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Abstract

This paper uses water provision data from Ottoman Istanbul to examine how political geography and ethno-religious identity impact the provision of local public goods in authoritarian regimes. Exploiting the fact that water fountains, built and maintained by the political elite as private endowments, were the only means of providing drinking water to most in Ottoman Istanbul, I demonstrate that the ruling class is more likely to contribute to public goods when the system is designed to deliver exceptional benefits to the benefactors’ co-ethnic group. Using an original dataset from 1580-1800, on the spatial distribution of fountains in Istanbul and ethno-religiously segregated neighborhoods, I find a systematic relationship between the choice of fountain site and the benefactor’s own ethnic community. The finding provides a novel answer for why political elites are more willing to fund social services certain groups in authoritarian settings. This finding may be generalized to a broad range of similar cases.

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I Introduction

The importance of effective and universal public good provisions on development is an important theme in discussions of comparative and historical political economy. There is a wide agreement that the state’s ability and willingness to provide equal access to public goods and services for all decreases inequality and promotes economic development. Historically, the inequalities in access to public utilities and goods between ethno-religious groups have been constituted political battlegrounds. The uneven geographic distribution of public services can create and reinforce both social and economic inequalities among geographically segregated ethno-religious groups.

It is widely recognized that ethnic diversity matters to the incidence and distribution of public goods (Fearon, 1999). Numerous studies document that homogeneous societies provide better basic infrastructure and government services than similar heterogeneous societies. Also, a wave of recent scholarship, on both developing and developed countries, has revealed that ethnically homogeneous regions generally have better access to local public goods and services than heterogeneous regions (Alesina, Baqir, and Easterly, 1999; Miguel and Gugerty, 2005). However, these accounts deal primarily with democracies. More importantly, they examine how ethnic diversity affects the aggregate supply of public goods within a region but not whether goods are targeted towards at co-ethnics of the political elite.

Foremost among the reasons for studying how autocracies allocate public goods among different ethno-religious groups is that autocracy is a highly prevalent form of government. Authoritarian regimes ruled the majority of the world’s population until the 1990’s. As of 2017, over 40 percent of the world’s population is governed by non-democracies (Mulligan, Gil, and Sala-i Martin, 2004). There are also sound empirical reasons for studying how ethnic minorities fare under autocracy. As Fearon (2003) suggests, an average country has about five ethnic groups that exceed one percent of the population. Essentially, most of the world’s population currently lives, or has lived, in ethno-religiously diverse countries under non-democratic regimes. Yet, the relevant theoretical and empirical literatures cover only the mechanisms that operate in multi-ethnic democracies. In principle, the effect of ethno-religious fragmentation on aggregate public service supply could differ between democracies and non-democracies. But we cannot be sure without empirical analysis.

The goal of this paper is to assess the effects of ethno-religious diversity on local public
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goods using an original dataset on water provision in Ottoman Istanbul between 1580 and 1800. This dataset is uniquely well suited to studying whether the political elites of autocracies allocate public goods selectively to groups which they themselves belong.

The existing literature suggests that in autocracies, ethno-religious fragmentation has two opposing effects with respect to the provision of public goods to privileged groups. On one hand, authoritarian institutions mitigate the collective action problem and preference diversity that impede public services in multi-ethnic democracies (Habyarimana, Humphreys, Posner, and Weinstein, 2007). They may also allocate public services more equally than democracies because of either ideology or fear of revolution (Acemoglu and Robinson, 2006), or perhaps concerns about economic growth (Gehlbach and Keefer, 2011). On the other hand, the concentration of power in the hands of a small group of elites might lead to the targeting of local services disproportionately to their own group. The basic reason is that the homogeneity of the ruling coalition facilitates collective action. In the absence of formal institutions of accountability, informal networks between elites and co-ethnic commoners may also fuel inequalities in the ethnic distribution of public goods (Tsai, 2007). In autocracies, the political elite can essentially choose their favored resource allocation. They may use that advantage in a way favorable to their own group.

The data set used to explore the extent of elite favoritism contains geographical information on the water fountains built in Istanbul during the period 1580-1800. It provides also the ethno-religious composition of the city’s neighborhoods. The main fault line in the population involved religion: one set of rules applied to Muslims and another to non-Muslims. Moreover, all non-Muslims were equal before the law, provided they paid their taxes (Ercan, 2001; Davison, 1954; Göçek, 1993). For this reason, henceforth, I will speak of religious groups, ignoring the distinctions based on ethnicity.

The primary objective is to assess whether fountains were disproportionately built in predominantly Muslim neighborhoods compared to the neighborhoods inhabited mostly by Christians and/or Jews. What makes this a particularly good context to test for pro-Muslim bias is that, at least within the city walls, Istanbul had no local sources of drinking water. Also, rules instituted after Istanbul became the Ottoman capital in 1453 required drinking water to be supplied solely through the public fountains. Moreover, a fountain could only be built through a waqf, or “Islamic trust”. A waqf is an unincorporated trust established through the endowment of a living person for the provision of a designated service in perpetuity according to the founder’s stip-
ulations (Kuran, 2001). The waqf’s endowment would cover both construction costs and the recurring costs maintenance. The institution of the waqf, which took shape between the years 800 and 1000, gave Muslims specific rights that it denied to Jews and Christians, who constituted roughly half of the city’s population in 1580-1800. Under the law of the waqf, a waqf founder must be a Muslim; and he or she must file a deed in an Islamic court (Kuran, 2001). Since the founder of the waqf was free to choose the fountain’s location, the geographic distribution of fountains was shaped solely by the city’s Muslim political elite.

The paper’s findings broadly support the hypothesis that in authoritarian countries political elites disproportionately favor their co-ethnics or co-religionists when providing public goods. On average, the predominantly Muslim neighborhoods of Ottoman Istanbul had twice as many fountains compared to non-Muslim neighborhoods. Given the importance of easy access to clean and safe drinking water to health outcomes, this result had far-reaching implications for the relative welfare of the Ottoman Istanbul’s ethno-religious populations.

The analysis in the paper has major implications for four other distinct literatures. One involves the provision of public goods in regions governed under Islamic law. The insights in the extensive literature on the political and economic consequences of the waqf have not yet been tested. Formally, it indicates no legal barrier to including non-Muslims among the beneficiaries of a waqf (Kuran, 2001). Thus, it was possible under Islamic law for a wealthy Muslim resident of Istanbul to build a fountain in an overwhelmingly, if not exclusively, Christian or Jewish neighborhood. But this is the first study to analyze whether the dominant political elite, which was overwhelmingly Muslim, served their own group disproportionately.

The second literature concerns the sources of persistent urban inequalities. Surprisingly, in the political economy literature, investigations of urban redistributive politics are in their infancy. Although political scientists routinely explore who gets what, how and why, such questions have rarely focused on cities as a whole, with the exception of some work in the urban politics literature. Yet, it is in cities that citizens face extreme inequalities, and where such inequalities have the greatest economic and political influence on specific identity groups.

The third literature involves an ongoing scholarly debate on whether to treat waqfs as an expression of religious altruism. This debate generally views waqfs as either the
expression of pure charitable acts by high state officials and political elites to provide services to citizens at no cost (Singer, 2011, 2012; Yediyıldız, 1984, 1990) or primarily as a wealth shelter (Kuran, 2001, 2016). The two arguments thus differ in the main motive they ascribe to waqf founders. The former literature views the waqf as an expression of altruism. By contrast, the latter views is views it as motivated by self-interest, specifically, the preservation of property. Private property becomes more secure when endowed as waqf, because waqf-owned assets were considered sacred.

Although existing literatures provide valuable insights concerning the motivations behind waqf endowments, these theories are yet to be empirically tested. In this paper, while I find evidence to support the self interest claim. I also add nuances to this claim. Specifically, I introduce an additional reason through which the Ottoman elites used the waqf system to their own benefit. In identifying and quantifying inter-faith variation in public services, this paper thus provides a novel perspective on the “universal charity” and the “wealth shelter” arguments. I show that the Ottoman elite allocated resources in a way that benefited them personally beyond wealth sheltering. Specifically, they ensured that their own households and community had the easiest access to abundant clean drinking water.

The remainder of this paper is organized as follows. The next section develops a theory for understanding how the political elite of autocratic states allocate public services among their religious groups. Section 3 outlines the relevant historical and institutional context, with a focus on water provision and the religious composition of Istanbul between 1580 and 1800. Section 4 discusses the data set, followed by empirical analysis in Section 5. Finally, Section 6 presents conclusions and some further implications.

II A Theory of Ethnic Diversity and Targeted “Public” Goods

A good is strictly public if it is both non-excludable and non-rivalrous: no individual can be excluded from consuming it, and no individual’s use reduces its availability to others. In line with this definition, most models of public goods provision rest on the assumption that public goods can effectively be enjoyed by an infinitely large number of individuals. In practice, though, the size of the group able to enjoy the non-excludable
and non-rivalrous services is limited. As Buchanan (1965) puts it, “while it is evident that some goods and services may be reasonably classified as purely private, even in the extreme sense, it is clear that few, if any, goods satisfy the conditions of extreme collectiveness.”

Many factors can limit the pool of beneficiaries able to consume non-excludable and non-rivalrous goods jointly. One such limitation is intrinsic to the service itself: a children’s hospital can only treat children; a public bath for men can only be used by men; and a library is of use only to the literate. By the same token, geography limits access to particular public goods. This is especially true for services that citizens use everyday: in principle, one can obtain a jug of water for one’s household from the closest public fountain that is 5 miles away, but in the absence of modern transportation the task could be prohibitively exhausting.

This paper’s central hypothesis is that the identity group with privileges will use that advantage to maximize its material-self interest under two conditions. First, it should be aware that it possesses as a resource that the other identity groups lack. Second, it should be able to predict how using that resource would maximize what it “gets” while minimizing what it “pays”. In the present context, the advantaged identity group, the Muslim elite, enjoys the legal right to build fountains, which is denied to other religious groups in the city. Recall that under Islamic law, only Muslims were permitted to establish a waqf. Why might Istanbul’s Muslims have wanted to deliver public goods disproportionately to Muslim neighborhoods? First of all, they might have been inclined to provide public goods where they and their family lived. Secondly, they might have received social or religious benefits from altruistic behavior toward their own groups. Finally, providing for their co-religionists, the politically powerful group in the society, might have helped to reduce potential threat of rebellions since throughout the history of the empire, Muslims were predominantly responsible for all rebellions in the capital and most of those in the peripheries (Sam, 2011). For all these reasons, one would expect the elites to have built fountains in predominantly Muslim neighborhoods.

Before describing the data and the findings from the analysis, the next section draws on the institutional and historical background of drinking water provision in Ottoman Istanbul to illustrate the main characteristics of the system.
III History of Water Provision in Istanbul

For a city that serves as the capital of an empire, the supply of water is a first-order challenge. Because water is vital to human existence, it requires the construction of waterways and the development of distribution channels. Running water must be delivered to residents for drinking, cleaning, cooking, gardening, raising animals, and fighting fires. Before the Industrial Revolution, few cities could survive without easy and convenient access to fresh water. Even in the 21th century, easy access to fresh and clean water remains a key determinant of urban location. Yet, unlike most ancient cities, Istanbul lacked easy access to drinking water. Istanbul was not built on a major river; it was surrounded by salty seas. To appreciate the special challenge involved, note that Rome was constructed on the Tiber, Cairo on the Nile, Baghdad on the Tigris, and London on the Thames (Kostof, 1992).

During the 17th and 18th centuries the majority of the citizens resided either in the walled city of Istanbul (henceforth intra muros Istanbul) or Eyyup. As in earlier times, the city depended entirely on outside water sources (Karakaş, 2013). The Byzantine Empire had coped with this challenge mainly by building cisterns to provide fresh and clean water to its citizens. It is estimated that intra-muros Constantinople contained more than 200 cisterns (Aynur and Karateke, 1995).

However, water in these cisterns became undrinkable soon after the Ottoman conquest of Istanbul because of neglect by the Ottoman officials. Hence, the Ottoman Turks stopped using the Byzantine cisterns for religious and hygienic reasons (Çeçen and Kolay, 1999), which made it necessary to find alternative mechanisms to distribute water to different neighborhoods. Meanwhile, Istanbul’s population grew sharply from 1453 to 1550. The rise in population, coupled with the idle cisterns, forced Ottoman rulers to seek alternative ways to provide drinking water to citizens.

In the Ottoman Empire, all public goods such as water, roads, bath houses, and soup kitchens were supplied, as noted above, through the Islamic institution of the waqf. All the water pipes that channeled fresh water from the vicinity of the city into intra muros Istanbul were endowed and controlled by a waqf, usually a waqf founded by members of the imperial family and the top state officials. Like water pipelines, fountains were founded and maintained through waqf endowments, which meant that non-Muslims
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Figure 1: Ottoman Istanbul

lacked rights to build fountains (Kuran, 2001).  

Fountains were diverse both in structures and water supplying capacities. Wall fountains were built into the walls of buildings, gardens or courtyards. They are also referred to as single-face or façade fountains. Corner fountains were mainly built on street corners mainly had two or three faces, they supplied more water than wall fountains. Freestanding fountains were located in public squares; usually they had four or more faces.

Until the 1850s, the Ottoman government favored supplying water through public fountains rather than delivering water to houses for private use (Dinçkal, 2008). Individuals had to get permission from the court in order to connect water to their houses. In most cases the permission was granted after only an individual applied to build a fountain near his or her house (Kal’a, 2011). Indeed, waqf registers reveal that in

\footnote{Only in the nineteenth century was the right to establish a waqf extended to members of the non-Muslim communities (Kuran, 2001).}
Table 1: Social status of individuals enjoying piped water in their residence: titled and untitled

<table>
<thead>
<tr>
<th>Social Status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titled</td>
<td>422</td>
<td>91.14</td>
</tr>
<tr>
<td>Ağা</td>
<td>158</td>
<td>34.13</td>
</tr>
<tr>
<td>Bey</td>
<td>12</td>
<td>2.59</td>
</tr>
<tr>
<td>Cavuș</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Çelebi</td>
<td>10</td>
<td>2.16</td>
</tr>
<tr>
<td>Efendi</td>
<td>128</td>
<td>27.65</td>
</tr>
<tr>
<td>Efendizade</td>
<td>5</td>
<td>1.08</td>
</tr>
<tr>
<td>Hacı</td>
<td>17</td>
<td>3.67</td>
</tr>
<tr>
<td>Halife</td>
<td>3</td>
<td>0.65</td>
</tr>
<tr>
<td>Hanım</td>
<td>3</td>
<td>0.65</td>
</tr>
<tr>
<td>Hatun</td>
<td>7</td>
<td>1.51</td>
</tr>
<tr>
<td>Kadın</td>
<td>1</td>
<td>0.22</td>
</tr>
<tr>
<td>Kethüda</td>
<td>11</td>
<td>2.38</td>
</tr>
<tr>
<td>Muallim</td>
<td>1</td>
<td>0.22</td>
</tr>
<tr>
<td>Paşa</td>
<td>55</td>
<td>11.88</td>
</tr>
<tr>
<td>Pașazade</td>
<td>5</td>
<td>1.08</td>
</tr>
<tr>
<td>Seyyid</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Sultan</td>
<td>2</td>
<td>0.43</td>
</tr>
<tr>
<td>Untitled</td>
<td>41</td>
<td>8.86</td>
</tr>
<tr>
<td>Total</td>
<td>463</td>
<td>100.00</td>
</tr>
</tbody>
</table>

the 152-year period between 1655-1807 only 462 homes were permitted to draw water from waqf-owned pipelines (Özkaya, 2011). Istanbul’s population during the time for my analysis was around 700,000, which corresponded approximately to 140,000 households. A rough calculation reveals that only around 0.3 percent of the residents had access to flowing water at their residences.

Evidently, the vast majority of Istanbul’s households lacked connected water and were dependent on the neighborhood fountains for drinking water. Table 1 reveals a summary of who these people were. Observe that most people with water connection were titled individuals, belonging to the Muslim elite of government officials, religious authorities, and high-ranking army members. Only 8 percent of this group had no titles. This table also reveals another interesting fact: not one non-Muslim household had direct water connection to its home.
Table 2: Title distributions of the benefactors

<table>
<thead>
<tr>
<th>Benefactor Title</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Titled</td>
<td>180</td>
<td>99.45</td>
</tr>
<tr>
<td>Ağa</td>
<td>55</td>
<td>30.39</td>
</tr>
<tr>
<td>Bey</td>
<td>3</td>
<td>1.66</td>
</tr>
<tr>
<td>Efendi</td>
<td>29</td>
<td>16.02</td>
</tr>
<tr>
<td>Hacı</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Halife</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Hanım</td>
<td>3</td>
<td>1.66</td>
</tr>
<tr>
<td>Kadın</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Kethüda</td>
<td>2</td>
<td>1.10</td>
</tr>
<tr>
<td>Paşa</td>
<td>54</td>
<td>29.83</td>
</tr>
<tr>
<td>Subaşı</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Sultan</td>
<td>29</td>
<td>16.02</td>
</tr>
<tr>
<td>Valide Sultan</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Untitled</td>
<td>1</td>
<td>0.55</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>100.00</td>
</tr>
</tbody>
</table>

In the period under consideration, about 58.8 percent of Istanbul’s population was Muslim, 34.8 percent was Christian, and the remaining 6.4 percent was Jewish (Mantran, 1962). Given that non-Muslims were not permitted to form waqfs during this period, practically half the residents of Istanbul lacked the right to bring water into their neighborhoods on their own initiative.

IV Data Description

IV.1 Fountains Data

There is abundant descriptive scholarship on the fountains of Ottoman Istanbul; the contributions provide information on the date of the endowment deed (vakfiye), the construction year, the name of the benefactor, and the location (Tamışık, 1943; Ege- men, 1993; Aynur and Karateke, 1995; Özdeniz, 2015; Bulut, 2010). I also investigated the water permits from the archives of the Istanbul Water Administration to identify fountains that were demolished to maximize the span of the data set. These sources yielded a dataset consisting of all the waqf-funded fountains built in Istanbul between the years 1565 and 1800. For each fountain, the dataset contains information on precise geographic location, benefactor name, benefactor gender, benefactor title, and bene-
factor profession.

Using ArcGIS, I geocoded these fountains to study the geographical spread and neighborhood coverage of water supply. The location of fountains demolished to pave way for modern constructions throughout the years were found through historical maps of Istanbul (Ayverdi, 1958a; Pervititch, 2000; Kubilay, 2010). Figures below offer summary statistics about the distribution and the benefactors of the fountains. Figure 2 shows the distribution of the 313 fountains built in Istanbul between 1565 and 1800. A pattern that jumps out at the reader is the uneven spatial distribution: whereas some areas are clustered with more fountains, others lack even a single fountain.

Figure 3 reveals that most neighborhoods had only one fountain, and also that a significant portion of the neighborhoods had none at all. A few neighborhoods had four or more fountains.

Most of the individuals who built a fountain carry an honorific title. Table 2 shows that, out of 181 identified founders, only one was un titled. The table reveals that the most common titles were Paşa, Efendi, Ağा, and Sultan. Of these, Paşa was given to the very high-ranking government officials. Efendi were given to learned people and government officials, though not exclusively. Ağa was a term of respect generally reserved for military men. Finally, Sultan was exclusively reserved for the members of the royal family (Kuran and Rubin, 2018). Figure 4 shows the distribution of the most common honorific titles of the benefactors. It is surprising that Ağas, presumably the least powerful among the elites listed above, contributed the most to water distribution services, as measured by number of fountains founded. Figure 5 maps the geographic location of fountains according to title in greater detail.

Finally, Figure 6 shows the location of the fountains endowed by the ruling Ottoman family. The purple dots indicate the fountains endowed by a member of the imperial family, whereas the yellow dots indicate the fountains endowed by affluent people without any royal connections.
IV.2 Demographic Data

This dataset also contains information on the spatial distribution and religious characteristics of Istanbul’s neighborhoods during the 18th century (Ayverdi, 1958a; Pervititch, 2000; Kubilay, 2010). I used Kara (2016) to identify and code the main religion of each neighborhood. In her study, Kara (2016) collects information on the religious characteristics of Istanbul’s neighborhoods by analyzing the neighborhood of origin of the people who appeared in the city’s sharia courts between 1708 and 1730. In many instances, non-Muslim communities had both Jewish and Christian residents, and the
Christians could be of Greek or Armenian origin. There were also a small number of other Christians such as Asyrians. But none of them dominated single community. For my purposes here, the specific religion or denomination of non-Muslims are not of interest. Their significant characteristic is that they do not adhere to the religion of the city’s ruling elites, namely Islam. Figure 7 shows the geographic locations of the neighborhoods, along with population and religious identity. The size of the circles indicate the number of households living in the neighborhood. Red circles refer to non-Muslim Neighborhoods, and green circles to Muslim neighborhoods.

For various reasons, although we can identify geographic centers, no historical record exists of the borders of Ottoman Istanbul neighborhoods. Another complication is that streets had no names until the early 20th century (Kuban, 2010). In the absence of street names and modern map techniques, a neighborhood typically consisted of a vaguely delineated area around some monument. In particular, every neighborhood was associated with a central mosque, church, or synagogue. In order to recreate the boundaries of the old neighborhoods, I geocoded these central religious
buildings for each neighborhood in Kara (2016) and created Thiessen polygons around these centers \(^2\).

Figure 8 illustrates the Thiessen polygons created with the information on central points and the religious composition of neighborhoods taken from Kara (2016), as well as the actual placements of the churches and synagogues that function in the time frame of interest. Green areas denote the neighborhoods identified as Muslim in Kara (2016), whereas the yellow areas indicate the non-Muslim neighborhoods. Observe that, for the most part, yellow areas and the churches coincide with each other. This shows that my estimates of the neighborhood characteristics and area are reliable.

My dependent variable is the number of fountains per neighborhood. Merging the neighborhood data with fountains data, I counted the incidence of fountains per neigh-

\(^2\)Thiessen polygons are polygons whose boundaries define the area that is closest to each point relative to all other points. They are mathematically defined by the perpendicular bisectors of the lines between all points (Brassel and Reif, 1979).
V Empirical Results

I estimate the effects of ethno-religious composition of the neighborhoods on the number of the fountains per neighborhood using a negative binomial model. This is a suitable specification because the number of fountains constructed is a count variable. The objective is to assess the relationship between a neighborhood’s ethno-religious composition and the expected number of fountains constructed within it.
In Table 1, I report the incidence rate ratios under three different specifications. The first column describes a negative binomial regression that uses as covariates the intercept and a dummy variable that equals 1 if the neighborhood is non-Muslim and 0 otherwise. The second column shows the incidence rate ratios adding another independent variable, the number of households per neighborhood. The third column includes a control variable that accounts for the size of the neighborhood. In parentheses, I report standard errors. For each specification, the total number of observations is 255 neighborhoods.

The intercept represents the average number of fountains in Muslim neighborhoods. Thus, the average number of fountains in Muslim neighborhoods is 1.13 under the third specification. Furthermore, the estimates suggest that for non-Muslim neighborhoods
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Figure 7: Incidence of fountains in neighborhoods with different ethno-religious characteristics. Green points represent Muslim neighborhoods, red points represent non-Muslim neighborhoods. Circle sizes indicate household number per neighborhood.

the fraction of fountains built decreases by 0.53. That is, the average number of fountains in non-Muslim neighborhoods is 0.6.

Also, although the number of the households in each neighborhood has a significant and positive effect on the number of fountains per neighborhood, the size of this effect is minimal. Evidently, in deciding where to locate the fountains, the Ottoman elite were unresponsive to neighborhood needs.

Figure 10 reports the “hot spot analysis” pertaining to the spatial distribution of fountains in Ottoman Istanbul. Hot spot analysis identifies statistically significant spatial clusters of high volume (hot spots) and low volume (cold spots). Red areas are the hottest spots, while yellow and blue represent chilly and cold spots, respectively.
Observe that Christian and Jewish neighborhoods tend to fall in cold spots.

Overall, the analysis provides support for the paper’s hypothesis. The Ottoman elite built fountains primarily in Muslim neighborhoods. Moreover, they were not particularly receptive to differences in expected demand; they did not respond to the needs of each neighborhood, measured by the area and the number of households. These results thus suggest that, at least in autocracies political elites are more likely to invest in services and goods of benefit to their own groups.
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Figure 9: Incidence of fountains in neighborhoods with different ethno-religious characteristics. Green points represent Muslim neighborhoods, red points represent non-Muslim neighborhoods. Circle sizes indicate number of fountains per neighborhood.

VI Alternative Explanations

VI.1 Rigidity of the neighborhood composition

In his seminal article on public goods, Tiebout (1956) posits that if citizens with heterogeneous preferences have free mobility and regions offer a variety of public goods and tax rates, citizens will sort themselves optimally among the regions. In other words, citizens will all receive optimal tax and public good combination.

In principle, non-Muslim neighborhoods might have received fewer fountains than Muslim neighborhoods because Istanbul’s residents sorted themselves into neighborhoods with different tax and public good combinations. The relevant sorting mechanisms
Table 3: Negative Binomial Regression: Incidence Rate Ratios

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1.347***</td>
<td>1.138</td>
<td>1.13</td>
</tr>
<tr>
<td></td>
<td>(0.109)</td>
<td>(0.115)</td>
<td>(0.117)</td>
</tr>
<tr>
<td>Non Muslim</td>
<td>0.622***</td>
<td>0.53***</td>
<td>0.53***</td>
</tr>
<tr>
<td></td>
<td>(0.113)</td>
<td>(0.104)</td>
<td>(0.105)</td>
</tr>
<tr>
<td>Number of Households</td>
<td>0.002**</td>
<td>1.002**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0009)</td>
<td></td>
</tr>
<tr>
<td>Control for Area</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Sample size</td>
<td>255</td>
<td>255</td>
<td>255</td>
</tr>
</tbody>
</table>

Note: Robust standard errors in parenthesis

fall into two categories. One involves Muslims settling in neighborhoods where it is relatively easier and cheaper to build fountains. The other possibility is that Muslims moved into non-Muslim neighborhoods that then have fountains, interfering with the identity of that particular neighborhood and driving out non-Muslims. This section explores the possible contributions of these relocation mechanisms to the difference in the incidence of fountains observed in neighborhoods with different identities.

How did groups of different ethnicities settle in Istanbul? After its conquest from the Byzantine Empire, Istanbul was almost an empty city. As a result of the Byzantine Empire’s economic and political decline Istanbul was in a destitute state at the time of its conquest (Kuban, 2010). The plunder that followed the conquest left the city not only deprived of its riches, and also of its residents: many left, and those who stayed were either enslaved or killed (Kafescioğlu, 2009).

One of the first order challenges faced by the Ottoman administration was to repopulate the city to its former glory (Nicol, 1993). The challenge was not merely to fill the city with people: the Ottomans had to make sure that certain political and economic motives were balanced. Especially, considering the need for labor to re-build an imperial city in ruins, a systematic recruiting of certain labor groups was of particular importance (İnalçık, 1969). Hence, to guarantee a sufficient labor force, along with balancing the presence of certain identity groups in the city, the Ottomans ordered permanent migration of groups of communities of all origins from different regions of

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the empire to settle in Istanbul (Freitag, Fuhrmann, Lafi, and Riedler, 2010; Işın, 1999).

These new-comers did not find residence in the city haphazardly. Government officials strove to group together people from the same origin and the same identity groups (İncicyan, 1976; Eyice, 1964; Schneider, 1952). Most of these re-population efforts were carried out between 1453 and 1475, which was almost a century before the new capital’s major waterways were built (Ayverdi, 1958b). Hence, the mismatch between the time of the re-population efforts and the construction of the major waterways works against the idea that the Muslim population sorted itself into neighborhoods with more public services.

For instance, Karaman, Çarsamba, and Kefeli neighborhoods of Istanbul consisted of individuals who were forcefully departed from these regions from Anatolia to Istanbul (Eyice, 1964; Başkan, 2012).
Another possible explanation for the pro-Muslim bias in the provision of fountains is that the ethno-religious characteristics of neighborhoods changed over time. Muslims might have forced Christians and Jews to move into the neighborhoods with less fountains, or Muslims might have settled in neighborhoods with good water provision. However, the Ottoman Empire enforced strict rules pertaining to the organization of urban life. As a matter of practice, the residents of Istanbul were not free to move across neighborhoods at will.

One such rule concerned the characteristics of the buildings that each ethno-religious group were permitted to build. According to Islamic Law, Muslim residences had to differ from those of Christians and Jews both in height and color. Under Selim III (reigned 1789-1807), for instance non-Muslims were ordered to paint their houses black and Muslims to paint their houses in a color different from black to enable easy spotting of non-Muslims. The order also stated that the non-Muslim houses should not have windows facing the houses of Muslims. The height of the buildings was another distinctive pattern for religious distinction. According to a 1719 order, in both intramural and extramural Istanbul, non-Muslims were prevented from building higher than two floors (Çokuğraş and Gençer, 2016). Thus, even though Muslims were the privileged group at the time, rules of construction would have prevented a Muslim from moving into a house that was previously inhabited by a Christian or Jew.

Moreover, it was forbidden for non-Muslims to settle in areas sacred to Muslims, and they would usually live in groups in certain neighborhoods. There are various court cases, in which the Muslim population of a certain neighborhood would complain about the non-Muslim settlers. These complaints usually involved the allegation that the non-Muslims harmed the Islamic values and traditions of the pious citizens. The following court case clearly demonstrates the inter-communal conflict that ensued whenever non-Muslim tried to move into Muslim neighborhoods.

Some Muslim residents of Istanbul’s Haraçbaşı İshak Bey neighborhood, which is situated near Kumkapı, appear in court, stating that customarily non-Muslims have not resided in their neighborhood. However, they add, following the 1660 fire, certain Muslims sold their plots and reconstructed houses near the neighborhood mosque to non-Muslims at excessive prices. The neighborhoods Muslim residents in court complain that since the arrival
of non-Muslims, participation in mosque services has fallen and screaming in the streets by drunk non-Muslims has prevented Quran reading and praying in the mosque. Earlier they petitioned İbrahim Paşa, legal agent of the grand vizier, about their concerns. They received from him a buyuruldu document ordering a hearing of the case by the judge of İstanbul. The residents add that they hold an order prohibiting non-Muslims from living in their neighborhood. The residents in court now request an examination of the documents and an investigation in their neighborhood. They also demand the evacuation of non-Muslims from the neighborhood. Experts report to the court that certain Muslim residents did indeed sell their property to non-Muslims and that other Muslim residents transferred waqf-owned properties with the permission of mutawallis. Consulting some trustworthy Muslims, they also report that before the fire the neighborhood was customarily a Muslims-only neighborhood. The court registers the experts report.⁴

This case, and many similar cases found in the Islamic court registers show that neighborhood ethno-religious characteristics were rigid and not subject to change. Thus, the difference between water provision levels between neighborhoods of different religions demonstrate the difference in investment levels.

VI.2 Clustering analysis

Another method to test if the Ottoman elites aimed at reducing inequalities in access to clean drinking water is to further investigate the spatial distribution of fountains. In theory, in a city center where there is not much variation in population density and settling patterns, one would expect that the fountains would be spatially uniformly distributed to ensure equal water access. A clustered distribution would mean that the elites favored certain areas of the city more than the other ones.

I examine the nature of clustering in fountain building sights in Ottoman Istanbul using the nearest neighbor statistic in ArcGIS. The nearest neighbor statistic measures the average distance to the closest neighbor against the expected average distance. The expected average distance is the random distribution of the number of points (in this case fountains) within a particular area. If the nearest neighbor statistic is less than 1 then there is evident clustering, with clustering increasing as the statistic approaches

⁴This case, Istanbul 9:226b/1(1662), is recorded in Kuran (2010).
zero. If the nearest neighbor statistic is greater than one, it signifies a dispersed, or uniform distribution (Oyana and Margai, 2015).

Figure 11 illustrates one of the striking observations of this paper: the nearest neighbor ratio for Ottoman Istanbul’s fountains is 0.64, meaning that the distribution of fountains was very clustered. This result is very significant at a level of 0.05. Evidently, privileged Muslim benefactors endowed more fountains in certain areas than the others. This finding is consistent with the main results of this paper.

![Average Nearest Neighbor Summary](image)

Given the z-score of -12.0371422232, there is a less than 0.01% likelihood that this clustered pattern could be the result of random chance.

<table>
<thead>
<tr>
<th>Table: Average Nearest Neighbor Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observed Mean Distance:</strong> 115.3462 Meters</td>
</tr>
<tr>
<td><strong>Expected Mean Distance:</strong> 178.8538 Meters</td>
</tr>
<tr>
<td><strong>Nearest Neighbor Ratio:</strong> 0.644919</td>
</tr>
<tr>
<td><strong>z-score:</strong> -12.037142</td>
</tr>
<tr>
<td><strong>p-value:</strong> 0.000000</td>
</tr>
</tbody>
</table>

Figure 11: Geographical distribution patterns of fountains in Istanbul: Clustering analysis
VII Conclusion

The results presented in this paper suggest that authoritarian political elites tend to favor their own ethno-religious groups when making allocational decisions about public goods. Insofar as the groups are segregated residentially, it becomes easier for elites to identify and supply social services disproportionately to their own groups. In favoring their own ethno-religious group, political elites earn legitimacy in the eyes of their co-ethnics. That lowers the probability of a revolution.

Public goods entail non-excludable services. But geographic distance can keep potential beneficiaries from taking advantage of opportunities. Hence, political elites can use geography as a tool to direct social services to their own communities. This has far reaching consequences, especially for autocracies. Scholars seek to explain the persistence of historical inequalities. The empirical relationship that I have uncovered in this paper adds to this persistence literature. Underprovision of public goods and economic opportunities can impede the mobility prospects of traditionally underserved groups.

Beyond the contributions above, this paper has implications for the literature on the role of the waqfs on provision of public goods. When elites are not constrained by democratic processes, they can use their legal and economic advantages to disproportionately serve their own groups. This paper sheds light on the patterns of endowments of the waqf founders. The vast literature on waqfs has numerous emphasized Ottoman elites' altruistic motives for providing most all citizens with abundant public services (Singer, 2011, 2012; Yediyildiz, 1984). But the validity of these philanthropic and altruistic motives had never been empirically tested. If the ongoing analysis is valid, my findings provide evidence that the waqf system disproportionately benefited Muslim citizens of the empire.
References


Bulut, N. (2010). Fatih’in Kayıp Çeşmeleri. İstanbul: İstanbul Büyükşehir Belediyesi KUDEB.


