0.0185)	(0.0259)
Provincial Birth-cohort FE	Yes	Yes	Yes	No	No	No
Regional Birth-cohort FE	No	No	No	Yes	Yes	Yes
Gender-specific Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Trend*Gender*Province	Yes	Yes	Yes	Yes	Yes	Yes
GDP per capita*Female	Yes	Yes	Yes	Yes	Yes	Yes
Provincial Income*Female	No	Yes	Yes	No	Yes	Yes
5-year Birth-cohort*NUTS2*Female	No	No	Yes	No	No	Yes
Observations	2,152,031	2,152,031	2,152,031	2,152,031	2,152,031	2,152,031
R-squared	0.292	0.292	0.295	0.291	0.291	0.294

Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: Distance is a dummy switching on when the individuals' enrollment date coincides to the first three months after the beginning of Ramadan. Duration refers the log of total fasting hours in provinces at the year that individuals must enroll in primary school. Standard errors are in parenthesis, clustered at province level (N=81) *** p<0.01, ** p<0.05, * p<0.1

Table 4: Estimated Consequences of Parental Religiosity in Adult Life

	Labor force	Income-earner	Professional jobs	Married
Female*Ramadan	-0.0120**	-0.0282***	-0.00632**	0.0303***
	(0.00510)	(0.00485)	(0.00303)	(0.00370)
Female	Yes	Yes	Yes	Yes
Provincial Birth-cohort FE	Yes	Yes	Yes	Yes
Trend*Gender*Province	Yes	Yes	Yes	Yes
5-year Birth-cohort*Region*Female	Yes	Yes	Yes	Yes
GDP per capita*Female	Yes	Yes	Yes	Yes
Provincial Income*Female	Yes	Yes	Yes	Yes
Observations	752,562	752,562	752,562	752,562
R-squared	0.276	0.545	0.043	0.057

Source: 1985 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: Ramadan is a dummy switching on when the individuals' enrollment date coincides to the first three months after the beginning of Ramadan. Standard errors are in parenthesis, clustered at province level (N=81). *** p<0.01, ** p<0.05, * p<0.1

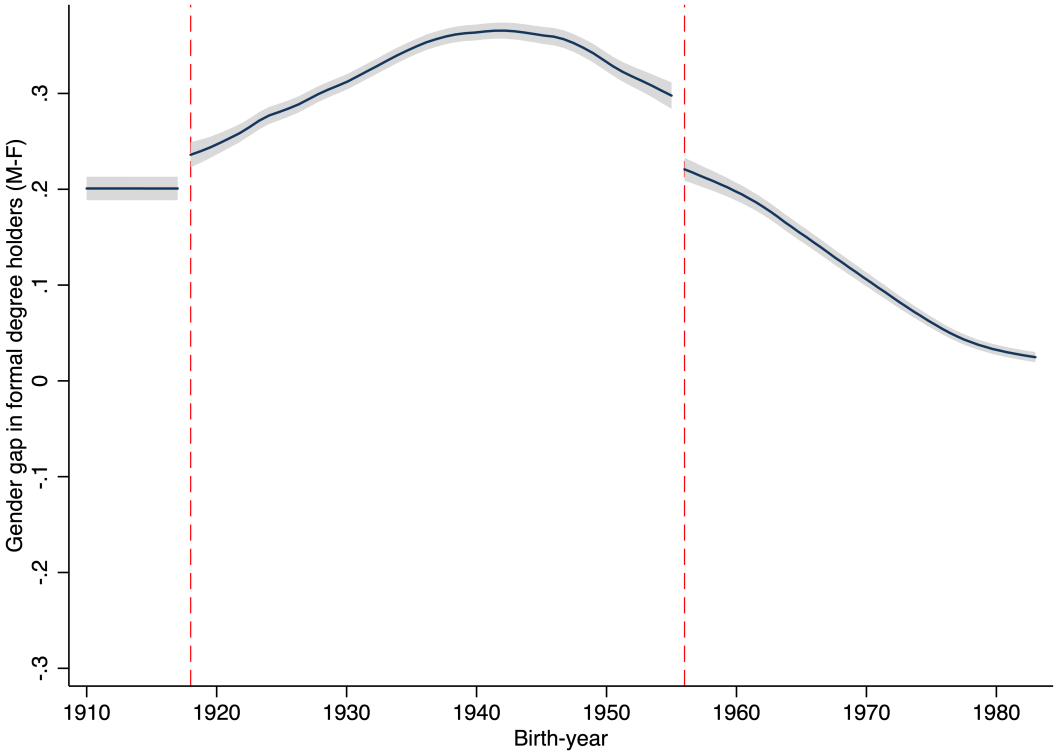
Table 5: Estimated Consequences of Parental Religiosity in Adult Life Using Fasting Hours

	Labor force	Income-earner	Professional jobs	Married	Nb. children	Housewife
Fasting hour	-0.764*	0.0432	0.193	-0.188	0.881**	1.477**
	(0.457)	(0.476)	(0.197)	(0.174)	(0.423)	(0.590)
Female*Fasting hour	-0.221***	-0.227***	-0.0641***	0.0616***		
	(0.0249)	(0.0195)	(0.0112)	(0.0159)		
Female	Yes	Yes	Yes	Yes	Yes	Yes
Regional Birth-cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Trend*Gender*Province	Yes	Yes	Yes	Yes	Yes	Yes
5-year Birth-cohort*Regional*Female	Yes	Yes	Yes	Yes	Yes	Yes
GDP per capita*Female	Yes	Yes	Yes	Yes	Yes	Yes
Provincial Income*Female	Yes	Yes	Yes	Yes	Yes	Yes
Observations	752,562	752,562	752,562	752,562	357,169	357,602
R-squared	0.275	0.544	0.041	0.055	0.157	0.037

Source: 1985 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: Fasting hour refers the log of total fasting hours in provinces at the year that individuals have to enroll in primary school. Standard errors are in parenthesis, clustered at province level (N=81). *** p<0.01, ** p<0.05, * p<0.1.

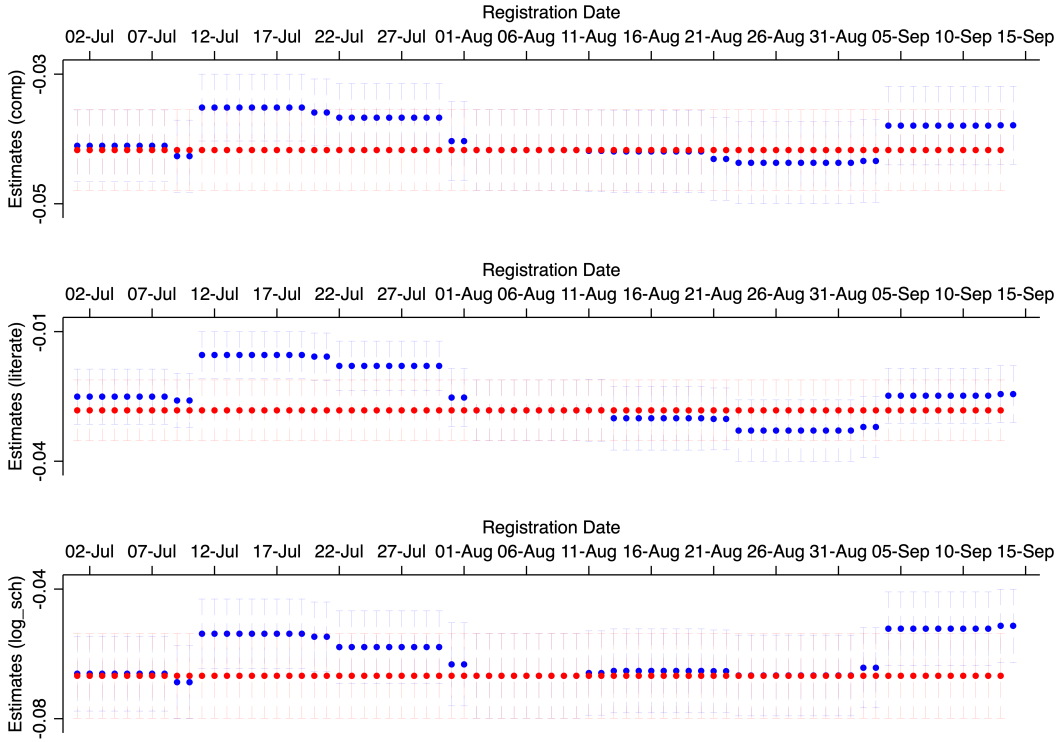
A.1 Appendix

Figure A.1: Gender gap in formal degree holders over time



Source: 1985, 1990, 2000 Census of Turkey. Notes: Data is aggregated and consists of birthplace and birthyear specific gender gap in the share of degree holders. The graph shows the predictions from the kernel-weighted local polynomial regressions for the different education system: The schools were gender segregated for 1910-1918 borners, and it became gender-mix after on. Those born after 1955 has experienced higher deterrence by the introduction of 1961 Constitutional Law. Hence, the discontinuities roughly present the effects of these policy changes on the gender gap in the share of degree-holders.

Figure A.2: Differing Period for Enrolment and The Effect on Female Education



Source: 1985, 1990, 2000 Census of Turkey. Notes: It plots the coefficients for which the enrollment date varies daily bases from 1st of July to 14th of September and where the specification relies on the equation 2. The blue diamonds denote the point estimates for each respective enrollment date shown in x-axis and the blue spikes show these estimates within 95% of confidence interval. The ones in red respectively present for the main finding presented in Table 2.

Table A.1: The Estimated Effects on Completing Primary School within the Same Census Year

	1985		1990		2000	
	Distance	Duration	Distance	Duration	Distance	Duration
Religiosity	-	0.128	-	-0.530	-	-0.415
		(0.575)		(0.485)		(0.509)
Female*Religiosity	-0.0387***	-0.175***	-0.0427***	-0.203***	-0.0489***	-0.228***
	(0.00405)	(0.0183)	(0.00460)	(0.0189)	(0.00431)	(0.0209)
Observations	752,562	752,562	744,534	744,534	654,935	654,935
R-squared	0.285	0.283	0.299	0.297	0.298	0.296
Provincial Birth-cohort FE	Yes		Yes		Yes	
Trend*Gender*Province	Yes	Yes	Yes	Yes	Yes	Yes
Regional Birth-cohort FE		Yes		Yes		Yes

Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: Outcome variable is a dummy showing whether the individual could complete primary school. Distance is a dummy switching on when the individuals' enrollment date coincides to the first three months after the beginning of Ramadan. Duration refers the log of total fasting hours in provinces at the year that individuals must enroll in primary school. Standard errors are in parenthesis, clustered at the province level. The number of clusters differ by the census years, as the total number of provinces increased over time from 67, to 73 and 81. *** p<0.01, ** p<0.05, * p<0.1.

Table A.2: Timing of the Exposure, and Number of Exposures

	Formal Degree	Log(Year of Schooling)
Female* one-time exposure*1933 (exposure at Grade 5)	-0.00998**	0.00437
	(0.00454)	(0.00821)
Female* one-time exposure*1943 (exposure at Grade 1)	-0.0373***	-0.0567***
	(0.00545)	(0.0101)
F value of Wald test (coef_1933= coef_1943)	*22.25*	*32.95*
	(0.0000)	*(0.0000)*
Female* two-times exposure*1934 (exposure at Grade 4 and 5)	-0.0184***	-0.00786
	(0.00474)	(0.00828)
Female*two-times exposure*1942 (exposure at Grade 1 and 2)	-0.0407***	-0.0587***
	(0.00455)	(0.00745)
F value of Wald test (coef_1934= coef_1942)	*16.87*	*24.00*
	(0.0001)	*(0.0000)*
Female*three-times exposure*1935 (exposure at Grade 3, 4 and 5)	-0.0421***	-0.0505***
	(0.00805)	(0.0142)
Female*three-times exposure*1941 (exposure at Grade 1, 2 and 3)	-0.0363***	-0.0483***
	(0.00542)	(0.00966)
F value of Wald test (coef_1935= coef_1941)	*0.57*	*0.02*
	(0.4500)	*(0.8823)*
Female*four-times exposure*1936 (exposure at Grade 2, 3, 4 and 5)	-0.0308***	-0.0314***
	(0.00574)	(0.0102)
Female*four-times exposure*1940 (exposure at Grade 1, 2, 3, and 4)	-0.0507***	-0.0698***
	(0.00668)	(0.0119)
F value of Wald test (coef_1936= coef_1940)	*7.90*	*8.76*
	(0.0062)	*(0.0040)*
Female*five-times exposure*1937 (exposure at Grades from 1 to 5)	-0.0311***	-0.0252**
	(0.00572)	(0.00957)
Female*five-times exposure*1938 (exposure at Grades from 1 to 5)	-0.0441***	-0.0474***
	(0.00528)	(0.00894)
Female*five-times exposure*1939 (exposure at Grades from 1 to 5)	-0.0344***	-0.0388***
	(0.00543)	(0.00894)
F value of Wald test (coef_1937= coef_1938= coef_1939)	*3.08*	*2.08*
	(0.0510)	*(0.1318)*
Province FE	Yes	Yes
Birth-cohort FE	Yes	Yes
Census-year FEs	No	No
Provincial Birth-cohort FE	Yes	Yes
Gender-specific census-year FEs	Yes	Yes
Trend*Gender*Province	Yes	Yes
Observations	2,152,031	2,151,876
R-squared	0.292	0.324

Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955. Notes: It examines whether the timing of exposure to Ramadan matters in parental decision on girls' educational attainment by differentiating the individuals regarding their number of exposures to Ramadan during the school start dates and the grade that they experienced this exposure. The estimates are based on the reference group consisting of the never-exposed individuals, of which starting date is too far from Ramadan, i.e., 1923-1933 borners and 1944-1955 borners. Linear models with many levels of fixed effects are applied and standard errors are clustered at province level (N=81). *** p<0.01, ** p<0.05, * p<0.1.

Table A.3: Potential Mechanism: Income Effects of Religious Fasting

	(1) Provincial Income	(2) Provincial Income	(3) Provincial Income
Fasting durations	-0.0346	-0.0497	0.202
	(0.0727)	(0.0582)	(3.298)
Observations	2,673	2,673	2,574
R-squared	0.000	0.953	0.971
Region-specific Year FE	No	No	Yes
Trend*Province	No	Yes	Yes

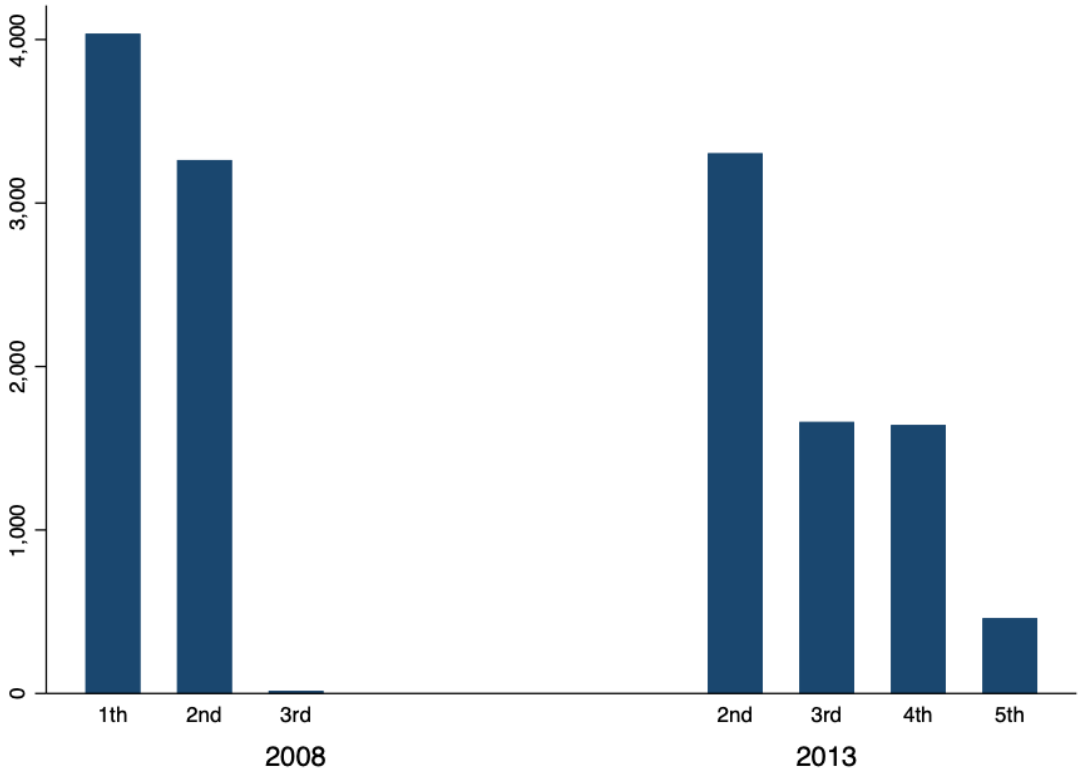
Notes: Province-level incomes for the years between 1929-1961 come from Asik et al. (2020). Provincial income refers to an index showing to what extent province-level income has deviated from the national income per capita. Total duration of religious fasting and provincial incomes are in log. Standard errors are clustered at province level (N=81). *** p<0.01, ** p<0.05, * p<0.1.

B.1 Supplementary Materials

Demographic Health Survey of Turkey. I measure the gender norms and the religiosity of women using the data from Demographic and Health Survey Program of Turkey conducted in 2008 and 2013. The data collects extensive information on the demographic characteristics of women, and it is representative at NUTS-2 level, so it allows for a greater span of the same cohort. Because collecting an extensive information from the field brings heavy workloads to interviewers, they usually complete the data collection period in 3-4 months. What is more, fall seasons are the usual period for collecting data. In short, DHS dataset enables to consider an extensive length of the observable characteristics that are closely related to religiosity and gender norms as well as to examine the time-varying effects of Ramadan. Figure B.1 shows to which extent the interviews conducted in 2008 and 2013 are monthly far from the ending date of Ramadan.

The target population of the survey started to include the single women in the respective age group in 2013, due to the upward trend of the age at first marriage. Before 2013, the sample was consisting of the ever-married women aged between 15 and 49. Therefore the data collection period is shorter in 2018 than 2013, as depicted in Figure B.1. To balance the sample characteristics across the waves, I drop the single women, however, their inclusion does not change the results qualitatively. Also, I drop women born abroad to minimize the measurement error of covariates. Note that they are in total 262 number of observations, hence constituting 1.8% of the raw data. The summary statistics of the sample used in this study are reported in Table B.1.

Figure B.1: The distribution of interviews with respect to their monthly distances to Ramadan



Source: Demographic and Health Survey of Turkey, 2008 and 2013.

Table B.1: Summary statistics from Demographic and Health Survey of Turkey

Variable	Mean	Std. Dev.	Min	Max	Obs
Perform prayer	0.794	0.404	0	1	14303
Wearing headscarf	0.760	0.427	0	1	14315
Religious fasting	0.934	0.248	0	1	14234
University education is more important for males than females	0.123	0.328	0	1	14327
Important family decisions should be made by husbands	0.171	0.377	0	1	14258
Women should be more involved in politics	0 .801	0.399	0	1	12868
1st month after Ramadan	0.280	0 .449	0	1	14327
2nd month after Ramadan	0.457	0.498	0	1	14327
3rd month after Ramadan	0.117	0.321	0	1	14327
4th month after Ramadan	0.114	0.318	0	1	14327
5th month after Ramadan	0.032	0.176	0	1	14327
No education	0.156	0.363	0	1	14327
Primary education	0.615	0.487	0	1	14327
Secondary and the higher	0.229	0.420	0	1	14327
Non-Turkish	0.225	0.418	0	1	14327
Turkish	0.774	0.418	0	1	14327
Mother tongue: Not administered	0.000	0.008	0	1	14327
Younger than 30	0.312	0.463	0	1	14327
Age between 30 and 39	0.380	0.485	0	1	14327
Older than 39	0.308	0.462	0	1	14327
Mother: Illiterate	0.555	0.497	0	1	14327
Mother: Literate but no formal education	0.236	0.425	0	1	14327
Mother: Have a formal education	0.178	0.382	0	1	14327
Mother's education: DK	0.030	0.172	0	1	14327
Father: Illiterate	0.177	0.382	0	1	14327
Father: Literate but no formal education	0.375	0.484	0	1	14327
Father: Have a formal education	0.380	0.485	0	1	14327
Father's education: DK	0.068	0.251	0	1	14327
Single	0.050	0.218	0	1	14327
Married	0.950	0.218	0	1	14327
Urban	0.731	0.444	0	1	14327
No children	0.117	0.321	0	1	14327
One child	0.241	0.428	0	1	14327
Two children	0.329	0.470	0	1	14327
More than two children	0.313	0.464	0	1	14327

Source: Demographic and Health Survey of Turkey; 2008, 2013

Table B.2: Balance Test

	(1) Distance	(2) Distance	(3) Distance	(4) Distance	(5) Distance	(6) Distance	(7) Distance	(8) Distance
Age between 30-39	-0.274							-0.170
	(0.363)							(0.386)
40 or more	-0.421							-0.255
	(0.452)							(0.475)
Non-Turkish		1.092						1.052
		(0.976)						(0.934)
Single			0.895					0.821
			(0.639)					(0.631)
Primary education				-1.108				-0.759
				(0.710)				(0.589)
Secondary or higher				-0.830				-1.297
				(0.865)				(0.790)
No children					0.992*			0.651
					(0.501)			(0.503)
One child					0.732**			0.519*
					(0.307)			(0.307)
Three or more children					0.536			0.384
					(0.372)			(0.419)
Literate mother without any diploma						-1.857***		-1.494***
						(0.654)		(0.533)
Mother with a formal education						3.291***		3.431***
						(1.034)		(1.089)
Illiterate father							-0.645	-0.313
							(0.599)	(0.619)
Literate father with a formal education							-1.776*	-0.818
							(0.912)	(0.850)
Observations	14,382	14,382	14,382	14,382	14,382	14,382	14,382	14,382
R-squared	0.686	0.686	0.686	0.686	0.686	0.688	0.686	0.688
F-test	0.465	8.582	1.962	1.408	2.619	4.168	1.313	3.477

Source: Demographic and Health Survey of Turkey; 2008, 2013 Notes: Outcome variable is daily distance of the interview dates with respect to the ending date of the most recent Ramadan. Reference categories of the covariates are the most prevalent ones in the sample. Hence, the reference person is non-educated, Turkish woman who is born to an illiterate mother and literate but non-schooled father, and who is younger than 30 years, and having two children. The estimates are condition on the province- and year-fixed effects and the type of residential area that the woman lives. Standard errors are clustered at province level (N=81) in all regressions. *** p<0.01, ** p<0.05, * p<0.1.

Supplementary Results from Census Data. The summary statistics of the pooled data of census and by census year are reported in Table B.3 and Table B.4, respectively.

Table B.3: Summary Statistics

	Mean	SD	Min	Max	Obs
Female	0.48	0.50	0	1	2,152,031
Year of birth	1942.44	9.23	1923	1955	2,152,031
Literate	0.70	0.46	0	1	2,151,949
Compulsory	0.61	0.49	0	1	2,152,031
Years of schooling	4.09	3.92	0	18	2,151,876
Labor force	0.62	0.48	0	1	2,152,031
Income earner	0.42	0.49	0	1	2,152,031
Professional jobs	0.06	0.23	0	1	2,152,031
Married	0.89	0.32	0	1	2,152,031
Housewife	0.53	0.50	0	1	1,043,387
Number of children	4.82	2.94	0	40	1,028,057
Provincial income, indexed	91.98	49.42	29.40	326.50	2,152,031
National income per capita	1329.41	283.66	712.11	1814.01	2,152,031
Ramadan	0.26	0.44	0	1	2,152,031
Average daily fasting hour	12.47	1.79	9.18	15.17	2,152,031
Total hourly fasting duration of the year	387.16	55.63	284.64	470.33	2,152,031

Source: 1985-1990-2000 Census of Turkey; Sample of birth-cohorts 1923-1955.

Table B.4: Summary Statistics by Census Year

1985

	Mean	SD	Min	Max	Obs
Ramadan	0.26	0.44	0	1	752,562
Fasting hour	12.41	1.81	9.18	15.17	752,562
Female	0.48	0.50	0	1	752,562
Age	43.01	9.37	30	62	752,562
Degree-holder	0.60	0.49	0	1	752,562
Literate	0.70	0.46	0	1	752,562
Years of schooling	4.01	3.82	0	15.00	752,512
Labor force	0.68	0.47	0	1	752,562
Income-earner	0.47	0.50	0	1	752,562
Professional jobs	0.06	0.23	0	1	752,562
Married	0.92	0.28	0	1	752,562
Number of children	4.90	3.07	0	24.00	357,169
Housewife	0.53	0.50	0	1	357,602
National income per capita	1318.29	288.04	712.11	1814.01	752,562
Provincial income per capita	91.98	49.42	29.40	326.50	752,562

1990

	Mean	SD	Min	Max	Obs
Ramadan	0.25	0.43	0	1	744,534
Fasting hour	12.44	1.80	9.18	15.17	744,534
Female	0.48	0.50	0	1	744,534
Age	47.76	9.32	35	67	744,534
Degree-holder	0.62	0.49	0	1	744,534
Literate	0.69	0.46	0	1	744,534
Years of schooling	4.12	3.95	0	15	744,429
Labor force	0.65	0.48	0	1	744,534
Income-earner	0.45	0.50	0	1	744,534
Professional jobs	0.06	0.23	0	1	744,534
Married	0.90	0.30	0	1	744,534
Number of children	4.94	2.87	0	40	344,272
Housewife	0.54	0.50	0	1	358,325
National income per capita	1324.86	286.18	712.11	1814.01	744,534
Provincial income per capita	91.79	49.15	29.40	326.50	744,534

2000

	Mean	SD.	Min	Max	Obs
Ramadan	0.26	0.44	0	1	654,935
Fasting hour	12.57	1.75	9.18	15.17	654,935
Female	0.50	0.50	0	1	654,935
Age	56.83	8.92	45	77	654,935
Degree-holder	0.60	0.49	0	1	654,935
Literate	0.71	0.45	0	1	654,853
Years of schooling	4.15	3.99	0	18	654,935
Labor force	0.52	0.50	0	1	654,935
Income-earner	0.33	0.47	0	1	654,935
Professional jobs	0.06	0.23	0	1	654,935
Married	0.84	0.37	0	1	654,935
Number of children	4.61	2.87	0	26	326,616
Housewife	0.52	0.50	0	1	327,460
National income per capita	1347.37	274.70	712.11	1814.01	654,935
Provincial income per capita	92.19	49.73	29.40	326.50	654,935

Source: 1985, 1990, and 2000 Census of Turkey; Sample of birth-cohorts 1923-1955.