Conflict and Religion: Evidence from Ramadan[*]

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Abstract

I investigate how the religious observance of Ramadan influences conflict dynamics, leveraging Ramadan's exogenous timing as a quasi-natural experiment and its widespread observance by over 1.5 billion Muslims. Drawing on event-level data from the Uppsala Conflict Data Program (1989–2022; 107 countries), I find that Ramadan leads to a 3–7% increase in state-based armed conflicts in predominantly Muslim countries. By classifying rebel groups based on religiosity and employing text analysis to attribute responsibility for conflict events, I show that this increase is driven primarily by radical religious rebel groups, who initiate more attacks during Ramadan than other months. Using protest data from the Armed Conflict Location & Event Data Project (1997–2023; 48 African countries), I also find that public protests decrease by nearly 10% during Ramadan. Using evidence from a longitudinal survey of 50 thousand Muslims across 61 countries, I document they exhibit heightened religious engagement, reduced political interest, and a lower likelihood of participating in protests during Ramadan. To explain these patterns, I build a simple actor-based framework: heightened religious devotion and the physical demands of fasting reduce the appeal of protests for citizens, while historical precedents of warfare during Ramadan and religious exemptions from fasting enable combatants to justify intensified military actions. These findings highlight the need for incorporating religious calendars into peacebuilding efforts, such as timing ceasefire negotiations, designing conflict monitoring systems, and increasing monitoring by international organizations and civil society actors to prevent abuses by regimes that may exploit reduced civilian dissent during Ramadan.

JEL classification: D74; F51; O57; Z12;

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1 Introduction

Despite global peace efforts, armed conflicts persist and continue to shape human history (Palik et al., 2022). While the origins of these conflicts vary—spanning from historical (Besley and Reynal-Querol, 2014; Michalopoulos and Papaioannou, 2016) to economic factors (Dube and Vargas, 2013; McGuirk and Burke, 2020)—religion often plays a pivotal role. Nearly all recent armed conflicts have some religious component, from the Eastern Orthodox schism underlying the Russo-Ukrainian War to sectarian tensions involving Abrahamic religions in the Middle East.

This paper examines the impact of religion on conflict, focusing on how religious experiences can simultaneously escalate violent conflict between authorities and opposition groups while diminishing the appeal of popular protests against those same authorities. By studying this interplay in the context of Ramadan, a month of fasting, prayer, reflection, and community observed by nearly two billion Muslims worldwide (Pew Research Center, 2017), the analysis offers novel insights into the complex relationship between religion and conflict dynamics.

Leveraging the exogenous timing of Ramadan in the Islamic lunar calendar relative to the Gregorian solar calendar, I use its occurrence as a quasi-natural experiment to isolate its causal effects. This approach overcomes key identification challenges by exploiting the quasi-exogenous variation in Ramadan's timing, which shifts approximately 1.5 weeks earlier each year in the Gregorian calendar, completing a full cycle over about 33 years. As a result, Ramadan sometimes falls in winter and sometimes in summer, capturing a wide range of seasonal contexts and mitigating confounding influences from seasonality. Additionally, since much of the Muslim world follows the Gregorian calendar for work and other secular purposes, the misalignment with the Islamic lunar calendar further strengthens the identification by introducing an exogenous shock to regular schedules. By doing so, I am able to disentangle its impact on two distinct forms of conflict: state-based armed conflicts and nonviolent protests.[1] This distinction is crucial, as the mechanisms through which Ramadan may influence conflict behavior differ depending on the form of conflict and the actors involved.

Ramadan is a period that induces substantial changes in daily life for observing individuals, heightening religious devotion while imposing physical demands. The spiritual and physically demanding nature of Ramadan reduces the appeal of public protests, as ordinary people focus more on religious devotion and less on worldly activities (Pope, 2024). On the other hand, for authorities and rebel groups, religious exemptions from fasting during combat may facilitate military engagement. Historical examples, such as

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[1]Following the Uppsala Conflict Data Program (UCDP) definition, state-based conflict involves armed force between a government and at least one organized rebel group, resulting in at least 25 battle-related deaths in a single calendar year (Högbladh, 2023).

the Battle of Badr and the conquest of Mecca, illustrate that Muslims were on the offensive during Ramadan, with the Prophet even instructing his companions not to fast to maintain physical strength (Siddiqui, 1976). Numerous other major battles and conquests throughout Islamic history, especially well-known among Muslims, also coincide with Ramadan. These precedents enable both sides in a conflict to justify their actions during Ramadan, presenting their cause as consistent with Islamic principles and historical practices. Such events can serve as a pretext to inspire greater membership and violence, with claims that these actions carry divine approval or confer additional merit.

To empirically test these ideas, I construct monthly cross-country panels of state-based armed conflicts, converted into the Islamic calendar, covering 107 countries from 1989 to 2022. The results show that Ramadan corresponds to a 3.5–6.5% increase in state-based armed conflicts per predominantly Muslim country in a single year, driven particularly by radical religious rebel groups. To understand which side between the government and rebel groups is more on the offensive during Ramadan, I use advanced natural language processing techniques to analyze nearly 100,000 conflict event descriptions from the UCDP dataset involving radical religious groups to attribute responsibility for each event. While I find that Ramadan does not significantly affect the frequency of conflict events initiated by the state, its impact on conflict episodes initiated by radical rebel groups is positive and statistically significant, underscoring the unique role of Ramadan in shaping rebel aggression.

Additionally, using event-level data on protests from the Armed Conflict Location & Event Data (ACLED) project for 48 African countries from 1997 to 2023, I find that Ramadan decreases protest activity by 8.5–9.6% per country and year in predominantly Muslim countries. Drawing on a longitudinal cross-country survey of roughly 50,000 Muslims, I also find that individuals interviewed during Ramadan report heightened religious engagement and lower levels of political interest and activism compared to those interviewed outside the fasting period.

Aggregating the results for the increase in armed conflicts and accounting for the average monthly number of fatalities per incident per country annually, I estimate that across 31 countries with a Muslim population share exceeding 75%, Ramadan is associated with additional 15 state-based armed conflict episodes annually, resulting in approximately 108 battle-related fatalities and leading to other significant human costs during Ramadan each year. In contrast, Ramadan is linked to a reduction of 12 demonstration episodes per year across 14 African Muslim-majority countries. This reduction is substantial, as it underscores how Ramadan suppresses peaceful political expression—particularly if these lost events are critical or impactful, potentially altering governance and civil society, especially in authoritarian regimes.

This study highlights the dual influence of Ramadan on political behavior, intensi-

fying state-based armed conflicts while suppressing peaceful demonstrations. The rise in conflicts calls for peacebuilding efforts like early-warning systems and pre-Ramadan ceasefire negotiations, with religious leaders promoting nonviolence and unity. Meanwhile, the decline in demonstrations underscores the need to time key political decisions outside Ramadan and for increased monitoring by international organizations and civil society actors to prevent abuses by regimes exploiting reduced dissent.

Economists and other social scientists have surveyed research on religion, politics, and conflict (e.g., Iannaccone, 1998; McCleary and Barro, 2006; Becker et al., 2021; Finke, 2013; Silvestri and Mayall, 2015), and the causal link between religious practice and both armed and non-armed conflict needs further exploration. Part of the difficulty lies in the endogeneity of religious behavior, as individuals may turn to faith either to bury their grievances or to justify their engagement in conflict (Iyer, 2016). This paper helps fill this gap by leveraging extensive conflict and survey datasets and the exogenous timing of Ramadan as an identification strategy.

This paper directly contributes to three strands of literature. First, it advances research on how religious events, institutions, and norms shape intergroup relations, potentially influencing peace, tolerance, or hostility (e.g., Clingingsmith et al., 2009; Becker and Pascali, 2019). I provide new evidence that a recurrent, globally observed religious practice systematically affects not only violent conflict but also protest behavior, extending our understanding of how religious observance can influence the social fabric at a large scale.

Second, it extends the body of work examining the broader social and economic implications of Ramadan observance. While previous studies leverage the exogenous timing of the month to identify effects on health, economic outcomes, and educational performance (e.g., Almond and Mazumder, 2011; Majid, 2015; Campante and Yanagizawa-Drott, 2015; Oosterbeek and van der Klaauw, 2013; Hornung et al., 2023), my analysis adds a new important dimension. I explore how Ramadan observance influences social stability.

Finally, this study extends existing research on Ramadan observance and political violence by moving beyond the narrower conflict outcomes that have dominated previous work. The closest forerunners to this paper, Reese et al. (2017) and Hodler et al. (2024), focus on the effects of Islamic holidays and Ramadan fasting hours within the realm of terrorism, respectively. In contrast, I broaden the analytical lens to encompass state-based armed conflicts—arguably the most pervasive form of organized violence worldwide—and mass protests, a more public, civilian-driven form of contention. Beyond these substantive differences, the approach here also diverges methodologically. Reese et al. (2017) examine Islamic holidays in three Muslim-majority countries and do not focus on Ramadan, while Hodler et al. (2024) propose that variations in fasting hours influence incidents of terrorism over the subsequent year—a hypothesis that seems counterintuitive, given that

Ramadan observance lasts only one month and terrorist insurgents can take advantage of religious exemptions from fasting before battles.

This paper directly compares the frequency of armed and non-armed conflicts during Ramadan with other months. Multiple robustness checks and falsification tests confirm that the observed changes in conflict patterns are attributable to Ramadan observance. This analysis also offers novel theoretical and empirical insights by showing that Ramadan can simultaneously intensify state-based conflict while curbing public demonstrations. Integrating survey data to capture shifts in religious engagement, political interest, and activism provides individual-level insights that bridge macro-level conflict trends with micro-level behavioral responses.

The rest of the paper is structured as follows. Section 2 describes the observance of Ramadan and offers a brief historical overview of major battles fought by Muslims during this period. Section 3 outlines a simple conceptual framework illustrating how Ramadan may influence conflict behavior among governments, opposition groups, and citizens. Section 4 details the data, identification methods, and empirical strategies. Section 5 presents the main results, and Section 6 discusses potential mechanisms behind the observed increase in armed conflicts and the decrease in public protests. The final section concludes.

2   Ramadan Background

Ramadan is the ninth month of the Hijri calendar.[2] Ramadan holds profound significance for Muslims as the month in which the Qur'an was first revealed. Observing Ramadan through fasting is a key practice, known as one of the five pillars of Islam. Fasting during the month of Ramadan was made obligatory during the second year of Hijrah (624 AD) after the Muslims migrated from Mecca to Medina in the month immediately preceding Ramadan. Fasting from true dawn until sunset is obligatory for all Muslims who have reached puberty,[3] with exceptions for those who are acutely or chronically ill, traveling, elderly, breastfeeding, diabetic, pregnant, or experiencing intense hunger and thirst. Fasting during Ramadan involves abstaining from food, drink, tobacco products, sexual relations, and all forms of sinful behavior.

Ramadan significantly transforms the social and individual lives of those who observe it. Participants wake up before true dawn to eat and drink (*suhur*) and carry on

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[2]The Islamic (Hijri) calendar begins with Prophet Muhammad's migration (Hijrah) from Mecca to Medina, a transformative event in Islamic history that enabled the Muslim community to establish itself. About six years after the Prophet's death, following consultations with his companions, Caliph Umar ibn al-Khattab officially designated this migration as the starting point of the Islamic era. It is a purely lunar calendar that consists of twelve months that are either 29 or 30 days long. This causes Ramadan to occur 10 to 12 days earlier each year in relation to the Gregorian calendar.

[3]True dawn (*subh sadiq*) is when the sun is about 15° below the horizon and when the rays of light begin to spread over the horizon.

with their daily activities, before breaking their fast (*iftar*) at sunset, often in the company of family and friends. Mosques also host iftar meals, attracting large gatherings throughout the month. Among various religions, predominantly Muslim countries have the highest daily and weekly rates of worship (Pew Research Center, 2018). Muslims pray five times a day, either in the mosque or individually, and gather for weekly Friday congregational prayers around noon throughout the year, with heightened emphasis on these practices during Ramadan. Both men and women frequently attend additional congregation prayers (*tarawih*) after iftar, which typically last 1-2 hours.

Another widely practiced observance, particularly among men, is *i'tikaf*, performed during the last ten days of Ramadan. This involves secluding oneself in the mosque from sunrise to sunset, focusing on reciting the Qur'an and seeking spiritual knowledge. The Qur'an is believed to have been revealed on one of the odd nights of the last ten days of Ramadan known as the Nights of Decree (*laylat al-qadr*), prompting many believers to engage in all-night worship during the last ten days in search of this blessed night. In line with this, Pope (2024) uses evidence from US cellphone data to report large spikes in Muslim worship attendance during Ramadan, especially the last week, and during Eid al-Fitr, which marks the end of the month-long fasting.

In almost all Muslim-majority countries, the Hijri calendar is primarily used for religious purposes, rather than for civil or administrative functions. This calendar is essential for determining the dates of these religious observances, which are central to Muslim practices and community life. For day-to-day civil, commercial, and governmental activities, most Muslim countries use the Gregorian calendar, which aligns with international standards and simplifies coordination with the global economy. Even a country like Saudi Arabia, which historically used the Hijri calendar for official purposes, has recently shifted to the Gregorian calendar for administrative functions to streamline operations and align with the global system.

2.1 Fighting in Ramadan

In Islam, four months are specifically designated as sacred, during which fighting is prohibited except in cases of self-defense.[4] Ramadan, however, is not one of these sacred months. While the Qur'an generally discourages fighting during Ramadan and other months, it is considered permissible in non-sacred months. Warfare is generally discouraged but allowed if it serves a just cause, such as self-defense, protecting the oppressed, or maintaining justice.

Notably, two significant conflicts initiated by Muslims during the Prophet's time—the Battle of Badr and the conquest of Mecca—occurred during Ramadan. These events have

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[4]These sacred months are Muharram (the first month), Rajab (the seventh month), and the last two months, Dhul Qa'dah and Dhu al-Hijjah (Quran 9:36, Tafsir Ibn Kathir, nd).

had lasting implications for the rules of warfare in the Muslim world and the practice of observing Ramadan during military engagements. Throughout Islamic history, some other major battles have also begun during Ramadan, such as the Muslim conquest of the Iberian Peninsula in 711, the Siege of Jerusalem in 1187, the Battle of Ain Jalut in 1260, and, more recently, the start of the 1973 Arab-Israeli War, which coincided with the 10th day of Ramadan.

The Battle of Badr was the first major confrontation between the Muslims and the pagan Quraysh of Mecca (Al-Fughom, 2003). It occurred in the middle of Ramadan during the second year of the Hijri calendar, marking the first time Muslims observed fasting as an obligation. The conquest of Mecca took place in the early weeks of Ramadan in the eighth year of the Hijri calendar, when the Prophet marched on Mecca (Campo, 1991). The conquest of Mecca, in particular, is regarded as a pivotal milestone in the establishment of the Islamic faith. These battles are well-known among Muslims, frequently taught in Islamic studies, and extensively discussed in biographies of the Prophet.

Most relevant to our research is that in both these conflicts, Muslims were on the offensive during Ramadan. The Prophet instructed his companions not to fast on these occasions—not due to travel but because they required physical strength to face the enemy. Based on this precedent, Muslims are exempted from fasting during combat situations.[5] The exemption from fasting during Ramadan, applicable to all Muslims in combat situations, can be used by both government forces and rebel groups alike. Both sides may cite examples such as the Battle of Badr and the conquest of Mecca to justify their actions during military engagements in Ramadan, presenting their cause as consistent with Islamic principles and past practices.

3   Conceptual Framework

Existing theory provides no clear answers on whether intense religious observance during Ramadan encourages or discourages participation in conflict-related activities. Neither theory nor analysis can possibly provide definitive answers on this. It appears to be more a matter of empirical inquiry. Although there is no grand unified theory to answer this question, in this section I present potential mechanisms that act as channels through which Ramadan may affect conflict (Figure 1) and build a simple model to make testable predictions about conflict dynamics during Ramadan.

These mechanisms may not operate uniformly across actors, who whave varying degrees of agency in conflicts. For instance, ordinary civilians, who typically do not participate in armed conflict, may instead engage in demonstrations. For them, spiritual importance of Ramadan and the physical demands of fasting, combined with other daily responsibilities, can significantly increase the opportunity cost of protest activities during

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[5]This exemption is specific to combat and does not extend to activities like demonstrations.
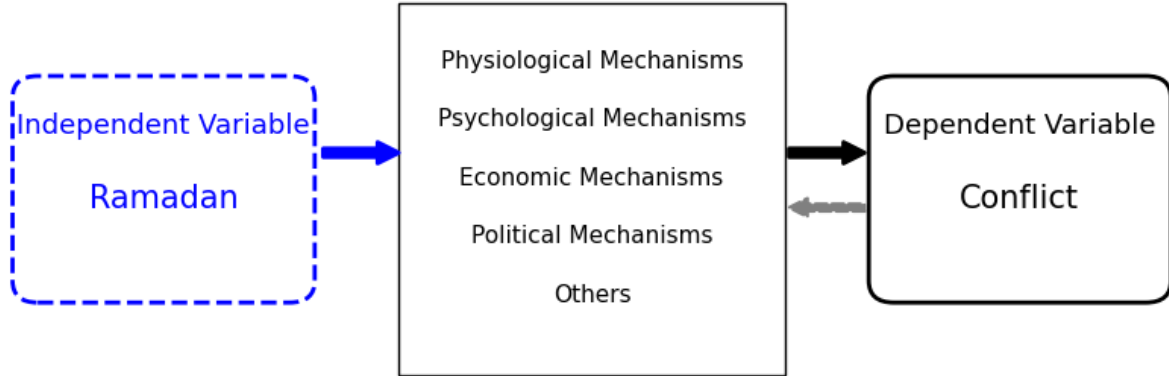
Figure 1: The Potential Mechanisms for the Ramadan-Conflict Relationship

Notes: This figure outlines key mechanisms by which Ramadan influences armed conflicts and demonstrations. Ramadan's most immediate impacts stem from the physiological demands of fasting and a range of psychological experiences, such as heightened social cohesion, self-discipline, and compassion. Armed conflicts commonly involve incidents like direct firearm engagements, shelling, and airstrikes. Demonstrations typically involve groups of three or more individuals protesting against political entities, government institutions, and policies.

Ramadan. In contrast, fighters in rebel groups—actively engaged in armed conflict—may experience no unique physiological constraints during Ramadan, as they are often exempt from fasting due to travel or active combat duties. Instead, political mechanisms such as disrupting social order, especially when people's religious sensitivities are high, to damage state reputation may be more salient. We can expect these mechanisms to be more potent for one party than another, as motivations for conflict can vary significantly across the government, rebel groups, and civilians.

Hence, I build a simple stylized framework to analyze these mechanisms, carefully accounting for the distinct roles and choices of each actor. Let us consider an economy with three actors: the government, rebel groups, and civilians. Ramadan's symbolic significance influences their behavior differently, and armed conflict and demonstrations happen independently of each other, in the sense that they are neither substitutes nor complements.

1. Rebel Groups: Let us assume that there are three types of rebel groups identified by a parameter $\theta \geq 0$, reflecting their strictness of interpretation of Islam. The first type of rebel groups can be categorized into radical religious groups (high θ) who have an uncompromising and militant stance on their strict version of adherence to Islam. These groups are known for their practice of *takfir*, declaring Muslim leadership or others who commit major sins or fail to adhere to their strict interpretation of Islam as unbelievers.

Their ultimate goal is to establish governance based entirely on their ideological and theological principles, often justifying violence to achieve this aim. Radical religious groups can exploit the historical precedent of significant battles during Ramadan, such as the Battle of Badr and the conquest of Mecca, to incite violence and frame their actions as part of a sacred tradition. By misinterpreting these events and the spiritual significance of Ramadan, they attempt to inspire their members, claiming such acts carry divine approval or added merit.

The second type of rebel groups (moderate θ) position themselves as religious reformers rather than theological purists. While their stance remains in line with religious orthodoxy, they are more pragmatic and willing to find common ground with mainstream Muslim populations and leadership. These groups reject the idea of separating religion from the state, advocating instead for a hybrid system that integrates governance with a more moderate interpretation of shariah. Their approach is less confrontational compared to radical groups, focusing on reform and negotiation rather than outright aggression.

The third type of rebel groups ($\theta \approx 0$) consists of secular Muslim or non-religious groups, whose motivations are primarily driven by political, ethnic, or nationalist ideologies rather than religious concerns. These groups advocate for goals such as political autonomy, national independence, or socio-economic justice. They distance themselves from religious frameworks in their rhetoric and objectives, often emphasizing inclusivity and neutrality to garner broader support.

The likelihood of armed aggression is:

$$P_A = \frac{\beta(\theta)}{C_R}, \tag{1}$$

where $\beta(\theta)$ represents the propensity of a rebel group to act, influenced by their ideological rigidity (θ) and the perceived symbolic or material returns from aggression. C_R is the cost of initiating and sustaining armed conflict, including logistical expenses, organizational challenges, and potential risks of retaliation. More ideologically rigid group leaders and their members (high θ) are more likely to engage in aggression due to their uncompromising goals.

During Ramadan, the symbolic importance of the month amplifies $\beta(\theta)$, particularly for radical groups (high θ), who may frame their actions as "lesser jihad" and justify increased aggression as a religious duty. Importantly, combatants are often exempt from fasting, meaning the physiological toll that might otherwise increase C_R is minimized. This combination of heightened returns and stable costs leads to an increased P_A for radical groups during Ramadan. Moderate groups (moderate θ) may experience a smaller increase in $\beta(\theta)$, focusing on symbolic or low-cost actions rather than sustained campaigns. Secular groups ($\theta \approx 0$), disconnected from religious symbolism, see no significant change in $\beta(\theta)$, maintaining consistent levels of aggression regardless of Ramadan.

2. Civilians: Civilians engage in demonstrations independently of rebel actions. Their participation is driven by socio-political grievances, economic conditions, and cultural factors. The likelihood of participation is given by:

$$P_D = \frac{\alpha}{C_C \cdot (1 + \phi)}, \tag{2}$$

where α is the baseline propensity to act, which reflects the inherent willingness of civilians to protest based on their dissatisfaction with the status quo, and C_C is the cost of participation, which includes the time, resources, and potential risks involved. Civilians also prioritize spiritual practices during Ramadan, engaging in "greater jihad," an internal struggle for self-improvement and moral conduct. This emphasis on introspection and spiritual fulfillment further lowers their interest in political activism, as spiritual obligations take precedence over material or political concerns. The parameter ϕ reflects their preference for spirituality. Higher values of ϕ correspond to a stronger focus on spirituality and non-political religious goals such as self-reformation and purification of the soul, diminishing the likelihood of political participation.

During Ramadan, both C_C and ϕ increase. Fasting imposes physical and psychological strains, raising C_C as participation becomes more challenging. Simultaneously, civilians prioritize spiritual practices, increasing ϕ, which further lowers their propensity for political engagement. This dual effect sharply decreases P_D, as civilians focus on "greater jihad," emphasizing self-improvement and religious observances over political activism. The physiological toll of fasting and the spiritual emphasis of Ramadan combine to make demonstrations exceedingly rare during the holy month.

3. Government: The government, a collective entity comprising the ruling party and the military, plays a central role in maintaining stability and authority. It seeks to manage two primary challenges: demonstrations by civilians and armed aggression from rebel groups. These dual threats require the government to allocate resources strategically and prioritize interventions based on the perceived severity of each conflict type and associated costs.

The propensity of the government to act is influenced by the dynamics of both demonstrations and armed aggression. The government adjusts resource allocation between demonstrations and armed aggression during Ramadan:

$$R_G = \lambda \cdot \frac{\delta(A)}{C(A)} + (1 - \lambda) \cdot \frac{\gamma(D)}{C(D)}, \tag{3}$$

where $\lambda \in [0, 1]$ reflects the government's prioritization of armed aggression relative to demonstrations. $\delta(A)$ reflects the perceived threat level of rebel aggression, influenced by its scale, intensity, and destabilizing potential. $C(A)$ represents the cost of countering armed aggression, including military expenditures and risks to long-term stability. $\gamma(D)$

represents the perceived severity of demonstrations, which depends on factors such as their size, frequency, and potential political fallout. $C(D)$ represents the cost of addressing demonstrations, encompassing economic, social, and reputational impacts.

During Ramadan, the government expects $\gamma(D)$ to decrease as civilian demonstrations become less likely due to increased C_C and ϕ, reducing the perceived urgency of addressing protests. Conversely, $\delta(A)$ increases as radical rebel groups intensify their aggression, leading the government to assign a higher weight (λ) to preemptive or defensive actions against armed aggression. The rise in $\delta(A)$ coupled with the heightened need for stability during Ramadan shifts the government's focus toward maintaining order against rebel threats, even as it benefits from reduced civilian unrest.

4 Data and Empirical Methodology

4.1 Data

Conflict Datasets

The primary source of armed conflict data is the UCDP Georeferenced Event Dataset (GED) covering the period from 1989 to 2023 (34 Hijri years). I focus on state-based armed conflicts, that account for more than 70% of all armed conflict types within this dataset. An individual "event" in UCDP-GED involves the use of armed force by the government of a state against one or more opposition groups, with at least one direct battle death (Sundberg and Melander, 2013). This panel dataset covers nearly all Muslim-majority countries and spans one complete cycle of Ramadan's progression through the solar year,[6] with a sample of 107 countries. Figure 2 shows these countries on the world map.

For non-armed conflict data involving demonstrations, I use the Armed Conflict Location & Event Data (ACLED) project in Africa over the period 1997-2023, involving 48 countries (Raleigh et al., 2023). I use the definition of demonstration from the ACLED codebook that defines it as "an in-person public gathering of three or more people advocating for a shared cause". The project started by focusing on Africa, allowing for coverage dating back to 1997, thus making it the only continent with the most extensive data. The rationale behind additionally focusing on Africa in this part is its significant Muslim population, with over half a billion Muslims and at least 17 Muslim-majority countries, comprising nearly a third of the global Muslim population (Kettani, 2010). In a global survey examining the significance of religion within various religious traditions, Pew Research Center (2018) documents that Africa exhibits the highest average percent-

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[6]Since a lunar month is about 29.5 days long, the Hijri calendar shifts by around 1.5 weeks each year compared to the Gregorian calendar, with 34 Hijri years approximately corresponding to 33 Gregorian years.

Figure 2: Countries by Share of Muslim Population

% Muslims, UCDP

| | 0-1% | 1-25% | 25-50% | 50-75% | 75-100% |

Notes: There are 107 in-sample countries in the UCDP dataset. Hatched countries in gray do not appear in the dataset. Countries are grouped according to their average share of Muslim population from 1989 to 2022.

ages of individuals who consider religion to be very important in their lives as well as the highest percentages of individuals who pray daily (around 80%). The countries are shown in Figure 3.
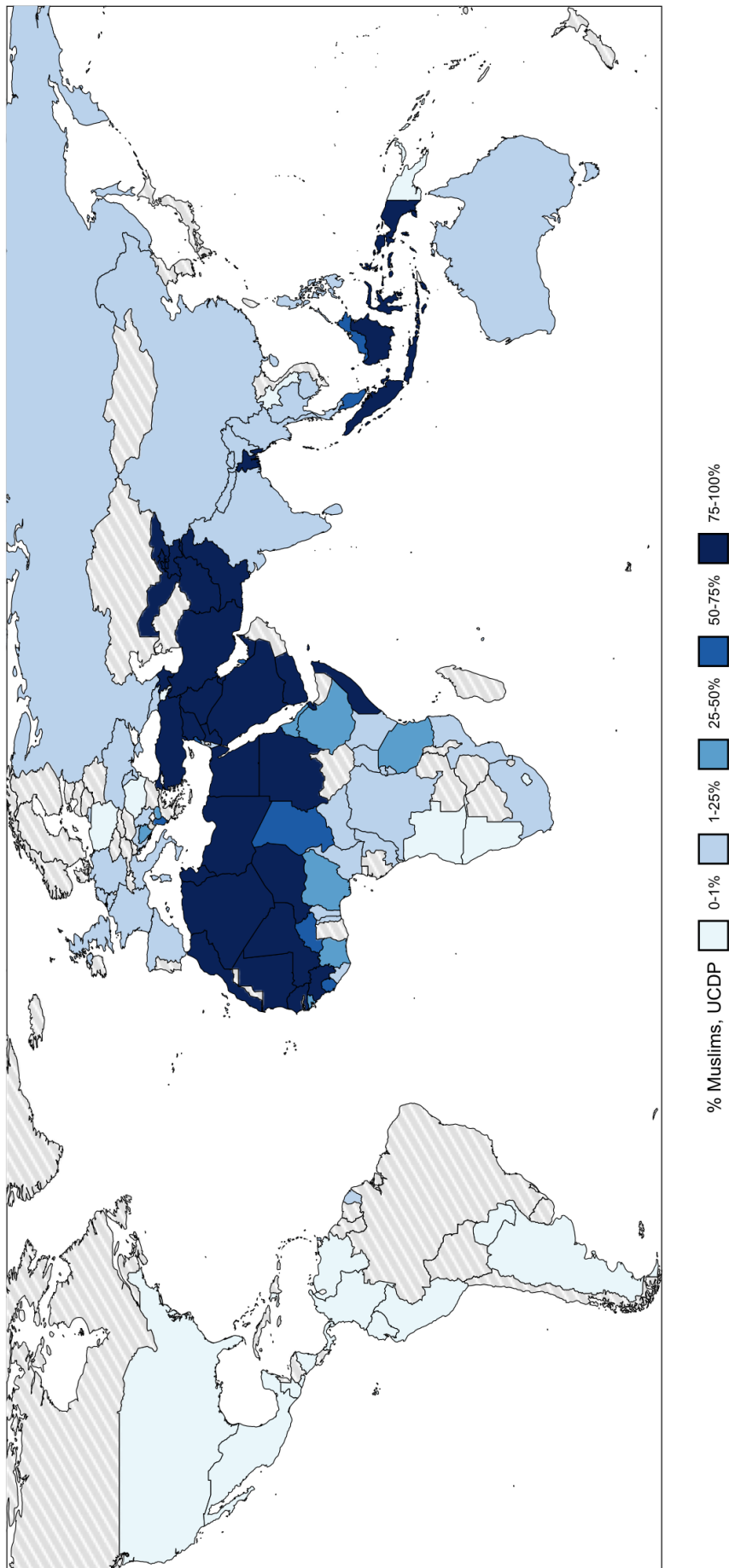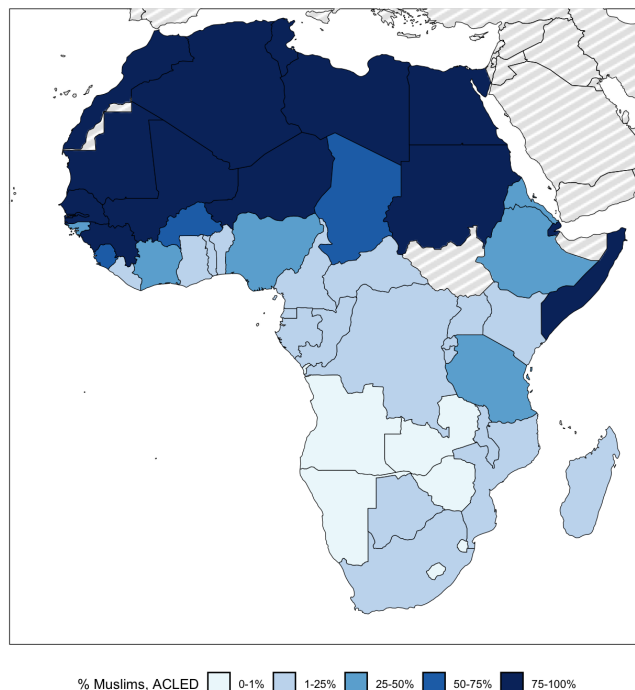

Figure 3: African Countries by Share of Muslim Population

Notes: There are 48 in-sample countries in the ACLED dataset. Hatched countries in gray do not appear in the dataset. Countries are grouped according to their average share of Muslim population from 1997 to 2023.

These publicly available conflict datasets, characterized by their high frequency and structured around individual events, are collected in real-time and adhere to a rigorous and established set of methodologies. I construct daily conflict data by summing the incidents of state-based conflict and demonstrations for each day and country, and then I replace days with no reported conflict by setting the value to zero. To convert these dates from the Gregorian calendar to the Hijri calendar, I use an expert reviewed HijriDate Python package in the widely recognized Python Package Index (PyPI) repository.[7] Then I crosscheck these dates using Islamic Philosophy Online.[8]

Global Religion Datasets

I separately combine the conflict datasets with datasets on the Muslim population share in each country from the World Religion Project (WRP) (Maoz and Henderson, 2013) and the Pew Research Center. The WRP provides data on the number of followers

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[7]Available at https://pypi.org/project/hijridate.

[8]Available at https://www.muslimphilosophy.com/ip/hijri.htm from the Institute of Oriental Studies, Zürich University.

and total population in five-year intervals from 1985 to 2010. I interpolate these figures to create an annual cross-country dataset for the years between the WRP's five-year markers. For the period from 2010 to 2023, I interpolate data from the Pew Research Center, which offers similar data at ten-year intervals.

World Values Survey

I use individual-level survey data from the World Values Survey (WVS) not only to examine why civilian demonstrations tend to decrease during Ramadan, but also to investigate whether the cross-country results hold at the individual level. The analysis focuses on four survey waves conducted between 1999 and 2022, using only interviews with exact survey dates available. The sample includes approximately 45,000 Muslim respondents from 62 countries.

I begin by constructing a standard indicator variable to measure spirituality based on a survey question about the frequency of prayer: "Apart from weddings and funerals, about how often do you pray?" Respondents could choose from eight possible answers: (1) "Several times a day," (2) "Once a day," (3) "Several times each week," (4) "Only when attending religious services," (5) "Only on special holy days/Christmas/Easter days," (6) "Once a year," (7) "Less often," and (8) "Never or practically never." Since my focus is on the intensity of religious observance during Ramadan, and it is common for Muslims in the survey to pray at least once a day,[9] I assign a value of 1 to the first two responses ("Several times a day" and "Once a day") and 0 to all other responses.

The study also focuses on two main measures of political engagement: interest in politics and participation in peaceful demonstrations. For political interest, respondents were asked, "How interested would you say you are in politics?" I construct an indicator variable coded as 1 if the response is "Very interested" or "Somewhat interested" and 0 if it is "Not very interested" or "Not at all interested."

For participation in peaceful demonstrations, respondents were presented with the prompt: "Now I'd like you to look at this card. I'm going to read out some different forms of political action that people can take, and I'd like you to tell me, for each one, whether you have actually done any of these things, whether you might do it, or would never, under any circumstances, do it: Attending peaceful demonstrations." I create a similar indicator variable coded as 1 for responses of "Have done" or "Might do" and 0 for "Would never do.

Fasting Hours

Another key variable is the number of fasting hours during Ramadan, calculated as the difference between civil twilight and sunset times for any location on Earth, webscraping

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[9]Nearly 72% of respondents in the final sample reported that they prayed at least once a month.

data from the U.S. Naval Observatory's Astronomical Applications Department.[10] The duration of fasting during Ramadan is exogenously determined by geographical and astronomical factors, making it orthogonal to the incidence of conflict. This provides a valuable source of exogeneity, allowing us to isolate the idiosyncratic impact of fasting intensity, as measured by daylight hours, once latitude and seasonality are accounted for. To control for these factors, I include country and time fixed effects in the analysis. Using this variable, I investigate how variations in fasting intensity across countries during Ramadan influence the likelihood of armed conflict and demonstrations.

The required twilight and sunset times can be web-scraped for any Gregorian date and location on Earth. For this analysis, I use the geographic coordinates of the capital cities in the sample countries. The dates are converted to the Islamic calendar using the `HijriDate` Python package, and then merged with the conflict data. The fasting duration during Ramadan varies substantially across countries due to two main factors:

1. **Seasonal timing of Ramadan**: Ramadan shifts approximately 10–12 days earlier each year in the Gregorian calendar, causing it to occur during longer daylight periods in the summer months and shorter periods in the winter months.[11]

2. **Latitude of the country**: Latitude significantly affects the variation in fasting hours. Countries closer to the equator experience relatively constant and moderate fasting durations throughout the year. In contrast, countries located farther from the equator face greater variation, with much longer fasting hours in summer and shorter ones in winter.

The maximum within-country variation in fasting hours ranges widely, from as little as one hour in equatorial countries to as much as seven hours in some predominantly Muslim countries farther from the equator.

Summary statistics for all the key variables presented in this section is available in Table A1.

4.2 Baseline Specifications

To examine the causal change in conflict frequency during Ramadan compared to other months, I use a Hijri calendar balanced panel setup. I estimate the following baseline model, focusing on countries with a Muslim population share above 75%:

$$log(y_{cmt} + 1) = \beta_1 Ramadan_{mt} + X_{cmt}\gamma' + \theta_{ct} + \epsilon_{cmt} \tag{4}$$

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[10]Civil twilight occurs when the sun is 6° below the horizon, closely approximating the 15° angle traditionally used by Muslims to determine the start of fasting, rather than the sunrise time.

[11]In both hemispheres, daylight hours increase during their respective summer months (June to August in the Northern Hemisphere and December to February in the Southern Hemisphere) and decrease during winter.

where y_{cmt} is either the number of state-based armed conflicts or demonstrations in country c, month m and Hijri year t. The log transformation of the dependent variable reduces skewness in conflict count data, allows for interpretation in relative percentage changes, and handles zero counts by adding 1. $Ramadan_{mt}$ is an indicator variable equal to 1 if the month in a given year is Ramadan and 0 otherwise. Since Ramadan is consistent across countries in the Hijri calendar, this variable does not vary by country. X_{cmt} is a vector conflict-related controls.[12] θ_{ct} denotes country by year fixed effects and control for any unobserved, time-varying factors within each country that could influence conflict levels, such as economic conditions, political changes, or seasonal patterns that vary year to year.

The identification strategy leverages the exogenous variation in the timing of Ramadan due to the Islamic lunar calendar, which shifts approximately 10-12 days earlier each year relative to the Gregorian calendar. This shift enables a natural experiment, isolating the effects of Ramadan from other seasonal and yearly influences on armed conflict and protest activity. By including country-by-year fixed effects, I additionally place a more restrictive control on time-varying factors specific to each country in a given year. This framework mitigates concerns over omitted variable bias, providing a clearer view of Ramadan's causal influence on conflict and demonstrations.

In the spirit of Campante and Yanagizawa-Drott (2015), I estimate the following regression for the whole sample to observe how the relative effect of Ramadan varies with relative size of the Muslim population:

$$log(y_{cmt} + 1) = \beta_1 Ramadan_{mt} + \beta_2 Ramadan_{mt} \times \%Muslim_{ct} + X_{cmt}\gamma' + \theta_{ct} + \epsilon_{cmt} \quad (5)$$

where β_2 measures how the relative impact of Ramadan on conflict changes as the proportion of Muslims in the population varies. Since the specification includes country-year fixed effects, the yearly Muslim share variable does not need to be included separately as a control.

The interaction in the previous specification assumes a linear relationship between the percentage of Muslims and the relative effect of Ramadan on conflict. Therefore, I also estimate the following to capture the relative effect of Ramadan on conflict within specific ranges of the Muslim population share, enabling a more flexible, piecewise approach that can reveal potential nonlinear patterns:

$$log(y_{cmt} + 1) = \beta_1 Ramadan_{mt} + \sum_{k=1}^{4} \theta_k \cdot (D_{k,ct} \times Ramadan_{mt}) + X_{cmt}\gamma' + \theta_{ct} + d_{kt} + \epsilon_{cmt} \quad (6)$$

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[12]The controls - conflict duration and fatality - are only available for the state-based armed conflicts. Controlling for duration and fatalities helps ensure that any observed effect of Ramadan is on the number of conflicts, not their severity or length.

where $D_{k,ct}$ represents a set of indicator variables that correspond to different categories based on the percentage of Muslims in a country.[13] For instance, θ_1 captures the effect of Ramadan on conflict in countries where the Muslim population share is above 75%, relative to countries with less than 1% Muslim population. d_{kt} serves as a category-specific fixed effect for each of the Muslim population share categories defined by the indicator variables.

5 Basic Results

5.1 Effects on Armed Conflicts

Table 1 provides insights into how Ramadan influences the frequency of state-based armed conflicts in predominantly Muslim countries. Across the first six columns, where the sample focuses on countries with a Muslim population share exceeding 75%, the presence of Ramadan corresponds to a consistent rise in armed conflicts. The Ramadan indicator is significant at the 1% level, suggesting an approximate 3.7% increase in armed conflicts compared to other months. By computing $\exp(\beta) - 1$ and multiplying it by the baseline mean, we can interpret these effects in levels, providing a clearer picture of their real-world impact. 3.7% translates into a tangible increase of nearly 0.5 incidents on average during one Ramadan per country relative to other months, given the baseline mean of 11.83 conflict episodes per month per country. It amounts to around 15 more conflicts during one Ramadan across all 31 countries in the sample of predominantly Muslim countries. Considering that the average fatality per conflict incident and month in a single Muslim-majority country is about 7 deaths, this is a substantial and economically significant result, translating into an increase of approximately 3.5 Ramadan-related fatalities per country and 108 fatalities across all 31 countries during Ramadan each year. The results are robust to the inclusion of controls and increasingly restrictive fixed effects. This trend implies armed clashes between the government and other organized groups in countries where Islam holds a deep social significance for the populace intensifies with the arrival of Ramadan.

The results in column (7) of Table 1 indicate a positive, albeit statistically insignificant, association between Ramadan and state-based armed conflicts as the share of Muslims in the population increases. This lack of significance could imply that the relationship between Ramadan and conflict does not follow a simple linear pattern. Instead, it is likely that Ramadan's impact on armed conflict intensity varies non-linearly with

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[13]$D_{1,ct}$, $D_{2,ct}$, $D_{3,ct}$, $D_{4,ct}$ are indicators for countries where the Muslim population is greater than 75% (31 countries for UCDP and 14 for ACLED), between 50%-75% (7 for UCDP and 3 for ACLED), between 25%-50% (8 for UCDP and 6 for ACLED), and between 1%-25% (39 for UCDP and 19 for ACLED), respectively. The baseline category consist of countries where the Muslim population is less than 1% (22 for UCDP and 6 for ACLED).

the share of Muslims, with effects that may become more pronounced or diminish at certain population thresholds. As a natural solution to this, column (8) further highlights variations in Ramadan's effects by interacting it with different Muslim population shares. The coefficient on the interaction between Ramadan and indicator representing countries with more than 75% share of Muslim population (0.033, $p < 0.05$) indicates that during Ramadan, the level of armed conflict in countries with a Muslim population share exceeding 75% is approximately 3.3% higher relative to countries with less than 1% Muslim population. This significant result highlights that the impact is the strongest in predominantly Muslim countries where observance of Ramadan is the highest. By contrast, in country groups with smaller Muslim population shares (between 1% and 75%), Ramadan does not significantly influence conflict rates relative to the baseline group, suggesting that the heightened religious observance and communal aspects of Ramadan is most potent in countries with a more concentrated Muslim population.

These results remain robust across various sensitivity checks. First and foremost, I restricted the control group of months to periods 1, 2, 3, 4, and 5 months before and after Ramadan. The estimates remain the same, although the precision decreases slightly only in the estimates involving all countries when focusing on the narrower windows of 1 and 2 months before and after Ramadan. Since Ramadan is the ninth month in the Hijri calendar, I report the estimates where the control group of months include 3 months before and after in Table A2. This results confirm that the observed effects are specific to Ramadan and not a result of broader seasonal patterns.

Next, I run baseline regressions for a group of countries with less than 1% Muslim population as a placebo test. 1 in 5 countries in the whole sample fulfill this criterion. This approach ensures that the observed results are not driven by non-religious factors, as Ramadan observance is minimal or nonexistent in these countries. I expect to find results that are not statistically different from zero. In columns (7)–(8), instead of using the share of Muslims and Muslim population categories, I include analogous variables for Christians in Table A3. As expected, the results in columns (1)–(6) are not statistically significant, indicating no meaningful effect. Additionally, the findings suggest that as Christian populations increase and become the majority, the number of relative demonstrations during Ramadan decreases. This is most likely because the reference group of countries with less than 1% Christian populations consists predominantly of Muslim-majority countries.

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Table 1: The Relative Effects of Ramadan on State-Based Armed Conflicts in Muslim Countries, 1989-2022

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Dependent Variable: log(armed conflict+1)				
Ramadan	0.037***	0.037***	0.035***	0.037***	0.037***	0.036***	0.008	0.002
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.008)	(0.009)
Ramadan × % Muslim							0.022	
							(0.016)	
Ramadan× >75% Muslim								0.033**
								(0.015)
Ramadan× 50−75% Muslim								-0.017
								(0.025)
Ramadan× 25−50% Muslim								-0.023
								(0.025)
Ramadan× 1-25% Muslim								0.020
								(0.014)
Conflict mean	11.83	11.83	11.83	11.83	11.83	11.83	5.046	5.046
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	12648	12648	12648	12648	12648	12648	43656	43656
Adj. R^2	0	0.464	0.0526	0.518	0.896	0.900	0.876	0.876
Country FE		✓		✓				
Year FE			✓	✓				
Controls						✓		
Country-by-year FE					✓	✓	✓	✓
Share-by-year FE							✓	✓

Notes: In columns (1)–(6), the sample consists of the 31 countries with at least 75% muslims on average for the given period in the World Religion Project (WRP) and PEW database. In columns (7)–(8), the sample consists of 107 countries. In column (8), the reference group consists of 22 countries with an average Muslim population of 1% or less. Conflict mean provides the average of the outcome in levels. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by ** $p < 0.05$, *** $p < 0.01$.

The estimates remain robust when using the levels of state-based armed conflicts as the dependent variable. Additionally, I estimate a Poisson regression to account for the count nature of the conflict data and potential overdispersion, ensuring that the findings are not sensitive to the functional form of the outcome. The results of the Poisson pseudo-maximum likelihood (PPML) in Table A4 are consistent with the main findings and demonstrate even stronger effects, both in magnitude and statistical significance, achieving significance at the 1% level.

Finally, I use a similarly defined outcome in the ACLED dataset to further verify whether the results presented here hold when analyzing events reported in a different dataset focused on a single continent. ACLED defines a politically violent event as a single altercation, often involving the use of force by one or more groups to achieve a political objective. To align as closely as possible with the definition of state-based conflict in the UCDP dataset, I restrict the analysis to events where at least one actor is the government of a state, leveraging the actor codes available for each incident. The results, presented in Table A5, are consistent with the original findings, with effect sizes nearly doubling in magnitude and remaining statistically significant at the 1% level.

5.2 Effects on Demonstrations

Table 2 examines the effect of Ramadan on the number of public demonstrations, focusing on a subset of African countries where Muslims make up more than 75% of the population in first five columns. Column (5) displays the coefficient for the baseline regression in equation 4: Ramadan is linked to a relative reduction in demonstrations of 8.5% at the 10% significance level. This suggests that Ramadan may dissuade people from participating in protests and public gatherings, possibly due to the increased opportunity cost of fasting and/or a stronger emphasis on religious reflection and social harmony during this period. Given a baseline mean of 9.78 demonstrations, this translates to nearly one less demonstration per county in Ramadan compared to other months on average. This translates into a cumulative reduction of around 33 demonstrations on average over the given period compared to non-Ramadan months per country.

In column (6), the coefficient for the interaction between Ramadan and the share of Muslims is -0.137, statistically significant at the 5% level. This indicates a dampening effect on public demonstrations during Ramadan, with higher Muslim population shares correlating with a decrease in demonstrations. Specifically, the coefficient implies that for each additional quarter-unit increase in the interaction term (i.e., a 0.25 increase in the population share when the Ramadan dummy equals 1), the number of demonstrations decreases by approximately 3.5%. Assuming linearity for this relationship may not be appropriate, as effects can vary across shares of the Muslim population. Turning to column (7), where the model controls for Muslim population share categories, we

see that countries with a Muslim population above 75% experience a notable reduction in demonstrations during Ramadan, with a statistically significant relative decrease of approximately 18.3% compared to the baseline. For countries with smaller shares of Muslims, there is no significant difference in the frequency of demonstrations during the religious month. In predominantly Muslim countries, religious obligations and communal norms appear to lead to a pause or reduction in this form of public dissent, as people shift focus toward introspective and spiritual practices.

In a similar fashion to the effects of armed conflicts, I test the robustness of the baseline results for demonstrations. I start by examining the sensitivity of the results to the choice of control months. Table B1 shows that the estimates remain to the choice of including 3 months before and after Ramadan (months 6-12). Next, I shift my focus to running the baseline regressions for the subsamples of countries with a share of Muslim population below 1%. Table B2 demonstrate null results for this selection of countries.

Finally, I test the robustness of the results to the choice of the form of the outcome variable. I find that the results are largely the same for using plain levels with OLS or Poisson pseudo maximum likelihood regression with the levels. I report the results of the PPML in Table B3. The results are stronger and statistically significant at conventional levels.

For Tables 1 and 2, which examine armed conflict and demonstrations, respectively, the results remain robust when each Muslim country is excluded from the sample individually. Additionally, the findings hold when two-way clustering of standard errors is applied by both country and year. The results also remain largely consistent when thresholds for the share of predominantly Muslim countries are lowered or when the thresholds for the reference group of non-Muslim countries are slightly increased or decreased. Full results supporting these robustness checks are available upon request.

Table 2: The Relative Effects of Ramadan on the Number of Demonstrations in Muslim Countries, 1997-2023

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Dependent Variable: log(demonstrations +1)				
Ramadan	-0.085*	-0.085*	-0.096**	-0.085*	-0.085*	0.068***	0.098
	(0.043)	(0.043)	(0.039)	(0.043)	(0.043)	(0.023)	(0.063)
Ramadan × % Muslim						-0.137**	
						(0.053)	
Ramadan× >75% Muslim							-0.183**
							(0.076)
Ramadan× 50−75% Muslim							0.028
							(0.091)
Ramadan× 25−50% Muslim							-0.028
							(0.072)
Ramadan× 1-25% Muslim							-0.078
							(0.065)
Demonstration mean	9.78	9.78	9.78	9.78	9.78	6.05	6.05
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	4536	4536	4536	4536	4536	15552	15552
Adj. R^2	0	0.172	0.419	0.594	0.846	0.803	0.803
Country FE			✓	✓			
Year FE		✓		✓			
Country-by-year FE					✓	✓	✓
Share-by-year FE						✓	✓

Notes: In columns (1)–(5), the sample consists of 14 African countries with at least 75% muslims on average for the given period in the World Religion Project (WRP) and PEW database. In columns (6)-(7), the reference group consists of 6 African countries. In column (8), the whole sample consists of 48 African countries with an average Muslim population of 1% or less. Demonstration mean provides the average of the outcome in levels. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$.

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5.3 Weekly Variation within Ramadan

In this subsection, I additionally present the results of the following regression graphically to analyze the weekly variation in conflict around Ramadan:

$$log(y_{ct} + 1) = \sum_{w=-6}^{8} \theta_w RelativeWeek_{wt} + X_{ct}\gamma' + \nu_c \times year_t + \epsilon_{ct} \tag{7}$$

where y_{ct} is the weekly number of either state-based armed conflicts or demonstrations in country c and week t. $RelativeWeek_{wt}$ indicates a set a dummy variables indicating the relative weeks of date t compared with the start of Ramadan in this year. θ_w estimate the percentage change in conflicts relative to the omitted group of 12-7 weeks before Ramadan. The rationale for this selection is that Muslims start making preparations for Ramadan a month in advance. The regression includes country by year fixed effects. Weeks 7-10 are highlighted in gray in the graphs to illustrate the month of Ramadan.[14]

In Figure 4, armed conflicts show an overall relative increase during Ramadan. In the immediate week prior to Ramadan, we see a statistically significant surge in armed conflicts. This coincides with the last week of Sha'ban where Muslims may make up for the fasts they missed in the previous year and/or spiritually, physically, and financially prepare for the fasting month. The first week of Ramadan (relative week 7) starts with a statistically significant decrease of almost 5% compared to the baseline weeks. This pattern could be driven by increased security measures, or simply a period where all parties adjust to the arrival of Ramadan in relative peace. There is a reversing upward trend starting from week 2 of Ramadan. This relative positive change lasts till the end of the month, peaking in the last 10 days that coincide with the Nights of Decree. This upward trend in the armed clashed between the government of a state and other organized groups suggests that armed conflicts intensify as the celebration of Eid al-Fitr marking the end of Ramadan draws close. In the immediate week that postdates Ramadan, we observe a statistically significant decrease in the relative number of state-based conflicts. The result may stem from a respite during Eid al-Fitr celebrations, which lasts several days, and potential ceasefires or agreements tied to the festivities.

The results for the placebo group of countries with less than 1% Muslim share of population in Figure A1 are not statistically significant from zero and do not show any striking patterns, suggesting that the relative difference in armed clashed for the Muslim countries are being driven by the arrival of Ramadan.

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[14]Week 10 includes 8 or 9 days since the lunar month of Ramadan is 29-30 days long.
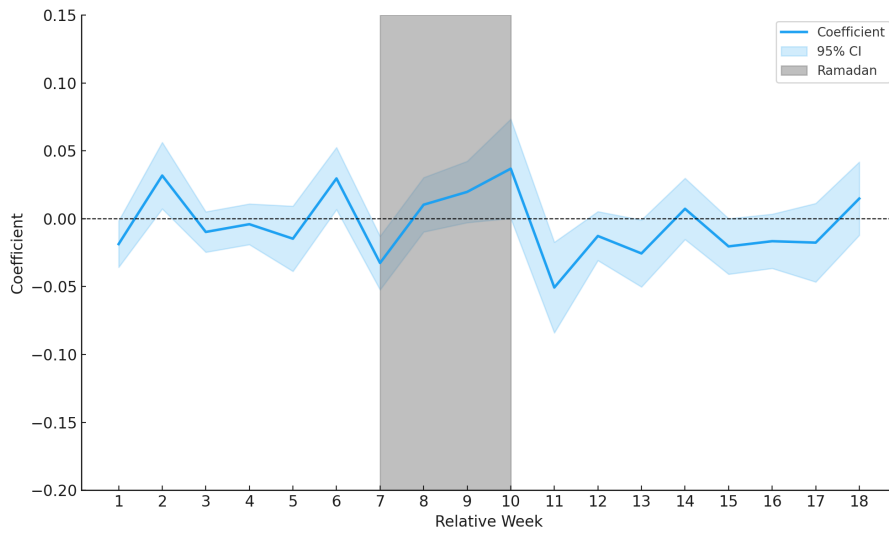
Figure 4: Ramadan Weeks and Armed Conflict in Muslim Countries

Notes: The sample consists of 31 countries with a Muslim share of population above 75%. The dependent variable is the log(armed conflict+1). The control group of weeks include 7-14 weeks before Ramadan.
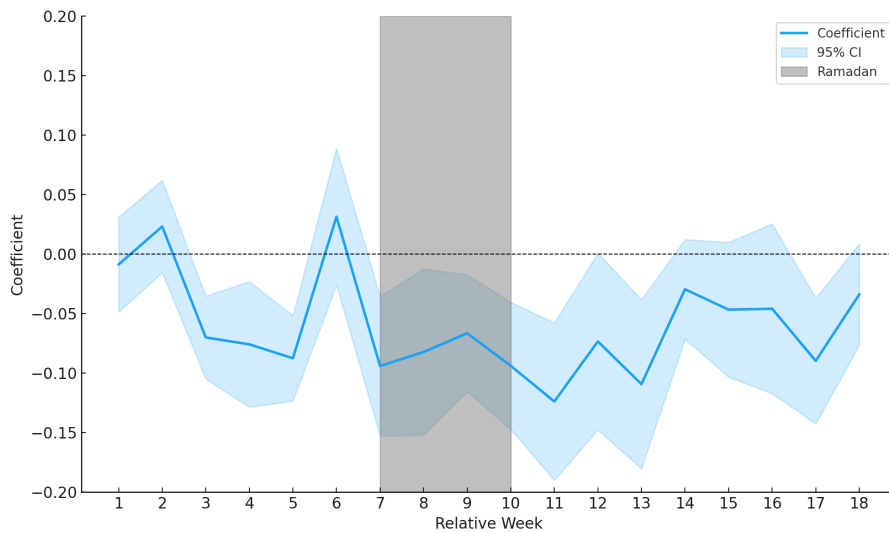
Figure 5: Ramadan Weeks and Demonstrations in Muslim Countries

Notes: The sample consists of 14 African countries with a Muslim share of population above 75%. The dependent variable is the log(demonstrations+1). The control group of weeks include 7-12 weeks before Ramadan.

In Figure 5, public demonstrations exhibit a clear reduction during Ramadan, weeks 7 to 10, marked in gray. In the weeks leading to Ramadan, demonstrations occur at relatively lower and consistent rates, with the exception of week 6. This could be associated with preparations people make for Ramadan. However, as Ramadan begins, a sharp decline in demonstrations is observed in week 7 and continues to the end, with the highest relative difference occurring in the week after Ramadan that marks the beginning of Eid al-Fitr. This suggests that Ramadan has a calming effect on public protests. The reduction could be attributed to increased religious activities and fasting, which may lessen individuals' energy and motivation for public dissent and redirect their focus toward spiritual practices and non-political community gatherings.

The trend indicates that, during Ramadan, there may be a temporary shift away from political activism as people prioritize religious observance. The consistent decline across these weeks could imply that the physical and spiritual demands of Ramadan decrease public engagement in demonstrations, as individuals may be less inclined to express opposition during this time. The persistently lower rate of demonstrations after Ramadan reflects a lingering effect of the heightened religious engagement and social cohesion fostered during Ramadan. The period of Eid al-Fitr, which follows Ramadan, is characterized by celebrations and family gatherings that may continue to draw focus away from political dissent. This period is also a few weeks from the last month of the Hijri calendar, that marks the beginning of the annual Hajj pilgrimage to Mecca. Yet again, the results for the placebo group of countries with less than 1% Muslim share of population in Figure A2 are not statistically different from zero and suggest that the results for the Muslim countries are being driven by the observance of Ramadan.

5.4 Fasting Hours and Conflict Frequency

In this section, I present the results of interacting the Ramadan variable in Equations (4)-(6) with the logarithm of the number of fasting hours during Ramadan, as in Campante and Yanagizawa-Drott (2015). This interaction allows us to examine how the intensity of fasting influences the intensity of armed conflict and demonstrations, measured by their numbers within Ramadan. These analyses are based on Ramadan-year balanced panels. Using this framework, I investigate how the variation in fasting hours across countries affects the relative frequency of conflict.

Theoretically, the variation in fasting hours is unlikely to have a significant direct impact on the incidence of armed conflict. Combatants actively engaged in warfare often rely on religious exemptions that permit breaking the fast during battles or other physically demanding situations. These exemptions are well-documented in Islamic jurisprudence and are typically observed in practice, ensuring that the physical demands of fasting do not directly hinder combatants' operational effectiveness.

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Fasting intensity may influence civilian demonstrations, as longer fasting hours impose greater physical and mental strain, particularly in warmer climates or during summer months with extended daylight. This strain, compounded by increased religious activities such as prayer and community obligations during Ramadan, may reduce individuals' energy and willingness to participate in protests. However, the variation in fasting intensity within Ramadan is relatively small, with most individuals already accustomed to fasting for 12–16 hours daily. A marginal increase in fasting hours across countries is unlikely to impose a substantial additional burden. Therefore, while longer fasting hours might slightly deter collective action, their overall impact on demonstrations during Ramadan is expected to be modest.

Table C1 summarizes the results of the regression analyses where the main explanatory variable is the log of the number of fasting hours. The first three columns report the findings for armed conflict, while the next three focus on demonstrations. The results indicate that in Muslim-majority countries ($> 75\%$) and when interacting fasting hours with the share of Muslims in the population, the coefficients are statistically insignificant. This finding holds for both armed conflict and demonstrations, showing that the link between the variation in Ramadan fasting hours across countries and conflict frequency within Ramadan is weak.

6   Discussion

The main analysis demonstrates that the lunar month of Ramadan has a robust, statistically significant, and quantitatively meaningful positive effect on the incidence of state-based armed conflicts in predominantly Muslim countries, where religious rituals are observed en masse. In contrast, Ramadan is associated with a robust, statistically significant, and quantitatively meaningful negative effect on public demonstrations. This contrasting pattern suggests that Ramadan may intensify armed tensions while simultaneously mitigating public unrest in the form of demonstrations.

Building on the theoretical mechanisms discussed in Section 3, this part of the paper taps into individual survey data, takes a deeper look at the conflict data, and rules out alternative explanations to empirically explore the mechanisms behind the contrasting effects observed in the main results.

6.1   Mechanisms for Armed Conflict Effects

Group-Based Heterogeneity

State-based armed conflicts, as defined earlier, involve clashes between a state government and another organized group, such as foreign governments, opposition parties, religious militias, or radical terrorist organizations. In this part of the analysis, I focus

on predominantly Muslim countries, where Ramadan is widely observed, and break down these conflicts into three main categories: radical, religious, and secular. To do this, I use a popular AI-powered natural language processing tool to classify the groups in the dataset into these categories. The classifications into "secular", "radical religious", and "religious" groups were based on their primary ideologies and objectives. Secular groups focus on political, ethnic, or nationalist goals without explicit ties to religion. Radical religious groups are driven by militant or extreme interpretations of religion, often aiming to establish religious states or enforce religious laws. Religious groups, while connected to religious traditions, focus more on cultural or regional autonomy without radical agendas. These distinctions rely on the groups' stated goals, affiliations, and documented actions to reflect their core motivations.

By accounting for differences in the nature of opposition groups, this analysis highlights which groups are more or less active during Ramadan. For example, moderately religious groups might scale back activities due to spiritual practices, while radical groups could take advantage of the lull. Secular groups, on the other hand, may be more open to negotiating truces or ceasefires. This detailed perspective is vital for creating more effective and targeted strategies to address conflict dynamics.

The results, presented in Table 3, highlight notable differences in the behavior of these groups during Ramadan. Columns (1) through (3) assess the effect of Ramadan on the frequency of armed conflict. For radical groups (column 1), there is a significant increase in conflict activity during Ramadan, with a coefficient of 0.049 (significant at the 5% level). This corresponds to an approximately 5% rise in conflict intensity from a baseline mean of 12.22 events per month. In contrast, religious groups (column 2) and secular groups (column 3) exhibit no statistically significant changes in conflict activity during Ramadan. These findings suggest that while religious and secular groups maintain their usual activity levels, radical groups may leverage Ramadan to escalate tensions, potentially reflecting different strategic or ideological motivations.

Table 3: The Ramadan Effect on Armed Conflict and Fatality by Group Type

	log(armed conflict +1)			log(fatalities +1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Ramadan	0.049**	0.030	0.009	0.052**	0.044	-0.018
	(0.018)	(0.021)	(0.008)	(0.024)	(0.027)	(0.021)
Group Type	Radical	Religious	Secular	Radical	Religious	Secular
Outcome mean (levels)	12.22	10.41	1.732	59.31	75.83	19.76
Observations	8505	4080	9792	8505	4080	9792
Adj. R^2	0.913	0.930	0.695	0.869	0.899	0.627
Controls	✓	✓	✓	✓	✓	✓
Country-by-year FE	✓	✓	✓	✓	✓	✓

Notes: All the samples include countries where at least 75% of the population is Muslim. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

Turning to conflict fatalities, columns (4) through (6) explore the effect of Ramadan on the logarithm of fatalities plus one. Similar to conflict activity, state-based armed clashes involving radical groups (column 4) are more fatal during Ramadan and experience a statistically significant increase in fatalities during Ramadan, with an increase of roughly 5.2% at the 5% level. This translates to more than 3 deaths per country during Ramadan directly from combat. For religious groups (column 5), the estimated coefficient of 0.044 suggests a moderate increase, though it lacks statistical significance. Secular groups (column 6) display a slight decline in fatalities during Ramadan, with a negative coefficient of -0.018, though this result is also not statistically significant.

State-based conflicts involving radical religious groups tend to spike during Ramadan, likely because governments take a more aggressive stance to curb potential threats or preempt attacks during this sensitive period. At the same time, radical religious groups may escalate their activities, leveraging the period for symbolic or strategic gains. Religious groups, while tied to religious traditions, generally remain quieter, likely focusing on community life or spiritual observances rather than conflict. Secular groups show a contrasting pattern, often pulling back and reducing conflict and fatalities, potentially due to international pressure on both sides to achieve a ceasefire. These patterns highlight how governments and different types of groups adjust their behavior during Ramadan.

Identifying Aggressor Behavior

Having established that the recent surge in political violence stems primarily from clashes between ruling groups and radical religious factions, this section aims to determine which side accounts for a greater share of these conflict events by examining how each actor's levels of aggression differ from those in other periods. However, it is important to note that the UCDP data does not specify which party acted as the aggressor or the victim in the recorded incidents. Determining the aggressor or victim in each incident can be subjective, context-dependent, and challenging to verify. Assigning responsibility for attacks may also be contentious depending on the source.

However, the UCDP dataset includes a variable containing snippets of source material information—such as names, dates, and titles—from which event details are derived. In many cases, this text makes it possible to infer which side initiated the conflict or which side was targeted. Given that there are nearly 100,000 observations, I employ advanced natural language processing techniques to classify each event into one of three categories: 1 if the government forces can be identified as the initiators with high confidence; 2 if the radical rebel groups can be identified as the initiators with high confidence; and 0 if the information is insufficient, preventing a confident determination of either aggressor or victim.

To achieve this classification, I utilize advanced natural language processing tech-

niques and AI-driven tools to analyze the textual snippets from the UCDP dataset. By leveraging a large language model, I dynamically generate prompts that provide clear guidelines for identifying whether the government forces, the radical religious groups, or neither side can be confidently deemed the aggressors. This automated approach enables the efficient and systematic processing of nearly 100,000 state-based episodes of conflict involving radical religious groups, ensuring a high level of consistency and reducing the subjective bias that might otherwise occur in manual event classification. This contribution is valuable because it addresses a critical gap in the data, identifying which party initiates violence, through a novel, data-driven methodology. By applying advanced NLP techniques to a large dataset, we can achieve more precise, systematic, and scalable insights into conflict dynamics, enabling richer and more reliable empirical analyses.

It is important to mention that the classification relies on the quality and detail of the source texts, which may be incomplete, biased, or ambiguous. Additionally, even advanced NLP techniques may misinterpret certain linguistic nuances or context-specific expressions, leading to inaccuracies. However, I mitigate these concerns as I fine-tune the algorithms by repeatedly sampling 500 observations and manually reviewing them each time. Nearly half of the results exhibit non-zero classifications, and the assigned classifications demonstrate high accuracy based on this approach. Figure B1 provides a randomly selected snippet of the classified data, along with notes describing the important features.

Figure 6 is helpful in illustrating the temporal variation in state-based conflict events by actor (state versus rebel aggression) across Islamic calendar months, with a specific focus on the period of Ramadan. It shows the average number of conflict events in 21 countries with a Muslim population share above 75% from 1989 to 2022. The results show that state aggression remains relatively stable across the months except for the dip in months 5-6, with no significant change during Ramadan. In contrast, rebel aggression is slightly on the rise before it reaches its peak during Ramadan, as highlighted in the shaded area. This suggests that the timing of Ramadan has a pronounced impact on rebel behavior, potentially driven by religious and strategic considerations during this period.

Furthermore, the figure highlights a clear discrepancy between the averages of the two sides. State aggression consistently shows higher baseline levels across most months, reflecting the state's predominant role in initiating or sustaining conflicts. Rebel aggression, while generally lower, shows greater variability and a more noticeable peak during Ramadan. This disparity underscores the differing conflict dynamics and capacities between state and rebel actors, with the latter potentially timing their actions to align with the symbolic and strategic significance of Ramadan.

Turning to Figure 7, the focus shifts to the estimated impact of Ramadan on state-
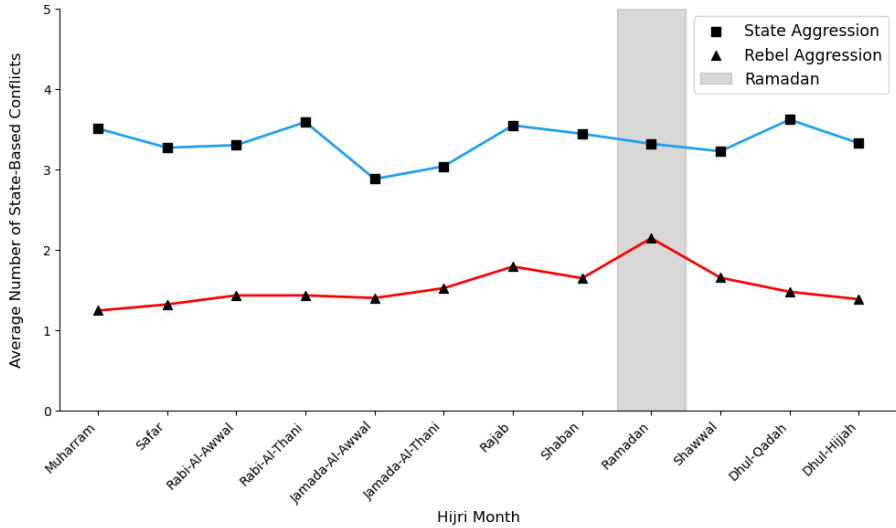
Figure 6: Frequency of State-Based Conflict Events by Actor

Notes: The sample consists of 21 countries where the Muslim population share exceeds 75%, covering the period from 1989 to 2022. The figure shows the average number of state-based conflict events per Hijri month, disaggregated by actor type: state aggression (square markers) and rebel aggression (triangle markers). The outcomes are aggregated across all countries and years, highlighting variations in conflict intensity by month. The shaded region represents the month of Ramadan, a period of religious significance, allowing for a focused comparison of conflict dynamics during this time relative to other months. The data illustrates patterns in both state and rebel aggression, shedding light on the role of Ramadan in influencing conflict behaviors.

and rebel-attributed conflict events, controlling for conflict duration, fatalities, and country by year fixed effects. Based on regression analyses, the figure presents coefficient estimates for the Ramadan variable, highlighting the differential effects on state and rebel aggression. For state-attributed conflicts, the Ramadan coefficient is small and statistically insignificant, suggesting that state behavior remains largely unaffected by the religious period. In contrast, the coefficient for rebel-attributed conflicts is positive and statistically significant, indicating a notable increase in rebel aggression during Ramadan compared to other months. This finding aligns with the earlier observation of temporal patterns, reinforcing the idea that Ramadan uniquely reinforces radical rebel aggression.

6.2 Mechanisms for Demonstration Effects

The Ramadan Effect on Spirituality and Political Engagement

In this part, I compare responses on measures of spirituality (prayer frequency) and political engagement from interviews conducted during Ramadan to those conducted in other months. Since the timing of the interviews is orthogonal to the occurrence of Ramadan, and all countries have respondents surveyed across different months over the study period, the results presented in Table 4 can causally be attributed to the effects of religious observance during Ramadan.

I begin by examining the change in the measure of spirituality, specifically prayer
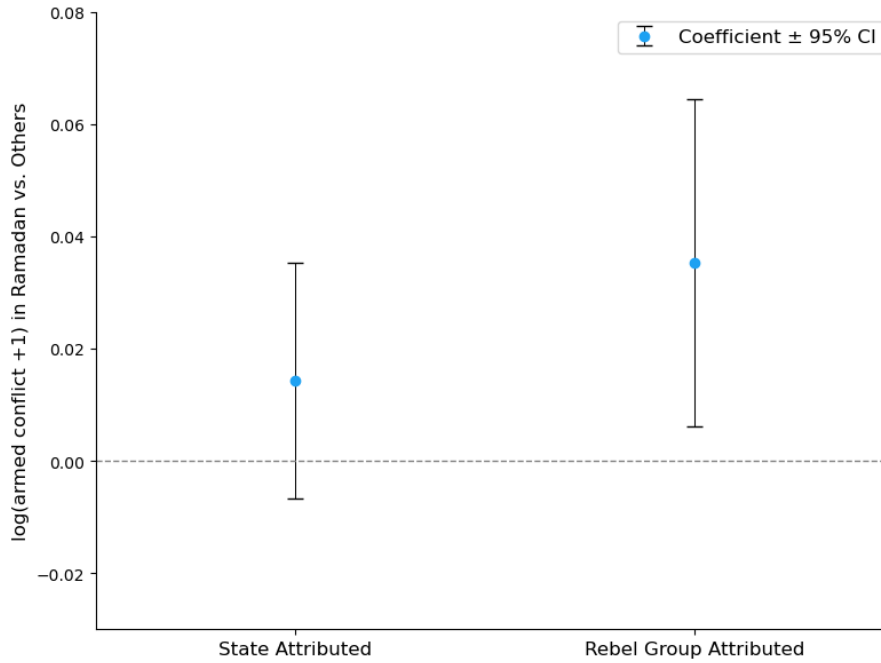
Figure 7: The Impact of Ramadan on State and Rebel-Attributed Conflict

Notes: The sample consists of 21 countries where the Muslim population share exceeds 75%, covering a monthly balanced panel from 1989 to 2022. The figure illustrates the estimated impact of Ramadan on the log-transformed number of state-attributed and rebel-attributed conflict events, derived from regression models that control for conflict duration, the best estimate of fatalities, and country-year fixed effects. The analysis is based on data from 8,505 observations across 21 countries, with robust standard errors clustered at the country level.

attendance, during Ramadan compared to other months. In columns (1), despite an already high baseline rate of prayer attendance, we observe a marginally significant increase of nearly 3 percentage points during Ramadan at the 10% significance level. These result remains consistent to the inclusion of control variables such as gender, age, age squared, marital status, number of children, education level, and a binary variable based on their answer to the overall importance of religion in their life in column (2). Comparing columns (3) and (4), the baseline rate of high-intensity prayer attendance is higher for females than for males, and the magnitude of the Ramadan effect is both larger and statistically significant among females. Although the effect for males is only borderline significant, the positive coefficient still indicates an increase in prayer attendance during Ramadan.

Turning to the results on survey responses on political engagement, the rest of the columns present the regression analyses of two previously discussed measures of political interest and action. The estimates in columns (5)-(6) show the effect of Ramadan on interest in politics, first without controls and then with controls specified in the table notes, respectively. The results are statistically significant at the 1% level, indicating a decline in political interest of approximately 10%, from a baseline share of 0.48 to 0.43. This decline in political interest during Ramadan reflects a quantitatively meaningful shift

in priorities for thousands of individuals, as they may choose to focus more on religious and familial obligations, reducing their engagement with political matters.

Columns (7) and (8) present results separately for women and men. Women have a lower baseline mean interest in politics compared to men (0.42 vs. 0.54), but the reduction in their political interest during Ramadan is more pronounced. Women's interest drops by 0.05 (a significant decline at the 1% level), while men experience a smaller reduction of 0.04 pp., significant at the 10% level. The next couple of columns reveal that the decline in political interest extends to outcomes related to demonstration attendance. During Ramadan, the proportion of individuals reporting past or potential participation in lawful and peaceful demonstrations decreases by nearly 15%. While this reduction is evident for both females and males in columns (11)-(12), it is stronger and statistically significant for females, showing a 16% drop from their baseline rate of 0.3.

Taken together, these results suggest that the spiritual and communal dynamics of Ramadan significantly reduce individuals' likelihood of engaging in political interest and activism in demonstrations. The heightened focus on religious observance and its associated social expectations during Ramadan may disproportionately affect women's engagement with politics, potentially due to higher religiosity observed for female Muslims as demonstrated in column (3) as well as gendered differences in social or familial responsibilities during this period.

6.3 Addressing Potential News Biases

One possible explanation for the baseline results could be that if news coverage of armed conflicts during is especially stronger and that more events are making their way into these news-based datasets[15]. Although, it is hard to reconcile with the second result that there are fewer demonstrations, and it is also not immediately obvious why relative news coverage for demonstrations in Ramadan would be lower than relative coverage for armed conflicts during Ramadan.

Nevertheless, to test the hypothesis that news coverage of conflict outcomes differs during Ramadan compared to other months, I first restrict the sample to events with non-zero fatalities, as these events are more likely to receive consistent coverage both during and outside Ramadan. In another specification, I limit the sample to conflict events reported by at least two sources, which helps ensure greater reliability by reducing the impact of single-source biases. Lastly, I examine the results separately for events covered by international media and those reported by non-international or local media.[16]

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[15]It needs to be mentioned that both datasets extensively incorporate local sources, with ACLED explicitly prioritizing them, and do not rely solely on traditional media.

[16]International traditional media tends to focus on high-profile or large-scale events, whereas local sources offer broader coverage, including smaller incidents, prolonged conflicts, and events in inaccessible regions that global outlets may miss. Separating the samples helps mitigate the biases of traditional media, which are influenced by factors like (English speaking) audience demand, limited space, and the

Table 4: The Ramadan Effect on Spirituality and Political Engagement

	Spirituality/Prayer				Interest in Politics				Attending Demonstrations			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Ramadan	0.028*	0.029*	0.030*	0.028	-0.052***	-0.047***	-0.057***	-0.039*	-0.049*	-0.041*	-0.050**	-0.028
	(0.016)	(0.017)	(0.016)	(0.020)	(0.017)	(0.016)	(0.015)	(0.020)	(0.029)	(0.024)	(0.024)	(0.025)
Dataset												
Sample	All	All	Females	Males	All	All	Females	Males	All	All	Females	Males
Outcome mean	0.718	0.718	0.734	0.701	0.481	0.481	0.421	0.543	0.376	0.376	0.303	0.452
Observations	39036	39036	19783	19241	47305	47305	24160	23131	42688	42688	21656	21018
Adj. R^2	0.214	0.246	0.308	0.230	0.0701	0.0947	0.0856	0.0861	0.103	0.140	0.131	0.130
Controls	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
Country-by-year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Notes: The sample includes Muslims around 61 countries across the world. The controls include gender, age, age squared, marital status, number of children, education level, and a binary variable based on their answer to the overall importance of religion in their life. Robust standard errors are clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

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Table 5: The Ramadan Effect and News Reporting

	log(armed conflict +1)			log(demonstrations +1)		
	(1)	(2)	(3)	(4)	(5)	(6)
Ramadan	0.030**	0.031*	0.030**	-0.039**	-0.062*	-0.054
	(0.012)	(0.015)	(0.012)	(0.018)	(0.031)	(0.036)
Dataset	UCDP	ACLED	UCDP	ACLED	ACLED	ACLED
Fatality threshold	$\geq$5	$\geq$5	None	None	None	None
News sources per event	$\geq$1	$\geq$1	$\geq$2	$\geq$2	$\geq$1	$\geq$1
Source type					International	Other
Outcome mean (levels)	8.696	0.797	8.696	7.397	3.259	14.76
Observations	11016	4536	11016	4536	4536	4536
Adj. R^2	0.895	0.716	0.895	0.677	0.556	0.888
Controls	✓		✓			
Country-by-year FE	✓	✓	✓	✓	✓	✓

Notes: All the samples include countries where at least 75% of the population is Muslim. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

In column (1) of Table 5, I restrict the sample to state-based armed conflicts with at least five fatalities, retaining approximately one-fourth of the original events. In column (2), I apply a similar restriction but focus on political violence events from the ACLED dataset where at least one party represents a state government.[17] The results are robust, showing positive and statistically significant effects at conventional levels. Furthermore, the findings in columns (3) and (4) for UCDP and ACLED, respectively, provide additional reassurance, as they suggest that the results are not driven by single-source biases.

Next, in column (5), I restrict the sample to events where at least one source is international traditional media, which accounts for approximately one-quarter of all ACLED events. The results remain robust under this specification. Finally, in column (6), I exclude events that rely solely on international news media, keeping those covered by national, local partner, or subnational sources. While the results remain negative, there is a modest decrease in precision. Taken together, these findings suggest that reporting bias during Ramadan is unlikely to explain the results.

7   Conclusions

The findings of this study highlight the dual influence of Ramadan on political behavior, intensifying state-based armed conflicts while suppressing peaceful public demonstrations. These results provide actionable insights into how religious observance interacts with conflict dynamics and offer clear avenues for targeted interventions.

The observed increase in armed conflicts during Ramadan suggests that peacebuilding

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pressures of continuous news cycles, allowing for a more accurate analysis of conflict patterns.

[17]Fatalities are rare in demonstrations, so this variable is used to better capture differences in ACLED event coverage based on the severity of the conflict.

organizations and mediators should focus on early-warning systems and pre-Ramadan ceasefire negotiations, engaging religious leaders to frame these efforts within culturally and religiously resonant narratives. For example, religious leaders could lead coordinated messaging campaigns emphasizing nonviolence and unity, which would directly counter the heightened risk of violence during Ramadan while fostering trust and cooperation among conflicting parties.

The suppression of demonstrations highlights the need for policymakers to avoid scheduling public consultations, major reforms, or elections during Ramadan, when civic participation is lower. International organizations and civil society actors could monitor for abuses by regimes exploiting this period of reduced dissent to push through controversial measures. Timing policy and advocacy efforts to align with post-Ramadan periods of higher civic activity could also ensure greater public engagement.

By identifying how Ramadan reshapes political and conflict dynamics, this study underscores the importance of culturally informed policymaking to mitigate risks during sensitive periods while leveraging the opportunities presented by heightened social cohesion and community focus during Ramadan.

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Online Appendix
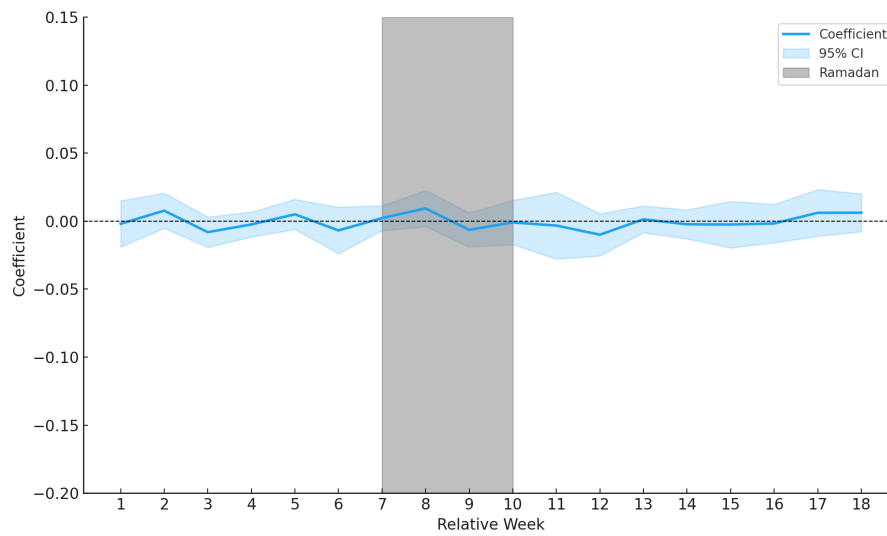
Figure A1: Ramadan Weeks and Armed Conflict for the Placebo Group

Notes: The sample consists of 29 countries with a Muslim share of population below 1%. The dependent variable is the log(armed conflict+1). The control group of weeks include 7-12 weeks before Ramadan.
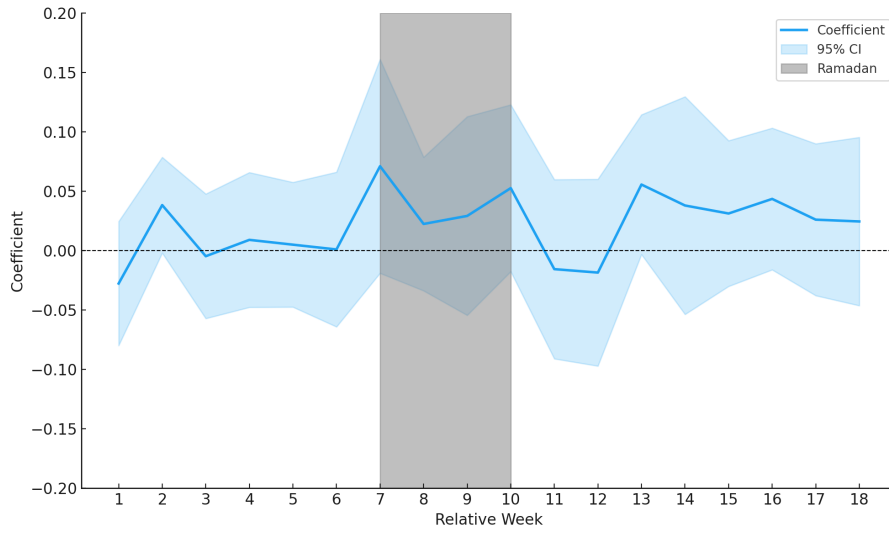
Figure A2: Ramadan Weeks and Demonstrations for the Placebo Group

Notes: The sample consists of 6 African countries with a Muslim share of population below 1%. The dependent variable is the log(demonstrations+1). The control group of weeks include 7-14 weeks before Ramadan.

Table A1: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Max
UCDP Country-Level Full Sample					
Log (State Conflict+1)	43,656	0.465	1.020	0	7.602
State Conflict	43,656	5.046	45.068	0	2001
Conflict Duration	43,656	0.084	0.675	0	13.675
Fatalities	43,656	39.023	470.865	0	48,219
% Share Muslims	43,656	0.365	0.397	0	1
UCDP Country-Level Muslim Majority Sample					
Log (State Conflict+1)	1,054	0.759	1.325	0	7.298
State Conflict	1,054	12.574	82.343	0	1476
Average Conflict Duration (days)	1,054	0.129	0.906	0	12.533
Fatalities	1,054	70.937	363.180	0	6053
ACLED Country-Level Full Sample					
Log (Demonstrations+1)	15,552	0.844	1.178	0	5.811
Demonstrations	15,552	6.047	20.166	0	333
Log Political Violence	15,552	0.611	1.013	0	5.652
Political Violence	15,552	3.437	11.825	0	284
Population Growth (%)	15,552	2.319	1.476	-14.079	17.223
ACLED Country-Level Muslim Majority Sample					
Log (Demonstrations+1)	4,536	1.082	1.361	0	5.730
Demonstrations	4,536	9.789	28.352	0	307
Log Political Violence	4,536	0.742	1.166	0	5.652
Political Violence	4,536	5.260	16.794	0	284
Population Growth (%)	4,536	2.064	1.701	-14.079	17.223
World Values Survey (Individual-Level)					
Praying Frequency (Dummy)	39,046	0.718	0.450	0	1
Ramadan (Dummy)	39,046	0.123	0.328	0	1
Participation in Demonstrations (Dummy)	42,699	0.376	0.484	0	1
Interest in Politics (Dummy)	47,317	0.481	0.500	0	1
NLP Muslim Majority (Radical Group Events)					
Indeterminate Aggressor Classification	54,914	0	0	0	0
Aggressor Classification (Dummy - 1, 2)	42,016	1.317	0.465	1	2

Notes: This table presents summary statistics for UCDP, ACLED, World Values Survey, and NLP datasets. Variables include measures of conflict, demonstrations, population growth, and religious indicators. Muslim Majority sample includes 31 and 14 countries in UCDP and ACLED datasets, respectively, with a Muslim share of population above > 75%. Summary statistics for subsamples with different thresholds, placebo group, controls in the survey data, and others are available upon request.

Table A2: The Relative Effects of Ramadan on State-Based Armed Conflicts in Muslim Countries, 1989-2022 (Months 6-12)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Dependent Variable: log(armed conflict +1)				
Ramadan	0.030**	0.030**	0.030**	0.030**	0.030**	0.030**	0.007	0.003
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.008)	(0.009)
Ramadan × % Muslim							0.017	
							(0.016)	
Ramadan× >75% Muslim								0.025*
								(0.015)
Ramadan× 50−75% Muslim								-0.020
								(0.024)
Ramadan× 25−50% Muslim								-0.011
								(0.025)
Ramadan× 1-25% Muslim								0.015
								(0.014)
Conflict mean	12.18	12.18	12.18	12.18	12.18	12.18	5.19	5.19
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	7378	7378	7378	7378	7378	7378	25466	25466
Adj. R^2	0	0.460	0.0561	0.518	0.910	0.914	0.891	0.891
Country FE		✓		✓				
Year FE			✓	✓				
Controls						✓	✓	✓
Country-by-year FE					✓	✓	✓	✓
Share-by-year FE							✓	✓

Notes: The control group of months includes the three months preceding and following Ramadan. In columns (1)–(6), the sample consists of the 31 countries with at least 75% muslims on average for the given period in the World Religion Project (WRP) and PEW database. Columns (7) and (8) expand the sample to include countries with varying Muslim population percentages. Conflict mean provides the average number of conflicts. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$.

Table A3: The Relative Effects of Ramadan on Conflict in Non-Muslim Countries, 1989-2022

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Dependent Variable: log(armed conflict +1)				
Ramadan	0.002	0.002	0.006	0.002	0.002	0.003	0.023**	0.049**
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.011)	(0.021)
Ramadan × % Christian							-0.021	
							(0.016)	
Ramadan× >75% Christian								-0.038*
								(0.022)
Ramadan× 50–75% Christian								-0.056**
								(0.025)
Ramadan× 25–50% Christian								-0.063*
								(0.033)
Ramadan× 1-25% Christian								-0.030
								(0.024)
Conflict mean	0.88	0.88	0.88	0.88	0.88	0.88	5.04	5.04
Sample	Non-Muslim	Non-Muslim	Non-Muslim	Non-Muslim	Non-Muslim	Non-Muslim	All	All
Observations	5236	5236	5236	5236	5236	5236	25466	25466
Adj. R^2	0	0.551	0.0267	0.581	0.844	0.851	0.891	0.891
Country FE		✓		✓				
Year FE			✓	✓				
Controls					✓	✓	✓	✓
Country-by-year FE						✓	✓	✓
Share-by-year FE							✓	✓

Notes: Columns (1)–(6) focus on 22 predominantly non-Muslim countries, while columns (7) and (8) include all countries, with reference groups representing different Christian population shares. Conflict mean provides the average number of conflicts. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$.

Table A4: The Relative Effects of Ramadan on State Based Armed Conflict in Muslim Countries, 1989-2022 (PPML)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Dependent Variable: Number of Armed Conflicts				
Ramadan	0.066***	0.066***	0.083***	0.066***	0.066***	0.069***	0.061	-0.079*
	(0.022)	(0.022)	(0.023)	(0.022)	(0.022)	(0.026)	(0.118)	(0.042)
Ramadan × % Muslim							0.007	
							(0.120)	
Ramadan× >75% Muslim								0.155***
								(0.048)
Ramadan× 50−75% Muslim								0.146
								(0.277)
Ramadan× 25−50% Muslim								-0.314
								(0.255)
Ramadan× 1-25% Muslim								0.244*
								(0.136)
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	12648	12648	12648	12648	6672	6672	16692	16692
Pse. R²	0	0.595	0.203	0.798	0.935	0.937	0.895	0.896
Country FE		✓						
Year FE			✓	✓				
Controls				✓		✓	✓	✓
Country-by-year FE					✓	✓	✓	✓
Share-by-year FE							✓	✓

Notes: In columns (1)–(6), the sample consists of the 31 countries with at least 75% muslims on average for the given period in the World Religion Project (WRP) and PEW database. In columns (7)-(8), the sample consists of 107 countries. In column (8), the reference group consists of 22 countries with an average Muslim population of 1% or less. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5: The Relative Effects of Ramadan on Political Violence in Muslim Countries, 1997-2023 ACLED

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Dependent Variable: log(Political Violence +1)			
Ramadan	0.065***	0.065***	0.065**	0.065***	0.065***	-0.006	0.001
	(0.018)	(0.018)	(0.023)	(0.018)	(0.015)	(0.015)	(0.017)
Ramadan × % Muslim						0.070***	
						(0.025)	
Ramadan× >75% Muslim							0.065**
							(0.024)
Ramadan× 50–75% Muslim							-0.029
							(0.056)
Ramadan× 25–50% Muslim							0.020
							(0.055)
Ramadan× 1-25% Muslim							0.005
							(0.023)
Political Violence mean	5.260	5.260	5.260	5.260	5.260	3.437	3.437
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	4536	4536	4536	4536	4536	15552	15552
Adj. R²	0.0000200	0.365	0.141	0.509	0.840	0.791	0.791
Country FE			✓	✓			
Year FE		✓		✓			
Country-by-year FE					✓	✓	✓
Share-by-year FE						✓	✓

Notes: In columns (1)–(5), the sample consists of 14 African countries with at least 75% Muslims on average for the given period in the World Religion Project (WRP) and PEW database. In columns (6)-(7), the whole sample consists of 48 African countries. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table B1: The Relative Effects of Ramadan on Demonstrations in Muslim Countries, 1997-2023 (Months 6-12)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Dependent Variable: log(demonstrations +1)				
Ramadan	-0.061*	-0.061*	-0.058	-0.061*	-0.061*	0.063***	0.096
	(0.034)	(0.034)	(0.033)	(0.034)	(0.034)	(0.023)	(0.058)
Ramadan × % Muslim						-0.106**	
						(0.045)	
Ramadan× >75% Muslim							-0.158**
							(0.067)
Ramadan× 50−75% Muslim							0.031
							(0.090)
Ramadan× 25−50% Muslim							-0.001
							(0.070)
Ramadan× 1-25% Muslim							-0.081
							(0.060)
Demonstrations mean	9.4	9.4	9.4	9.4	9.4	6.03	6.03
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	2646	2646	2646	2646	2646	9072	9072
Adj. R^2	0	0.161	0.429	0.594	0.866	0.818	0.818
Country FE		✓		✓			
Year FE			✓	✓			
Country-by-year FE					✓	✓	✓
Share-by-year FE						✓	✓

Notes: The control group of months includes the three months preceding and following Ramadan. Columns (1)–(5) use a sample of 14 countries with at least 75% muslims on average for the given period in the World Religion Project (WRP) and PEW database. Columns (6) and (7) expand the sample to include countries with varying Muslim population percentages. Conflict mean provides the average number of demonstrations. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Table B2: The Relative Effects of Ramadan on Demonstrations in Non-Muslim Countries, 1997-2023

	Dependent Variable: Demonstrations						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ramadan	0.098	0.098	0.087	0.098	0.098	-0.059	-0.130*
	(0.068)	(0.068)	(0.071)	(0.069)	(0.068)	(0.038)	(0.075)
Ramadan × % Christian						0.147**	
						(0.059)	
Ramadan× >75% Christian							0.185**
							(0.081)
Ramadan× 50−75% Christian							0.162**
							(0.079)
Ramadan× 25−50% Christian							0.171**
							(0.079)
Ramadan× 1-25% Christian							0.117
							(0.088)
Demonstrations mean	2.001	2.001	2.001	2.001	2.001	6.047	6.047
Sample	Non-Muslim	Non-Muslim	Non-Muslim	Non-Muslim	Non-Muslim	All	All
Observations	1944	1944	1944	1944	1944	15552	15552
Adj. R^2	0	0.168	0.244	0.413	0.569	0.803	0.803
Country FE		✓		✓			
Year FE			✓	✓			
Country-by-year FE					✓	✓	✓
Share-by-year FE						✓	✓

Notes: Columns (1)–(5) focus on pred countries, while columns (6) and (7) include all countries. Demonstrations mean provides the average number of demonstrations. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Table B3: The Relative Effects of Ramadan on Demonstrations in Muslim Countries, 1997-2023 (PPML)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
				Dependent Variable: Number of Demonstrations			
Ramadan	-0.145*	-0.145*	-0.160***	-0.145*	-0.145*	0.038	0.232*
	(0.074)	(0.074)	(0.062)	(0.074)	(0.074)	(0.048)	(0.139)
Ramadan × % Muslim						-0.181*	
						(0.095)	
Ramadan× >75% Muslim							-0.377**
							(0.156)
Ramadan× 50–75% Muslim							-0.108
							(0.172)
Ramadan× 25–50% Muslim							-0.273*
							(0.141)
Ramadan× 1-25% Muslim							-0.236
							(0.144)
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	4536	4536	4536	4536	4044	13488	13488
Pse. R^2	0	0.273	0.414	0.688	0.832	0.813	0.813
Country FE		✓		✓			
Year FE			✓	✓			
Country-by-year FE					✓	✓	✓
Share-by-year FE						✓	✓

Notes: In columns (1)–(5), the sample consists of 14 countries with at least 75% Muslims on average for the given period in the World Religion Project (WRP) and PEW database. In columns (6)-(7), the sample consists of 48 countries. In column (7), the reference group consists of 7 countries with an average Muslim population of 1% or less. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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Table C1: The Effect of Ramadan Fasting Hours on Conflict and Demonstration Intensity

	log(armed conflict +1)			log(demonstrations +1)		
	(1)	(2)	(3)	(4)	(5)	(6)
RFH	1.617	0.252	-0.082	0.341	1.718	2.984
	(1.528)	(0.294)	(0.184)	(5.366)	(3.067)	(2.822)
RFH × % Muslim		0.860			-1.184	
		(1.489)			(6.161)	
RFH× >75% Muslim			1.416			2.869
			(1.576)			(3.444)
RFH× 50–75% Muslim			-0.152			-10.052**
			(0.466)			(4.519)
RFH× 25–50% Muslim			0.708			-2.636
			(0.915)			(5.106)
RFH× 1–25% Muslim			0.520			-4.672
			(0.438)			(4.025)
Outcome Mean (levels)	12.57	5.319	5.319	8.566	5.730	5.730
Sample	Muslim	All	All	Muslim	All	All
Observations	1023	3638	3638	378	1296	1296
Adj. R^2	0.788	0.659	0.659	0.679	0.687	0.590
Controls	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Country trends	✓	✓	✓	✓	✓	✓
Share-by-year FE	✓	✓	✓	✓	✓	✓

Notes:

Notes: RFH stands for Ramadan fasting hours. The table presents interaction effects with the percentage of Muslim population and its subcategories. Robust standard errors are in parentheses, clustered at the country level. Controls include baseline covariates such as population size, conflict duration, and fatalities. The analysis is conducted using a country panel for each Ramadan year. For UCDP, the sample includes 31 Muslim countries with a Muslim population share above 75% and 107 countries in total. For ACLED, the sample includes 15 Muslim countries with a Muslim population share above 75% and 48 countries in total. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

	side_a	side_b	source_article	aggressor_classification
57815	Government of Syria	Syrian insurgents	"SOHR,2014-04-19,203 were killed yesterday","VDC,2014-04-18,VDC 2014-04-18"	0
26389	Government of Syria	Syrian insurgents	"SOHR,2012-06-28,More than 180 Syrians killed on Thursday 28/6/2012"	0
23517	Government of Somalia	Al-Shabaab	"Xinhua News Agency,2022-09-23,Somali forces kill 15 al-Shabab militants","Goobjoog News,2022-09-23,The government has spoken about the war in several areas of Galgaduug region","Gulf of Aden Security Review,2022-09-23,Gulf of Aden Security Review â€ September 23, 2022"	1
49843	Government of Syria	Syrian insurgents	"VDC,2013-10-12,Abo Wasim Salama Simwa Abo Khalil Abo Halab Ahmad al-Bahdaila Iyas Salama Ahmad Mnaizel Usama Mahmod"	0
30553	Government of Syria	Syrian insurgents	"VDC,2012-09-30,Mohammad Deib Obaied"	0
⋮	⋮	⋮	⋮	⋮
17486	Government of Pakistan	TTP	"Agence France Presse,2014-01-22,Bomb blast kills five in northwest Pakistan","BBC Monitoring South Asia,2014-01-22,BBC Monitoring Pakistan morning media roundup 22 Jan 14"	2
48927	Government of Syria	Syrian insurgents	"VDC,2013-09-20,Unidentified"	0
43767	Government of Syria	Syrian insurgents	"SOHR,2013-05-29,More than 160 fell yesterday"	0
73078	Government of Syria	Syrian insurgents	"VDC,2020-08-20,Orwa Sulaiman Deleh"	0
85316	Government of Syria	Syrian insurgents	"SOHR,2017-02-23,Breaches in the truce areas escalate with the end of the 54th day in a row","VDC,2017-02-23,Shaaban Shaabant"	0

500 rows × 4 columns

Figure B1: Snippet of Conflict Event Data with Automated Aggressor Classification

Notes: This figure presents a snippet from a dataset that includes information on individual conflict events, with each row representing a separate incident. The columns list the groups involved—such as "Government of Syria" and "Syrian insurgents"—alongside textual snippets from the source material documenting the event. The final column, "aggressorclassification," displays the outcome of an automated classification process, where a value of 1 indicates that government forces were identified as aggressors with high confidence, 2 indicates that rebel groups were identified as aggressors, and 0 signifies insufficient evidence. In this sample, most events remain unclassified (0), reflecting the complexity of attributing responsibility. However, there are cases where the text snippets enabled clearer assignments, such as an event involving the "Government of Somalia" and "Al-Shabaab" classified as 1, and an event involving the "Government of Pakistan" and "TTP" classified as 2, demonstrating how qualitative source data can be transformed into structured indicators of who initiated the violence.