Conflict and Religion: Evidence from Ramadan*

Humoyun Abdumavlon§

August 12, 2025

Click here for latest version

Abstract

This paper examines how Ramadan, a month of heightened religiosity for Muslims, shapes conflict intensity. Leveraging annual variation in Ramadan's timing due to the Islamic lunar calendar and fixed-effects panel regressions, I analyze armed conflicts involving states and rebel groups, as well as civilian protests, across Muslim-majority countries. Results indicate a 3–7% increase in armed conflict during Ramadan. Using a large language model (LLM) to classify rebel groups and attribute conflict initiation based on event news, I show that this increase is driven primarily by radical religious actors who invoke Islamic historical precedents of warfare during Ramadan and exploit fasting exemptions for combatants. In contrast, protest activity declines by nearly 10%, as fasting and spiritual focus reduce civilian political engagement. This pattern is reinforced by survey evidence from over 50,000 Muslims interviewed during Ramadan and other months. The findings offer new insights into how religious observance affects violent conflict, broader patterns of political engagement, and economic stability in Muslim societies. Practically, they underscore the importance of accounting for religious calendar cycles when designing the timing of peacebuilding, monitoring, and civic outreach efforts.

Keywords: Social Stability; Armed Conflict; Demonstrations; Religion; Ramadan
JEL classification: D74; F51; N30; O57; Z12;

*I am grateful to Aala Abdelgadir, Omer Ali, Michael Colaresi, Claire Duquennois, Andreas Ferrara, Vicky Fouka, Rania Gihleb, Osea Giuntella, David Huffman, Mohammad Isaqzadeh, Muhammad Yasir Khan, Guillermo Lezama, Laura Liu, Lester Lusher, Jared Rubin, Gabriel Tourek, Richard Van Weelden, and Randall Walsh for their helpful comments and feedback, as well as to participants of the 2025 Association for the Study of Religion, Economics, and Culture Conference.

§University of Pittsburgh, Department of Economics. E-mail: abdumavlon@pitt.edu.

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. Many recent conflicts feature religious dimensions, such as the schism between the Russian and Ukrainian Orthodox Churches amid the Russo-Ukrainian War, or the sectarian tensions among Abrahamic faiths 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 civilian protests against the 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.

While the timing of Ramadan is not randomly assigned – it is well-known and anticipated – its annual rotation through the Gregorian calendar introduces substantial quasi-exogenous variation that can be leveraged for causal inference. Because Ramadan shifts approximately 1.5 weeks earlier each year, it cycles through all Gregorian months over a 33-year period, allowing me to compare conflict outcomes across a wide range of seasonal, political, and institutional contexts. This design mitigates concerns about confounding seasonality or unobserved time trends. Although rebel groups and civilians may adapt to Ramadan's timing, the fact that much of the Muslim world organizes work, schooling, and governance on the Gregorian calendar means that the overlap between secular schedules and Ramadan observance generates disruptions to daily life. These shocks plausibly affect conflict behavior without being endogenously timed to it. I exploit this temporal misalignment to isolate Ramadan's influence on two distinct forms of conflict: state-based armed conflict and nonviolent protests.[1] This setting offers a rare opportunity to examine how religious observance, while anticipated and ritualized, can nevertheless induce shocks to both state and nonstate actors—shocks that can be meaningfully exploited for empirical analysis.

For authorities and rebel groups, religious exemptions from fasting during combat may facilitate military engagement. Historical examples, such as the first major military confrontation in Islamic history 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 or break their 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 an armed conflict to justify their actions during Ramadan, presenting their cause as consistent with Islamic principles and

[1] Following the Uppsala Conflict Data Program (UCDP) definition, *reported* state-based armed conflict event involves armed force between a government and at least one organized rebel group, resulting in at least 1 direct death at a specific location and a specific date (Högbladh, 2023). The ACLED codebook defines *reported* demonstrations as "an in-person public gathering of three or more people advocating for a shared cause" (Raleigh et al., 2023).

historical practices. Such events can serve as a pretext to inspire greater rebel group membership and violence, with claims that these actions carry divine approval or confer additional merit.

Ramadan is a period that induces substantial changes in daily life for observing individuals. The Muslim population is known to focus more on religious devotion during Ramadan, spending more time in places of worship (Pope, 2024). Ramadan daily intermittent fasting for around 30 days reduces energy and physical activity (Farooq et al., 2021). Therefore, the spiritual and physically demanding nature of Ramadan should reduce the appeal of public protests in this month.

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 OpenAI's API 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.

On the other hand, 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 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 10-20 state-based armed conflict episodes annually. Given the highly skewed nature of conflict deaths, a conservative estimate assuming 15 fatalities per added event yields a total of 150-300 more deaths in Ramadan compared to other months across the sample in a single year. Based on conservative estimates that place the economic and social cost of a typical low-intensity armed conflict episode in the range of a few million dollars, the additional 10–20 conflict events observed during Ramadan across Muslim-majority countries each year likely result in aggregate damages in the tens of millions of dollars annually. When accounting for broader indirect costs, such as infrastructure destruction, economic disruption, displacement, and long-term health consequences, the total societal cost may plausibly reach into the hundreds of millions of dollars during Ramadan per year. Regarding civilian protest activity, the fasting month 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.

To strengthen the credibility of the main findings, I conduct a series of robustness checks addressing concerns related to estimation strategy, functional form, sample composition, and potential reporting bias. Specifically: (i) to account for the count nature of conflict data and the large number of zero outcomes, I re-estimate all main specifications using Poisson pseudo-maximum likelihood (PPML) regressions, which yield consistent results; (ii) I show that the estimated effects are robust to an extensive set of controls, including country-by-year fixed effects, country-by-quarter fixed effects, and country-specific conflict trends; (iii) as a placebo test, I estimate the same models on countries with a low share of Muslim population and find no comparable Ramadan effects, suggesting the results are not driven by seasonality or other global trends; (iv) to further strengthen identification, I restrict the control group to the two, three, or four months immediately before and after Ramadan, and find that the results remain stable across these tighter windows; (v) I separately estimate the main models for the four sacred months when fighting is impermissible but find no comparable conflict effects, reinforcing that the observed spike is specific to Ramadan and not a general feature of Islamic months; (vi) I also estimate an event-study–style model with the full set of Hijri-month indicators (omitting Dhu al-Hijjah). Ramadan alone is reliably positive for state-based conflict and negative for demonstrations. Adjacent and other months are near zero, there is no post-Ramadan persistence, and the pattern is invariant to the omitted month; (vii) I demonstrate that no single country drives the results by conducting leave-one-out exclusion analyses;[2] (viii) to mitigate concerns about differential news reporting during Ramadan, I restrict the sample to conflict events with a minimum number of fatalities, under the assumption that high-casualty events are more reliably reported regardless of timing, and require that events be reported by at least two independent sources. Finally, I complement the event-level analysis of demonstrations with individual-level survey data from approximately 45,000 Muslims across 62 countries, showing that those interviewed during Ramadan report greater religiosity and lower political engagement. Together, these robustness checks reinforce the reliability of the core results and support the conclusion that Ramadan increases the motivation for political violence while suppressing civilian protest activity.

Economists and other social scientists have surveyed research on religion, politics, and conflict (e.g., Becker et al., 2021; Silvestri and Mayall, 2015; Finke, 2013; McCleary and Barro, 2006; Iannaccone, 1998), and the causal link between religious practice and 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 research helps fill this gap by leveraging extensive conflict and survey datasets and the varying occurrence of Ramadan as an identification strategy.

[2]The results are robust to excluding Syria and Afghanistan where around 50% of all reported state-based armed conflict events ocurred during the coverage period.

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., Becker and Pascali, 2019; Clingingsmith et al., 2009). 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; Birkholz and Gomtsyan, 2023), my analysis adds a new important dimension. I explore how Ramadan observance influences social stability.

Finally, the closest forerunners of this paper focus on a narrow outcome (terrorism) and different treatments from a month-long observance of Ramadan. Reese et al. (2017) study Islamic public holidays (not Ramadan per se) in Iraq, Afghanistan, and Pakistan and find event-day declines in violence, while Hodler et al. (2024) use daylight duration as a proxy for fasting intensity and show that longer fasts predict fewer terrorist attacks in the following year. Relative to Reese et al. (2017) and Hodler et al. (2024), this paper redefines the object of study from terrorism and holiday/fasting shocks to the contemporaneous, month-long Ramadan shift in state–rebel conflict and civilian protest – two core dimensions of political order – relative to other Hijri months in predominantly Muslim countries. Substantively, I bring actors to the foreground by classifying rebel ideology (to isolate radical religious groups) and using text-based aggressor attribution (to separate rebel- from state-initiated violence), showing that the Ramadan increase concentrates in radical, rebel-led events. I also document a Ramadan decline in demonstrations and triangulate mechanisms with individual-level evidence on religiosity and political engagement.

Beyond its political implications, the relationship between religion and armed conflict carries substantial consequences for economic development. Armed violence weakens state capacity, disrupts labor markets, reduces investment, displaces populations, destroys infrastructure, and shifts resources away from development and social spending (e.g., Federle et al., 2024; Blattman and Miguel, 2010; Miguel et al., 2004). In fragile states, where institutional buffers are already weak, religious observance that intensifies conflict may amplify these costs. Religious calendars can create shifts in social rhythms that affect conflict dynamics, with broader spillovers for development outcomes. While Campante and Yanagizawa-Drott (2015) show that longer daily fasting hours during Ramadan reduce annual GDP growth, their identification captures broad, year-level effects. I provide direct evidence that conflict spikes specifically during Ramadan, revealing a short-run channel through which religious observance can undermine economic stability.

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 ordinary civilians. 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.[3] 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,[4] with exceptions for those who are acutely or chronically ill, traveling, elderly, breastfeeding, diabetic, pregnant, experiencing intense hunger and thirst, or **partaking in armed struggle**. 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 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

[3]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.

[4]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.

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.[5] 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 had lasting implications for the rules of warfare in the Muslim world and the practice of observing Ramadan during military engagements. Throughout Islamic history, several other major battles have also begun during Ramadan, including the Muslim conquest of the Iberian Peninsula in 711, the Siege of Jerusalem in 1187, the Battle of Ain Jalut in 1260 and the Battle of Marj al-Saffar in 1303—-both fought against the Mongols—-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 this 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.[6] The exemption from fasting during Ramadan, applicable to all Muslims in combat situations, can be used

[5]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, n.d.).

[6]This exemption is specific to combat and does not extend to activities like demonstrations.

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.

2.2 Related Empirical Evidence

Reese et al. (2017) theorize that the Islamic calendar can act as a structural moderator of violence: on "important" religious days that are also public holidays (especially Eid), terrorists anticipate broad social disapproval and therefore restrain attacks. Empirically, they run parallel daily analyses across multiple conflict theaters (Iraq, Afghanistan, Pakistan, 2004–2014), separating public-holiday religious days from ordinary Islamic days (including most of Ramadan). They find sizable and consistent drops in violence on public-holiday religious days, but no systematic surges during Ramadan or other non-holiday religious days. They point to militant concerns about alienating local constituencies and violating widely shared norms about the sanctity of major holy days—reinforced by internal guidance and qualitative evidence from the groups themselves.

The starting point of Hodler et al. (2024) is that the intensity of Ramadan—proxied by longer daylight fasting hours—shapes public sentiment toward political violence, which then affects terror activity. Using within–country-year variation in Ramadan daylight hours at the district level, they show that in predominantly Muslim countries, longer daily fasting during Ramadan is followed by fewer terrorist incidents in the subsequent year (with similar patterns for fatal events). The reductions are stronger for attack types that are harder to execute without community tolerance or assistance, and survey evidence from multiple Muslim-majority countries shows that longer fasting coincides with lower justification of religiously motivated violence. The implied mechanism is a public-support channel: more intense fasting reduces societal acceptance of violence, raising operational costs for would-be perpetrators.

2.3 Radical Appropriations of Ramadan's Military History

While key Islamic battles such as Badr and the Conquest of Mecca occurred during Ramadan, classical Islamic teachings present these as fundamentally defensive engagements followed by restraint and reconciliation (Bearak, 2017). Contemporary radical jihadist organizations, including Al-Qaeda and ISIS, selectively appropriate this history to recast Ramadan as an ideal period for military escalation (Amarasingam and Winter, 2017). ISIS's chief spokesman, Abu Muhammad al-Adnani, explicitly framed Ramadan as "the month of conquest and jihad" and issued calls for global attacks during the fasting periods of 2015 and 2016 (Bin Ali, 2017). These calls coincided with high-profile operations in cities such as Baghdad, Dhaka, and Istanbul, consistent with strategic alignment between propaganda and operational tempo. This framing helps reconcile the terrorism evidence of muted civilian terror targeting during sacred times with my finding of Ramadan-timed increases in state–rebel clashes.

In contrast to work focused on (indiscriminate) terrorism, the argument in this paper is that this propaganda primarily legitimates *combatant-on-combatant* escalation during Ramadan. Public messaging creates a calendrical focal point for coordination, morale, and recruitment, lowering organizational frictions and portraying clashes with state forces as a religiously sanctioned continuation of defensive struggle. Two mechanisms make such escalation more likely: (i) *historical precedent and fasting exemption*, rebel groups make more effort toward direct engagements with security forces that fit the Ramadan war-narrative; and (ii) *interaction with state posture*, as governments heighten security during Ramadan, increasing contact rates and the probability of skirmishes. The empirical analysis therefore focuses on state-based armed conflict (rather than terrorism counts) and tests for Ramadan-timed shifts.

3 Conceptual Framework

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 intensity 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 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.[7]

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

[7] Appendix B provides empirical evidence on the relationship between demonstrations and incidents of political violence during Ramadan. The relationship is weak and statistically insignificant.

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 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.

However, this does not imply that government defensive investments during Ramadan fully offset rebel activity. Radical groups particularly may view the symbolic timing of Ramadan as uniquely advantageous, perceiving that the spiritual and propaganda benefits of staging attacks during the holy month outweigh the risks of increased government vigilance. As such, even if $\delta(A)$ increases and $C(A)$ decreases marginally through greater government effort, the numerator in rebel aggression likelihood (their perceived returns, $\beta(\theta)$ in Equation 1) may rise more sharply—leading to a net increase in conflict. This underscores how asymmetric motivations, rather than symmetric cost structures, can generate a Ramadan spike in violence.

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,[8] 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). 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 percentages 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.

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 Grego-

[8] 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.

rian calendar to the Hijri calendar, I use an expert reviewed HijriDate Python package.[9] Then I crosscheck these dates using Islamic Philosophy Online.[10]

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 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. For the armed conflict analysis, the monthly panel includes 31 countries with an average Muslim population share of at least 75%. For the demonstration analysis, 14 African countries meet the 75% Muslim population threshold over the sample period.

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,[11] 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

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

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

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

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 data from the U.S. Naval Observatory's Astronomical Applications Department.[12] 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, 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.[13]

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 A.1.

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,

[12] 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.

[13] 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.

focusing on countries with a Muslim population share above 75%:

$$\log(y_{cmt} + 1) = \beta_1 \text{Ramadan}_{mt} + \theta_{ct} + \epsilon_{cmt} \tag{4}$$

where y_{cmt} is the number of state-based armed conflicts or demonstrations in country c, month m, and Hijri year t. The log transformation reduces skewness in the count data, allows interpretation of coefficients as approximate percentage changes, and accommodates zero counts via the addition of 1.[14] Ramadan_{mt} is an indicator equal to 1 if month m in year t corresponds to Ramadan, and 0 otherwise. Since Ramadan is fixed across countries within each Hijri year, this variable does not vary by country. θ_{ct} denotes country-by-Hijri-year fixed effects, which absorb all unobserved shocks that are specific to a given country and Hijri year, such as economic conditions, political transitions, or national holidays. Thus, identification comes from within-country, within-Hijri-year variation across months. Results remain highly similar when replacing Hijri-year fixed effects with Gregorian-year fixed effects. I also include the vector X_{cmt} to control for conflict-specific characteristics—such as the average duration and number of fatalities per event—aggregated at the quarterly level. I further include Hijri-quarter fixed effects to capture any seasonal patterns that vary across Islamic years.

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 Hijri 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-Hijri-year fixed effects, I additionally place a more restrictive control on time-varying factors specific to each country in a given Hijri 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:

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

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-by-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

[14] As a robustness check, I also estimate Poisson Pseudo-Maximum Likelihood (PPML) models, which are well suited to count data with many zeros and heteroskedasticity (Silva and Tenreyro, 2006). Results are similar.

potential nonlinear patterns:

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

where $D_{k,ct}$ represents a set of indicator variables that correspond to different categories based on the percentage of Muslims in a country.[15] 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 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 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

[15] $D_{1,ct}$, $D_{2,ct}$, $D_{3,ct}$, $D_{4,ct}$ 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).

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 A.2. 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 A.3. 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.

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. This approach also avoids the pitfalls of applying log-like transformations to zero-valued outcomes, which recent work has shown may lead to scale-dependent and potentially misleading estimates (Chen and Roth, 2024). The results of the Poisson pseudo-maximum likelihood (PPML) in Table A.4 are consistent with the main findings and demonstrate stronger effects, both in magnitude and statistical significance.

I also 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 A.5, are consistent with the original findings, with effect sizes nearly doubling in magnitude and remaining statistically significant at the 1% level. These results are also robust to excluding any one country at a time ((Figure A.1)).

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, I find 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 A.6 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 A.7 demonstrate null results for this selection of countries.

I also 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 A.8. The results are stronger and statistically significant at conventional levels. Lastly, these results are at least marginally significant when excluding any one country at a time (Figure A.2). To further strenthen the robustness of the results I use quarter and quarter by year fixed effects in Table A.9, the main coefficients largely keep their signs, magnitude, and significance for both armed conflict and protest intensity.

For Tables 1 and 2, which examine armed conflict and demonstrations, respectively, 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 to 50% 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.

To test whether protests and political violence trade off in Ramadan, I examine both event-level trends and their reciprocal associations using the ACLED data in Appendix B. The time-series patterns in Figure B1 provide visual evidence of co-movement across years, while the regression estimates in Table B1 test the direction and strength of this relationship. I find that the link is weak/insignificant and that the two seem to move differently.

5.3 Weekly Variation within Ramadan

In this subsection, I analyze weekly dynamics and estimate::

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

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 also includes country by Hijri year fixed effects.

For armed conflicts (Figure A.3), three patterns emerge. First, a 15% pre-Ramadan surge coincides with Sha'ban spiritual preparations. Second, an initial 5% dip in Ramadan's first week suggests temporary de-escalation, followed by sustained escalation peaking (+22%) during Laylat al-Qadr. Third, an 12% post-Eid drop aligns with ceasefire norms. While weekly estimates show more noise than monthly results, the overall Ramadan escalation (weeks 7-10) remains clear.[16]

Demonstrations exhibit inverse dynamics (Figure A.4). Participation declines gradually from week -4, reaching a 28% nadir during Eid week as fasting fatigue peaks. The post-Ramadan rebound is sluggish, suggesting lingering spiritual focus rather than immediate po-

[16]Week 10 includes 8-9 days as Ramadan is 29-30 days long.

litical re-engagement. Placebo tests for armed conflict and protests in non-Muslim countries (Figure A.5 and Figure A.6) show flat trends, confirming the patterns in Muslim countries reflect Ramadan observance rather than seasonal artifacts.

This weekly analysis reinforces the core findings while highlighting two nuancecs: 1) Conflict escalation follows a J-curve pattern (pre-surge, temporary dip, then peak), and 2) Demonstration suppression begins earlier than Ramadan itself, consistent with anticipatory spiritual focus. Weekly estimates show greater noise from reduced statistical power, but the overall Ramadan-period effects remain robust.

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.

Theory suggests fasting duration minimally impacts armed conflict: combatants utilize well-established religious exemptions from fasting during warfare. For demonstrations, while prolonged fasting (12-16hrs) may strain participants, marginal increases likely impose limited additional burden given adaptation to routine observance.

Table A.10 confirms null effects: neither Muslim-majority countries (>75%) nor Muslim share interactions show significant links. One exception emerges as countries with 50-75% Muslim populations exhibit fewer demonstrations with longer fasts (-10.1 pp, $p<0.05$). However, this group contains only three countries, making results suggestive rather than conclusive. Overall, cross-country fasting-hour variation explains little conflict variation during Ramadan.

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

This analysis categorizes state-based armed conflict groups in predominantly Muslim countries into three types using Generative Artificial Intelligence: *secular* (political/ethnic goals), *radical religious* (militant religious agendas), and *religious* (cultural autonomy without religious extremism).[17] Classification relies on groups' stated objectives, affiliations, and documented actions. The study examines how Ramadan—a period of spiritual reflection—affects these groups' conflict behavior. Hypotheses suggest radical groups may exploit reduced vigilance, religious groups might prioritize observance, and secular groups could pursue truces due to external pressures.

Results in Table 3 columns (1)–(3) reveal divergent trends. Radical groups exhibit a 5% increase in conflict frequency during Ramadan ($p < 0.05$), rising from a baseline of 12.22 monthly events. Religious and secular groups show no statistically significant changes. This aligns with the notion that radical groups strategically escalate violence during religiously significant periods, while others adhere to norms or de-escalate.

For fatalities (columns 4–6), radical-linked conflicts see a 5.2% rise at the 5% significance level, translating to about 3 additional deaths per country. Religious groups show a nonsignificant 4.4% increase, while secular groups experience a slight, nonsignificant decline (-1.8%). These patterns mirror conflict activity trends, underscoring radical groups' operational intensity during Ramadan compared to others' relative restraint.

Identifying Aggressor Behavior

This analysis examines whether governments or radical religious groups initiate most conflict events during Ramadan, given the UCDP dataset's lack of explicit aggressor labels. To address this gap, I use ChatGPT 4o-mini to classify nearly 100,000 conflict episodes via the OpenAI API from rows of text snippets in the UCDP source material. Events are categorized as state-initiated (1), rebel-initiated (2), or ambiguous (0), using prompts to systematically infer aggressors based on contextual cues (e.g., "government forces raided" vs. "rebels ambushed"). This automated approach minimizes subjective bias and scales efficiently, offering novel insights into conflict dynamics.

Classification reliability hinges on source text quality, which may be biased or incomplete. To mitigate errors, I iteratively fine-tune the algorithm by manually verifying 500 randomly sampled observations, achieving high accuracy in non-zero classifications. Figure A.5 illustrates classified examples, highlighting key textual features used for labeling. While NLP may misinterpret linguistic nuances, this hybrid human-AI validation strengthens confidence in the results.

[17] In the given sample period, 152 organized groups were identified as engaging in state-based armed conflict against government forces. Categorization results obtained using OpenAI's ChatGPT 4.0 closely align with those derived from DeepSeek. A detailed list of sorted groups and rebel names is available upon request.

Figure 4 reveals temporal patterns in aggression across Islamic months. For 21 Muslim-majority countries (1989–2022), state-initiated conflicts remain stable except for dips in months 5–6, with no Ramadan-specific changes. Conversely, rebel aggression peaks during Ramadan (shaded region), rising from pre-Ramadan levels. This aligns with strategic or symbolic motives—radical groups may exploit the holy month's significance to amplify attacks, while governments maintain consistent operational tempo.

The disparity underscores divergent conflict logics: states, as dominant actors, sustain higher baseline aggression, whereas rebels leverage Ramadan's religious gravity for tactical escalation. These findings caution against conflating all violence as state-driven; radical groups actively shape Ramadan's conflict intensity. Policymakers should prioritize countering rebel mobilization during this period while exploring ceasefires with non-radical factions, whose aggression shows no Ramadan-linked spikes.

Turning to Figure 5, the focus shifts to the estimated impact of Ramadan on state- 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 attendance, during Ramadan compared to other months. In columns (1), despite an already high baseline rate of prayer attendance, there is 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 aspects 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[18]. 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

[18] 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.

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.[19]

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.[20] 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.

6.4 Sacred Months

I also examine whether Islamic sacred months, when warfare is religiously banned, affect armed conflict and protests differently than Ramadan. Each point shows the estimated coefficient from a separate regression that includes a dummy equal to 1 for the given month and 0 for all other months, with country-by-year and quarter-by-year fixed effects included as controls. As shown in (Figure A.8), Ramadan (which is not a sacred month) correlates with a notable rise in armed conflicts, while the sacred months—Muharram, Rajab, Dhul-Qa'dah, and Dhul-Hijjah—show minimal or even negative effects. This aligns with Islamic teachings that forbid fighting during these periods. Rebel leaders also likely avoid scheduling more attacks in these periods to prevent backlash from their ranks and/or violate religious norms.

Regarding civilian protests, (Figure A.9) reveals a steep drop in demonstrations during Ramadan, unlike the negligible positive shifts seen in sacred months. The sacred months do not involve obligatory fasting or daily congregational prayers, unlike Ramadan. Dhul-Hijjah, when annual Hajj pilgrimage occurs (8th–13th of the month), also does not seem to affect civilian unrest differently from other months. One reason could be that participation is limited by national quotas, making it accessible to only a small fraction of Muslims globally. Overall, Ramadan's historical and theological exemptions enable rebel violence, while its emphasis on spirituality and community discourages public dissent. Together, these patterns support the

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

[20] 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.

paper's core argument: it is Ramadan's historical and spiritual significance, not just its place on the calendar, that are driving the results.

6.5 Month-by-Month Dynamics

Using a full set of Hijri month indicators, Figure A.10 shows that state-based armed conflict is roughly flat or slightly below the baseline early in the Islamic year and then rises as Ramadan approaches, peaking in Ramadan. Relative to the omitted month of Dhu al-Hijjah,[21] coefficients turn positive from about Jumada al-Thani through Shaban (M6–M8), with a clear statistically significant Ramadan uptick. The month immediately after Ramadan falls back toward zero, indicating little persistence beyond Ramadan. In short, Ramadan stands out relative to neighboring months, and any pre-trend is modest and statistically insignificant.

For demonstrations, Figure A.11 displays the mirror image: coefficients edge down in Shaban (M8) and reach their lowest point in Ramadan (about 10% to 15%). Here, there is mild post-period carryover, Shawwal and Dhul Qadah (M10–M11) remain negative, before effects attenuate by Dhu al-Hijjah. Taken together, these month-by-month estimates offer a transparent visual robustness check. Ramadan uniquely coincides with higher armed conflict and lower demonstrations, with at most limited post-Ramadan persistence

7 Conclusion

While Ramadan is anticipated and socially embedded, its shifting position in the Gregorian calendar introduces exogenous temporal variation that interacts with secular institutions in plausibly random ways. Given that religious observance imposes nontrivial constraints on behavior, and actors cannot alter its timing, the overlap between Ramadan and conflict activity can be credibly interpreted as causal—particularly when controlling for fixed effects, time trends, and alternative confounders. 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. These results provide actionable insights into how religious observance interacts with conflict intensity and offer potential avenues for targeted interventions.

The observed increase in armed conflicts during Ramadan — particularly among radical religious groups — raises the possibility that targeted peacebuilding or monitoring interventions could help mitigate violence during this period. While my analysis does not directly evaluate ceasefire efforts or conflict monitoring, these patterns suggest the potential benefit of exploring pre-Ramadan de-escalation dialogues or community-based surveillance in high-risk regions. Future work could assess whether religious framing of ceasefire appeals or local mobilization before Ramadan is effective in curbing violence.

[21] Dhu al-Hijjah is used as the base month because it's non-adjacent to Ramadan (limits spillovers), its mean outcomes are near the annual average (stable anchor), and the results are invariant to the base—rotating the omitted month leaves Ramadan relatively high for conflict and low for demonstrations.

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 should monitor for potential abuses by regimes seeking to exploit this period of reduced dissent to pass unpopular laws or implement crackdowns. Timing policy and advocacy efforts to align with post-Ramadan periods of higher civic activity could also ensure greater public engagement. An important question for future research is whether governments in Muslim-majority countries systematically take advantage of this drop in protest activity to introduce controversial legislation, restrict rights, or consolidate power.

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.

References

Al-Fughom, Nawaf Bedah, "Factors in the Spiritual Preparation and Motivation of Muslim Armies." PhD dissertation, University of Leeds 2003.

Ali, Mohamed Bin, "IS Ramadan Attacks: Perverted Interpretation of Fasting Month," 2017. RSIS Commentary No.115.

Almond, Douglas and Bhashkar Mazumder, "Health Capital and the Prenatal Environment: The Effect of Ramadan Observance During Pregnancy," *American Economic Journal: Applied Economics*, 2011, *3* (4), 56–85.

Amarasingam, Amarnath and Charlie Winter, "ISIS's Bloody Interpretation of Ramadan," *The Atlantic*, 2017.

Bearak, Max, "How Terrorists Warp the Meaning of Ramadan to Justify Their Atrocities," *The Washington Post*, 2017.

Becker, Sascha O. and Luigi Pascali, "Religion, Division of Labor, and Conflict: Anti-Semitism in Germany Over 600 Years," *American Economic Review*, 2019, *109* (5), 1764–1804.

____ **, Jared Rubin, and Ludger Woessmann**, "Religion in Economic History: A Survey," *Handbook of Historical Economics*, 2021, pp. 585–639.

Besley, Timothy and Marta Reynal-Querol, "The Legacy of Historical Conflict: Evidence from Africa," *American Political Science Review*, 2014, *108* (2), 319–336.

Birkholz, Carlo and David Gomtsyan, "Immigrant Religious Practices and Criminality: The Case of Ramadan," *Journal of Comparative Economics*, 2023, *51* (1), 90–104.

Blattman, Christopher and Edward Miguel, "Civil War," *Journal of Economic Literature*, 2010, *48* (1), 3–57.

Campante, Filipe and David Yanagizawa-Drott, "Does Religion Affect Economic Growth and Happiness? Evidence from Ramadan," *Quarterly Journal of Economics*, 2015, *130* (2), 615–658.

Campo, Juan Eduardo, "Authority, Ritual, and Spatial Order in Islam: The Pilgrimage to Mecca," *Journal of Ritual Studies*, 1991, *5* (1), 65–91.

Chen, Jiafeng and Jonathan Roth, "Logs with Zeros? Some Problems and Solutions," *The Quarterly Journal of Economics*, 2024, *139* (2), 891–936.

Clingingsmith, David, Asim Ijaz Khwaja, and Michael Kremer, "Estimating the Impact of the Hajj: Religion and Tolerance in Islam's Global Gathering," *Quarterly Journal of Economics*, 2009, *124* (3), 1133–1170.

Dube, Oeindrila and Juan F. Vargas, "Commodity Price Shocks and Civil Conflict: Evidence from Colombia," *Review of Economic Studies*, 2013, *80* (4), 1384–1421.

Farooq, Abdualziz, Karim Chamari, Suzan Sayegh, Maha El Akoum, and Abdulla Saeed Al-Mohannadi, "Ramadan Daily Intermittent Fasting Reduces Objectively Assessed Habitual Physical Activity among Adults," *BMC Public Health*, 2021, *21*, 1–9.

Federle, Jonathan, André Meier, Gernot J. Müller, Willi Mutschler, and Moritz Schularick, "The Price of War," Technical Report, Kiel Working Paper 2024.

Finke, Roger, "Presidential Address: Origins and Consequences of Religious Freedoms: A Global Overview," *Sociology of Religion*, 2013, *74* (3), 297–313.

Hodler, Roland, Paul A. Raschky, and Anthony Strittmatter, "Religion and Terrorism: Evidence from Ramadan Fasting," *Journal of Peace Research*, 2024, *61* (3), 351–365.

Högbladh, Stina, "Ucdp GED Codebook Version 23.1," *Department of Peace and Conflict Research, Uppsala University*, 2023.

Hornung, Erik, Guido Schwerdt, and Maurizio Strazzeri, "Religious Practice and Student Performance: Evidence from Ramadan Fasting," *Journal of Economic Behavior & Organization*, 2023, *205*, 100–119.

Iannaccone, Laurence R., "Introduction to the Economics of Religion," *Journal of Economic Literature*, 1998, *36* (3), 1465–1495.

Iyer, Sriya, "The New Economics of Religion," *Journal of Economic Literature*, 2016, *54* (2), 395–441.

Kettani, Houssain, "Muslim Population in Africa: 1950–2020," *International Journal of Environmental Science and Development*, 2010, *1* (2), 136.

Majid, Muhammad Farhan, "The Persistent Effects of In Utero Nutrition Shocks over the Life Cycle: Evidence from Ramadan Fasting," *Journal of Development Economics*, 2015, *117*, 48–57.

Maoz, Zeev and Errol A. Henderson, "The World Religion Dataset, 1945–2010: Logic, Estimates, and Trends," *International Interactions*, 2013, *39* (3), 265–291.

McCleary, Rachel M. and Robert J. Barro, "Religion and Economy," *Journal of Economic Perspectives*, 2006, *20* (2), 49–72.

McGuirk, Eoin and Marshall Burke, "The Economic Origins of Conflict in Africa," *Journal of Political Economy*, 2020, *128* (10), 3940–3997.

Michalopoulos, Stelios and Elias Papaioannou, "The Long-Run Effects of the Scramble for Africa," *American Economic Review*, 2016, *106* (7), 1802–1848.

Miguel, Edward, Shanker Satyanath, and Ernest Sergenti, "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," *Journal of Political Economy*, 2004, *112* (4), 725–753.

Oosterbeek, Hessel and Bas van der Klaauw, "Ramadan, Fasting and Educational Outcomes," *Economics of Education Review*, 2013, *34*, 219–226.

Palik, Júlia, Anna Marie Obermeier, and Siri Aas Rustad, "Conflict Trends: A Global Overview, 1946–2021," *PRIO Paper*, 2022.

Pew Research Center, "The Changing Global Religious Landscape," April 5 2017. Report.

——, "The Changing Global Religious Landscape," June 13 2018. Report.

Pope, Devin G., "Religious Worship Attendance in America: Evidence from Cellphone Data," Technical Report, National Bureau of Economic Research 2024.

Quran 9:36, Tafsir Ibn Kathir, "Quran 9:36 with Tafsir Ibn Kathir (English Translation)," n.d. Verse 9:36. Accessed: 2024-12-15.

Raleigh, Clionadh, Roudabeh Kishi, and Andrew Linke, "Political Instability Patterns Are Obscured by Conflict Dataset Scope Conditions, Sources, and Coding Choices," *Humanities and Social Sciences Communications*, 2023, *10* (1), 1–17.

Reese, Michael J., Keven G. Ruby, and Robert A. Pape, "Days of Action or Restraint? How the Islamic Calendar Impacts Violence," *American Political Science Review*, 2017, *111* (3), 439–459.

Siddiqui, Abdul Hameed, *Sahih Muslim (Hadith), Book 006, Number 2486*, Peace Vision, 1976.

Silva, JMC Santos and Silvana Tenreyro, "The Log of Gravity," *The Review of Economics and Statistics*, 2006, *88* (4), 641–658.

Silvestri, Sara and James Mayall, "The Role of Religion in Conflict and Peacebuilding," in "British Academy Conference Proceedings" 2015.

Sundberg, Ralph and Erik Melander, "Introducing the UCDP Georeferenced Event Dataset," *Journal of Peace Research*, 2013, *50* (4), 523–532.

Figures & Tables

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.

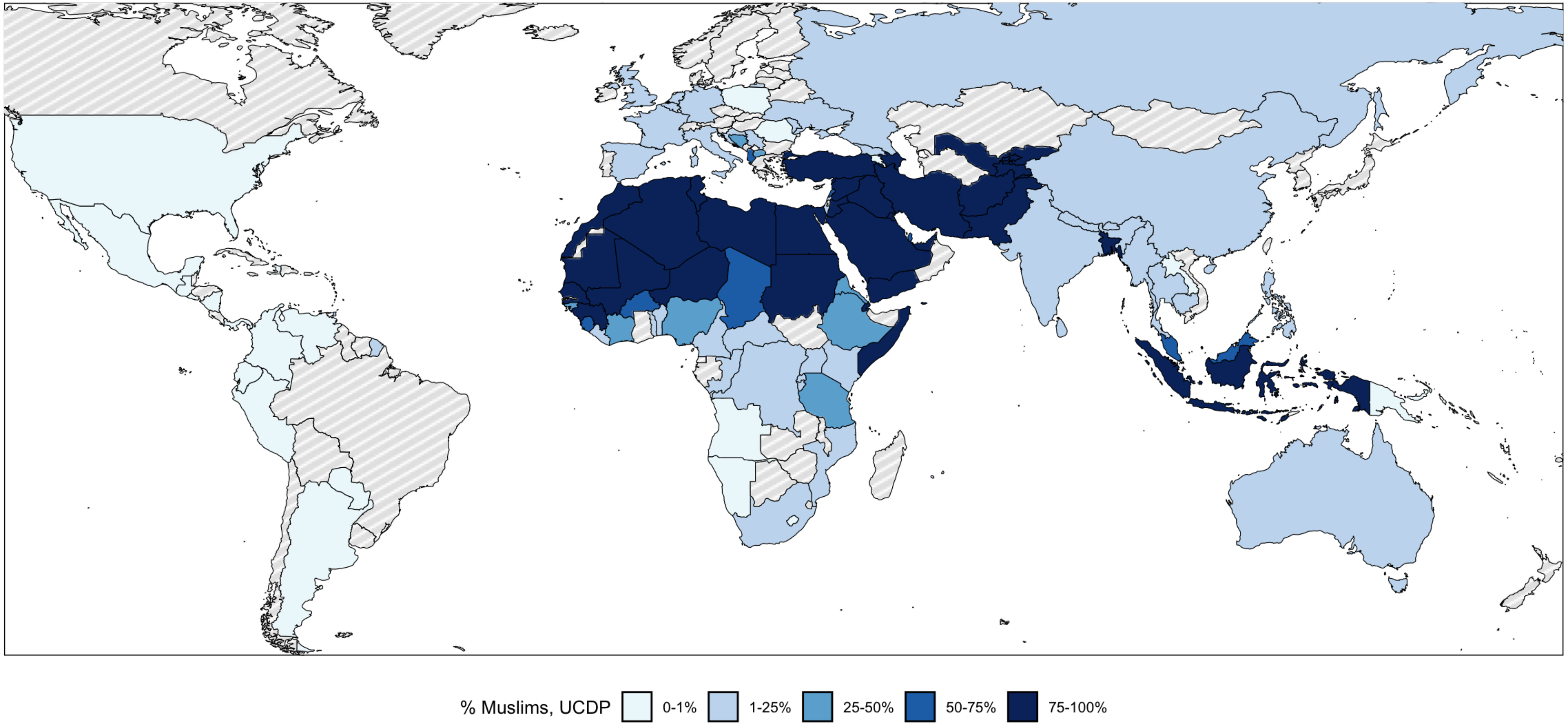

Figure 2: Countries by Share of Muslim Population

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.

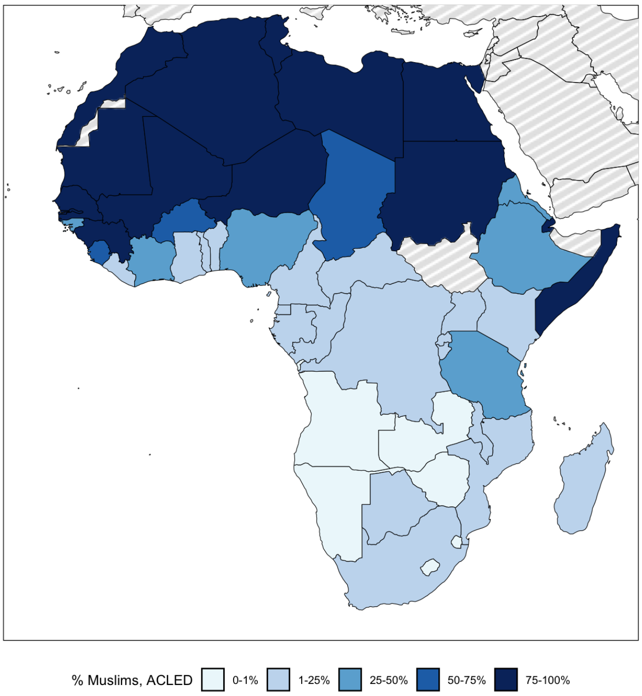

Figure 3: African Countries by Share of Muslim Population

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.

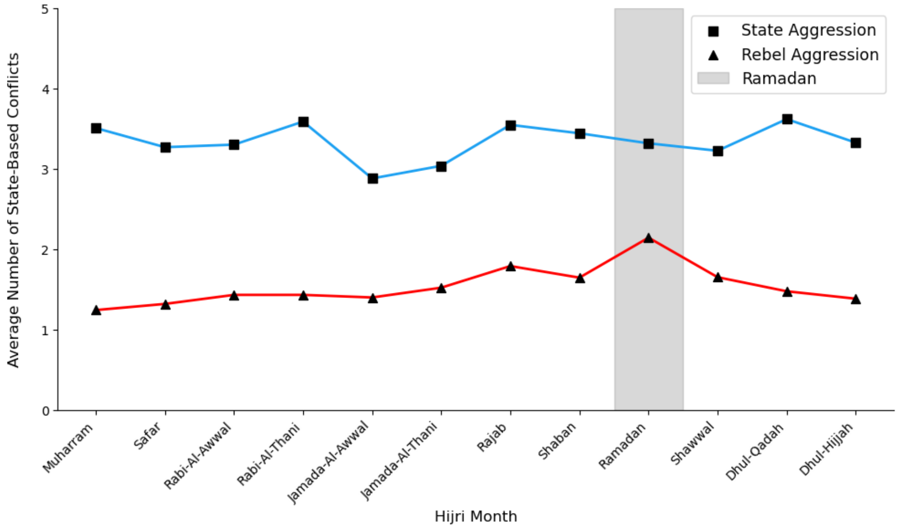

Figure 4: Frequency of State-Based Conflict Events by Actor

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 intensity 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.

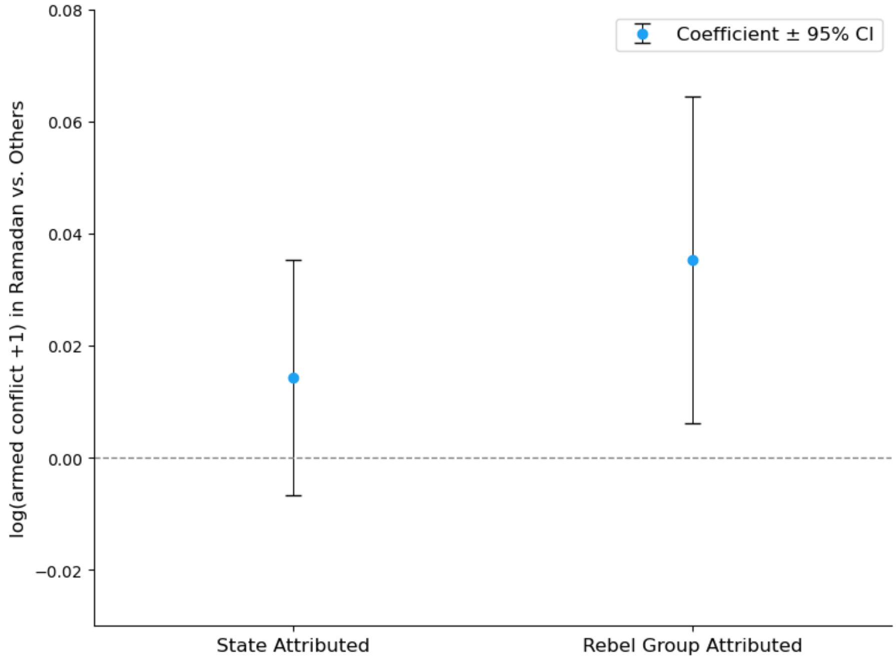

Figure 5: The Impact of Ramadan on State and Rebel-Attributed Conflict

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.

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

	Dependent Variable: log(armed conflict+1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ramadan	0.037***	0.037***	0.037***	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	11.84	11.84	11.84	11.84	11.84	11.84	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	0.901	0.877	0.876
Country FE		✓		✓				
Year FE			✓	✓				
Controls						✓	✓	✓
Country-by-year FE					✓	✓	✓	✓
Share-by-year FE								✓

Notes: In columns (1)–(6), the monthly panel 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. The controls include the duration of the conflict event and the number of direct deaths associated with the event. Conflict mean is the average of the outcome in levels. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

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

	Dependent Variable: log(demonstrations +1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ramadan	-0.085*	-0.085*	-0.085*	-0.085*	-0.085*	-0.085*	0.068***	0.098
	(0.043)	(0.043)	(0.043)	(0.043)	(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)
Demonstrations mean	9.789	9.789	9.789	9.789	9.789	9.789	6.047	6.047
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	All	All
Observations	4536	4536	4536	4536	4536	4536	15552	15552
Adj. R^2	0.0000760	0.172	0.419	0.594	0.846	0.853	0.807	0.806
Country FE		✓		✓				
Year FE			✓	✓				
Country-by-year FE					✓	✓	✓	✓
Share-by-year FE								✓

Notes: In columns (1)–(6), the monthly panel 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 (7)–(8), the whole sample consists of 48 African countries. In column (8), the reference group consists of 6 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 * $p < 0.10$, ** $p < 0.05$.

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. The controls include the duration of the conflict event and the number of direct deaths associated with the event. Robust standard errors are in parentheses, clustered at the country level. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

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 *** $p < 0.01$.

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	≥5	≥5	None	None	None	None
News sources per event	≥1	≥1	≥2	≥2	≥1	≥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 *** $p < 0.01$.

Appendix

List of Figures

List of Tables

A Figures & Tables

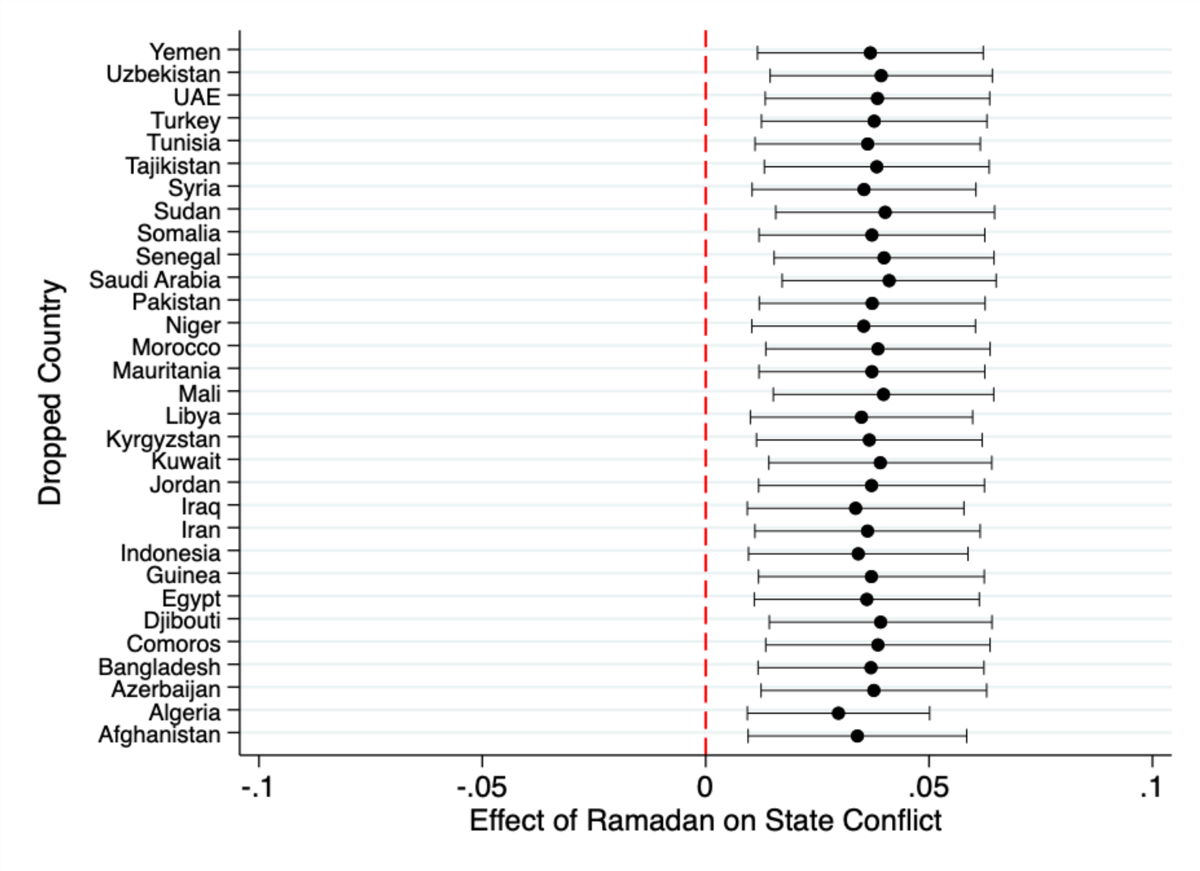

Figure A.1: Relative Effects of Armed Conflict in Ramadan in Muslim Countries Excluding 1 Country

Notes: This figure shows a leave-one-country-out sensitivity analysis of the effect of Ramadan on the incidence of state-based armed conflict, based on UCDP data from 1989–2022. The outcome is the natural logarithm of the number of conflict events plus one, measured monthly. Each point reports the Ramadan coefficient from a separate regression excluding one of the 31 Muslim-majority countries (defined as having a Muslim population share above 75%). All regressions are estimated via ordinary least squares (OLS) and include country-by-year fixed effects. Standard errors are clustered at the country level. The red vertical dashed line denotes the zero-effect benchmark. This robustness check assesses the influence of individual countries on the overall result.

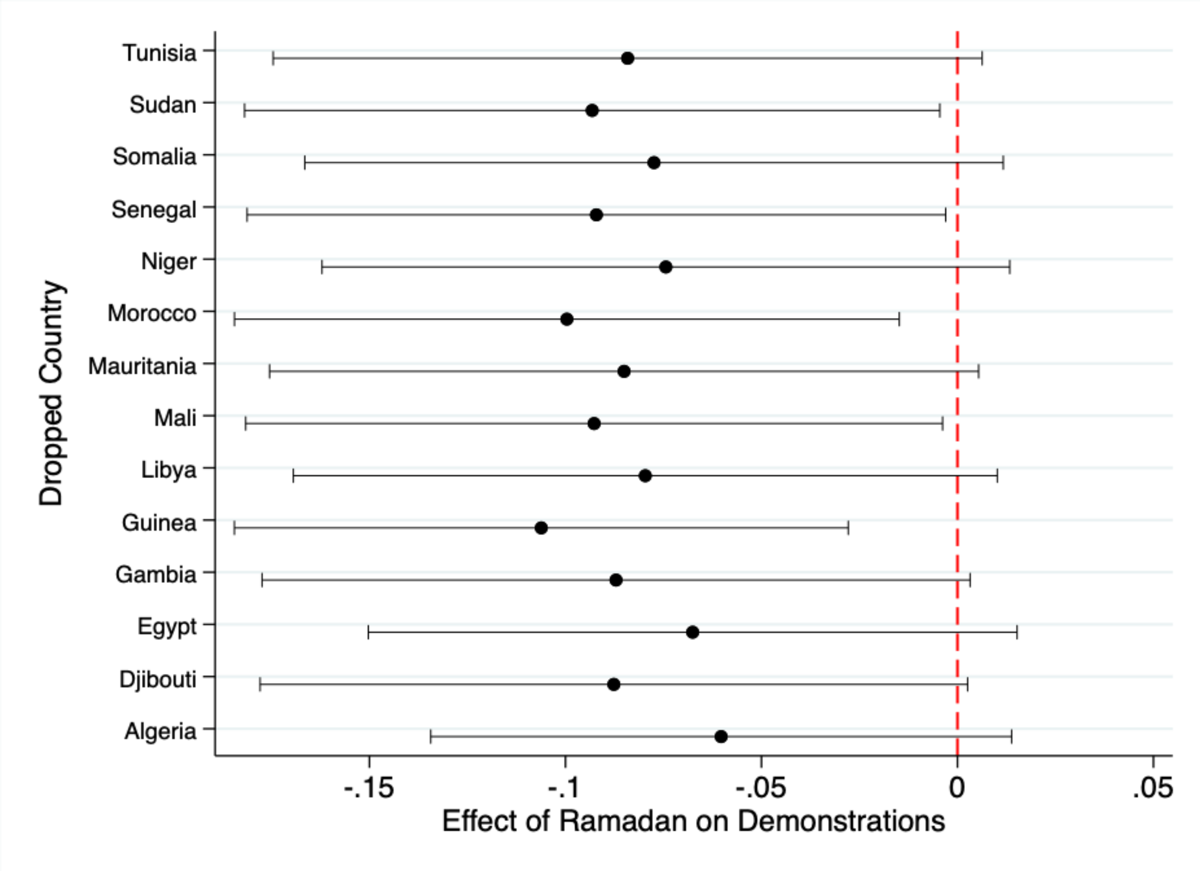

Figure A.2: Relative Effects Demonstrations in Ramadan in Muslim Countries Excluding 1 Country

Notes: This figure presents results from a leave-one-country-out sensitivity analysis of the effect of Ramadan on the number of demonstrations. Each point represents the estimated Ramadan coefficient from a regression that excludes one of the 14 Muslim-majority (>75%) African countries listed on the vertical axis. The horizontal lines indicate 95% confidence intervals. The dependent variable is the logarithm of demonstration events plus one. All regressions include country-by-year fixed effects and are clustered at the country level. The vertical red dashed line marks the null effect (zero).

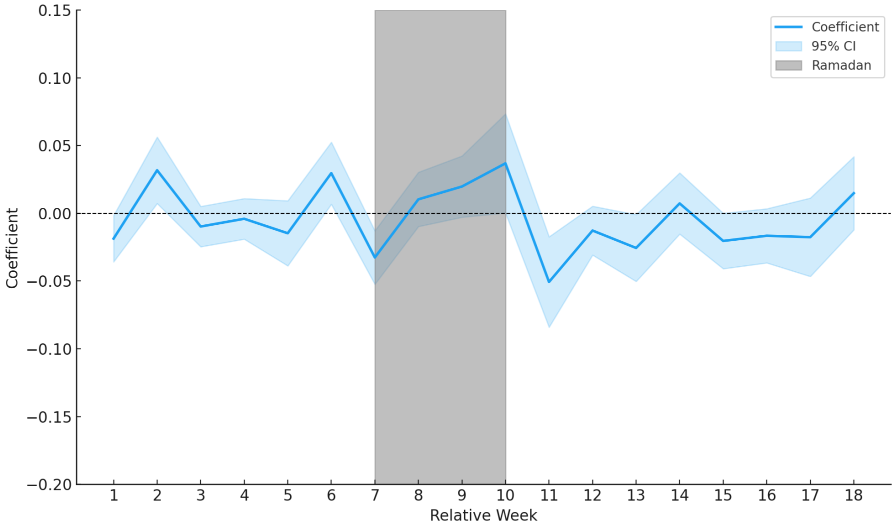

Figure A.3: Ramadan Weeks and Armed Conflict in Muslim Countries

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. The regression includes country-by-year fixed effects and are clustered at the country level.

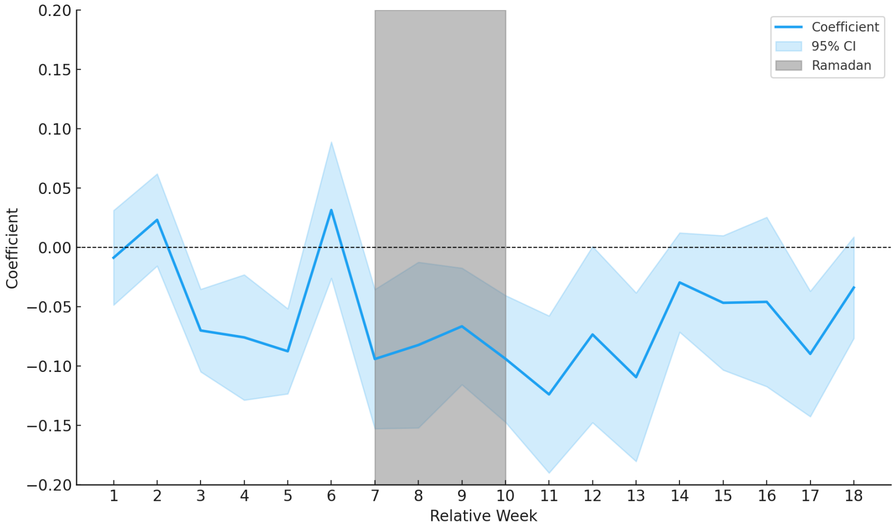

Figure A.4: Ramadan Weeks and Demonstrations in Muslim Countries

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. The regression includes country-by-year fixed effects and are clustered at the country level.

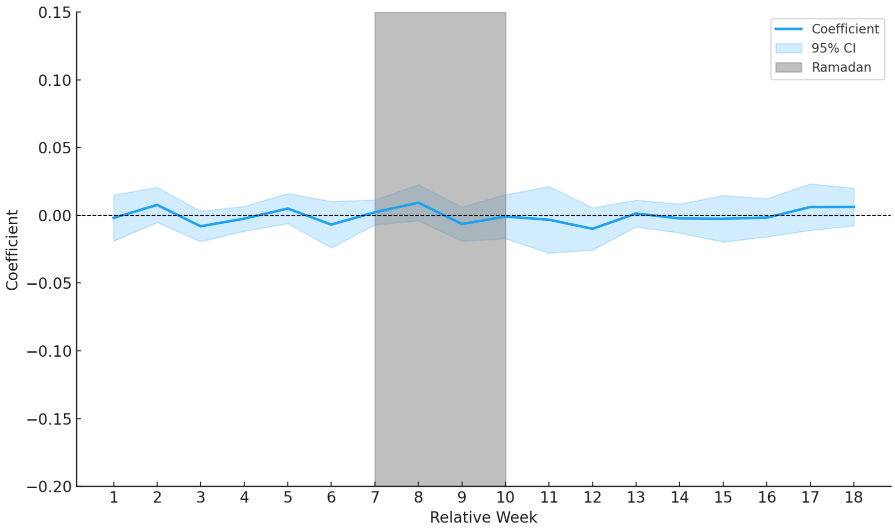

Figure A.5: Ramadan Weeks and Armed Conflict for the Placebo Group

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. The regression includes country-by-year fixed effects and are clustered at the country level.

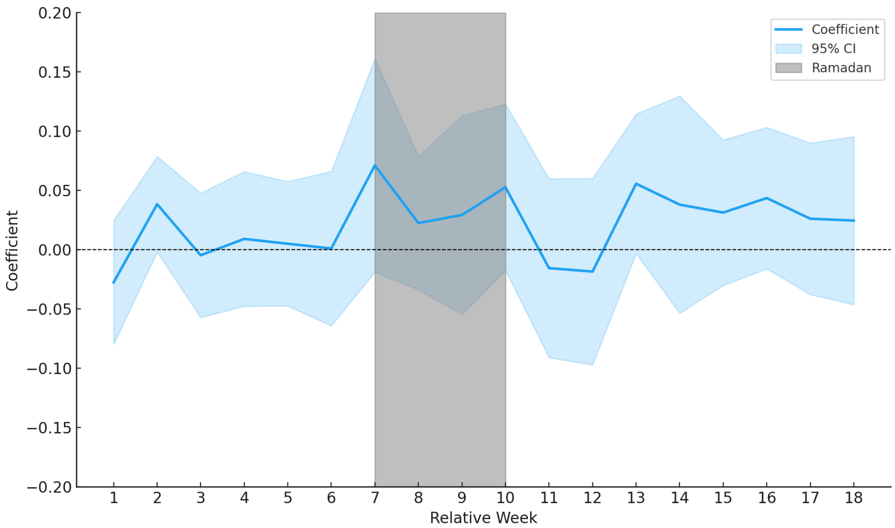

Figure A.6: Ramadan Weeks and Demonstrations for the Placebo Group

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. The regression includes country-by-year fixed effects and are clustered at the country level.

	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-Bwaida Abo Ali al-Bahdalia 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 Shaaban\t"	0

500 rows × 4 columns

Figure A.7: 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, "aggressor_classification," 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.

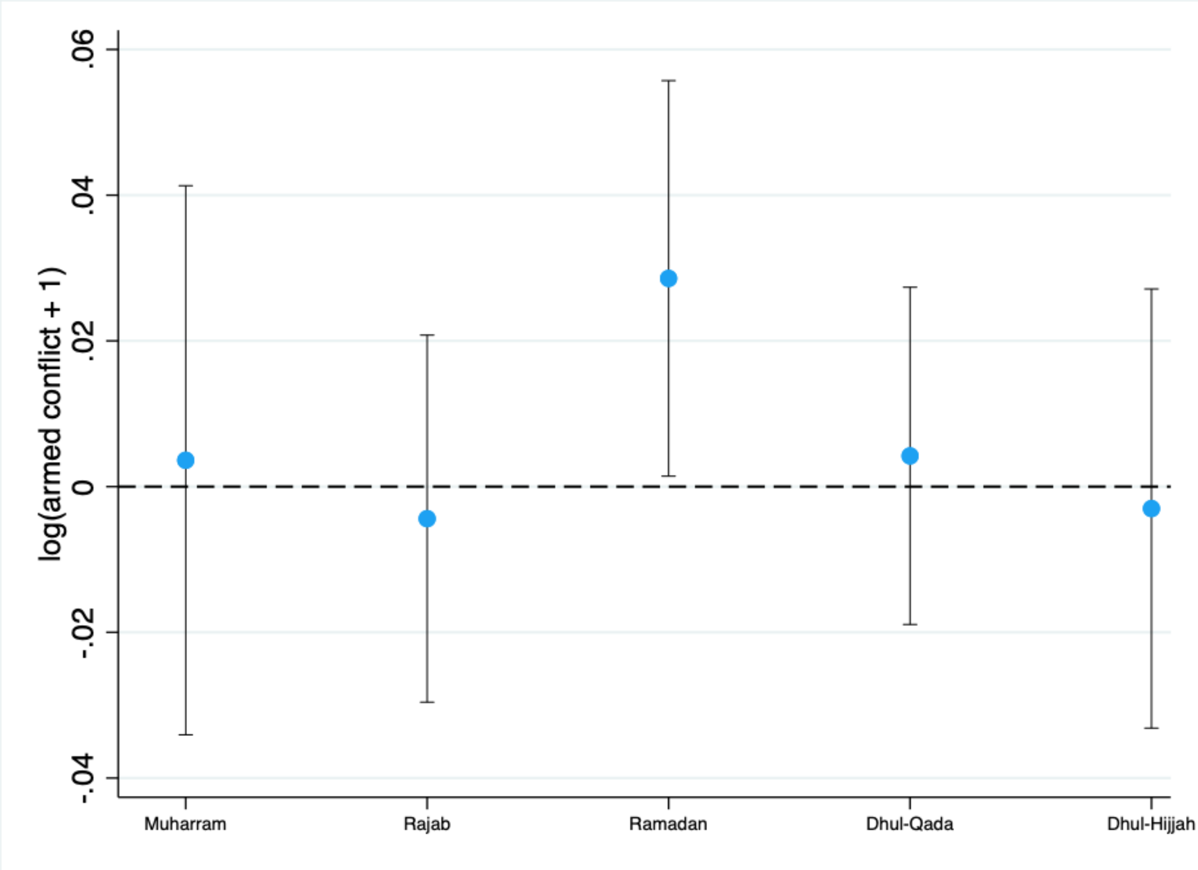

Figure A.8: Relative Effects of Sacred Months & Ramadan on State-Based Armed Conflict

Notes: This figure shows the estimated effects of sacred Islamic months and Ramadan on the number of state-based armed conflict events. Each point represents the coefficient from a separate regression including a dummy for the specified month (Muharram, Rajab, Sha'ban, Ramadan, Dhul-Qa'dah, and Dhul-Hijjah), controlling for country-by-year and quarter-by-year fixed effects. The dependent variable is the logarithm of conflict events plus one. Vertical lines represent 95% confidence intervals. The sample includes Muslim-majority countries as defined by having an average Muslim population share above 75%. The control group of months all other 11 months. Standard errors are clustered at the country level.

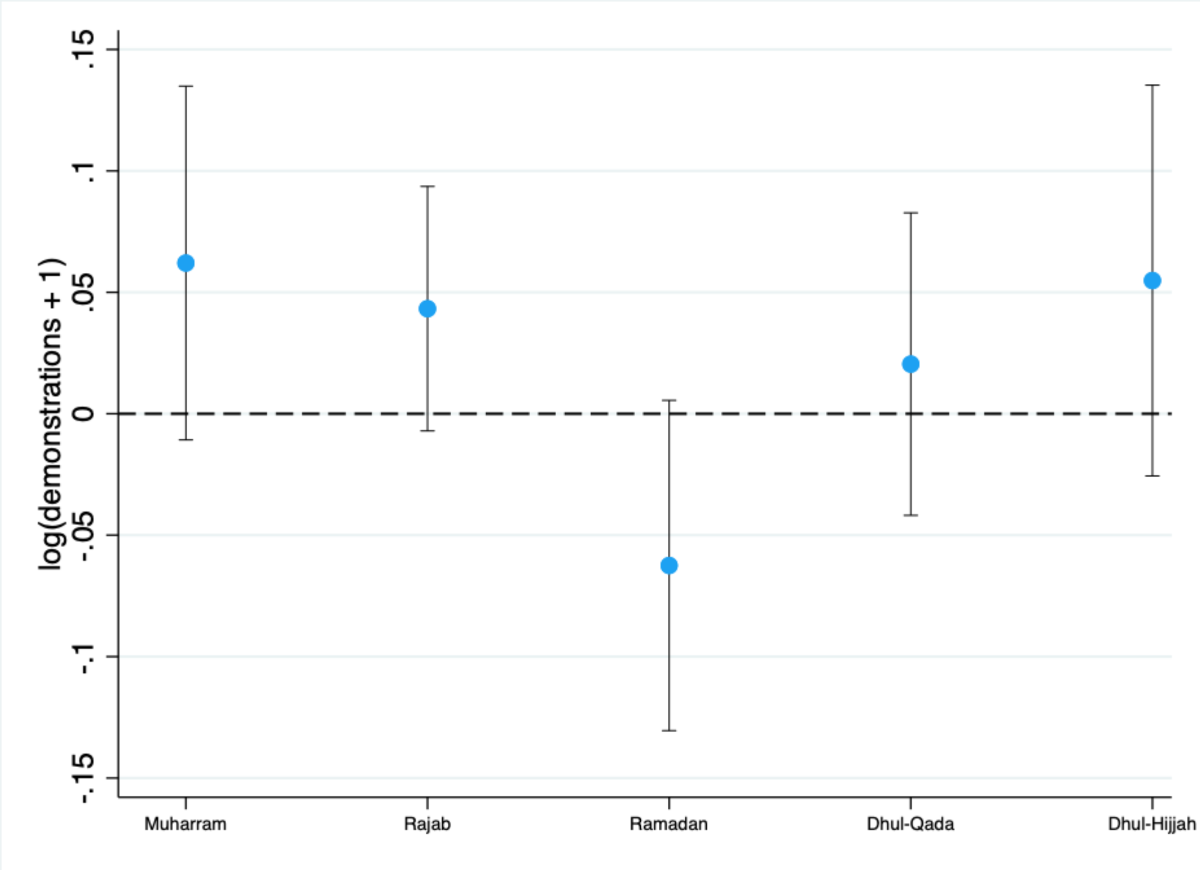

Figure A.9: Relative Effects of Sacred Months & Ramadan on Demonstrations

Notes: This figure shows the estimated effects of sacred Islamic months and Ramadan on the number of demonstrations. Each point represents the coefficient from a separate regression including a dummy for the specified month (Muharram, Rajab, Sha'ban, Ramadan, Dhul-Qa'dah, and Dhul-Hijjah), controlling for country-by-year and quarter-by-year fixed effects. The dependent variable is the logarithm of conflict events plus one. Vertical lines represent 95% confidence intervals. The sample includes Muslim-majority countries as defined by having an average Muslim population share above 75%. The control group of months all other 11 months. Standard errors are clustered at the country level.

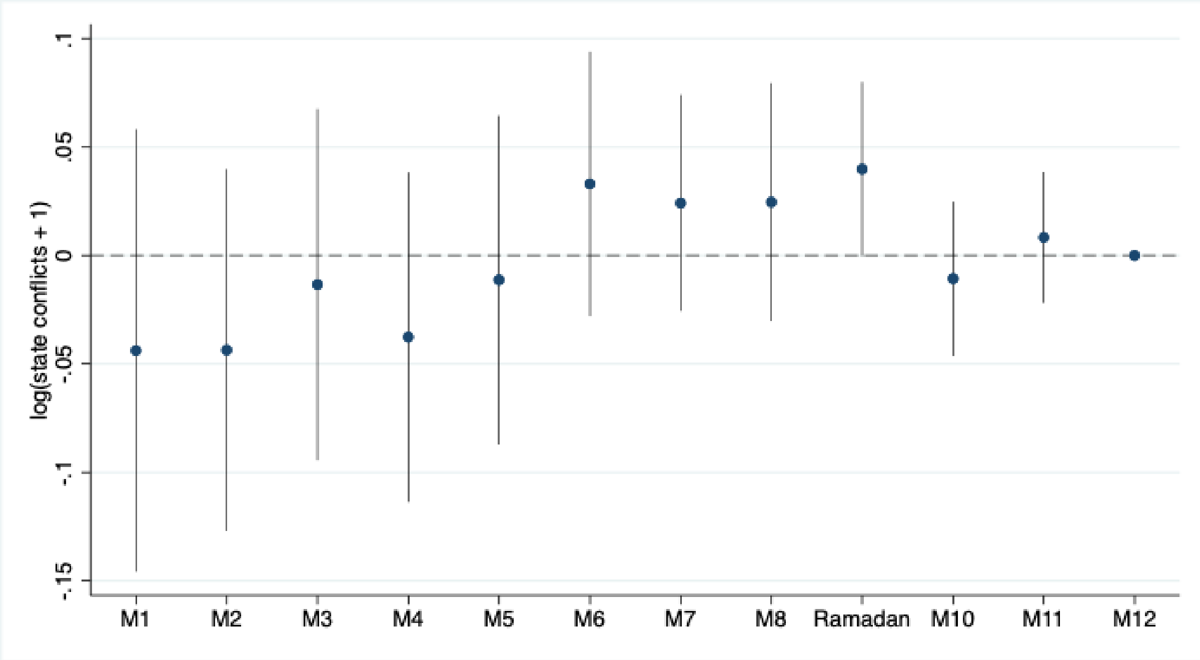

Figure A.10: Dynamic Effects of Islamic Months on Armed Conflict

Notes: This figure shows coefficients on Hijri-month indicators from a HDFE panel regression estimating the effect of each Islamic month on the incidence of state-based armed conflict relative the last month. The dependent variable is the natural logarithm of the number of conflict events plus one, measured monthly from the UCDP GED (1989–2023) and aggregated to the Islamic (Hijri) calendar. The sample consists of 31 Muslim-majority countries (average Muslim share above 75%). Each point is the estimated coefficient for the labeled month; vertical lines denote 95% confidence intervals based on standard errors clustered at the country level. All regressions include country-by–Hijri-year fixed effects and Gregorian year–quarter fixed effects. Dhu al-Hijjah (M12) is the omitted (base) month and is plotted at zero; all other estimates are interpreted relative to it. Month labels "M1"–"M12" follow Hijri order; Ramadan is M9.

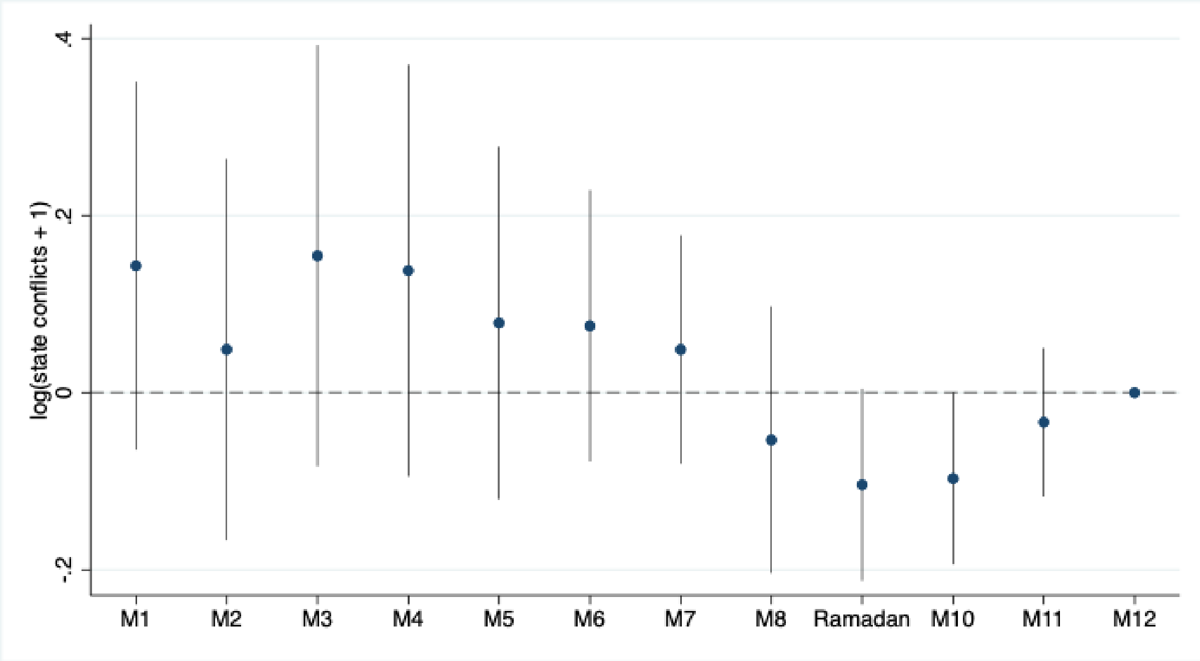

Figure A.11: Dynamic Effects of Islamic Months on Demonstrations

Notes: This figure shows coefficients on Hijri-month indicators from an HDFE panel regression estimating the effect of each Islamic month on the number of demonstrations relative to the last month. The dependent variable is the natural logarithm of demonstration events plus one, measured monthly from ACLED (1997–2023) and aggregated to the Islamic (Hijri) calendar. The sample consists of 14 African Muslim-majority countries (average Muslim share above 75%). Each point is the estimated coefficient for the labeled month; vertical lines denote 95% confidence intervals based on standard errors clustered at the country level. All regressions include country-by–Hijri-year fixed effects and Gregorian year–quarter fixed effects. Dhu al-Hijjah (M12) is the omitted (base) month and is plotted at zero; all other estimates are interpreted relative to it. Month labels "M1"–"M12" follow Hijri order; Ramadan is M9.

Table A.1: 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 A.2: The Relative Effects of Ramadan on State-Based Armed Conflicts in Muslim Countries, 1989-2022 (Months 6-12)

	Dependent Variable: log(armed conflict +1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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 A.3: The Relative Effects of Ramadan on Conflict in Non-Muslim Countries, 1989-2022

	Dependent Variable: log(armed conflict +1)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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 $\times$ % Christian							-0.021	
							(0.016)	
Ramadan$\times$ >75% Christian								-0.038*
								(0.022)
Ramadan$\times$ 50–75% Christian								-0.056**
								(0.025)
Ramadan$\times$ 25–50% Christian								-0.063*
								(0.033)
Ramadan$\times$ 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 A.4: The Relative Effects of Ramadan on State Based Armed Conflict in Muslim Countries, 1989-2022 (PPML)

	Dependent Variable: Number of Armed Conflicts							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
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. R^2	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 A.5: The Relative Effects of Ramadan on Political Violence in Muslim Countries, 1997-2023 ACLED

	Dependent Variable: log(Political Violence +1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
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. R^2	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 A.6: The Relative Effects of Ramadan on Demonstrations in Muslim Countries, 1997-2023 (Months 6-12)

	Dependent Variable: log(demonstrations +1)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
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 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.7: 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 $\times$ % Christian						0.147**	
						(0.059)	
Ramadan$\times$ >75% Christian							0.185**
							(0.081)
Ramadan$\times$ 50–75% Christian							0.162**
							(0.079)
Ramadan$\times$ 25–50% Christian							0.171**
							(0.079)
Ramadan$\times$ 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 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.8: The Relative Effects of Ramadan on Demonstrations in Muslim Countries, 1997-2023 (PPML)

	Dependent Variable: Number of Demonstrations						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
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 $\times$ % Muslim						-0.181*	
						(0.095)	
Ramadan$\times$ >75% Muslim							-0.377**
							(0.156)
Ramadan$\times$ 50–75% Muslim							-0.108
							(0.172)
Ramadan$\times$ 25–50% Muslim							-0.273*
							(0.141)
Ramadan$\times$ 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 * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.9: Robustness of Ramadan's Effect on Armed Conflicts and Demonstrations to Fixed Effects Specifications

	log(armed conflict +1)				log(demonstrations +1)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ramadan	0.037***	0.037***	0.029**	0.029**	-0.057	-0.062	-0.062*	-0.062*
	(0.012)	(0.012)	(0.013)	(0.013)	(0.042)	(0.042)	(0.031)	(0.031)
Outcome Mean (levels)	11.84	11.84	11.84	11.84	9.789	9.789	9.789	9.789
Sample	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim	Muslim
Observations	12648	12648	12648	12648	4536	4536	4536	4536
Adj. R^2	0.465	0.897	0.516	0.897	0.176	0.848	0.595	0.853
Country FE	✓		✓		✓		✓	
Quarter FE	✓	✓			✓	✓		
Quarter-by-year FE			✓				✓	
Country-by-year FE		✓		✓		✓		✓

Notes: Each column reports the estimated coefficient of a Ramadan dummy variable under v arying combinations of fixed effects. Standard errors are clustered at the country level and shown in parentheses. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$. The dependent variable is the log-transformed count of armed conflicts or demonstrations plus one. Country-by-year and quarter-by-year fixed effects are used in more saturated specifications to capture temporal and spatial heterogeneity in Ramadan conflict intensity.

Table A.10: 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 *** $p < 0.01$.

Appendix B

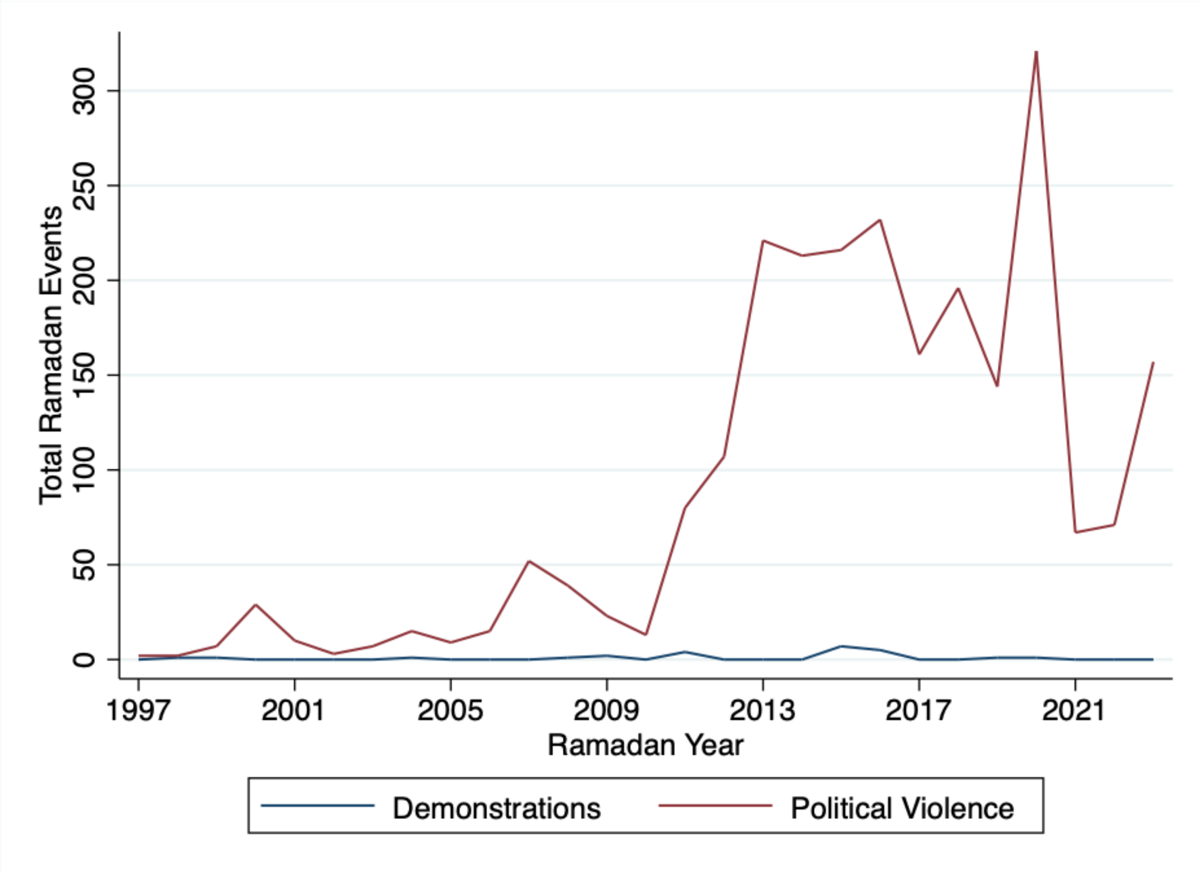

Figure B1: Trends in Demonstrations and Political Violence During Ramadan in Predominantly Muslim Countries (ACLED, 1997–2023)

Notes: This figure shows the total number of demonstrations and political violence events during Ramadan for each year from 1997 to 2023, based on ACLED data. Political violence events from ACLED are filtered such that only state-based armed conflicts remain. The sample includes only countries where more than 75% of the population is Muslim. Data are aggregated annually for the month of Ramadan using the Hijri calendar. Demonstrations and political violence are defined according to ACLED event classifications.

Figure B1 displays the annual trends in both demonstrations and political violence events during Ramadan in predominantly Muslim countries from 1997 to 2023. The visualization suggests that while both event types fluctuate over time, there isn't a clear inverse or simultaneous relationship across years. In some years, spikes in violence coincide with dips in demonstrations (and vice versa), hinting at a possible substitutive relationship. However, in other periods, both trends rise or fall together, suggesting complementarity. Overall, the temporal patterns imply a weakly substitutive relationship, but the trend alone is insufficient to establish a consistent dynamic between the two phenomena.

Table B1: Reciprocal Effects Between Demonstrations and Political Violence During Ramadan (ACLED, 1997–2023)

	Political Violence		Demonstrations	
	(1)	(2)	(3)	(4)
Political Violence	0.013	0.011		
	(0.016)	(0.015)		
Demonstrations			0.322	0.296
			(0.273)	(0.267)
Muslim Population Share	>75% Muslim	>50% Muslim	>75% Muslim	>50% Muslim
Outcome mean (levels)	0.0635	0.0610	6.381	5.728
Observations	378	459	378	459
Adj. R^2	0.0754	0.0501	0.472	0.449
Controls	✓	✓	✓	✓
Country-by-year FE	✓	✓	✓	✓

Notes: This table presents results from a restricted sample examining the reciprocal relationship between demonstrations and political violence during Ramadan, split by Muslim population share. Political violence and demonstrations are log-transformed. Political violence events from ACLED are filtered such that only state-based armed conflicts remain. Columns 1–2 estimate effects on political violence, while Columns 3–4 estimate effects on demonstrations. All regressions include country and year fixed effects, and control variables. Observations are limited to the Ramadan period in the Hijri calendar. Robust standard errors are clustered at the country level. Outcome means are in levels. Significance levels are denoted by * $p < 0.10$, ** $p < 0.05$, and *** $p < 0.01$.

The estimates in Table B1 provide direct empirical evidence on whether demonstrations and political violence are complements or substitutes during Ramadan. Across Muslim-majority countries (with Muslim population shares over 50% and 75%), the coefficients suggest a positive association between the two—indicating that more of one type of event is associated with more of the other. However, these results are statistically insignificant, meaning the relationship is weak and not robustly supported by the data. This suggests that while the direction of association leans toward complementarity, the evidence is inconclusive, and the two forms of unrest may operate relatively independently during Ramadan.