EXPLAINING OUT-GROUP BIAS IN WEAK STATES
Religion and Legibility in the 1891/1892 Russian Famine

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ABSTRACT

Two dominant explanations for ethnic bias in distributional outcomes are electoral incentives and out-group prejudice. This article proposes a novel and complementary explanation for the phenomenon: variation in legibility across ethnic groups. The author argues that states will allocate fewer resources to groups from which they cannot gather accurate information or collect taxes. The argument is supported by original data on state aid from the 1891/1892 famine in the Russian Empire. Qualitative and quantitative analyses show that districts with a larger Muslim population experienced higher famine mortality and received less generous public assistance. The Muslims, historically ruled via religious intermediaries, were less legible and generated lower fiscal revenues. State officials could not guarantee the repayment of food loans or collect tax arrears from Muslim communes, so they were more likely to withhold aid. State relief did not vary with the presence of other minorities that were more legible and generated more revenue.

INTRODUCTION

ETHNIC bias in the distribution of state resources is endemic around the world.[1] The literature provides two main explanations for this phenomenon. One attributes it to electoral pressures:[2] an incumbent politician expects a lower electoral "rate of return" from (re)distribution to non-coethnics either because particularistic benefits can't be targeted efficiently[3] or because ethnic out-groups are less likely to expect and reward such benefits in the first place.[4] The other explanation attributes the bias to greater altruism toward in-group members or to taste-based discrimination.[5] Neither explanation adequately accounts for the historical process of state-building, which determines both ethnic demographics and the state's capacity to target resources to specific ethnic groups.[6]

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This article proposes a novel and complementary explanation for the widespread phenomenon of ethnic bias, one that takes into account the history of state interaction with different groups. I find that approaches to governance often vary based on group identity. Non-coethnics, in particular, may be governed through intermediaries to save on administrative resources and to secure cooperation without coercion. In the short run, indirect rule reduces the central government's information asymmetries vis-à-vis non-coethnics, but in the long run it prevents ethnic out-groups from interacting with the state and impedes the accumulation of state capacity.[7] As a result, non-coethnics' social practices and economic resources remain illegible to state officials.

Low informational capacity, in turn, weakens state control over revenue extraction and thus reduces the state's incentives to allocate resources to non-coethnic populations.[8] State officials are more likely to discriminate against non-coethnics when they can't ensure that investing in this group will pay off in tax revenues. This fiscal logic of ethnic discrimination is most applicable to administratively weak autocracies, which lack detailed information about their populations and bear limited electoral costs for ignoring citizens' needs.

I test this argument using data on the 1891/1892 famine in the Russian Empire. Famine relief is less studied than other collective goods, such as education and health care, even though it's one of the basic services that states have historically provided to their citizens.[9] Authoritarian and democratic governments alike have incentives to avert famines because famine-induced mortality is concentrated in space and time, providing a clear signal of incompetence.[10] And yet states often misallocate aid, leaving the most vulnerable population groups unattended.[11]

The 1891/1892 famine, among the worst in Russian history, occurred in the Volga basin, a region with a multiconfessional population and a history of peasant unrest.[12] The government

mounted an extensive relief campaign that provided supplementary rations to millions of people. Yet the distribution of aid was extremely uneven: the size of loans for food and seed, the timing of relief operations, and the famine-induced mortality varied across districts with comparable crop failures.

My analysis of a newly assembled district (*uezd*) data set on famine mortality and state relief suggests that religious demography influenced the extent of human suffering and the quality of the imperial government's response to the crisis. Districts with a larger Muslim minority experienced higher mortality and lower natality in the famine year. At the same time, the relief campaign was less extensive in such districts: food loans were smaller, on average, and the relief campaign was shorter.

What explains the observed bias in relief distribution? One obvious explanation is the prejudice of largely Orthodox state officials. But differences in state capacity—a legacy of past governance strategies—also mattered. At the time of the famine, the Muslim minority in Russia was still governed with the help of religious intermediaries, whose authority was eroding rapidly, whereas other confessions were subject to the same administrative apparatus as the Orthodox peasants. Thus, state agents faced particular difficulties in obtaining information from Muslims and in taxing them. I show that the officials' ability to gather information, proxied by the accuracy of age data reported in the 1897 census, was lower in districts with a larger Muslim population than in Orthodox districts or those with other religious minorities. Actual tax receipts were also lower. Reports from zemstvos, local self-government institutions, indicate that officials delayed or withheld aid because they couldn't collect tax arrears or guarantee that Muslim communes would repay their loans. Other minorities, such as the Protestant and Catholic German settlers and the Old Believers, a group of dissenters who had left the Orthodox Church,

were more legible to the state because they were administered in the same way as the Orthodox peasantry and interacted more directly with state agents. I also show that linguistic cleavages were less important for the allocation of relief and don't predict fiscal or informational capacity; this weak correlation between language and state capacity is consistent with my argument that information asymmetries that resulted from reliance on a confessional governance, rather than out-group prejudice alone, shaped the distribution of famine relief.

This study's findings fit with the evidence in other settings that minorities are disadvantaged in the provision of infrastructural goods and welfare. But I offer a novel explanation for these patterns: differences in legibility across ethnic groups. This mechanism is compatible with accounts that emphasize politicians' electoral incentives to distribute to coethnics because greater knowledge of a specific ethnic group means more efficiency in translating particularistic benefits into electoral payoffs.[13] But it also implies that non-coethnics may receive fewer transfers from the state because they generate less revenue—that is, they're not disadvantaged to the same extent across all domains of distributive politics, and they can get away with paying less into state coffers. Orthodox peasants received more support than Muslim peasants during the famine in Imperial Russia, but they also paid more taxes. This article thus underscores the flip side of the preferential service delivery toward coethnics: state officials rely more heavily on coethnics when it comes to raising tax revenue. This insight is consistent with Kimuli Kasara's finding that politicians tax coethnics at higher rates because the politicians have more reliable allies and intermediaries in coethnic areas.[14] Yusuf Magiya finds similar patterns in the Ottoman empire, which taxed Sunni Muslims, a dominant group, more heavily than minority groups in wartime.[15]

This article's second contribution is to link information asymmetries in diverse societies to historical differences in governance institutions. My findings fit with recent work that views contemporary public goods provision and ethnic heterogeneity as legacies of institutional development in the past.[16] The article also relates to the scholarship on the enduring negative implications of indirect colonial rule for state capacity and public goods provision in South Asia and Africa.[17] For instance, the British devoted less funding to those Indian provinces where they delegated the responsibility for collecting taxes to *zamindars* because that reliance on intermediaries reduced British contact with the local population and constrained tax policy.[18] In West Africa, the weakness of the colonial administration and its reliance on chiefs for tax collection resulted in a combination of lower public investment in regions with less compliant intermediaries and lower revenue extraction.[19] Ethnic intermediaries are still powerful in many developing countries, as citizens lack direct ties to state institutions and don't participate in formal fiscal exchange. This equilibrium comes with low state investment and high social extraction based not on citizenship but on lineage, ethnicity, or religion.[20]

In addition, by highlighting fiscal considerations that arise from intergroup differences in legibility, this article advances scholarship on the institutional determinants of state responsiveness to famines and other humanitarian crises.[21] I show that when disaster strikes, assisting populations whose needs are harder to verify or who are harder to tax may be a lower priority. By contrast, targeting economic support to legible groups allows the state to recover quickly after a disruption in revenue flows. In his seminal book, James Scott argues that governments' attempts to make their populations "legible" through collectivization, "villagization," and similar coercive policies have contributed to famines in Ethiopia, Tanzania, and Ukraine.[22] Yet these policies, despite their cruelty and ineffectiveness, were envisioned as a

way to increase food production and raise revenues. In the USSR, the forced collectivization of the peasantry, which contributed to the 1932/1933 famine and increased mortality in Ukrainian-dominated provinces,[23] was motivated by the Bolsheviks' goal to feed growing cities and to increase the grain exports needed to finance industrialization. In Imperial Russia, a weaker state, extracting more grain meant channeling aid to the more taxable Orthodox peasants at the expense of Muslims. But the USSR, which had more coercive power, sought to reduce information asymmetries vis-à-vis a resistant Ukrainian peasantry by forced collectivization, with equally disastrous consequences for the noncore group. This study also relates to work on how information deficiencies limit the ability of governments to respond to famines even when they have the resources and willingness to do so.[24]

ARGUMENT

My argument proceeds in two steps: (1) clarifying the link between informational capacity, taxability, and incentives to invest state resources; and (2) highlighting why informational capacity may vary with ethnicity.[25]

Governments' incentives to supply collective goods are shaped by their informational capacity. On the one hand, knowledge about specific communities allows governments to target resources in ways that maximize fiscal returns. On the other hand, information asymmetries in relation to specific population groups can lead to discrimination in the distribution of state resources because state officials can't ensure that transfers will pay off in future revenues. From the perspective of state officials, illegible populations are a risky investment because they're harder to tax and their needs are less verifiable.[26]

Information and extractive capacity are sometimes seen as conceptually distinct dimensions of state capacity, but in practice they are closely related.[27] Assessing and collecting taxes depend

on first obtaining accurate information about the population, including its economic activity and assets.[28] Whenever the early-modern state was unable to evaluate individual incomes and assign the tax burden accordingly, it relied on customs and trade taxes, as well as on land taxes where the apportionment of fixed sums was left largely to the discretion of local communities.[29] The need for greater revenue motivated states to expand information-gathering capabilities through cadastral surveys, censuses, and tax registers.[30] This increase in informational capacity, in turn, enabled greater tax revenues and public goods provision.[31]

In multiethnic states, informational capacity is often discontinuous at ethnic or religious boundaries. Shared culture and social ties are important for citizens' willingness to cooperate with state officials, as well as for officials' ability to monitor and sanction noncompliance.[32] Governing religious, ethnic, or linguistic out-groups entails higher transaction costs. As a rule, non-coethnics will be less legible than coethnics from the state's perspective; legibility may also vary across non-coethnic groups. Governments can solve the information problem by building up administrative capacity in out-group dominated regions, but this strategy only pays off in the long run. As noted above, the fiscal payoff of institutional and other investments decreases with legibility. A cheaper solution to this information problem is indirect rule, whereby the resource-constrained state is able to extract some revenue from harder-to-monitor areas by delegating authority to local intermediaries. In the developing world, most citizens still lack direct contact with the government; instead, ethnic and religious intermediaries are responsible for collecting taxes and providing services.[33]

Although it's effective in the short run, reliance on local intermediaries leaves the central government blind with respect to non-coethnics' economic activity. It reduces the government's

ability to directly monitor and enforce compliance with taxation and other policies, thus limiting its reach into minority-dominated areas.[34]

I argue that the lower legibility of ethnic out-groups that are indirectly ruled will disadvantage those groups in the allocation of state resources. State officials will discriminate against the illegible non-coethnics in the distribution of collective goods because the officials can't ensure that resources allocated to this group will pay off in tax revenues. This bias in distribution does not depend on out-group prejudice or electoral incentives.

Ethnic differences may also affect the allocation of state resources and governance through other channels. Non-coethnics are more likely to resist the imposition of direct rule, which not only makes them less legible but also could affect state policy directly. The threat of unrest is a prominent explanation for the variation in state-provided resources in authoritarian settings.[35] Food riots have been linked to the politics of food provision in times of scarcity, although famines may also demobilize.[36] On the one hand, governments may seek to stay in power by transferring more resources to areas prone to rebellion, despite lower informational capacity in such areas. On the other hand, states may leverage famine relief to increase control over the illegible populations, taking advantage of their desperate situation.

Historical Context

In 1891, a severe crop failure struck the Volga River basin, a region where Muslims, Old Believers, and Western Christians lived alongside the Orthodox Christian majority.[37] The immediate causes of the crop failure were the cold winter of 1890/1891 and the summer drought that followed, both of which affected large swaths of the region. As a result of these combined temperature and precipitation shocks, the winter crop of rye, wheat, oats, and barley failed almost completely; the harvest in the worst-affected areas was less than 25 percent of the 1883–

87 average. As measured by the percentage deviation of the output-seed ratio from an eight-year moving average, the 1891 grain harvest was the worst on record between 1833 and 1911.[38]

Initially, the government was reluctant to admit the famine's existence. Finance Minister Ivan Vyshnegradsky opposed the ban on grain exports, as he considered them essential for strengthening the economy. To achieve the gold standard, he adopted the mantra: "Even if we starve, we will export grain."[39] And yet the government eventually organized an unprecedented relief campaign. In 1891/1892, state aid amounted to at least 196 million rubles, or 20 percent of total state expenditure in 1891.[40] At the height of the relief effort in early 1892, at least 11.8 million people—about 10 percent of European Russia's population—were receiving government assistance in the form of food and seed loans or public works.

Distributing relief on this scale was a daunting task, given the state's sparse presence in the countryside. The government depended on district zemstvos to appraise local needs and request aid from provincial authorities, who then turned to the central government.[41] Zemstvo officials, in turn, had to rely on information provided by the peasants themselves. Self-reported estimates of local need were sometimes exaggerated, but because the entire commune was collectively responsible (*krugovaia poruka*) for repaying any loans disbursed to needy households,[42] the wealthier villagers just as often conspired to ensure that the estimates were kept low.[43] Uncertainty about the true extent of harvest loss and the affected population delayed the provision of public assistance, as village communes, land captains, zemstvo officials, the governor, and the Ministry of Internal Affairs (MVD) all wrangled over the size of loans needed to relieve the citizenry. Insufficient knowledge about household-level conditions also increased the misallocation of aid. As one contemporary expert explained, the zemstvo "often does not

know to whom and how the aid ought to be given. Through its 'emissaries' and randomly dispatched members, it compounds the guesswork, and thus its aid does not achieve its goal."[44]

As many as five hundred thousand people died as a result of food scarcity and concurrent outbreaks of cholera and typhoid fever. The public viewed the state's response as "careless and callous," and accused the bureaucracy withholding aid "until it had received 'statistical proof'" of starvation.[45] Historians argue that the disastrous response set in motion "the conflict between the population and the regime" that would culminate in the revolution.[46]

Mortality rates were higher in provinces with large religious minorities. State aid never reached some of the hardest-hit areas, with Astrakhan (only 50 percent Orthodox) receiving no assistance from the central government, despite its staggering death rates (see Figure 1).[47] Within provinces, mortality rates varied dramatically by religion. In Saratov, for example, the number of Muslim deaths increased by 61 percent, the number of Orthodox deaths by 40 percent, and the number of deaths among Western Christians by 34 percent. In Orenburg, Muslim deaths increased by 56 percent and Orthodox deaths by 36 percent.

I argue that incentives to supply aid depended on accurate information about the population in need of aid and on the ability of officials to ensure that food and seed loans would be repaid and future tax obligations fulfilled. The historical origins of state information asymmetries related to specific religious communities are considered below.

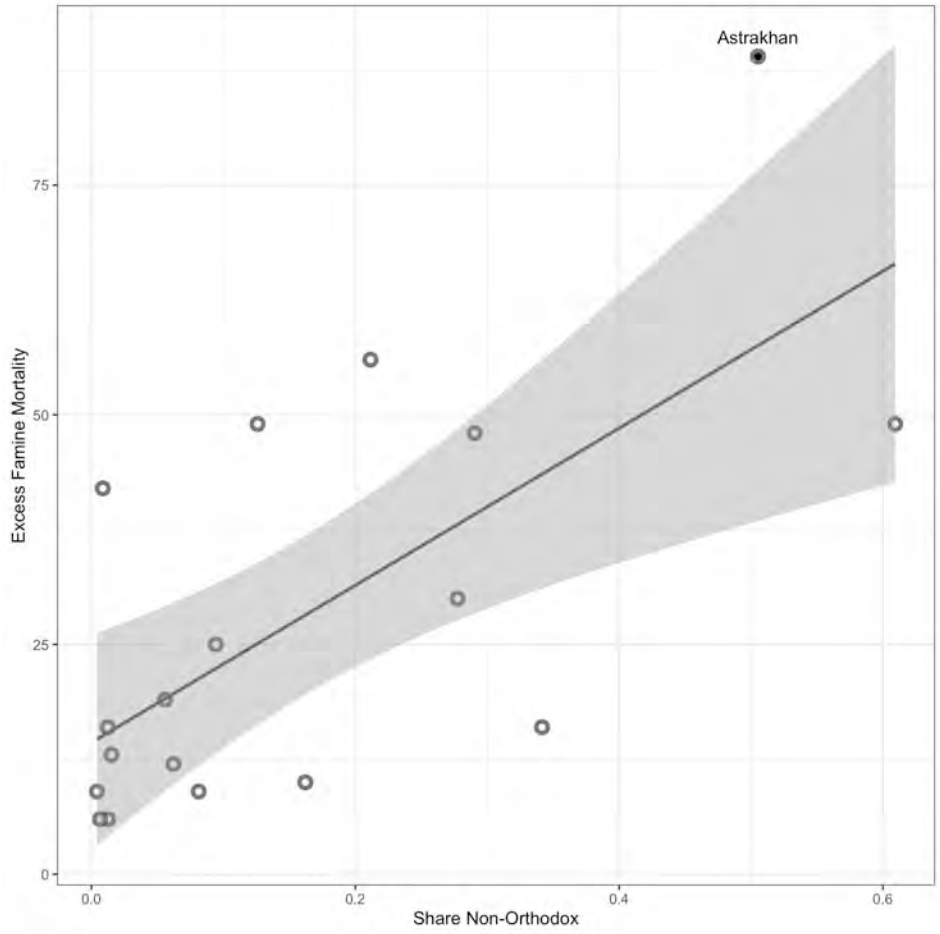


FIGURE 1
RELIGIOUS DEMOGRAPHICS AND MORTALITY IN PROVINCES AFFECTED BY THE FAMINE[a]

[a] Scatterplot with linear regression line and 95 percent confidence interval.

THE ORIGINS OF MEDIATED GOVERNANCE

Most members of the bureaucratic elite and the imperial family belonged to the Russian Orthodox Church, but just 69.3 percent of the empire's population was Orthodox in 1897. As the empire expanded, the tsars allowed many of their non-Orthodox subjects to follow their own customs and to be ruled by their own elites; this was done to minimize the costs of governance and the potential for unrest. The state relied on a form of indirect rule, "granting superior rights to its intermediaries and holding over their heads the threat of taking these rights away."[48]

This model of mediated governance was first applied to Muslims, who in 1897 made up the largest minority, at fourteen million people. The predominantly Muslim Kazan Khanate was conquered in 1552. After a brief period of forced conversions and discrimination against the local elites, the autocracy co-opted the privileged classes of the Volga-Tatar society into the Russian hereditary nobility and retained much of the status quo, including the Mongolian system of taxation known as *iasak*. Despite a shortage of labor, the Muslim population was spared from serfdom and conscription.[49] Still, the potential for unrest among the Muslim population remained high, as shown by their participation in popular revolts led by Stepan Razin (1670–71) and Emel'ian Pugachev (1773–75). To pacify the Muslim minority, Catherine the Great created the Tauride Mohammedan Ecclesiastical Board in Simferopol and the Orenburg Mohammedan Ecclesiastical Assembly in Ufa, headed by muftis. The assemblies were religious in form but carried out many administrative functions, including record keeping, arbitrating intracommunal disputes, and communicating imperial decrees.[50] Islamic clerics and scholars received privileged treatment in return for securing the loyalty of the Muslim peasants and containing unrest.

Starting in the eighteenth century, Protestants, Catholics, and Old Believers began to settle in the Volga basin. Catherine invited Europeans (mostly Germans) to colonize the Russian steppe, promising them abundant land, religious freedom, temporary exemption from taxes, and permanent exemption from military service. She hoped that the colonists would raise the region's economic productivity. The colonists' main intermediary with the Russian state in the Volga region was the Saratov Office for the Guardianship of Foreign Settlers (the Kontora), established in 1766. Highly paid Kontora inspectors took great care of the colonists' well-being and regularly interacted with officials in St. Petersburg.[51]

The Old Believers, a minority that emerged after the seventeenth-century schism within the Orthodox Church, were initially viewed as a threat and persecuted. As they weren't considered a separate confession, they were ruled directly by the state. State policy toward this group varied from one tsar to the next, but was mostly discriminatory until the late nineteenth century. Peter the Great (1682-1725) profited from the Old Believers' religious devotion by burdening them with the double poll tax, in addition to the infamous beard tax.[52] Catherine (1762-1796) encouraged their resettlement to a few designated regions to facilitate control and taxation.[53]

Intergroup Differences in Legibility and Taxability

The imperial policy toward its "foreign confessions" changed substantially after the debacle of the Crimean War (1853–56). Russia sought to reform its institutions, modernize the military, and industrialize its economy. Serfdom was abolished (in 1861) and zemstvos were created to manage local economic affairs (starting in 1864). These local self-governance institutions, dominated by the nobility, received jurisdiction over the assessment and apportionment of land taxes; the provision of roads, schools, and hospitals; and the administration of fire insurance and famine relief programs. The regime also increased control over the non-Orthodox population by standardizing tax obligations, introducing universal male conscription, and abolishing some intermediaries, such as the Saratov Kontora.

Muslim intermediaries were retained, but the central government intervened in their selection. Muftis, traditionally elected by the Muslim clergy, were appointed by the MVD after 1889. Starting in 1888, mullah candidates were required to demonstrate proficiency in Russian; the teaching of Russian was also mandated in Muslim schools. These interventions undercut the assemblies' legitimacy among the local population and made Muslims suspicious of Orthodox officials. Protests against the reforms brought together hundreds of Muslim communes, and

sometimes escalated into physical confrontation.[54] Muslim clerics began refusing to provide parish statistics on the pretext that their congregation had hidden the records. Zemstvo officials faced an increasingly hostile reception in Muslim settlements. Muslims feared that by signing the public declarations (*obschestvennye prigovory)* required by the zemstvos to receive food loans during bad harvests, they were unwittingly consenting to baptism.[55]

The abolition of the Saratov Kontora in 1870 brought colonists under the same administrative apparatus as the Orthodox peasants and Old Believers. The colonists resented losing their privileged status, but largely remained loyal to the tsar. To make up for the loss of the Kontora, they participated in the zemstvos and reportedly managed the budgets efficiently, implementing insurance and education programs and maintaining village granaries as per official mandates.[56]

The Old Believers actually gained during the reform period, receiving more of the rights already held by other religious minorities with the passing of the 1863, 1874, and 1883 decrees.[57] Like the colonists, they engaged with the zemstvos, particularly by managing zemstvo schools.[58] Still, admission to government service, the army, and educational institutions remained limited for Old Believers.

These divergent governance strategies with regard to different confessions help to explain the variation in legibility and fiscal capacity across different religious groups on the eve of the famine. The quality of state information about Muslims, the only group still ruled indirectly, was lower than the quality of information about minorities governed the same way as the Orthodox peasantry. I thus expect the state to channel less assistance to districts with larger Muslim populations. This pattern should hold regardless of actual needs in the aftermath of the harvest failure. I expect state treatment of the other non-Orthodox minorities to be less discriminatory, in light of their higher legibility and taxability.

This discussion also highlights the Muslim minority's greater potential for unrest and resistance to tsarist policies. It is thus possible that the state was responding not to lower legibility, but to a greater threat of rebellion in districts with larger Muslim populations. Relatedly, state famine policy could be linked to more subtle forms of resistance that raised the costs of tax collection and reduced informational capacity in Muslim communes in the first place. In this interpretation, illegibility is itself a product of non-coethnics' defiance of state attempts to control and tax their communes.[59]

Data and Level of Analysis

The territory of European Russia (the western and most populated part of Russia) was organized into fifty provinces (*gubernia*) that were subdivided into districts (*uezd)*. I use data at the district level in the twenty-two provinces that received government assistance during the famine.[60] District is the smallest unit of analysis for which data exist; it's particularly relevant for studying the distribution of relief because district zemstvos were in charge of apportioning taxes, collecting data on peasant economies, evaluating local needs, and requesting famine relief from higher authorities.

Death and Birth Rates during the Famine

To evaluate the human consequences of the crop failure, I use data on births and deaths for a five-year window around the 1891 harvest failure (1885–96) from MVD Central Statistical Committee (CSC) yearbooks. District-level births and deaths are aggregated for all religious groups. These totals were converted to crude birth and death rates per one thousand people; the denominator, district-year population, was interpolated using information from 1870 and 1897.[61] Figure 2 shows a sharper spike in mortality in 1892 in districts with an above-average ($\mu = 6.4$) share of the Muslim population. The figure also shows that in nonfamine years, both mortality

and natality were significantly lower in districts with above-average Muslim population shares; these demographic differences were due to more infant breastfeeding and lower alcohol consumption.[62]

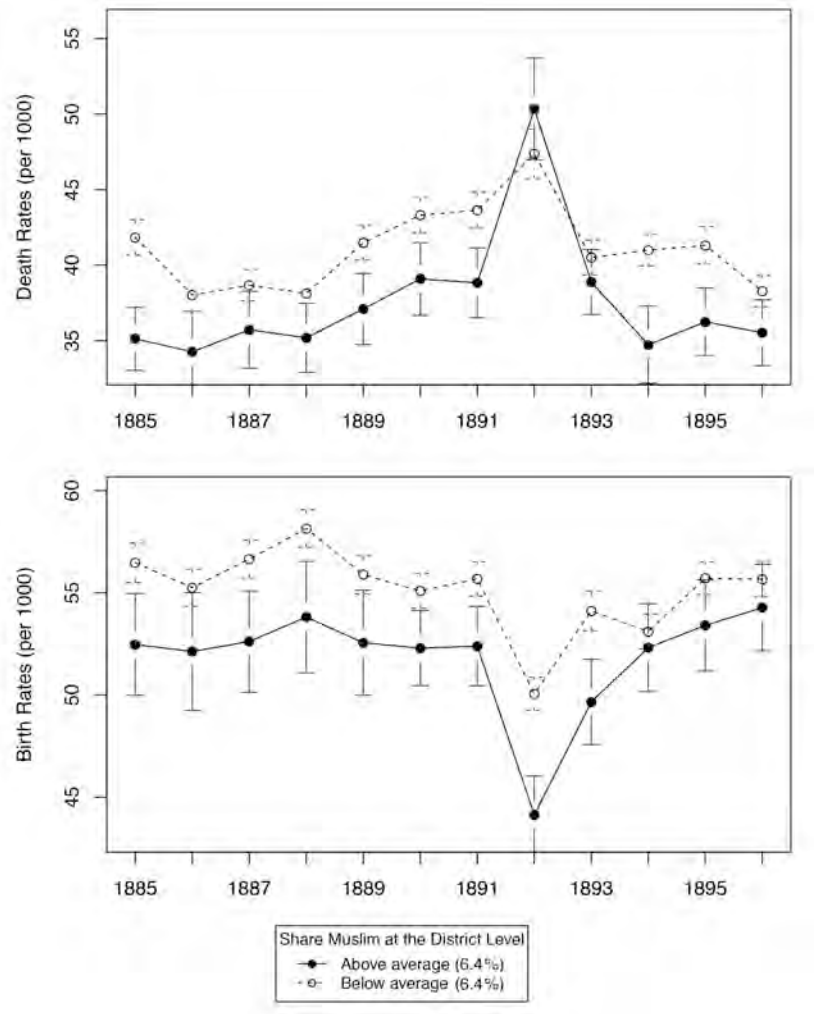


FIGURE 2
BIRTH AND DEATH RATES BY DISTRICT IN PROVINCES AFFECTED BY THE FAMINE, WITH THE SHARE OF MUSLIM POPULATION ABOVE AND BELOW THE MEAN

FAMINE RELIEF INDICATORS

Data on the relief operation come from the 1894 report of the Interior Ministry. The report describes the distribution of food and seed loans and cash payments to the rural population in provinces that received assistance from the central government in 1891/1892.[63] The report

distinguishes between central relief—disbursed from the provincial food supply capital funds and the central fund for the empire as a whole—and local relief disbursed from district capital funds and subdistrict granaries.

The duration and scale of central relief, the key variables of interest for this study, are based on the following indicators. *Months on relief* refers to the number of months in which more than 1 percent of the rural population received public assistance.[64] *Relief onset* is coded as 1 for July 1891, 2 for August 1891, and so on up to 14 for August 1892. *Average share of population on relief* refers to the share of a district's peasant population that received public assistance in the form of food and seed loans or cash payments during the fourteen-month relief campaign (July 1891–August 1892). *Average loan size* is defined as the average amount of grain (in *pudy*) received per individual per month over the fourteen months of the relief campaign.[65] Because an overwhelming share of famine relief was delivered in kind, this variable captures the generosity of the authorities in allocating public assistance. *State relief* is defined as total relief from the central government per capita. In addition to state relief, I calculated the amount of *local relief*, disbursed from village granaries, as distinct from provincial and empire-wide funds.[66]

To avoid multiple comparisons and to minimize measurement error, I use principal component analysis to reduce these indicators to a scalar index. The first principal component (mostly state aid indicators) explains about 50 percent of the variance, while the second principal component (mostly local relief) explains 19 percent (see section D.1 in the supplementary material).

Religion and Linguistic Differences

Data on religious affiliation in 1870 were published by the MVD CSC.[67] The population is divided into eight confessional categories: Orthodox, Old Believer, Armenian Gregorian, Roman

Catholic, Protestant, Jewish, Muslim, and Idolaters (*idolopoklonniki)*. The main explanatory variables are *share Muslim* and *share other non-Orthodox*, which mostly combines Western Christians and Old Believers. Aggregating these groups is necessary because their numbers are smaller, especially in the provinces affected by the famine.

Supplementary analyses use data on key language groups from the 1897 census.[68] Numbers of Turkic speakers (Tatar, Bashkir, Turkmen, Kirgiz, Uzbek, Chuvash, Teptiar) and Russian speakers (Russian, Belarusian, Ukrainian) were used to create two variables: s*hare Turkic* and *share other non-Russian*. Under this alternative classification, the Old Believers are considered part of the Russian-speaking in-group and some Orthodox believers are coded as Turkic speakers.[69]

Figure 3 presents the spatial distribution of Russia's religious minorities.

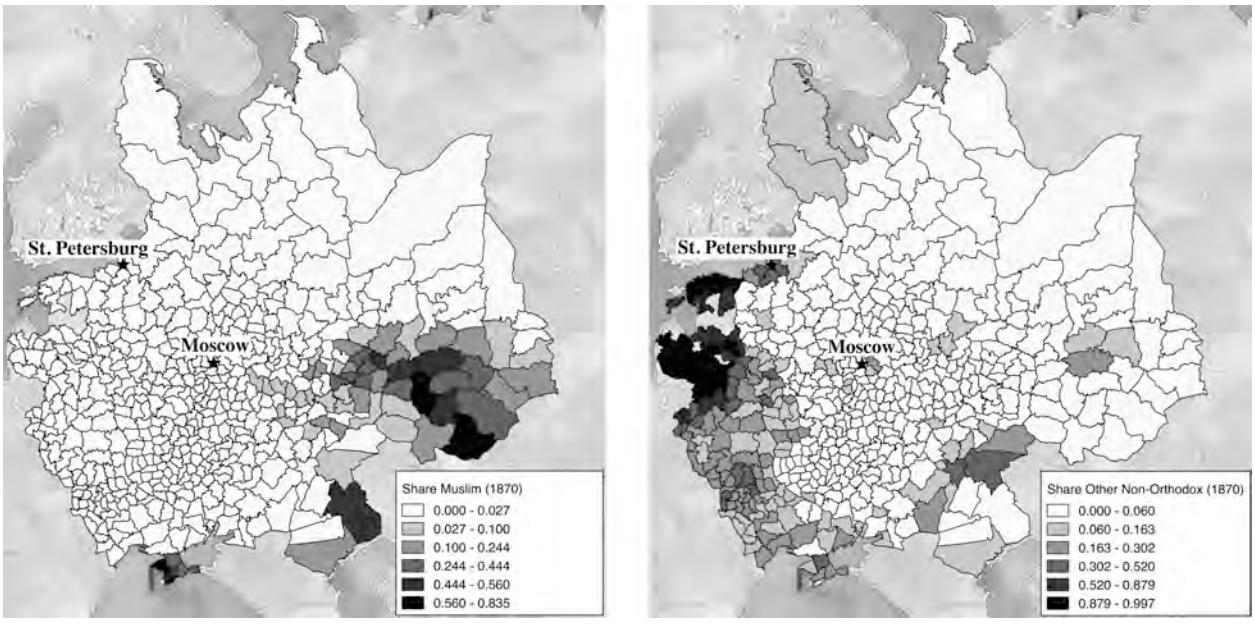
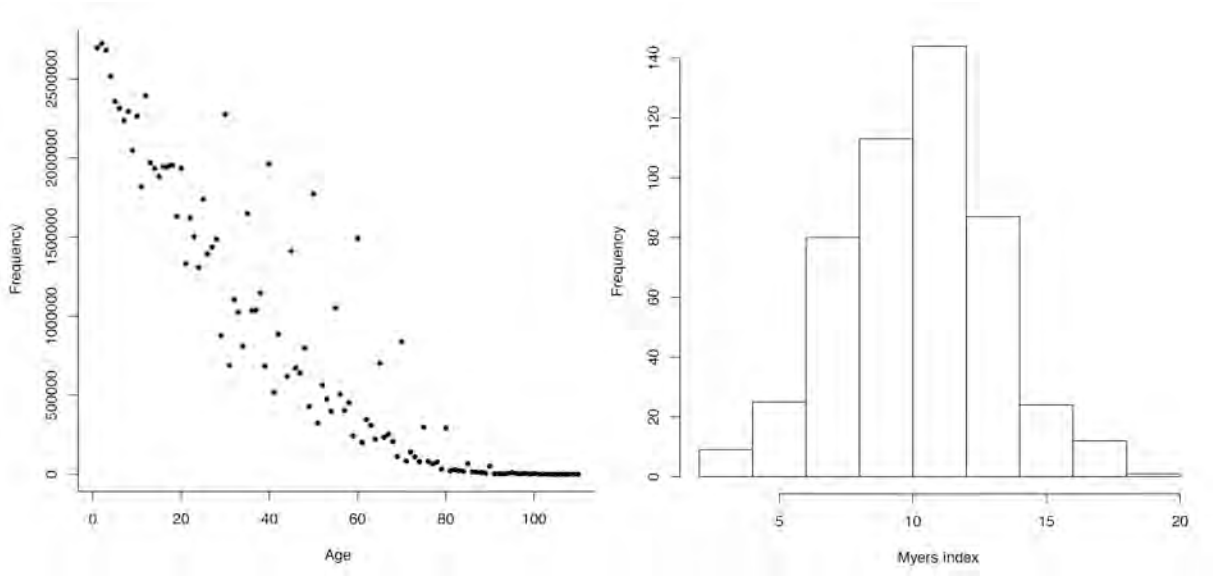


FIGURE 3
PROPORTION OF MUSLIMS AND OTHER NON-ORTHODOX CONFESSIONS IN 1870, BY DISTRICT

LEGIBILITY AND TAX REVENUES

I consider two closely related dimensions of state capacity: information and revenue extraction. To measure informational capacity, I use the distribution of ages from the 1897 census.[70] My intuition is that age distributions follow a smooth curve, whereas errors in the age data reported in a census tend to produce heaping on specific numbers, typically those ending on the focal digits 0 and 5. The panel (a) of Figure 4, which depicts raw counts of age data, suggests considerable heaping on these focal digits between the ages of 30 and 80.



1897 Census (a) District-Level Distribution of the Myers Index (b)

FIGURE 4
FREQUENCY OF AGES IN FIFTY PROVINCES OF EUROPEAN RUSSIA, BASED ON THE 1897 CENSUS AND DISTRICT-LEVEL DISTRIBUTION OF THE MYERS INDEX

Two circumstances may give rise to age heaping: either people don't know their precise ages, or census enumerators have difficulty eliciting this information. Both factors were relevant in Russia at this time. Ignorance about exact ages was high among the peasantry, and there was widespread reluctance to cooperate with census enumerators; peasants may have feared that age

data would be used to enforce conscription, or they simply refused to communicate with state officials. Muslims were particularly resistant to being counted. Religious intermediaries, tasked with conducting exploratory work ahead of the census and later recruited as enumerators, often withheld their cooperation after the state curbed their authority in the 1880s. In several provinces the military was even called in.[71] Under these circumstances it's easy to imagine that enumerators reported inaccurate age data either because they deliberately misled the authorities or because they had to resort to guesswork in the absence of cooperation from the villages.

I quantify age heaping using the Myers index, developed by demographers. Because age heaping appears to be concentrated in the adult population, I exclude the youngest group (under fifteen years of age) and oldest (more than seventy-four years) in calculating the index. If ages are reported accurately, the proportion of the population with ages ending in each digit should make up 10 percent of the total; if ages are reported inaccurately, deviations from 10 percent are observed for some digits. These deviations were added up and the final sum was divided by two to compute the Myers index (for more detail, see the supplementary material). The index ranges from zero to ninety, where 0 indicates no age heaping and 90 indicates extreme age heaping (where all observed ages terminate on the same focal digit). The right panel of Figure 4 depicts the distribution of the Myers index across European Russia. The index is positively correlated with the share of Muslim population ($\rho = 0.16$, $p < 0.05$), negatively correlated with the share of other non-Orthodox minorities ($\rho = -0.23$, $p < 0.05$), and uncorrelated with the share of Russian speakers.

Because age heaping may depend on economic development and other factors, I condition on literacy, urbanization, remoteness, and economic welfare. I also use an additional indicator, direct taxes collected from peasant land in 1888–90, to capture a related, fiscal dimension of

state capacity.[72] State and zemstvo alike levied taxes on peasant allotment (*nadel'naia*) land—that is, land set aside for the use of village communes under the terms of the emancipation settlement. Zemstvo and state revenues are combined to obtain the total tax receipts from peasant land in each district and standardized to obtain total tax receipts per unit land. Note that these figures represent not the official tax bill—that is, the amount of taxes owed on the basis of the land's assessed value—but actual receipts on taxes and arrears. I aggregate the annual tax receipts over the three prefamine years to account for idiosyncratic cross-sectional and temporal fluctuation in harvests.[73] Still, tax revenue fluctuates not only with state ability to gather information and tax, but also with local economic conditions, addressed by including covariates (see below).

COVARIATES

To account for the severity of the crop failure, I use data on the harvest (*chistyi ostatok*) of winter rye, spring rye, winter wheat, spring wheat, and oats, published by the MVD CSC. These five crops were grown and consumed throughout the Russian Empire and suffered the most from the 1890/1891 weather anomalies. The unusually cold winter would have a greater effect on winter grains; spring and summer drought would harm the spring grains. The data on harvests are available for 1888–95 and are used in both temporal and cross-sectional analyses.

The remaining covariates are time invariant. Cross-sectional analyses of famine relief control not only for the 1891 harvest, but also for the 1891 drop in yields relative to the five-year average per unit land (1883–87).[74] I also measure distance between the district centroid and the nearest railway line in 1891, which affected aid delivery. And I control for the proportion of serfs in the district population in 1858, for the number of land captains per district area, and for the number of noble landowners per thousand people (in 1877), since during the famine the nobility

was actively involved in providing food and credit to the impoverished peasants. Further, most local officials were recruited from the nobility, so a shortage of nobles would mean more vacancies and a larger number of officials unfamiliar with the region. Regressions control for urbanization as a proxy for economic development, which may be correlated with legibility and tax revenues as well as state ability to deliver aid.[75]

Different population groups may have differed in wealth, which could explain the variation in both taxation and access to state support. I account for this by controlling for the size of the peasant allotment and the number of horses owned per household, taken from the Cavalry Census of 1888–91. I also use data on the average height (in meters) of draftees into the army in 1883, which is correlated with nutrition and living standards.[76]

I also control for the natural logarithm of population and area (in square kilometers), because larger, more populated regions are harder to govern. Cross-sectional estimations include geographic covariates as well: centroid latitude and longitude, their interaction, distance from St. Petersburg, and soil quality.[77] Specifications that examine the predictors of age heaping also control for male literacy in 1897.[78] Specifications that examine tax revenue condition on the average harvest in 1883–87, in addition to soil quality (both matter for economic productivity).

All models use province fixed effects to adjust for unobserved province-level characteristics. These include the incentives and abilities of the governors, who requested famine relief from the center and mediated between the zemstvos and the MVD.[79] The province dummy also accounts for differences between zemstvo and nonzemstvo provinces. Table A.1 in the supplementary material reports descriptive statistics on all variables.

EMPIRICAL ANALYSIS

FAMINE MORTALITY

I first examine whether the consequences of the harvest failure varied with religious composition, interacting confessional makeup of the district with the famine dummy (coded 1 for 1892) and estimating two-way fixed effects equations of the form

$$m_{it+1} = \beta_1(\text{religion}_i \times \text{famine}_t) + \beta_2 \text{harvest}_{it} + \beta_3(\text{harvest}_{it} \times \text{famine}_t) + X_i \times \text{famine}_t + \gamma_i + \tau_t + \epsilon_{it},$$

where m_{it+1} is the crude death or birth rate in district i and year $t + 1$; religion_i is the population share of a given religious group; famine_t is a dummy variable that equals 1 for year 1892 (or for both 1892 and 1893, see the supplementary material); harvest_{it} is per capita grain output; X_i are remaining district covariates, which vary by model and are interacted with the famine dummy; and γ_i and τ_t are vectors of district and year fixed effects, respectively.

Table 1 reports the baseline results from specifications that include grain output in year *t*, an interaction between grain output and the famine year,[80] and an interaction between the famine year and the share of urban population, since the famine was a rural phenomenon. The *famine* × *share non-Orthodox* interaction term is significant in all estimations, indicating both higher mortality and lower natality in districts with larger religious minorities during the crop failure. In substantive terms, a standard deviation increase in the share of non-Orthodox population (equivalent to 17 percent) predicts 2.3 more deaths and 1.2 fewer births per one thousand population. Models 2 and 5 disaggregate the non-Orthodox group into Muslim and other minorities. The analysis indicates that a standard deviation increase in *share Muslim* (equivalent to 15 percent) predicts an increase in the number of deaths by 1.8 and a decrease in the number of births by 1.1 per thousand population in 1892. As the differences in birth and death rates by religion are imputed from aggregate district data, these estimates may be too low. Even so, they

are substantively meaningful. In nonfamine years, the crude death rate among Muslims typically was within the range of twenty-five to thirty-five per one thousand population, and the crude birth rate was within the range of forty to fifty. The coefficient on the interaction term for other non-Orthodox populations is also significant, but smaller in substantive terms. A standard deviation increase in *share other non-Orthodox* (6 percent) predicts an increase in deaths by 1.3 per one thousand and decrease in births by 0.5 (models 2 and 5). Models 3 and 6 examine linguistic cleavages: only the interaction between Turkic speakers, who were predominantly Muslim, is statistically significant. A standard deviation increase in the share of Turkic speakers (18 percent) predicts an increase in deaths by 1.5 and decrease in births by 1.1 per one thousand, slightly lower estimates than those obtained for *share Muslim*. The presence of other non-Russian-speaking groups doesn't predict mortality or natality. To verify that these results aren't driven by the underestimation of standard errors due to spatial and temporal correlation, I estimate Conley standard errors in Table A.4 in the supplementary material, allowing for correlation of nine hundred kilometers.

TABLE 1
RELIGION, LANGUAGE, AND DISTRICT-LEVEL MORTALITY AND NATALITY DURING THE FAMINE[a]

	Deaths per 1000 people			*Births per 1000 people*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Famine × Share non-Orthodox	13.50***			–7.16***		
	(3.86)			(1.17)		
Famine × Share Muslim		11.83***			–7.01***	
		(4.31)			(1.30)	
Famine × Share other non-Orthodox		21.54**			–7.86**	
		(9.62)			(3.33)	
Famine × Share Turkic			8.44**			–5.84***
			(3.91)			(1.38)
Famine × Share other non-Russian			5.28			–0.70
			(4.23)			(1.80)
Harvest per capita (lag)	–0.01	–0.01	–0.02	0.06***	0.06***	0.06***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Famine × Harvest per capita (lag)	–0.14*	–0.15*	–0.11	0.20***	0.20***	0.18***
	(0.08)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)
Famine × Share urban	–3.63	–4.82	–0.12	9.99***	10.09***	7.91***
	(6.76)	(6.89)	(6.52)	(2.71)	(2.69)	(2.65)
District FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓

Adjusted R^2	0.64	0.64	0.64	0.69	0.69	0.69
Num. district years	1736	1736	1736	1736	1736	1736

$^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$, standard errors clustered at the district level.

[a]All models are OLS with district and year fixed effects. Data are from twenty-two provinces affected by the harvest failure and receiving relief. These are baseline specifications without additional covariates.

As a robustness check, Table A.5 in the supplementary material presents results with additional covariates that may affect mortality and religious demography (interacted with the famine dummy): the distance to St. Petersburg and the railroad, the proportion of serfs before emancipation, the average height of recruits, the number of noble landowners, the number of land captains, and the number of horses per household. The coefficients on interactions between *share non-Orthodox* and *share Muslim* with the famine year are consistent with the baseline specifications in Table 1, although the coefficient is slightly attenuated for birth rates. The coefficient on *famine* × *other non-Orthodox* is no longer statistically significant in any of the models. An alternative, language-based classification of the population confirms the results in Table 1: *famine* × *share Turkic* predicts higher mortality and lower natality, but the estimate is smaller and less precise; the presence of other non-Russian population groups doesn't predict the outcomes.

Adding too many variables that are collinear increases the risk of overfitting and false discovery. To reduce researcher discretion in variable selection, I implement the double-selection method.[81] This approach selects relevant covariates based on their ability to predict both treatment (*famine* × *share Muslim*) and outcome, and retains variables only with non-zero coefficients. The results (shown in Table A.8 in the supplementary material) remain robust to this analysis. Additional specifications include the famine dummy interacted with latitude, longitude, and their interaction in Table A.6; the estimates vary slightly but the key interactions remain significant. In Table A.7, I interact *share Muslim* with the year indicator. The interactions

are positive (negative) and statistically significant for death (birth) rates for 1892 and 1893, two years after the 1891 harvest failure, but not for other years. I also consider an alternative coding of the famine years, with both 1892 and 1893 coded 1. In this estimation (shown in Table A.3), the coefficient on *famine* × *share Muslim* increases in magnitude, while the coefficient on *famine* × *share other non-Orthodox* decreases. In sum, the famine was more devastating in districts with a greater share of Muslims. Muslim presence predicts higher mortality and lower natality, whereas the estimates for other religious groups or linguistic cleavages are less robust.

Province data disaggregate Muslim and Orthodox deaths, supporting the conclusion that Muslims fared worse during the famine (see Table A.2). In Kazan, Muslim mortality increased by 67 percent from 1891 to 1892, while Orthodox deaths rose by 22 percent; in Simbirsk, Muslim mortality rose by 75 percent, while Orthodox mortality rose by 24 percent; and in Astrakhan, Muslim deaths increased by 90 percent and Orthodox deaths by 71 percent.

Relief Campaign

The greater human toll in districts with greater Muslim presence suggests a more acute need for state relief. Did religious demography influence the allocation of public assistance?

In Table 2, I regress the first principal component, which corresponds to the generosity of relief by the central government, as well as separate indicators of relief on the share of the Muslim population, the share of other non-Orthodox population groups, and covariates. Standardized coefficients on key explanatory variables are plotted in Figure 5. The coefficient on *share Muslim* is negative and statistically significant for the first component of relief; a standard deviation increase in *share Muslim* (15 percent) predicts a decrease in this outcome by a quarter of a standard deviation, which is twice as large as the predicted effect of the 1891 drop in yields and exceeds most other covariates in magnitude.

TABLE 2
RELIGIOUS COMPOSITION OF THE POPULATION AND MAIN RELIEF INDICATORS[a]

	PC 1 (1)	*Months on Relief* (2)	*Relief Onset* (3)	*Avg. Bread Loan* (4)	*Pop. on Relief* (5)	*Ln(State aid +1)* (6)
Harvest pc 1891	–0.04***	–0.10***	0.06***	–0.00*	–0.65***	–0.14***
	(0.01)	(0.03)	(0.02)	(0.00)	(0.18)	(0.03)
Share Muslim	–1.73***	–5.60***	4.21***	–0.45***	–3.58	–1.63
	(0.49)	(1.68)	(1.16)	(0.16)	(9.75)	(1.75)
Share other non-Orthodox	0.07	–0.59	3.83	0.06	36.24*	1.58
	(1.18)	(4.19)	(3.16)	(0.29)	(21.01)	(3.41)
Harvest drop	0.08*	0.16	–0.18	0.01	1.75**	0.18
	(0.04)	(0.18)	(0.13)	(0.01)	(0.86)	(0.14)
Covariates	✓	✓	✓	✓	✓	✓
Province dummies	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.67	0.50	0.55	0.33	0.50	0.68
Num. obs.	173	188	173	188	173	210

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$, heteroskedasticity-robust standard errors in parentheses.

[a]All models are OLS with province fixed effects. The first principal component (model 1) combines five relief measures: months on relief, average loan size, population on relief, and total state aid. Models also include the following covariates: *share urban*, *average land allotment*, *average recruit height*, *ln(railway distance)*, *land captains per area*, *ln(distance to St. Petersburg)*, *serfdom*, *horses per household*, *noble landowners per 1000*, *black soil*, *area*, *ln(population)*, *longitude*, *latitude*, and their interaction.

It's also informative to examine separate relief indicators. Muslim presence predicts the onset and duration of the relief campaign as well as the size of the average monthly loan. A standard deviation increase in *share Muslim* predicts an approximately twenty-day delay in the delivery of food loans and a reduction of the relief campaign by almost one month ($\mu = 8$, $\sigma = 3.28$). These estimates are comparable to the effects of a standard deviation increase in the 1891 harvest. A standard deviation increase in *share Muslim* (15 percent) corresponds to a decrease in aid by 0.05 *pud,* or 0.8 kilograms ($\mu = 0.42$, $\sigma = 0.22$). The standardized coefficient on *share Muslim* is twice as large as the coefficient on *harvest pc 1891* and three times as large as the coefficient on *harvest drop*. The qualitative section unpacks this aggregate result further by showing that in some districts, loans for Muslims were set to half the size of loans for Orthodox peasants. The coefficient on *share Muslim* is negative but doesn't reach significance for the other two indicators.

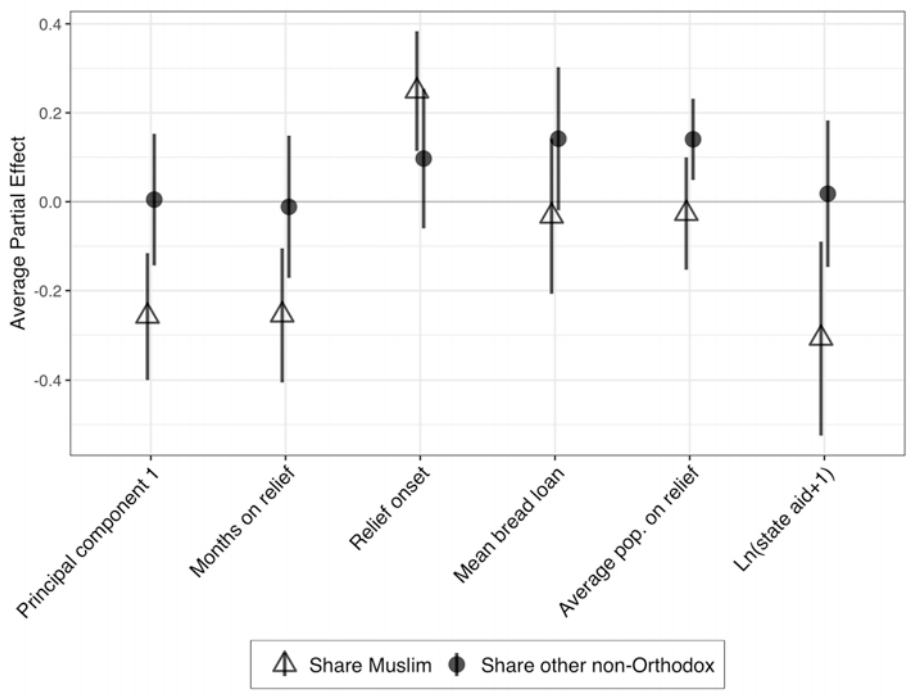


FIGURE 5
STANDARDIZED COEFFICIENTS ON *SHARE MUSLIM* AND *SHARE OTHER NON-ORTHODOX* IN REGRESSIONS OF VARIOUS INDICATORS OF FAMINE RELIEF FROM TABLE 2[a]
[a] Point estimates represent changes in each outcome equivalent to one standard deviation increase in each variable. Lines represent 95 percent confidence intervals.

By contrast, the coefficient on *share other non-Orthodox* changes signs across models, indicating more generous relief for some indicators and less generous relief for others.

Table A.11 in the supplementary material uses the same specifications but codes groups by language rather than religion. Language doesn't predict the generosity of state relief as consistently as religious cleavages do.

Figure 6 examines the sensitivity of the coefficient on *share Muslim* to unobserved confounding. The distance to the line indicates that the unobserved confounder, such as poverty, would have to be many times more powerful than the observed confounders, including *ln(distance to the railway)*, *harvest drop*, *serfdom*, and *harvest pc 1891*, selected for their high explanatory power.

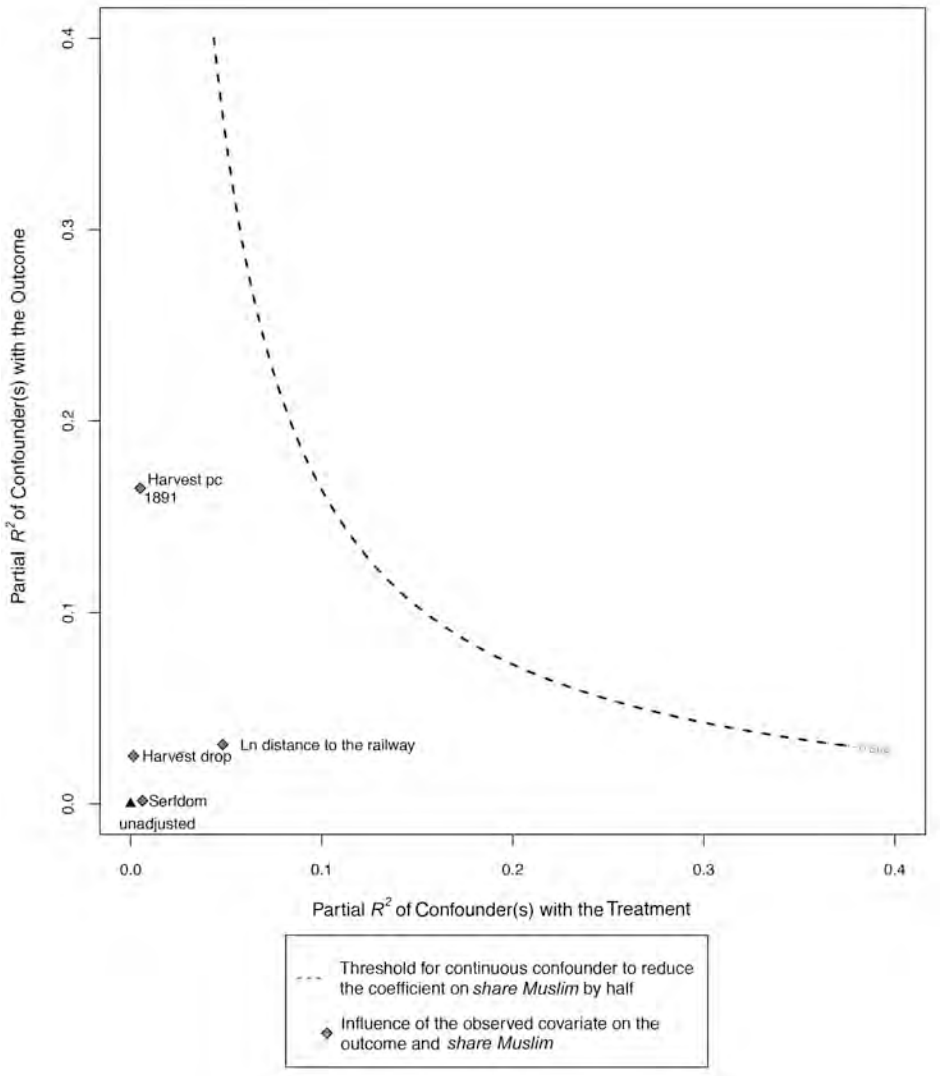


FIGURE 6
SENSITIVITY OF THE EFFECT OF *SHARE MUSLIM* TO UNOBSERVABLES
BASED ON TABLE 2, MODLE 1[a]

[a] The y-axis represents the effect of the confounder on *principal component 1*; the x-axis represents the effect of the confounder on s*hare Muslim*. The line represents threshold for the covariate to reduce the treatment effect by half. Select observed covariates are plotted as benchmarks; the closer to the line, the more powerful the covariate.

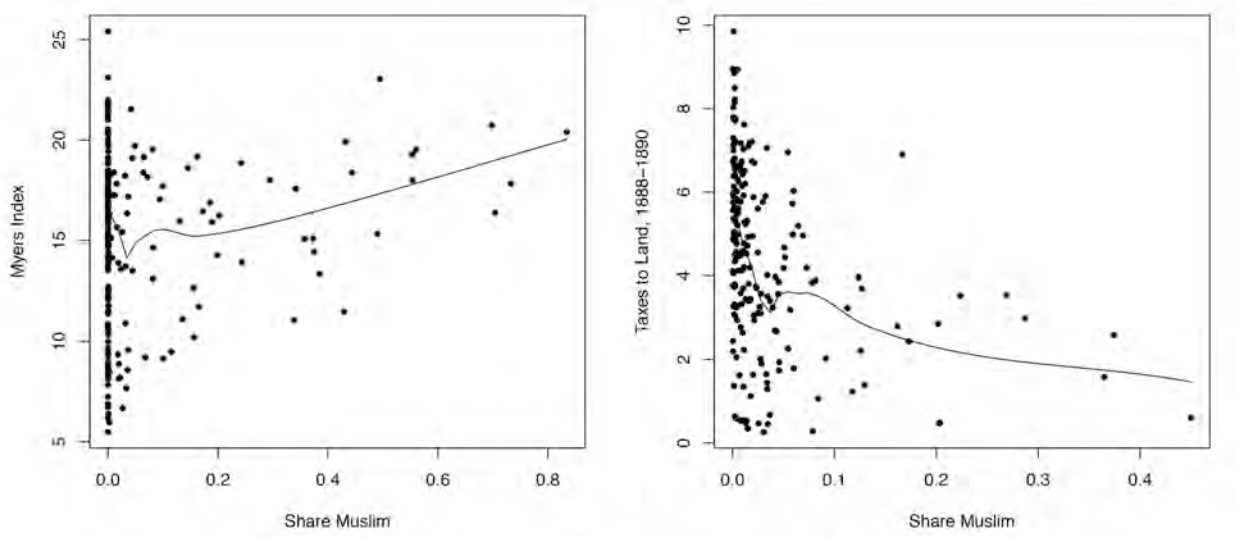
In sum, districts with a larger Muslim minority (but not other non-Orthodox groups) were disadvantaged in the allocation of famine relief. They received smaller loans, and the relief

campaign started later and lasted for a shorter time. Religious differences are stronger predictors of relief than are linguistic differences.

UNDERSTANDING THE MECHANISMS

I hypothesize that greater information asymmetries and lower state revenues explain the less generous assistance in districts with a higher share of Muslims. If this is the case, the share of Muslims (but not of other minorities) should predict higher age heaping and lower prefamine tax revenues. In turn, both age heaping and taxes should predict famine relief, conditional on harvest. Alternatively, if officials are motivated by prejudice alone, Muslims should be disadvantaged not only in relief transfers, but also in taxes. The analysis presented below is more exploratory, given that legibility is measured indirectly, using postfamine data on ages.

Figure 7 shows that age heaping increases and tax revenue decreases with *share Muslim*. Analyses in Table 3 investigate the robustness of these relationships to conditioning on the distance to St. Petersburg and the railway, as well as urbanization (proxies for development and accessibility), literacy (relevant for age heaping), average harvest and soil quality (most relevant for tax revenue), past incidence of serfdom, and several proxies for poverty (average recruit height, land allotment size, and horses per household). Model 1 indicates that a 15 percent increase in *share Muslim* corresponds to an increase in *Myers index* by 1.78 ($\mu = 15.02$, $\sigma = 4.06$). This is a substantively meaningful difference: the (standardized) coefficient on *share Muslim* is twice as large as the coefficient on *serfdom* and 2.5 times larger than the coefficient on *literacy*. A 15 percent increase in *share Muslim* also predicts a decrease in tax revenues per unit of land by 0.46 rubles per *desiatina*[82] ($\mu = 4.37$, $\sigma = 2.13$). The coefficient on *share Muslim* in model 3 is as large as the coefficient on soil quality and almost twice the size of the coefficient on average harvest when standardized.



Informational (a) Fiscal Capacity (b)

FIGURE 7
DISTRICT-LEVEL BIVARIATE RELATIONSHIP BETWEEN *SHARE MUSLIM* AND INFORMATIONAL AND FISCAL CAPACITY

TABLE 3
RELIGION, LANGUAGE, AND STATE-CAPACITY INDICATORS[a]

	Myers Index		*Taxes to Land*		
	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Share Muslim	11.89***		–3.07***		
	(2.20)		(0.81)		
Share other non-Orthodox	–4.49		0.87		
	(3.06)		(1.38)		
Share Turkic		0.47		0.05	
		(2.53)		(0.70)	
Share other non-Russian		–0.81		0.58	
		(1.56)		(0.61)	
Myers index					–0.07**
					(0.03)
Covariates	✓	✓	✓	✓	✓
Province dummies	✓	✓	✓	✓	✓
Adjusted R^2	0.83	0.77	0.82	0.81	0.82
Num. obs.	212	212	200	200	200

*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$, heteroskedasticity-robust standard errors in parentheses.

[a]All models are OLS with province fixed effects. Models also include the following covariates: *average harvest 1883–87, share urban, average land allotment, average recruit height, male literacy in 1897* (models 1 and 2 only), *ln(railway distance), ln(distance to St. Petersburg), serfdom, horses per household, noble landowners per 1000, black soil, area, ln(population), longitude, latitude*, and their interaction.

The share of other non-Orthodox minorities or linguistic differences (*share other non-Russian* and *share Turkic*) are not significant predictors of legibility or tax revenues, consistent with the analysis in the previous section. Model 5 in Table 3 shows that a standard deviation increase in the *Myers index* corresponds to a 0.32-ruble decrease in tax revenue. The coefficient on *Myers index* is twice as large as the coefficient on serfdom.

Next, I examine whether legibility and fiscal capacity predict famine relief. Results from Table 4 are summarized for standardized coefficients on *Myers index* and *Taxes to land* in Figure 8. The analysis supports the argument that legibility and the corresponding taxability of different population groups influenced the allocation of relief. The government was more generous in districts that were more legible (that is, those with lower *Myers index)* and that generated greater fiscal revenue. *Myers index* predicts the aggregate indicator of relief (*principal component 1)*, the duration of the relief campaign, and the size of food loans; it is positive (as expected) but imprecisely estimated for the month of relief onset. *Myers index* doesn't predict total state aid or the size of the population on relief—the two outcomes for which *share Muslim* was insignificant. For *principal component 1*, the standardized coefficient on *Myers index* is slightly lower than the coefficient on *harvest pc 1891* and 2.5 times the size of the coefficient on *serfdom*. A standard deviation increase in *Myers index* corresponds to a reduction in the average bread loans by one quarter, exceeding all other coefficients in the model.

TABLE 4
RELATIONSHIP BETWEEN LEGIBILITY AND THE PROVISION OF RELIEF,
AND RELATIONSHIP BETWEEN TAX REVENUES AND THE PROVISION OF RELIEF[a]

Relationship between Legibility and the Provision of Relief
(a)

	PC 1	*Months on Relief*	*Relief Onset*	*Avg. Bread Loan*	*Avg. Pop. on Relief*	*Ln(State aid +1)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Myers index (1897)	–0.06**	–0.12*	0.09	–0.02***	–0.18	–0.02
	(0.02)	(0.07)	(0.06)	(0.01)	(0.46)	(0.06)
Harvest pc 1891	–0.03***	–0.09***	0.05**	–0.00*	–0.49***	–0.12***
	(0.01)	(0.03)	(0.02)	(0.00)	(0.18)	(0.03)
Harvest drop	0.10**	0.18	–0.22*	0.01	2.19**	0.25*
	(0.04)	(0.18)	(0.12)	(0.01)	(0.85)	(0.14)
Covariates	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.65	0.49	0.52	0.35	0.48	0.67
Num. obs.	173	188	173	188	173	210

Relationship between Tax Revenues and the Provision of Relief
(b)

	PC 1	*Months on Relief*	*Relief Onset*	*Avg. Bread Loan*	*Avg. Pop. on Relief*	*Ln(State aid +1)*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Taxes to land (1888–1890)	0.16***	0.42**	–0.31**	0.03**	2.71**	0.38*
	(0.04)	(0.20)	(0.14)	(0.01)	(1.17)	(0.21)
Harvest pc 1891	–0.04***	–0.10***	0.07***	–0.00*	–0.54***	–0.14***
	(0.01)	(0.03)	(0.02)	(0.00)	(0.14)	(0.03)
Harvest drop	0.09**	0.18	–0.15	0.01	2.06**	0.22
	(0.04)	(0.16)	(0.12)	(0.01)	(0.83)	(0.14)
Covariates	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓
Adjusted R^2	0.69	0.51	0.53	0.34	0.56	0.68
Num. obs.	161	176	161	176	161	198

*$p < 0.1$; **$p < 0.05$; ***$p < 0.01$; heteroskedasticity-robust standard errors in parentheses.

[a]All models are OLS with province fixed effects. The first principal component Model 1 combines five relief measures: months on relief, relief onset, average loan size, population on relief, and total state aid. Models also include the following covariates: *share urban*, *average land allotment*, *average recruit height*, *ln(railway distance)*, *ln(distance to St. Petersburg)*, *serfdom*, *horses per household*, *noble landowners per 1000*, *black soil*, *area*, *ln(population)*, *longitude*, l*atitude*, and their interaction.

As expected, tax receipts in the prefamine period predict higher values of *principal component 1* and separate relief indicators, including the indicators for which *share Muslim* was

insignificant. A standard deviation increase in tax revenue ($\sigma = 2.13$) corresponds to a decrease in the duration of the relief campaign by almost a month (0.89), a delay in relief onset by 0.66 months, and a reduction of the average bread loan by 0.06 *pud*, or 1.05 kilograms ($\mu = 0.42$, $\sigma = 0.22$).

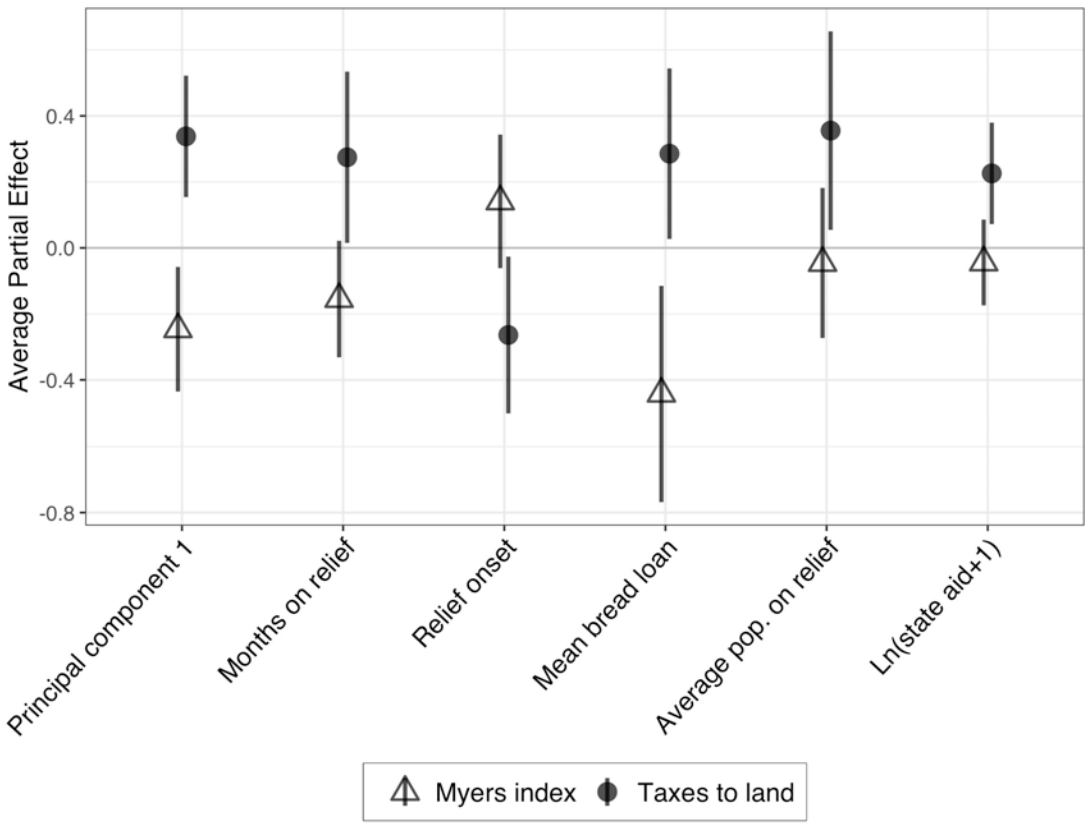


FIGURE 8
STANDARDIZED COEFFICIENTS ON *MYERS INDEX* (HIGHER VALUES MEAN LOWER LEGIBILITY) AND *TAX REVENUE* IN REGRESSIONS OF VARIOUS INDICATORS OF FAMINE RELIEF, BASED ON MODELS IN TABLE 4 WITH A FULL SET OF COVARIATES AND PROVINCE FIXED EFFECTS[a]

[a] Point estimates represent changes in each outcome equivalent to one standard deviation increase in *Myers index* or *tax revenue*. Lines represent 95 percent confidence intervals.

To the extent that informational capacity rather than prejudice determines fiscal payoff, legibility and tax revenues should affect famine relief even in districts with a negligible Muslim population. To investigate this, I repeat the analysis using a subset of districts where *share*

Muslim is below the median of 0.0000948. The coefficient on *Myers index* remains negative and significant—that is, less-legible, non-Muslim districts received less-generous famine relief. The results are similar for *taxes to land* but the coefficient doesn't reach significance (N = 67) (see Table A.12 in the supplementary material). This indicates that it was the underlying state capacity, rather than ethnic prejudice as such, that shaped the distribution of aid. Furthermore, if Muslim presence matters primarily because it reduces state informational capacity and fiscal payoff, a district's religious composition should reduce relief only in districts with low state capacity. Figure A.3 in the supplementary material suggests that this is the case: the negative relationship between *share Muslim* and relief holds only at below-average legibility and taxes.[83]

The null findings for non-Muslim religious minorities and for linguistic differences are also informative with respect to the prejudice explanation. The Old Believers were more legible, generated considerable tax revenues, and on the whole were not disadvantaged in the receipt of state aid, even though they were persecuted for their beliefs and treated unfairly in other domains. Furthermore, not all non-coethnics were disadvantaged. While the share of Muslims predicts discrimination in relief and legibility, the share of Turkic speakers (who converted to Orthodoxy but retained their language) or other non-Russians does not.

An alternative explanation for these patterns is the presence of more unrest in Muslim-dominated districts. Although the threat of unrest has been argued to increase public goods provision in autocracies, it's also possible that the government stayed away from restive districts altogether or denied them aid during the famine. Scholars of Imperial Russia argue that religiously heterogeneous districts posed a greater threat of rebellion, which reduced peasant representation in zemstvos and limited redistributive policies.[84] *Share Muslim* doesn't predict peasant protest in the decade before the famine or during the abolition of serfdom, nor does

unrest predict legibility or tax revenue (see Table A.13 in the supplementary material). Still, the possibility remains that state policy was influenced by subtler or Muslim-specific forms of resistance not captured in these data. In a way, the state agents' inability to extract revenue—and, more broadly, information—can be interpreted as Muslim resistance to imperial rule.

QUALITATIVE EVIDENCE

To provide qualitative evidence on the mechanisms tested above and to address the problem of ecological inference that arises from imputing differences in the treatment of Muslims from the analysis of religiously mixed districts, I draw on proceedings (*zhurnaly)* and reports (*otchety, doklady)* of the district and provincial zemstvos and food supply commissions. I also consult archival materials pertaining to the organization of the relief campaign in Kazan, Samara, and Simbirsk provinces, all of which had sizable Muslim populations.[85]

First, the records highlight the difficulties in gathering reliable information about harvests and peasant needs. On the eve of the famine, the zemstvos in Kazan and Samara encountered particular challenges when surveying the Muslim population. Reportedly, members deliberately misled zemstvo officials for "fear that they might be baptized or evicted." Muslim distrust was "so great that in some villages it was necessary to abandon the census."[86] Some Muslim communes refused to be surveyed because it would "lead to higher taxes." The population in Sultangulov Volost (Buguruslan district) had to be visited three times; the locals agreed only after they visited a neighboring locality to observe zemstvo work there.[87] Zemstvo officials also noted that whereas German peasants provided accurate information, the information from Old Believers was less trustworthy than that received from the Orthodox peasants. The officials remarked that literacy didn't guarantee "truthfulness."[88]

Inadequate information about local economies, in turn, complicated tax assessment and reduced fiscal payoff. In 1888, the Buzuluk zemstvo board (Samara province) discussed tax arrears and lamented that peasants (ethnicity unspecified) were still repaying the food and seed loans granted after the poor harvests of 1873 and 1880. The board favored petitioning the tsar to extend the loan repayment period because of the difficulties in collecting the arrears, and expressed skepticism that additional loans would be repaid.[89] One official questioned the need for providing seed loans to Bashkirs [Muslims] because the loan "would not be used for its intended purpose, since the Bashkirs there are generally bad landowners."[90] Similarly, the Buguruslan zemstvo complained in 1888 that some Muslim communes had paid no taxes for six years, and asked the governor to allow bailiffs to accompany the zemstvo officials and facilitate collecting the arrears.[91] Another source notes, "Being bad farmers, Tatars [Muslims] are bad taxpayers. The indebtedness of the Tatar population … is enormous and significantly exceeds the indebtedness of other groups in the region."[92] In Saratov, for instance, the arrears of the Orthodox peasants stood at 2.95 rubles per household in 1885, whereas the arrears of the Muslim population reached 65 rubles per household.[93]

Monitoring the distribution of relief was particularly important during the famine. In Simbirsk, concern that aid wasn't reaching its target led the provincial zemstvo, in September 1892, to discuss alternative ways of distributing relief. The chairman of the provincial board admitted that "the genuinely needy did not receive enough [loans], while those with less urgent needs received [them] in excess."[94] The zemstvo was especially concerned about misallocation of aid in the district of Buinsk, which had a large Muslim minority (36 percent). Buguruslan zemstvo (Samara province) stressed the importance of giving seed loans only to persons "who had land prepared for winter sowing," and asked land captains to help monitor that the loans

were "used for their intended purpose."[95] Similar concerns about monitoring how loans were used were raised in Kazan province.[96]

Zemstvos lacked the police power that would have allowed them to compel village communes to maintain their grain reserves in good order. Instead, they mostly relied on the rural population's quasi-voluntary compliance. To distribute food and cash loans among its members, a commune had to draw up a declaration (*prigovor)* specifying the beneficiary and the amount; the local (*volost')* administration would then verify the declaration and the district zemstvo board would authorize it. This was no easy task in Muslim communes: the records had to be kept in Russian, and the requirement that villagers sign documents of unknown content incited fears of baptism.[97]

Second, zemstvo records confirm the main statistical finding: Muslims received less aid during the famine. The size of a loan was sometimes explicitly tied to the recipient's identity. In Buguruslan district (Samara), loans granted to Muslims were half the size of those granted to the Orthodox peasants, at sixteen pounds of grain (or *funty,* equivalent to 6.6 kilos) per person per month. Officials justified this by "the huge indebtedness […] for food loans given in previous years, incorrect universal requests for food loans at the present time, and […] the custom of eating horse meat, which is now extremely cheap."[98] In late 1891, given the desperate situation, the Buguruslan zemstvo increased loan size to thirty-two pounds, but this policy didn't take effect until February 1892.[99] Monthly loans granted to Muslims in Stavropol district (Samara) were also initially set at twenty pounds per recipient, half the size of loans to non-Muslims.[100] In Novouzensk district (Samara), the zemstvo also initially decided to issue half rations to Muslims, but increased the rations in response to petitions.[101]

Some officials were clearly motivated by prejudice. They questioned the needs of the Muslim communes, believing that "Tatars" [Muslims] exploited state generosity and suffered due to laziness. During the October 1891 session of the Samara provincial zemstvo assembly, a deputy argued that Muslims sold their grain immediately after the harvest in order to qualify for zemstvo loans.[102] Similarly, the zemstvo board of Spasskii district (Kazan) claimed that food loans had a "corrupting moral influence on the population, particularly the Tatars," drawing attention to the latter's heavy indebtedness.[103]

Yet much of the discussion focuses on high arrears, difficulties in securing the repayment of future loans, and other budgetary considerations. The Kazan provincial zemstvo board argued—with respect to peasants of all faiths—that "in view of the excessive debt of the population on food loans, the requirements for new food loans should be treated with the utmost caution, limiting them to cases of disasters and indisputable need."[104] District zemstvos often invoked budgetary concerns when requesting aid from the central government. In Spasskii district (Kazan), the zemstvo noted that failing to provide assistance in 1892 would "create an artificial famine in 1893 and 1894" and result "in a heavy burden on the funds of the state."[105] Relief was seen as ensuring that the fields were planted, which was necessary for future tax revenues and grain exports.

It seems that local officials used religion as a heuristic for tax-paying capacity because they lacked reliable information about peasant living standards, and Muslims were ipso facto less legible and less willing to pay up. It wasn't so much the poverty of the Muslim population that was to blame. Rather, in the words of the Stavropol district zemstvo's Audit Commission (Revizionnaia Komissia), it was the zemstvo's inability "to take any decisive measures" against the Muslims, which meant that the zemstvo was "forced to assist this population during poor

harvests without any hope of repayment of the loans issued, which burdens the budget of the zemstvo and other taxpayers." Indeed, the Commission pointed out that Muslims were the most recalcitrant payers, despite possessing "huge, in comparison with the rest of the population, land allotments."[106]

The "decisive measures" the Stavropol Audit Commission had in mind may be discerned from the zemstvo's 1888 petition to the MVD. The petition asked the authorities to compel indebted Tatar communes to rent out their excess allotment land and use the proceeds to pay down arrears in taxes and contributions to the food supply fund. As an alternative, villages in arrears could set aside land for communal tillage "in such a quantity and for as long a term as the Zemstvo Board deems necessary to liquidate the arrears."[107] The provincial zemstvo in Samara observed "a stubborn unwillingness" to comply with this requirement among the Muslim population, which despite "really needing and demanding a loan, resolutely refused to accept communal tillage."[108]

The communal tillage requirement was designed to ensure adequate grain storage for future harvest failures and prompt repayment of grain loans from the state. The Muslims' refusal to comply delayed the arrival of relief. In Samara district, for example, it wasn't until February 1892 that most Tatar villages finally agreed to introduce communal tillage and consequently began receiving food and seed loans. Even then, one village continued to hold out.[109]

The fiscal rationale was also central to the response of the central government. The Finance Ministry pressured zemstvos to hold the line on requests for aid and keep loans to a minimum. The ministry dragged its feet on banning grain exports, worried about the fiscal impact of the ban. It waited until mid-August to ban rye exports, and then only at a few ports at a time. The main export crop, wheat, was exported until November 3rd.[110]

The Interior Ministry (MVD) likewise distrusted local requests for aid and sent its own agent to gather additional information. The agent's telegrams to St. Petersburg called for a sharp reduction in the estimates of need and recommended "extreme caution in the disbursal of relief monies." Distrusting zemstvo figures, the agent sometimes brought in local tax collectors.[111] The MVD insisted that the provinces affected by famine must "cover a part of their needs with … [the local] supplies," which explains the zemstvos' emphasis on communal tillage as a precondition for loans.[112]

MVD circulars frequently mention tax collection. In August 1891, a circular issued to provincial governors emphasized the need to gather accurate information *before* suspending the collection of taxes and arrears; it suggested that deferment apply only to redemption payments and not to regular taxes, "lest the state lose revenue." The MVD cautioned that some communes might be able to fulfill their fiscal obligations even when the harvest fails.[113]

To summarize, zemstvo records confirm the main statistical finding: Muslims were often underserved in the provision of famine relief. This wasn't due to prejudice alone, although anti-Muslim sentiment was indeed widespread. Fiscal considerations and information asymmetries figure prominently as motivations in their own right. Muslim communes presented greater challenges than Orthodox communes to officials who were responsible for tax and debt collection. State agents' inability to enforce the communal tillage mandates and to monitor how loans were used meant that the fiscal payoff from assisting Muslims was lower than the fiscal payoff from assisting other population groups. These local incentives were in line with the central policy of minimizing expenditure and ensuring a steady stream of tax revenue—even during the famine.

Conclusion

States rarely treat all citizens equally. This article shows that one of the largest famines in Russia's history brought higher mortality and lower natality to districts with a larger Muslim population. At the same time, relief from the central government arrived in these districts later, lasted for a shorter period, and was less plentiful.

I argue that this pattern in the distribution of relief can be explained, in part, by greater information asymmetries with regard to the Muslim minority. State agents diverted famine relief away from groups that were difficult to monitor and tax and channeled it toward the more legible population, with the goal of maximizing revenues. Statistical analysis confirms that prefamine tax receipts decreased while age heaping—a proxy for informational capacity—increased with the share of Muslims, but not with the share of other minorities. Legibility and tax revenue, in turn, predict the generosity of relief. Zemstvo reports support this interpretation, although they also highlight the prevalence of prejudice against Muslims. Local officials neglected the Muslims' welfare because they didn't expect this minority group to repay state loans and pay tax arrears.

Politicians and bureaucrats often lack institutional capabilities to translate their preferences into policy outcomes when interacting with ethnic and religious minorities, whether or not they're motivated by electoral considerations, out-group prejudice, or revenue maximization. This argument implies that non-coethnics are disadvantaged in some domains of distributive politics *because* they benefit from low state capacity in others. The flip side of state discrimination against minorities in the distribution of resources is that when it comes to raising tax revenue and conscripts, state agents rely more heavily on coethnic areas where they have more reliable intermediaries or more direct access.

I emphasize the implications of legibility for state responsiveness during hard times, but the argument draws on the equilibrium dynamics. In a longer time frame, discrimination by administratively weak states is both a cause of legibility and an effect. When ethnic minorities are illegible, state officials can't verify their needs or ensure that invested resources will pay off in the future, which lowers the incentives for officials to invest in minority-dominated areas. The resulting discrimination by the state further reduces minorities' willingness to comply with taxation and other state obligations.

The theory is most applicable to states that have limited electoral accountability, are concerned with extracting maximum revenue from their populations, and lack easy access to rents from natural resources. Imperial Russia wasn't unique in seeking to maximize fiscal returns; many other colonial powers set up institutions to extract resources from the governed populations through excessive taxation, along with outright economic exploitation and plunder.[114] Maximizing revenue motivated the British in Bengal and Kenya, the Spanish Crown in the Americas, and the Belgians in the Congo.[115] The need for revenue only increased in times of war.[116] For instance, Alexander Lee shows that local intermediaries were incorporated in governance when the empire was militarily and financially secure, but not in times of European war, when fiscal pressures were higher and direct rule was preferred.

In an agrarian empire, harvest failures were closely tied to state revenues. The 1891/1892 famine occurred at a time when Russia faced immense pressure to increase state revenues and modernize its economy to remain competitive with the other great powers. The related objectives—maximizing domestic tax revenues and increasing grain exports—were needed to finance state-led industrialization and military modernization. Correspondingly, Russia embarked on a series of reforms to eliminate religious intermediaries and standardize tax

obligations across groups. In the years leading up to the famine, Russia imposed new duties on imports and increased excise taxes on basic consumer goods to encourage the sale of grain. During the famine, food and seed loans were supplied not only to help hungry peasants, but also to ensure that fields would be planted and taxes paid in the next harvest season. In this regard, the relief campaign of 1891/1892 succeeded: the long-term economic damage wrought by the crop failure was minimal.[117]

Supplementary Material

Supplementary material for this article can be found at https://doi.org/10.1017/S0043887tktkt.

Data

Replication files for this article can be found at https://doi.org/10.7910/DVN/Q4DMKK.

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KEY WORDS

autocracy, discrimination, distributive politics, ethnic bias, ethnic favoritism, famine relief, fiscal capacity, governance, indirect rule, informational capacity, legibility, minorities, Muslims, rebellion, Russian Empire, taxation

[1] Franck and Rainer 2012; Lee 2018; Posner 2005.

[2] Golden and Min 2013.

[3] Dixit and Londregan 1996.

[4] Adida et al. 2017; Carlson 2015.

[5] Greenwald and Pettigrew 2014.

[6] Darden and Mylonas 2016; Singh and vom Hau 2016; Wimmer 2016.

[7] Migdal 1988; Scott 1998.

[8] Lee and Zhang 2017; Soifer 2013; Suryanarayan and White 2021.

[9] Ó Gráda 2009, 195–215.

[10] Mani and Mukand 2007.

[11] State policies, such as the collectivization of agriculture and excessive grain procurement, may also cause famines. Meng, Qian, and Yared 2015; Naumenko 2021.

[12] I use religion rather than language or nationality as the key ethnic attribute, because Russia historically relied on the confessional governance model. Kappeler 2001, 141–42.

[13] Dixit and Londregan 1996.

[14] Kasara 2007.

[15] Magiya 2021.

[16] Singh and vom Hau 2016; Wimmer 2016.

[17] E.g., Ali et al. 2019; Lee 2019.

[18] Lee 2019.

[19] McAlexander and Ricart-Huguet 2021.

[20] Lust and Rakner 2018.

[21] Kung and Chen 2011; Meng, Qian, and Yared 2015; Sen 1999.

[22] Scott 1998.

[23] Markevich, Naumenko, and Qian 2021.

[24] See review by Ravallion 1997.

[25] I define ethnic groups as groups whose membership is based on descent-based attributes, such as region, religion, language, dialect, tribe, and caste, etc. The relevance of specific attributes is context-dependent.

[26] Brambor et al. 2020; Scott 1998; Soifer 2013.

[27] Hanson and Sigman 2021.

[28] Lee and Zhang 2017; Levi 1989; Soifer 2013.

[29] Ertman 1997, 16.

[30] Lee and Zhang 2017; Scott 1998.

[31] Christensen and Garfias 2021; Lee and Zhang 2017.

[32] Kasara 2007; Lieberman 2003.

[33] Lust and Rakner 2018.

[34] Lee 2019; Migdal 1988; Scott 1998.

[35] Chen, Pan, and Xu 2016; Distelhorst and Hou 2017.

[36] Scott 1998, 29; Ó Gráda 2009, 56–57.

[37] According to the 1897 census, 3.2 million Muslims lived in the twenty-two provinces affected by famine, accounting for 7.5 percent of the population. Old Believers formed the second-largest religious minority, with 0.96 million adherents, or 2.2 percent of the population. Western Christians (the most numerous being Lutherans and Roman Catholics) together amounted to 0.74 million (1.7 percent), but they were unevenly distributed; in some districts they made up two-fifths of the population.

[38] Kahan 1989, 131.

[39] Robbins 1975, 7–8.

[40] Simms 1982, 68.

[41] Robbins 1975, 168.

[42] Peasants of all religions lived in communes and were collectively responsible for harvests and taxes.

[43] Robbins 1975, 24, 264.

[44] Robbins 1971, 264.

[45] Figes 1996, 161.

[46] Figes 1996, 161–62.

[47] Mortality estimates in Figure 1 are from Table 3.6, column 3, in Wheatcroft 1992, 56–57.

[48] Burbank 2006, 416.

[49] Kappeler 2001, 29–30.

[50] Tuna 2015.

[51] Long 1988, 17–18.

[52] Peter the Great imposed the beard tax in 1698 to encourage men to shave, following Western European style. The Old Believers were allowed to keep their beards after paying the tax.

[53] De Simone 2018, 43.

[54] Tuna 2015, 92.

[55] Vladimirova 2016, 47–48.

[56] Long 1988, 26–29; Lankina 2012.

[57] The 1863 decree allowed the Old Believers to hold public office; the 1874 decree recognized their marriages; and the 1883 decree further expanded the Old Believers' civil and religious rights, including by allowing them to obtain identification documents and build houses of worship.

[58] Brooks 1982, 246.

[59] Scott 1998.

[60] The main affected provinces are Kazan, Kherson, Nizhegorod, Orel, Orenburg, Penza, Perm, Riazan, Samara, Saratov, Simbirsk, Tambov, Tula, Ufa, Viatka, and Voronezh. In addition, Arkhangelsk, Kaluga, Kursk, Olonets, Tavrida, and Kharkov received assistance. Astrakhan, where the Russian Orthodox population was just under 50 percent, was affected but received no aid.

[61] Unlike the data collected by state agents in the 1897 census, births and deaths were registered by the religious institutions, provided the appropriate rituals were performed. These data are less likely to reflect illegibility to the state, particularly after the 1886 abolition of the poll tax.

[62] Natkhov and Vasilenok 2021.

[63] Tobol'sk province, outside of European Russia, is excluded because data on other variables are not available for it. In Kursk province, four districts didn't receive relief because they experienced no harvest failure. Data on relief onset and number of relief recipients are missing for Kaluga and Kharkov.

[64] Sometimes relief was interrupted but resumed midway through a campaign.

[65] The *pud (pudy)* is an imperial Russian unit of mass, equivalent to 16.38 kilograms. Zemstvos also used *funt* (pound); 1 *pud* = 40 *funtov* (pounds).

[66] To compute this variable, I used data on grain prices to convert food and seed loans to their equivalent in rye grain at September 1891 prices.

[67] "Nalichnoe Naselenie Rossiiskoi Imperii za 1870 God" 1875.

[68] Imperial Russia did not collect data on nationality.

[69] E.g., in Kazan province, 36 percent of the Orthodox population spoke Tatar or Bashkir.

[70] Lee and Zhang 2017.

[71] Zagidullin 2000, 166–68.

[72] See Suryanarayan and White 2021 for a similar approach.

[73] Former serfs also made redemption payments (*vykupnye platezhi)* that were charged to compensate for lost labor services and quitrent.

[74] Available in the 1888 MVD publication *Average Harvest in European Russia in 1883–87*.

[75] The data come from Dower et al. 2018 and are measured in 1883.

[76] Note that recruit height varies by ethnicity, with Russians being taller than Tatar and Bashkir recruits (Anuchin 1889, 110–11). An additional limitation of this measure is that height was recorded only for draftees who passed a medical examination that included a minimum height requirement, so the indicator is biased upward; Markevich and Zhuravskaya 2018.

[77] Variable *black soil* from Dower et al. 2018.

[78] These variables aren't used in all models because they are measured after several of the main outcomes or explanatory variables.

[79] Robbins 1975, 125–26.

[80] Grain output is more likely to affect birth and death rates when food is scarce. Meng, Qian, and Yared 2015; Natkhov and Vasilenok 2021.

[81] Chernozhukov et al. 2018.

[82] The *desiatina* is a unit of area equivalent to 10,925 square meters.

[83] The results are stronger for tax revenues (models 3 and 4 in Table A.12).

[84] Dower et al. 2018.

[85] European settlers, particularly numerous in Samara province, weren't mentioned in discussions about relief distribution.

[86] Discussion here was about *podvornaya perepis*, the household census conducted by zemstvos in the 1880s. Fortunatov 1892, xix–xx.

[87] Vladimirova 2016, 72–73.

[88] Fortunatov 1892, xix–xx.

[89] *Buzulukskoe Uezdnoe Zemskoe Sobranie* 1888, 4–5, 13–14.

[90] *Buzulukskoe Uezdnoe Zemskoe Sobranie* 1888, 171–72.

[91] Vladimirova 2016, 61, 103.

[92] Semenov 1901, 164.

[93] *Sbornik Svedenii* 1886, 135–36.

[94] *Simbirskoe Gubernskoe Sobranie* 1892, 7.

[95] *Buguruslanskoe Zemskoe Sobranie* 1894, 167–68.

[96] National Archive of the Republic of Tartarstan, 81-2-407, "Kozmodem'ianskaia Uezdnaia Zemskaia Uprava," 56. 1891.

[97] Vladimirova 2016, 47–48.

[98] *Buguruslanskoe Zemskoe Sobranie* 1892, 21.

[99] *Buguruslanskoe Zemskoe Sobranie* 1892, 54; *Buguruslanskaia Zemskaia Uprava* 1893, 9.

[100] *Stavropolskoe Uezdnoe Zemskoe Sobranie* 1893, 209.

[101] *Novouzenskoe Uezdnoe Zemskoe Sobranie* 1891, 9.

[102] *Stavropolskoe Uezdnoe Zemskoe Sobranie* 1893, 24–25.

[103] National Archive of the Republic of Tartarstan, 81-1-163, "Kazanskaia Zemskaia Gubernskaia Uprava," 282–83. 1892.

[104] National Archive of the Republic of Tartarstan, 81-1-163, "Doklad po voprosam o nuzhdakh naroda vvidu neurozhaia," 274. 1892.

[105] National Archive of the Republic of Tartarstan, 81-2-437, "Perepiska o vydache ssud na obsemenenie polej," 8. 1892.

[106] *Stavropolskoe Uezdnoe Zemskoe Sobranie* 1892, 225.

[107] *Stavropolskaia Uezdnaia Uprava* 1892, 6.

[108] *Prilozhenie* 1893, 5.

[109] *Prodovol'stvennyi Komitet* 1892, 10.

[110] Robbins 1975, 207.

[111] Robbins 1975, 47.

[112] Robbins 1975, 51.

[113] Circular of the Zemskii Otdel, August 1, 1891, no. 30, TsGIA, f. Dep. Obshchikh del, op 238 d. 78 "Tsirkuliary za 1891 god," 31–33. Cited in Robbins 1975, 52.

[114] Acemoglu, Johnson, and Robinson 2001; Young 1994.

[115] Frankema 2011.

[116] Guardado 2018; Lee 2017.

[117] Simms 1982, 69–74.

Supplementary Material

Explaining out-group bias in weak states: Religion and legibility in the 1891/1892 Russian famine

World Politics Apr. 2022

Volha Charnysh

Replication files at Charnysh, Volha. 2021. Harvard Dataverse, doi:10.7910/DVN/Q4DMKK.

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A Descriptive statistics

Table A.1: Descriptive statistics for main variables; data from provinces affected by the famine and receiving state aid.

Statistic	N	Mean	St. Dev.	Min	Max
Deaths per 1000 people	1,740	53.78	6.50	14.33	84.09
Births per 1000 people	1,740	41.42	8.76	11.76	76.85
Harvest (pud) per capita*	1,522	19.76	13.44	−5.77	143.28
Principal component 1	175	−0.00	1.00	−2.83	2.21
Mean food loan (pud)	190	0.42	0.22	0.00	1.33
Months on relief	190	7.76	3.28	0.00	13.00
Relief onset (month)	175	5.31	2.52	1.00	13.00
Harvest in 1891 (pud per capita)*	210	10.04	9.08	−6.60	75.75
State aid per capita	212	2.28	2.09	0	9
Local aid per capita	212	0.57	0.65	0.00	3.37
Average population on relief pc	190	0.25	0.17	0.00	0.72
Myers index	212	15.02	4.06	5.49	23.12
Taxes to land, 1888-1890	200	4.37	2.13	0.26	9.85
Share non-Orthodox (1870)	212	0.10	0.17	0.0002	0.86
Share Muslim (1870)	212	0.06	0.15	0	1
Share other non-Orthodox (1870)	212	0.03	0.06	0.0001	0.45
Share Turkic	212	0.08	0.18	0.00	0.91
Share other non-Russian	212	0.07	0.13	0.0003	0.73
Blacksoil	212	0.31	0.33	0.00	0.96
Serfdom (share)	212	0.32	0.25	0.00	0.85
Distance to railway (km)	212	99.77	124.61	0.38	821.45
Land captains per district area	212	0.53	0.34	0.00	1.32
Distance to St. Petersburg (km)	212	1,117.16	331.88	200.30	2,020.35
Population	212	167,319	86,791	11,292	458,629
Horses per household	212	0.76	0.10	0.31	0.93
Average yield 1888-87	212	3.25	1.20	0.83	6.67
Average recruit height (m)	212	1.64	0.01	1.62	1.68
Noble landowners per 1,000 people (1877)	212	1.40	1.33	0.00	7.25
Average land allotment	212	5.89	5.27	1.60	41.30

* Note that harvest is negative in a few districts because sown grain exceeds harvested grain. The variable (*chistyi ostatok* in Russian for wheat, rye, and oats) was divided by the district's population.

B Mortality and natality during the famine

Table A.2: Change in birth and death rates from 1891 to 1892 by religion for provinces that had a large Muslim population. All numbers are percentages.

Province	**Share Muslim**	**Change in death rate 1891–92**			**Change in birth rate 1891–92**		
		Orthodox	**Muslim**	**Difference**	**Orthodox**	**Muslim**	**Difference**
Simbirsk	8.25	23.74	73.13	−49.39	−13.75	−29.14	15.39
Samara	9.75	67.33	50.07	17.26	−14.80	−21.65	6.85
Orenburg	26.95	35.57	56.14	−20.57	−20.82	−22.97	2.15
Kazan'	26.08	22.46	67.21	−44.75	−14.90	−23.81	8.91
Astrakhan'	28.43	71.35	89.67	−18.32	−7.84	−5.17	−2.67
Taurida	18.03	7.87	22.88	−15.01	−6.12	−0.01	−6.11
Ufa	54.56	41.82	49.40	−7.58	−8.85	−19.74	10.89

Note that Muslim mortality is lower than Orthodox mortality only in Samara province. This is due to the uneven spread of cholera, which largely spared Bugul'minsky district, which contained 51% of all Muslims in Samara province. In this district, cholera deaths, at 583, accounted for just 2% of all deaths in 1892. The toll of cholera was highest (14% of all deaths in 1892) in Nikolaev and Samara districts, where the Muslim population accounted for 3% and 4%, respectively.

Table A.3: Religion, language, and district-level mortality and natality during the famine. The famine dummy was coded one for both 1892 and 1893.

	Deaths per 1000 people			**Births per 1000 people**		
	(1)	(2)	(3)	(4)	(5)	(6)
Famine X non-Orthodox	12.51***			−8.99***		
	(3.01)			(1.27)		
Famine X Muslims		11.92***			−9.75***	
		(3.47)			(1.52)	
Famine X Other non-Orthodox		15.55**			−5.02	
		(6.34)			(3.12)	
Famine X Turkic			8.99***			−6.57***
			(2.57)			(1.27)
Famine X Other non-Russian			8.32***			−3.88**
			(2.58)			(1.57)
Harvest per capita (lag)	−0.02	−0.02	−0.02	0.06***	0.06***	0.06***
	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Famine X Harvest per capita (lag)	−0.11***	−0.11***	−0.07**	0.10***	0.09***	0.07**
	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Famine X Share Urban	−0.97	−1.43	1.85	5.97**	5.37**	3.71
	(3.96)	(4.07)	(3.79)	(2.62)	(2.55)	(2.47)
District FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Adj. R^2	0.65	0.65	0.65	0.69	0.69	0.69
Number of district-years	1736	1736	1736	1736	1736	1736

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

Notes: All models are OLS with district and year fixed effects. Only the 22 provinces affected by the harvest failure and subsequent relief effort are included. These are baseline specifications without additional covariates. Standard errors are clustered at the district level.

Table A.4: Religion, language, and district-level mortality and natality during the famine. Standard errors account for temporal and spatial correlation. Famine dummy is equal to one for 1892.

	Deaths per 1000 people			**Births per 1000 people**		
	(1)	(2)	(3)	(4)	(5)	(6)
Famine X non-Orthodox	13.50**			−7.16***		
	(5.66)			(1.39)		
Famine X Share Muslims		11.83*			−7.01***	
		(6.33)			(1.82)	
Famine X Share other non-Orthodox		21.54**			−7.86**	
		(8.92)			(3.15)	
Famine X Share Turkic			8.44**			−5.84***
			(4.19)			(1.57)
Famine X Share other non-Russian			5.28			−0.70
			(3.41)			(1.76)
Harvest per capita (lag)	−0.01	−0.01	−0.02	0.06***	0.06***	0.06***
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Famine X Harvest per capita (lag)	−0.14	−0.15	−0.11	0.20***	0.20***	0.18***
	(0.11)	(0.12)	(0.12)	(0.05)	(0.05)	(0.05)
Famine X Share urban	−3.63	−4.82	−0.12	9.99***	10.09***	7.91***
	(6.75)	(6.54)	(6.99)	(2.24)	(2.32)	(2.13)
Num. obs.	1736	1736	1736	1736	1736	1736
Adj. R^2	0.98	0.98	0.98	0.99	0.99	0.99
Spatial corr. kernel cutoff (km)	900	900	900	900	900	900
Num. groups: year	8	8	8	8	8	8
Num. groups: district	217	217	217	217	217	217

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

All models are OLS with district and year fixed effects. Data from 22 provinces affected by the harvest failure and receiving relief. These are baseline specifications without additional covariates. Conley standard errors in parentheses are calculated in Stata with the Bartlett kernel, which assumes that weights gradually diminish with distance. The distance at which spatial correlation is assumed to vanish is 900km, and the distance at which serial correlation is assumed to vanish is 8 periods.

Table A.5: Religion, language, and district-level mortality and natality during the famine. Models with additional covariates. Famine dummy is equal to one for 1892.

	Deaths per 1000 people			**Births per 1000 people**		
	(1)	(2)	(3)	(4)	(5)	(6)
Famine X Share non-Orthodox	11.30***			−4.11**		
	(4.38)			(1.82)		
Famine X Share Muslim		11.02**			−4.79**	
		(4.76)			(2.01)	
Famine X Share other non-Orthodox		12.52			−1.15	
		(8.51)			(3.78)	
Famine X Turkic			6.78*			−3.80**
			(3.89)			(1.74)
Famine X Other non-Russian			5.16			−1.36
			(4.63)			(2.47)
Harvest per capita (lag)	0.00	0.00	0.00	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Famine X Harvest per capita (lag)	−0.09	−0.09	−0.09	0.19***	0.19***	0.19***
	(0.09)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)
Famine X Share urban	1.34	1.15	3.67	10.48***	10.01***	9.50***
	(7.38)	(7.55)	(7.13)	(2.74)	(2.78)	(2.95)
Famine X Ln(Distance to railway)	−1.04**	−1.04**	−1.06**	−0.11	−0.10	−0.06
	(0.53)	(0.53)	(0.53)	(0.23)	(0.23)	(0.23)
Famine X Serfdom (share)	−0.96	−0.95	−0.77	1.43	1.45	1.21
	(2.84)	(2.84)	(2.87)	(1.31)	(1.31)	(1.30)
Famine X Avg. recruit heights	16.34	13.12	38.17	−45.96*	−53.76*	−62.55**
	(59.24)	(66.04)	(60.01)	(27.54)	(30.61)	(31.28)
Famine X Horses per household	0.54	0.52	0.31	−4.15	−4.21	−4.06
	(5.88)	(5.86)	(5.91)	(3.56)	(3.54)	(3.63)
Famine X Noble landowners	−0.64	−0.63	−0.29	0.05	0.07	−0.04
	(0.60)	(0.60)	(0.53)	(0.21)	(0.23)	(0.21)
Famine X Land captains	9.53***	9.48***	9.18***	−2.27***	−2.37***	−2.28**
	(1.92)	(1.94)	(1.99)	(0.87)	(0.91)	(0.90)
Famine X Ln(Distance to St. Petersburg)	5.45**	5.49**	6.89***	−4.11***	−4.01***	−4.28***
	(2.41)	(2.42)	(2.16)	(1.27)	(1.28)	(1.16)
Famine X Population density	−0.09**	−0.09**	−0.11***	−0.01	−0.01	0.00
	(0.04)	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)
District FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Adj. R^2	0.66	0.66	0.66	0.70	0.70	0.70
Number of district years	1728	1728	1728	1728	1728	1728

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

Notes: All models are OLS with district and year fixed effects. Only the 22 provinces affected by the harvest failure and subsequent relief effort are included. Standard errors are clustered at the district level.

Table A.6: Religion, language, and district-level mortality and natality during the famine. Models add geographic covariates interacted with famine dummy (coded one for 1892).

	Deaths per 1000 people			**Births per 1000 people**		
	(1)	(2)	(3)	(4)	(5)	(6)
Famine X Muslims	10.72**	6.24*	9.48**	−6.59***	−3.78**	−5.37***
	(4.78)	(3.64)	(3.96)	(1.40)	(1.49)	(1.35)
Famine X other non-Orthodox	17.46*	21.88***	22.63**	−6.30*	−8.05**	−8.62***
	(9.86)	(8.40)	(9.11)	(3.34)	(3.21)	(3.30)
Harvest per capita (lag)	−0.00	−0.01	−0.02	0.06***	0.06***	0.06***
	(0.02)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Famine X Latitude	−0.43**			0.16*		
	(0.17)			(0.09)		
Famine X Harvest per capita (lag)	−0.19**	−0.09	−0.11	0.22***	0.17***	0.18***
	(0.09)	(0.09)	(0.09)	(0.04)	(0.04)	(0.04)
Famine X Share urban	−8.62	0.93	−1.21	11.55***	6.77***	7.57***
	(7.04)	(6.79)	(7.26)	(2.85)	(2.46)	(2.62)
Famine X Longitude		0.32***			−0.19***	
		(0.09)			(0.04)	
Latitude X Longitude X Famine			0.00**			−0.00***
			(0.00)			(0.00)
District FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Adj. R^2	0.65	0.65	0.65	0.69	0.69	0.69
Number of district years	1736	1736	1736	1736	1736	1736

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

Notes: All models are OLS with district and year fixed effects. Only the 22 provinces affected by the harvest failure and subsequent relief effort are included. Standard errors are clustered at the district level.

Table A.7: Religion, language, and district-level mortality and natality during the famine. Famine dummy is equal to one for 1892.

	Deaths per 1000 people		**Births per 1000 people**	
	(1)	(2)	(3)	(4)
year 1890 X Share Muslim	−1.44		−1.87	
	(5.45)		(5.24)	
year 1891 X Share Muslim	−0.85		2.02	
	(2.10)		(3.34)	
year 1892 X Share Muslim	11.95*		−7.36*	
	(6.21)		(4.19)	
year 1893 X Share Muslim	7.88*		−8.03*	
	(4.72)		(4.86)	
year 1894 X Share Muslim	−5.30		2.42	
	(3.44)		(5.87)	
year 1895 X Share Muslim	−3.15		−0.02	
	(4.43)		(7.44)	
year 1896 X Share Muslim	3.72		3.07	
	(2.62)		(5.76)	
year 1890 X Share Turkic		−2.65		−0.89
		(2.94)		(2.73)
year 1891 X Share Turkic		−1.48		−0.96
		(1.58)		(2.10)
year 1892 X Share Turkic		8.31*		−5.85**
		(4.79)		(2.42)
year 1893 X Share Turkic		6.73**		−4.51*
		(2.73)		(2.69)
year 1894 X Share Turkic		−3.93*		3.84
		(2.29)		(2.85)
year 1895 X Share Turkic		−2.51		−1.10
		(2.57)		(3.27)
year 1896 X Share Turkic		2.97*		3.51
		(1.67)		(2.48)
Harvest per capita (lag)	−0.02	−0.02	0.07***	0.06***
	(0.01)	(0.01)	(0.02)	(0.02)
Famine X Harvest per capita (lag)	−0.15*	−0.11	0.20***	0.18***
	(0.09)	(0.09)	(0.04)	(0.04)
Famine X Share urban	−4.75	−0.09	10.01***	7.91***
	(6.90)	(6.53)	(2.67)	(2.65)
Famine X Share other non-Orthodox	21.37**		−7.66**	
	(9.70)		(3.31)	
Famine X Share other non-Russian		5.28		−0.70
		(4.23)		(1.80)
District FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Adj. R^2	0.65	0.64	0.70	0.69
Number of district years	1736	1736	1736	1736

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

Notes: All models are OLS with district and year fixed effects. Only the 22 provinces affected by the harvest failure and subsequent relief effort are included. Standard errors are clustered at the district level.

Table A.8: Religion, language, and district-level mortality and natality during the famine. Famine dummy is coded one for 1892. Estimates are based on the double-selection method for including covariates proposed by Chernozhukov et al. (2018).

	Deaths per 1000 people			**Births per 1000 people**		
	(1)	(2)	(3)	(4)	(5)	(6)
Share non-Orthodox	11.15**			−3.71**		
	(4.32)			(1.86)		
Share Muslim		10.48**			−6.55***	
		(4.59)			(1.57)	
Share Turkic			9.21**			−2.21
			(3.73)			(1.67)
Famine X Share other non-Orthodox		13.99*			−5.05*	
		(7.71)			(3.01)	
Famine X Share other non-Russian			2.52			−0.82
			(4.02)			(2.46)
Harvest per capita (lag)	0.00	0.00		0.05***	0.06***	0.05***
	(0.01)	(0.01)		(0.01)	(0.01)	(0.01)
Famine X Harvest per capita (lag)	−0.08	−0.09		0.18***	0.17***	0.17***
	(0.08)	(0.09)		(0.04)	(0.04)	(0.04)
Famine X Share urban	1.91	1.03	4.85	9.56***	10.05***	8.46***
	(7.26)	(7.46)	(7.25)	(2.66)	(2.53)	(2.91)
Famine X Ln(distance to railway)	−1.10**	−1.09**	−1.66***	0.04	0.34*	0.03
	(0.51)	(0.51)	(0.44)	(0.22)	(0.19)	(0.23)
Famine X Serfdom (share)	−1.16	−1.19	−3.57	1.78	2.47**	1.98
	(2.78)	(2.79)	(2.61)	(1.29)	(1.21)	(1.21)
Famine X Avg. recruit heights	−16.12	−16.85		14.48***		15.55***
	(11.16)	(11.19)		(5.52)		(4.99)
Famine X Horses per household	−0.63	−0.36		−1.87		
	(5.74)	(5.76)		(3.61)		
Famine X Noble landowners	−0.64	−0.61	−0.67	0.05	0.32	−0.06
	(0.59)	(0.59)	(0.47)	(0.21)	(0.20)	(0.21)
Famine X Land captains	9.46***	9.37***	9.50***	−1.87**	−2.27***	−1.93**
	(1.85)	(1.83)	(1.90)	(0.90)	(0.80)	(0.90)
Famine X Ln(distance to St. Petersburg)	5.47**	5.61**	2.11***	−4.20***	−1.24***	−4.69***
	(2.36)	(2.36)	(0.39)	(1.19)	(0.21)	(1.13)
Famine X Population density	−0.09**	−0.09**	−0.13***	−0.01		0.00
	(0.04)	(0.04)	(0.04)	(0.02)		(0.02)
District FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Adj. R^2	0.67	0.67	0.67	0.70	0.70	0.70
Number of district years	1728	1728	1728	1728	1728	1728

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

Notes: All models are OLS with district and year fixed effects. Only the 22 provinces affected by the harvest failure and subsequent relief effort are included. All covariates were included in the first-stage analysis, but only some were selected as relevant by the double-selection method because they predict both treatment (religion) and mortality/natality. Standard errors are clustered at the district level.

C Legibility measured as age heaping

I compute the Myers index of age heaping as a proxy for legibility of the population. The 1897 Russian census records ages from under one year old to "110 and older." However, in most districts, the number of people of a specific age dwindles considerably already in the 40s (see Figure 4 in text). To construct the index, I limit the population to multiples of ten and use the cut-off of 15 to 74.[112] The Myers index calculates total population starting from each terminal digit. For ages between 15 and 74 this means calculating the population at each terminal digit for [15–64], [16–65], [17–66], [18-67], and so on up to [24–73], and aggregating the population in these ten sets into a blended total. In this blended total, people aged 15 are counted once, people aged 16 are counted twice, etc. The blended population at each terminal digit is then represented as a percentage of the blended total, and the deviation of each of these percentages from 10 is calculated. If there is no age heaping, the population at each digit should amount to 10% of the total. As a final step, all deviations from 10 are added up and divided by two.

An alternative indicator of age heaping is the Whipple index, which is more sensitive to scale and does not account for the fact that terminal digits at the end of each age bracket (e.g., 9 in [20-29] and [30-39]) will have less population than the terminal digit at the beginning of the bracket (e.g., 1 in [20-29] and [30-39]).[113] In the Russian data, the Whipple index and the Myers index are correlated at $\rho = 0.99$. Figure A.1 maps the Myers index at the district level for European Russia.

[112] An alternative index using all ages from 0 to 109 is correlated at $\rho = 0.98$ with the index that uses ages 15 to 74.

[113] M. M. Lee and Zhang 2017.

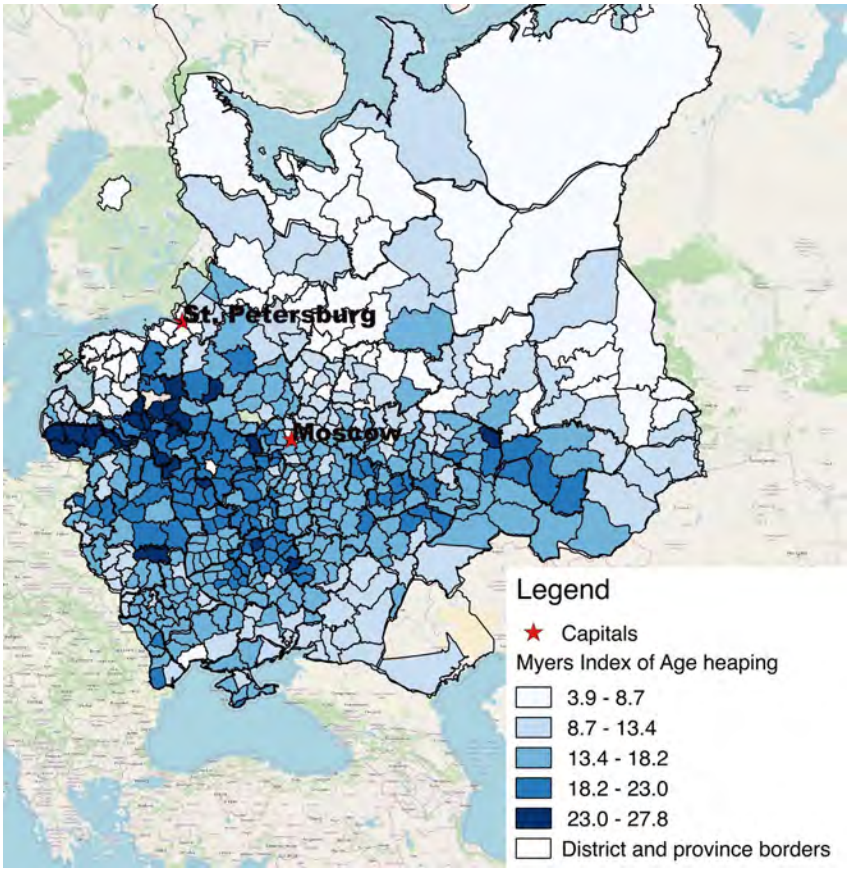

Figure A.1: Myers index at the district level for provinces receiving famine relief.

D Analysis of famine relief indicators

D.1 Principal component analysis

I aggregate the data on six different measures of relief (*months on relief, relief onset, mean size of bread loan, average population on relief, total state aid, total local aid*) using principal component analysis to reduce measurement error and avoid multiple comparisons. I then use the first principal component as the main outcome of interest, given that it explains more than twice as much variance (0.500 vs. 0.199) and captures aid from the central government, most relevant for my theory.[114] Table A.9 displays how the eigenvalues decrease with each additional component. The first component accounts for 50% of the total variance (eigenvalue = 2.39). The second component accounts for 20% of the total variance (eigenvalue = 1.18). Factor loadings by variable indicate that the first principal component captures variation in the generosity of relief from the central government (including the mean population on relief, total state aid, average size of bread loan, and the number of months on relief), while the second principal component is based primarily on the amount of local aid.

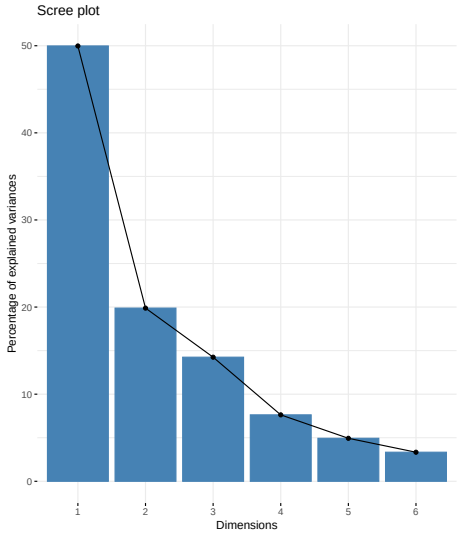

Table A.9: Eigenvalues for each component.

Table A.10: Factor loadings by variable.

	PC1	**PC2**
Mean pop. on relief	0.691	-0.490
Total local aid		0.777
Total state aid	0.723	-0.349
Average bread loan	0.725	0.436
Months on relief	0.875	0.163
Relief onset	-0.839	
SS loadings	2.998	1.193
Proportion Var	0.5	0.199
Cumulative Var	0.5	0.699

[114]Note *Local aid* was used for computing *Principal component 1*, but the component excludes it since *Local aid* loads exclusively on the second principal component.

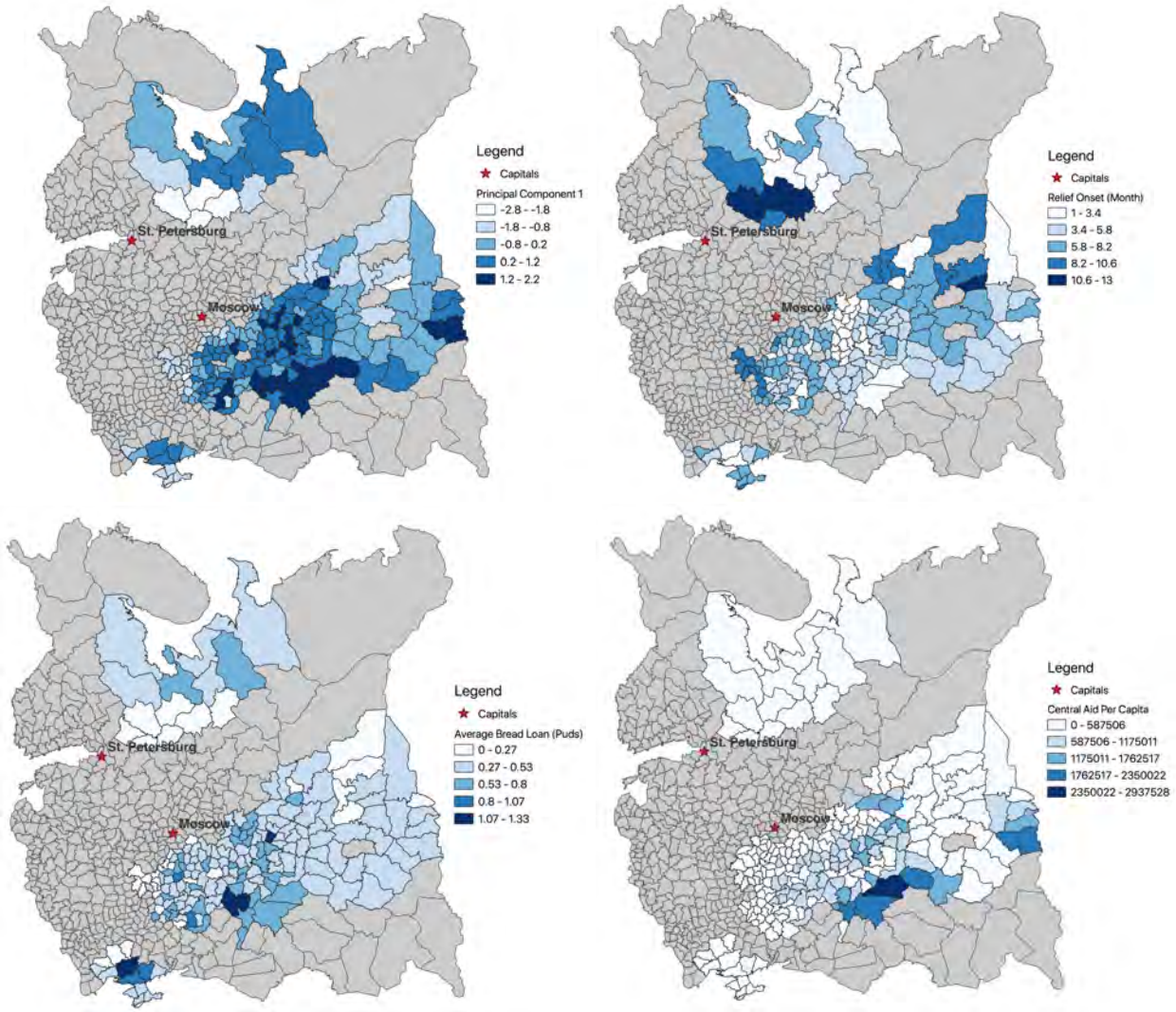

Figure A.2: Various indicators of famine relief at the district level.

Table A.11: Linguistic composition of the population and relief indicators.

Panel A	**PC 1**	**Months on relief**	**Relief onset**	**Avg. bread loan**	**Pop. on relief**	**Ln(state aid +1)**
	(1)	(2)	(3)	(4)	(5)	(6)
Harvest pc 1891	−0.04***	−0.09**	0.06***	−0.00	−0.58***	−0.14***
	(0.01)	(0.04)	(0.02)	(0.00)	(0.17)	(0.03)
Share Turkic	−0.90*	−2.00	3.03***	0.01	−12.55	−1.38
	(0.50)	(1.49)	(1.06)	(0.20)	(8.59)	(1.21)
Share non-Russian non-Turkic	−0.50	0.76	2.60	−0.12	18.73**	−1.08
	(0.57)	(1.91)	(1.70)	(0.15)	(9.25)	(1.41)
Harvest drop	0.08*	0.18	−0.18	0.02	1.87**	0.18
	(0.04)	(0.18)	(0.13)	(0.01)	(0.86)	(0.14)
Covariates	✓	✓	✓	✓	✓	✓
Province FE	✓	✓	✓	✓	✓	✓
Adj. R^2	0.65	0.49	0.54	0.30	0.51	0.68
Num. obs.	173	188	173	188	173	210

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

All models are OLS with province fixed effects. The first principal component Model 1 combines five relief measures: months on relief, average loan size, population on relief, and total state aid. Models also include the following covariates: *share urban*, *average land allotment*, *average recruit height*, *ln(railway distance)*, *land captains per area*, *ln(distance to St. Petersburg)*, *serfdom*, *horses per household*, *noble landowners per 1000*, *black soil*, *area*, *ln(population)*, *longitude*, *latitude*, and their interaction. Heteroskedasticity-robust standard errors in parentheses.

Table A.12: Models 1-2 present the relationship between relief and state capacity indicators (*Myers Index, Tax revenue*) in the subset of districts with no Muslims (defined as *Share Muslim* below the median of 0.0000948). Models 3-6 use the full dataset and examine the interaction between Share Muslim and state capacity indicators. Low legibility is defined as Myers Index below the mean. Low taxability is defined as tax revenue below the mean.

	Principal Component 1					
	(1)	(2)	(3)	(4)	(5)	(6)
Myers index (1897)	−0.13***		−0.01			
	(0.04)		(0.03)			
Myers index * Share Muslim			−0.06			
			(0.13)			
Tax to land * Share Muslim				0.46*		
				(0.26)		
High Myers index (low legibility)					0.11	
					(0.16)	
Low legibility*Share Muslim					−1.36*	
					(0.69)	
Low tax						−0.20
						(0.17)
Low tax*Share Muslim						−2.71*
						(1.54)
Harvest pc 1891	−0.01	−0.01	−0.03***	−0.04***	−0.04***	−0.05***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Harvest drop	0.13**	0.16***	0.09**	0.08*	0.09**	
	(0.06)	(0.05)	(0.04)	(0.04)	(0.04)	
Tax revenue per unit land		0.08		0.09*		
		(0.07)		(0.05)		
Share Muslim			−0.47	−2.53***	−0.63	1.10
			(2.43)	(0.94)	(0.73)	(1.52)
Share other non-Orthodox			0.29	0.21	0.49	0.54
			(1.25)	(1.06)	(1.15)	(1.17)
Covariates	✓	✓	✓	✓	✓	✓
Province FE			✓	✓	✓	✓
Adj. R^2	0.55	0.51	0.66	0.70	0.66	0.69
Num. obs.	73	67	173	161	173	161

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

All models are OLS. Province fixed effects are included only in Models 3-4 due to sample size. Models also include the following covariates: *share urban*, *average land allotment*, *ln(railway distance)*, *ln(distance to St. Petersburg)*, *serfdom*, *horses per household*, *noble landowners per 1000*, *black soil*, *area*, *ln(population)*, *Longitude*, *Latitude*, and their interaction. Heteroskedasticity-robust standard errors in parentheses.

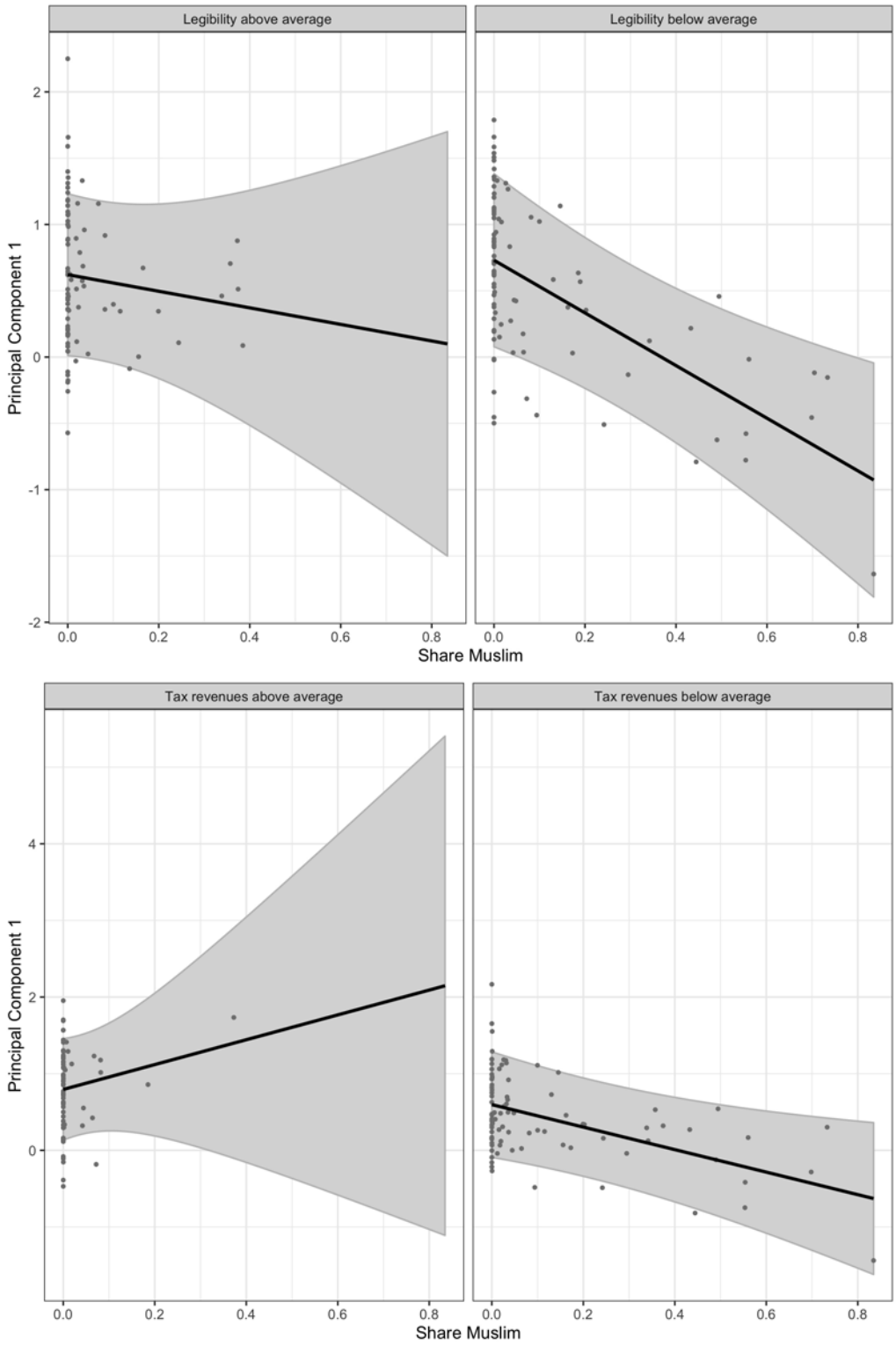

Figure A.3: Interaction effects from Models 5 and 6 in Table A.12

Social unrest as an alternative mechanism

To measure the threat of unrest, I use data on peasant protests published in *Krest'ianskoe dvizhenie v Rossii*.[115] The volumes were compiled by Soviet historians based on archival data and secondary historical literature on peasants and emancipation in Russia. All events in the decade before the famine (1880s) were coded and aggregated by district. Entries mentioning protests spanning multiple districts were counted separately. I also use data from Finkel, Gehlbach, and Olsen (2015) on protests in 1851–1863, the period with particularly high peasant unrest leading up to the creation of zemstvos.[116] It is important to acknowledge the limitations of these sources. In particular, they do not capture the disturbances among the Tatar population in 1878-79 provoked by imperial attempts to reform previous government arrangements, interpreted as forced conversion. Qualitative information accompanying each protest suggests that among Muslims and non-Muslims alike collective action during this period was aimed against state and zemstvo intervention and social upheaval caused by food shortages was virtually nonexistent. Thus, the conventional threat of unrest hypothesis, whereby the government provides aid to prevent food riots, is less applicable.

Furthermore, the presence of Muslims does not predict the incidence of rural arson, which can be viewed as a "weapon of the weak" in rural areas and was extremely frequent in the countryside as the peasants settled scores with the gentry and among themselves. The frequency of arsons increased during the famine years (1891-1892), but is uncorrelated with the presence of the Muslim population (ρ=-0.04) and (weakly) negatively correlated with the presence of non-Orthodox population (ρ=-0.28, p<0.10). Thus, arson was a tactic slightly more popular in Orthodox provinces and cannot explain the underprovision of famine relief to Muslim communes.[117]

[115]Druzhinin, N. (ed.). 1961. *Krest'ianskoe dvizhenie v Rossii v. 1796-1825 gg.: Sbornik dokumentov.* Moscow: Izdatel'stvo Sotsial'no-ekonomicheskoi literatury.

[116]Dower, Finkel, Gehlbach, and Nafziger (2017) use religious polarization as an instrument for unrest, arguing that religious intermediaries were unable to contain unrest in more heterogeneous districts.

[117]The data on arson comes from *Pozhary v Rossiiskoi Imperii 1888-1894.* 1897. St. Petersburg: Central Statistical Committee.

Table A.13: Relationships between religious composition and peasant unrest (Models 1-3) and between peasant unrest and legibility and taxation (Models 4-7).

	Peasant protest			**Myers Index**		**Taxes to land**	
	1880s	1880s	1851-63	1897		1888-90	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share Muslim	2.88	1.27	4.32				
	(2.17)	(1.47)	(2.68)				
Share other non-Orthodox	1.70	1.58	4.76				
	(1.69)	(2.39)	(5.16)				
Protests in the 1880s				0.10		−0.03	
				(0.08)		(0.05)	
Protests in 1851-63					0.07*		0.02
					(0.04)		(0.02)
Covariates		✓	✓	✓	✓	✓	✓
Province FE		✓	✓	✓	✓	✓	✓
Adj. R^2	0.07	0.28	0.51	0.77	0.77	0.82	0.82
Num. obs.	216	216	216	216	216	204	204

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

All models are OLS. Model 1 does not include covariates. Models 2-7 include province fixed effects and the following covariates: *share urban*, *average land allotment*, *average recruit height*, *ln(railway distance)*, *ln(distance to St. Petersburg)*, *serfdom*, *literacy* (for Myers index only), *average harvest* (for tax revenue only), *horses per household*, *noble landowners per 1000*, *black soil*, *area*, *ln(population)*, *longitude*, *latitude*, and their interaction. Heteroskedasticity-robust standard errors in parentheses.

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6. *Prilozhenie k Vsepoddanneishemu otchetu Samarskogo Gubernatora za 1891 g.* 1891. Samara: Gubernskaia Tipografiia.

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8. *Otchet Samarskogo Uezdnogo Prodovolstvennogo Komiteta, s 1 ianvaria po 1 iulia 1892 g.* 1892. Samara: Zemskaia Tipografiia.

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14. Fortunatov, Aleksei. 1892. *Obschii Obzor Zemskoi Statistiki Krest'ianskogo khoziaistva. Itogi Ekonomicheskogo Issledovania Rossii po Dannym Zemskoi Statistiki.* Moscow: Tipografia Mamontova.

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2. "Urozhai 1889 goda v 60 Gubernii Evropejskoi Rossii." 1890. Statistika Rossiiskoi Imperii. IX. St. Peterburg: CSC MVD.
3. "Urozhai 1890 goda v 60 Gubernii Evropejskoi Rossii." 1891. Statistika Rossiiskoi Imperii. XIV. St. Peterburg: CSC MVD.
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5. "Urozhai 1892 v 60 Guberniakh evropejskoi Rossii." 1893. Statistika Rossiiskoi Imperii. XXVI. St. Peterburg: CSC MVD.
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7. (a) "Urozhai 1895 goda. I. Ozimye Khleba i Seno." 1895. Statistika Rossiiskoi Imperii. XXXV. St. Peterburg: CSC MVD. (b) "Urozhai 1895 goda. II. Iarovye Khleba, Kartofel, Len, i Konoplia." 1896. Statistika Rossiiskoi Imperii. XXXV. St. Peterburg: CSC MVD.
8. "Srednii urozhai v Evropeiskoi Rossii za Piatiletie 1883-1887 gg." 1888. Statistika Rossiiskoi Imperii. IV. St. Peterburg: CSC MVD.

Sources for other variables:

1. Data on famine relief: "Statisticheskie dannye po vydache ssud na obsemenenie i prodovol'stvie naseleniu, postradavchemu ot neurozhaia v 1891-1892 gg." 1894. *Vremennik no. 28* St. Peterburg: CSC MVD.
2. Data on religious composition of the population in 1870: "Nalichnoe naselenie Rossiiskoi imperii za 1870 god." 1875. *Statisticheskii vremennik Rossiiskoi imperii.* Vol. 9. St. Peterburg: Bezobrazov and Co.
3. Data on births and deaths in 1885–96: 11 volumes of "Dvizhenie naselenia v Evropeiskoi rossii" (za 1885-1896 gg). 1890-1899. St. Peterburg: CSC MVD.
4. Data on horses: (a) "Voenno-konskaia perepis' 1888 goda." 1891. St. Peterburg: CSC MVD; (b)"Voenno-konskaia perepis' 1891 goda." 1894. St. Peterburg: CSC MVD.
5. Data on ages, religious and linguistic composition of the population: 1897 Russian Census. Publications for 50 individual provinces published by CSC MVD.
6. Distance to the railway line was computed by the author.
7. Remaining control variables were obtained from replication files for Dower, Paul Castañeda, Evgeny Finkel, Scott Gehlbach, and Steven Nafziger. 2017. "Collective Action and Representation in Autocracies: Evidence from Russia's Great Reforms". *American Political Science Review* 112, no. 1: 125–147. doi: 10.1017/S0003055417000454.