

Ramadan fasting increases leniency in judges from Pakistan and India

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We estimate the impact of the Ramadan fasting ritual on criminal sentencing decisions in Pakistan and India from half a century of daily data. We use random case assignment and exogenous variation in fasting intensity during Ramadan due to the rotating Islamic calendar and the geographical latitude of the district courts to document the large effects of Ramadan fasting on decision-making. Our sample comprises roughly a half million cases and 10,000 judges from Pakistan and India. Ritual intensity increases Muslim judges' acquittal rates, lowers their appeal and reversal rates, and does not come at the cost of increased recidivism or heightened outgroup bias. Overall, our results indicate that the Ramadan fasting ritual followed by a billion Muslims worldwide induces more lenient decisions.

Rituals are a feature of all known human societies. Through religion, culture, traditions or daily routines, rituals give symbolic meaning to specific gestures, words or actions. The social functions of rituals have been extensively studied in the social sciences since Durkheim¹. Rituals can impact decision-making through adverse physiological side effects, but they can also motivate better decision-making.

This paper studies the Ramadan fasting ritual, one of the most observed religious rituals in the world, followed by a billion Muslims worldwide every year². Made obligatory in the Quran (Chapter 2, Verse 183), the Ramadan fasting ritual has a clear rule: all adult Muslims must fast from dawn to sunset, with no ingesting of food and liquids during the observance of the ritual. Moreover, the ritual also requires prayer, reflection and self-control demonstrated in moral decision-making. The word for the Ramadan fasting ritual in Muslim holy texts is *sawm*—literally, restraint. We examine the impact of Ramadan fasting on criminal sentencing for half a century in India and Pakistan, which together comprise a quarter of the world's population.

Criminal acquittals provide a high-stakes setting where the impact of rituals on judicial decision-making can substantially affect lives. Theoretically, the jury is out on whether fasting increases or decreases acquittals. A large body of literature finds that physiological deprivation induces judges to make harsh decisions^{3–5}. Negative physiological effects can arise from disrupted sleep⁶, nutrient deprivation⁷ or even lack of attention⁸. However, when physiological deprivation is combined with the fasting ritual, the effect may actually be countered by greater leniency (or a reduction in harshness), whether due to religious restraint or forgiveness or some form of leniency bias. Judges may also

exert more effort to issue better decisions if fasting improves memory and cognition⁹. Recent literature has found that fasting may lead to elevated cognition via a reduction in cholesterol¹⁰ and fat mass¹¹, and Ramadan fasting in particular is associated with enhanced global cognition via increased production of wake-promoting neurotransmitter orexin-A¹². The harshness effect of the Ramadan fasting ritual may dominate in some judicial cases, while the leniency effect may dominate in others. Criminal sentencing decisions in Ramadan provide a close-to-ideal setting to observe this leniency effect and study any potential impact on decision-making observed through the lens of errors (reversals) and downstream consequences (recidivism).

This paper contributes to several additional strands of literature. Primarily, we complement a study¹³ of the impact of Ramadan hours on economic growth by exploring the impact of Ramadan hours on individual decision-making. We also extend the literature on non-Ramadan rituals and economic development, particularly regarding the role of religious festivals and their associated rituals in building social capital, which can be detrimental to long-run development, especially during the crop-growing season^{14–17}. We show how Ramadan fasting can impact judicial decision-making in criminal trials.

Results

Impact of Ramadan fasting on acquittals

Our main result is that Muslim judges are about 10% more likely to acquit with each additional hour of fasting relative to the baseline minimum hours of fasting during Ramadan. This holds for both Pakistan and India (Table 1). In Pakistan, another hour of fasting is associated with acquittals

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Table 1 | Impact of Ramadan fasting on acquittals by religion—Pakistan and India

(a) Pakistan	Muslim judges		Non-Muslim judges	
	(1)	(2)	(3)	(4)
Acquittal verdicts				
Ramadan hours	0.0422	0.0421	0.0123	0.0137
Standard error	(0.0192)	(0.0189)	(0.0257)	(0.0259)
95% two-sided CI	0.00136–0.0831	0.00185–0.0824	–0.0425 to 0.0672	–0.0415 to 0.0690
P	(0.04)	(0.04)	(0.63)	(0.60)
District and time FEs	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	3,849	3,849	1,997	1,997
R ²	0.055	0.058	0.069	0.078
Mean of dependent variable	0.529	0.529	0.498	0.498
Number of judges	597	597	320	320
(b) India	Muslim judges		Non-Muslim judges	
	(1)	(2)	(3)	(4)
Acquittal verdicts				
Ramadan hours	0.0674	0.0657	0.0324	0.0331
Standard error	(0.0369)	(0.0370)	(0.0226)	(0.0230)
95% two-sided CI	–0.00549 to 0.140	–0.00723 to 0.139	–0.0121 to 0.0769	–0.0121 to 0.0783
P	(0.06)	(0.07)	(0.15)	(0.15)
District and time FEs	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	19,995	19,995	352,057	352,057
R ²	0.230	0.234	0.293	0.295
Mean of dependent variable	0.719	0.719	0.523	0.523
Number of judges	400	400	7,243	7,243

Robust standard errors appear in brackets (clustered at the district level). The dependent variable is acquittal verdicts, a dummy variable that switches on for acquittal decisions. Ramadan hours are the number of daylight hours in Ramadan. The Ramadan month dummy and daylight hours individually are also always included. Panel **a** reports the results on Pakistan with controls including case characteristics: the number of pages in the judgement order, the presence of the chief justice on the bench, the number of judges in a case, the number of lawyers in a case and judge characteristics such as dummies for the judge's gender and prior employment (lawyer or former judge). Fixed effects include district and year fixed effects. Panel **b** reports the results on India with controls including judge experience, an indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft) and an indicator of judge type (whether the judge is a specialist criminal judge or a part-time criminal judge). Fixed effects include district, year, month, week and day fixed effects where time corresponds to the date of decision. CI, confidence interval; FE, fixed effect.

being four percentage points more likely, while in India, another hour of fasting is associated with acquittals being seven percentage points more likely. Figure 1 reports a stark jump in acquittals for Muslim judges in Pakistan with increasing Ramadan fasting intensity. The association between daylight hours and acquittals is present only in the month of Ramadan, not in other months. Moreover, in Fig. 1, we observe no effect of fasting intensity on rulings by non-Muslim judges, our placebo group. We present the corresponding figure for India in the appendix (Supplementary Fig. 4), where we find that the Ramadan effect for Muslim judges persists for several months after Ramadan. Note that these results include the full dynamics of pre- and post-Ramadan hour effects, although the results are slightly less precise (and not statistically significant), unlike those in Table 1, which only shows the specific effect of

Ramadan hours without the dynamics. Readers wishing to compare the results in Fig. 1 and Supplementary Fig. 4 should refer to Supplementary Table 14, where columns 1 and 2 report Pakistani samples of Muslim and non-Muslim judges, respectively, and columns 3 and 4 report the corresponding results for India. We also found that Ramadan effects are particularly pronounced for violent crimes, where the accused faces life imprisonment (Supplementary Table 2).

Our evidence is consistent with Ramadan fasting leading to fewer case reversals in higher courts. To understand whether the rise in acquittals comes at the cost of worse decisions along the dimensions of reversals (errors) and recidivism (downstream consequences), we made two linkages in the data: a linkage between lower court cases and their appeals and reversals in higher courts and a linkage across lower court cases for recidivism. Through these two linkages, we observed evidence consistent with fewer appeals and reversals of decisions in the higher courts. In particular, a one-hour increase in Ramadan fasting intensity reduces the likelihood that decisions will be appealed in higher courts by 4% over the sample mean (Supplementary Table 3). Conditional on appeal, these cases affected by each additional hour are about one percentage point or 5% less likely to be reversed (Table 2).

The effect of the Ramadan season (that is, the extensive margin effect) is shown in Fig. 2. Figure 2a presents this extensive margin effect of Ramadan month, reporting average acquittals in Ramadan versus non-Ramadan months for Muslim and non-Muslim judges in India. We observed a sharp and statistically significant increase in acquittals for Muslim judges in Ramadan, while no corresponding change during Ramadan is observed for non-Muslim judges. The estimates imply that acquittal verdicts are about 20 percentage points higher for Muslim judges in the month of Ramadan. This is qualitatively significant and represents a 40% increase over the sample mean. Figure 2b reports estimates for decision reversals at the extensive margin for India: difference-in-differences estimates indicate that reversed decisions are about 10 percentage points lower for Muslim judges in the month of Ramadan. Alternatively, leveraging the random allocation of cases within Ramadan, we observe that Muslim judges have about 4 percentage points fewer decision reversals in Ramadan relative to non-Muslim judges in Ramadan (Fig. 2b).

The cases that are reversed, however, may not be a random draw from the population of all criminal cases. Cases decided at times of high Ramadan fasting intensity may be less likely to be appealed or reversed than those decided in times of shorter Ramadan fasts. Therefore, instead of the Ramadan fasting ritual effect, it may be the unobservable case characteristics due to the selected sample of cases going to appeal that explain part of our results. To speak to this challenge, we directly modelled the progression of cases as they move from lower to appellate courts with the standard Heckman selection framework. This instrumental variable strategy builds on recent work¹⁸ and uses judge leniency as an instrument. In our application, we used the leave-out appeal rate of a judge as the instrument leveraging the tendency of some judges to be lenient regardless of case characteristics¹⁹. This allowed us to jointly estimate (1) the impact of Ramadan fasting on individuals' progression from lower court acquittal to higher court appeal and (2) the impact of Ramadan fasting on overturned decisions, conditional on the case progressing to the appellate court. Supplementary Table 4 shows the results from the first stage (the selection equation) and the second stage (the outcome equation). We found that the instrument is a strong predictor of appeals at the case level—that is, historically lenient judges are more likely to allow appeals and reversals regardless of the case facts. The second stage results, accounting for case progression, imply that an additional hour of Ramadan fasting leads to about a two-percentage-point decrease in decision reversals. If anything, the point estimates of the impact of Ramadan fasting on reversed decisions are slightly larger—that is, even when we account for selection, Muslim judges observing longer fasts make decisions that are less likely to be reversed in higher courts.

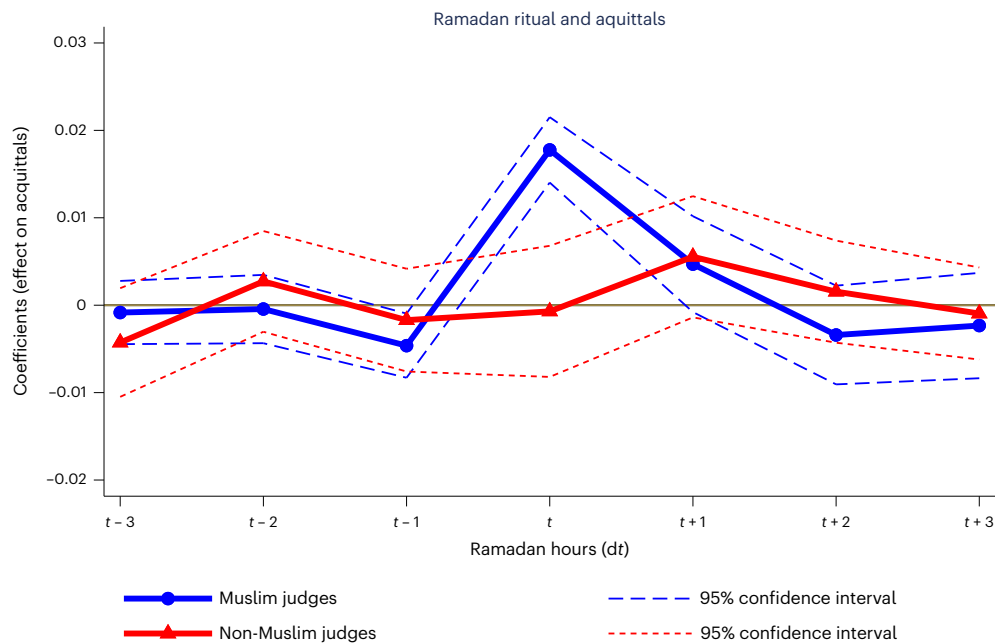


Fig. 1 | The impact of Ramadan hours in Pakistan. The effect of daylight hours on acquittals in the month of Ramadan and in the months before and after Ramadan. The points show the coefficients in our baseline regression using Pakistan case data with Ramadan hours (t) and coefficients on daylight hours during the preceding and subsequent Islamic calendar months. Specifically,

we also plot coefficients on Jumada al Akhira hours ($t - 3$), Rajab hours ($t - 2$), Shaban hours ($t - 1$), Shawwal hours ($t + 1$), Dhul Kada hours ($t + 2$) and Dhul Hijja hours ($t + 3$). The figure is based on 5,846 cases adjudicated by 917 judges in Pakistan ($n = 5,846$). A similar figure for India is provided in Supplementary Fig. 4. The dashed lines represent the 95% confidence intervals.

Table 2 | Impact of Ramadan ritual on decision reversals in high courts—India

	(1)	(2)	(3)
	Overturned (Reversed)		
Muslim × Ramadan hours	-0.00975	-0.00973	-0.00987
Standard error	(0.00401)	(0.00402)	(0.00398)
95% two-sided CI	-0.0176 to -0.00186	-0.0176 to -0.00181	-0.0177 to -0.00204
<i>P</i>	(0.01)	(0.01)	(0.01)
District FE	Yes	Yes	Yes
Time FE	No	Yes	Yes
Controls	No	No	Yes
Observations	19,914	19,914	19,914
R^2	0.182	0.194	0.196
Mean of dependent variable	0.219	0.219	0.219
Number of judges	2,783	2,783	2,783

Robust standard errors appear in brackets (clustered at the district level). The dependent variable is ‘Overturned’, a dummy variable that switches on for lower court verdicts reversed in the High Court. Controls include an indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft) and an indicator for judge type (whether the judge is a specialist criminal judge or a part-time criminal judge). We also include a Ramadan month dummy, a Muslim dummy, daylight hours, Ramadan hours and their corresponding interactions as controls in all columns of the table. Time fixed effects are dummy indicators for the year, month, week and day corresponding to the date of decision.

Second-order consequences of fasting

The higher acquittal rates in lower courts as Ramadan fasting becomes more intense may also lead to higher rates of reoffense or recidivism, especially if, for instance, physiological deprivation causes judges to acquit dangerous criminals. To investigate this possibility, we exploited the full names of the litigants in our court data and assessed whether,

after the case closed, they were involved in a new criminal case. Table 3a reports these findings. The increase in acquittal rates does not come at the expense of higher recidivism. If anything, the coefficient estimates are negative. This pattern also holds when we look specifically at violent crimes: murder and armed robbery. In fact, the point estimates suggest a slight reduction in recidivism for murder defendants whose cases are decided during Ramadan intense fasting periods (Supplementary Table 13).

We also examined whether Ramadan increases ingroup bias by making judge and litigant identities more salient. We examined heterogeneity by the saliency of litigant identity (for example, ingroup and outgroup bias)²⁰—that is, whether the Ramadan fasting ritual differentially impacts decisions involving Muslim versus non-Muslim litigants. We did not find much evidence of Ramadan fasting intensity making religious identity more salient for either Muslim or non-Muslim judges. Table 3b reports these results, which suggest that Ramadan ritual intensity is not accompanied by increased antipathy towards non-Muslim litigants (which is also consistent with the evidence presented for the Muslim holy pilgrimage or Hajj)²¹. Put differently, Ramadan fasting increases acquittals but does not appear to induce harshness towards non-Muslim litigants.

The increase in acquittals could also have been entirely explained by physiological effects from disturbed sleep or nutrient deprivation²² or by lack of attention²³. These effects are certainly important, but our evidence suggests that they may be outweighed by the positive mechanisms documented in the literature: fasting can lead to an elevation in mood²⁴, cognition, verbal skills and working memory^{25,26}.

We also observed that the caseload of a given judge is unaffected by Ramadan fasting, suggesting that judges are not exerting noticeably less effort by taking fewer cases. Likewise, we found that case delays and days to the first hearing of the case are unaffected, suggesting that judges are not paying less attention to cases or ruling without as much deliberation as fasting becomes more intense (Supplementary Tables 5 and 6). Taken together, this evidence suggests that Ramadan fasting does not deteriorate decision-making in terms of reversals, recidivism

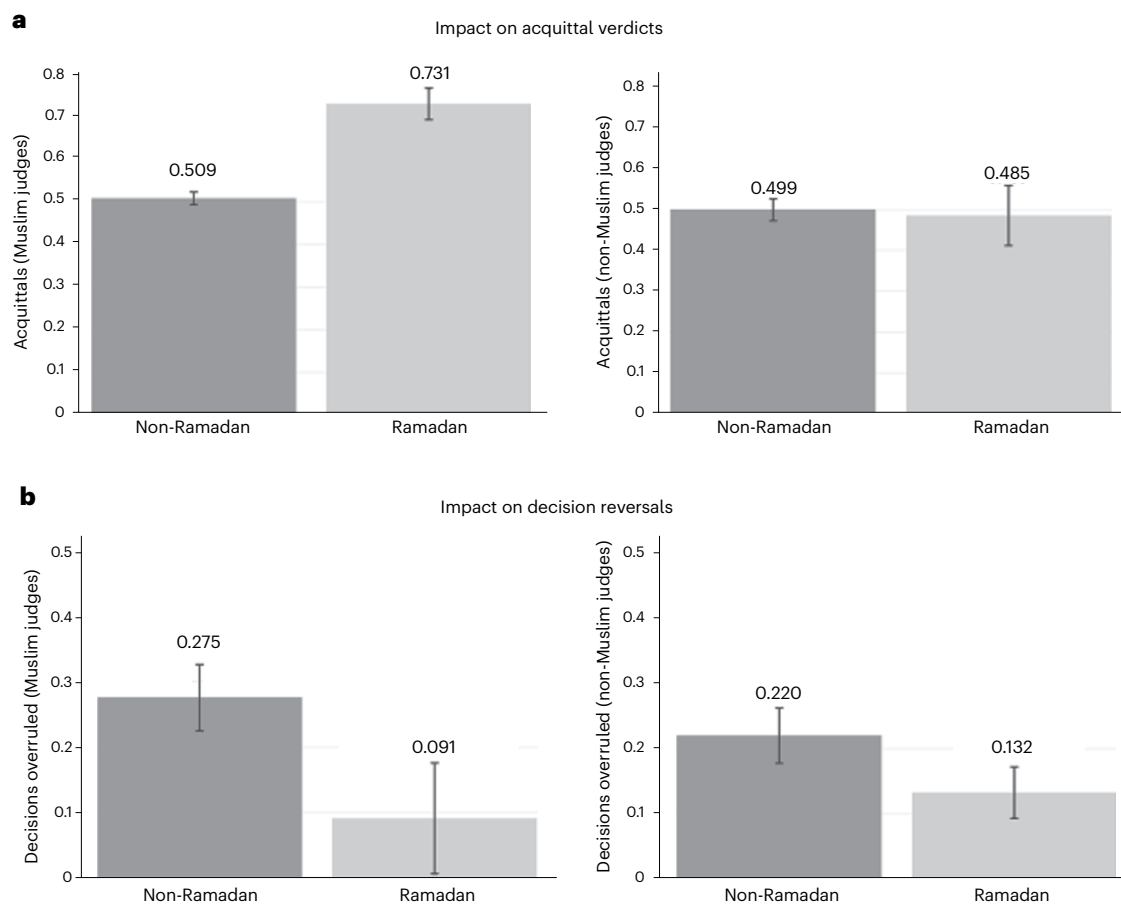


Fig. 2 | Impact of Ramadan for Muslim versus non-Muslim judges in India—extensive margin. **a**, Acquittal decisions that were decided in the month of Ramadan relative to those that were decided in non-Ramadan months by Muslim (left) and non-Muslim (right) judges. **b**, The average reversal rates of decisions

in the Indian High Courts. These are the cases previously decided in lower courts in the month of Ramadan by Muslim (left) and non-Muslim (right) judges. The figures are based on 372,052 cases adjudicated by 7,643 judges in India ($n = 372,052$). The error bars represent the 95% confidence intervals.

or ingroup bias, as shown by Muslim judges' lower decision reversals in Table 2, no increase in recidivism in Table 3a and no heightening of outgroup bias in Table 3b. We also found, in both India and Pakistan, that crop-related activities do not appear to mediate the impact of Ramadan fasting on judicial decision-making. For instance, Supplementary Table 11 shows that in both India and Pakistan, agricultural activities such as the wheat harvest (one of the largest crops in both nations) have no disproportionate impact on the effect of fasting rituals.

Discussion

In this paper, we provide evidence on how ritual Ramadan fasting impacts judicial decision-making. Using case-level microdata from Pakistan and India (which together comprise 25% of the world's population), we show that Muslim (but not non-Muslim) judges are more likely to acquit when the intensity of Ramadan fasting increases, and that these acquittals are less likely to be appealed and reversed in higher courts. Moreover, Muslim judges' increased rate of acquittals during Ramadan does not lead to a rise in recidivism or exacerbate outgroup bias for non-Muslim litigants. We isolated the causal effects of fasting intensity from ritual festival and seasonality effects by leveraging the rotating Ramadan calendar and the granular temporal and geographic nature of our data obtained from including month-of-Ramadan and calendar season fixed effects. The length of daily fasting varies by up to two hours in South Asia, and the intensity of fasting reverses from the northern to the southern hemisphere roughly every decade. The random case assignment to decision-makers allowed a *ceteris paribus* comparison of cases across Muslim versus non-Muslim judges.

The results are meaningful: 10% higher acquittals and a 3% reduction in appeals are associated with each additional hour of fasting relative to the baseline minimum hours of fasting during Ramadan. Conditional on appeal, each additional hour is associated with a 5% reduction in decision reversals. We interpret these acquittal results as Ramadan fasting leading to greater leniency or reduced harshness. These results provide evidence that a religious ritual observed by one billion people worldwide can impact contemporary high-stakes decisions and that extrajudicial factors need not increase harshness in decisions. We investigated the association between daylight hours and judicial decisions during Ramadan and interpret this association as the effect of Ramadan or fasting intensity. Exploring different behavioural or biological mechanisms to explain the association between fasting intensity and decision-making remains an area for future research. To the extent that it is generally perceived negatively for extraneous factors to impact judicial decision-making, our study shows that, in contrast, extraneous factors need not deteriorate decision-making. This points to a potentially new direction for the study of ritualistic decision-making.

Methods

Empirical challenges

The Ramadan calendar and micro-data available in court settings offer a unique combination of features to address several challenges that preclude the systematic empirical investigation of the impact of religious rituals on decision-making. First, the varying daily length of Ramadan fasting according to geographic latitude provides us with a

Table 3 | Impact of Ramadan ritual on recidivism and bias—India

(a) Impact on recidivism				
	Acquitted in lower court		Convicted in lower court	
	(1)	(2)	(3)	(4)
Reoffense (Recidivism)				
Muslim judge×Ramadan hours	-0.000112	-0.000124	-0.002700	-0.002653
Standard error	(0.001480)	(0.001484)	(0.002025)	(0.002010)
95% two-sided CI	-0.003022 to 0.002799	-0.003041 to 0.002794	-0.006683 to 0.001284	-0.006608 to 0.001301
P	(0.93)	(0.93)	(0.18)	(0.18)
District and time FEs	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	192,891	192,891	169,629	169,629
R ²	0.172	0.173	0.205	0.205
Number of judges	5,533	5,533	4,276	4,276
(b) Impact on bias by litigant religion				
	Muslim litigant		Non-Muslim litigant	
	(1)	(2)	(3)	(4)
Acquittals				
Muslim judge×Ramadan hours	-0.000104	-0.000140	0.000197	0.000197
Standard error	(0.00220)	(0.00220)	(0.00278)	(0.00279)
95% two-sided CI	-0.00443 to 0.00422	-0.00446 to 0.00418	-0.00526 to 0.00566	-0.00529 to 0.00568
P	(0.96)	(0.94)	(0.94)	(0.94)
District and time FEs	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	86,428	86,428	280,331	280,331
R ²	0.310	0.311	0.285	0.286
Mean of dependent variable	0.516	0.516	0.541	0.541
Number of judges	4,486	4,486	7,139	7,139

Robust standard errors appear in brackets (clustered at the district level). In **a**, the dependent variable is recidivism, a dummy variable that switches on if a defendant is charged with a new crime in the court following his or her acquittal. Muslim judge×Ramadan hours is the interaction between the dummy for Muslim and the average daylight hours in Ramadan. We also include a Ramadan month dummy, a Muslim dummy, daylight hours, Ramadan hours and their corresponding interactions individually as controls. In **b**, the dependent variable is acquittals, a dummy variable that switches on for acquittal verdicts. Fixed effects include district, year, month, week and day fixed effects where the time corresponds to the date of decision. The unit of observation is an individual case, and each column considers a subsample of cases for judges and litigants with different religious identities.

source of variation in ritual intensity at the spatial level, with fasting intensity varying up to two hours on the same day. Second, the yearly changes of the month of Ramadan based on the lunar calendar enable us to separate variation in ritual intensity from seasonality (the calendar season) and thus to study the effect of fasting intensity within Ramadan (Supplementary Figs. 1 and 2). Third, the random assignment of cases among Muslim and non-Muslim judges provides us with similar decisions made by different individuals during the fasting period (the decisions of non-Muslim judges serve as a placebo group to compare with those of Muslim judges during Ramadan). Last, we can study the impact of Ramadan in both a Muslim-majority country (Pakistan) and

a Muslim-minority country (India). Our sample consists of judges from 65.1% Muslim judges in Pakistan and 5.2% Muslim judges in India. Studying both India and Pakistan affords us complementary identification strategies. We use Pakistan to help distinguish the intensity of ritual from the Ramadan season itself by virtue of data spanning almost 70 years, moving from almost all non-Muslim judges when British colonial rule ended to very few in recent years, and we use India to link lower court verdicts to resolution in the higher court and to link the litigant to a future criminal case. Note that since we include year-fixed effects, our results are unlikely to be driven by the changing composition of the judiciary.

We can disentangle the extensive margin effect of general societal shifts around the ritual season from the intensive margin effect of the religious ritual within the month of Ramadan by including the month of Ramadan and calendar season fixed effects. To give a concrete example, when Ramadan falls in winter, the daily fasting will be longer in district Tirunelveli than in Kupwara because Tirunelveli is closer to the equator. In contrast, when Ramadan falls in summer, the daily fasting will be longer in the district court of Kupwara than in Tirunelveli. On the same day, Ramadan fasting can vary up to two hours across the districts of Tirunelveli and Kupwara (Supplementary Fig. 2). This interaction of latitude and the fact that the Islamic calendar is not synchronized with the solar cycle provides us with a source of variation in the prescribed intensity of ritual. This, in turn, allows us to address the aforementioned empirical challenges—different types of cases, direct effects of seasons and the direct effect of Ramadan—that have hitherto prevented systematic empirical analysis of rituals and decision-making in naturally occurring settings.

Case assignment to judges

Cases in both Pakistan and India are randomly assigned to judges subject to a workload constraint. First, a courthouse is determined on the basis of territorial jurisdiction in criminal cases (the focus of our study). Then, the cases are randomly assigned. For instance, if there is just one judge adjudicating, that judge will be allocated the case, but if there are multiple judges, the judge assignment process is fully random, subject to a workload constraint. Moreover, the judiciary explicitly condemns and punishes attempts at ‘forum shopping’, where litigants select particular judges in the hope of a favourable outcome (for more details, see recent work). In our robustness section in Appendix S4 of the Supplementary Information, we discuss evidence in favour of the random assignment of judges via a series of balance tests.

Empirical specification

We use cross-district and over-time daily variation in the length of fasting hours to estimate the effect of Ramadan fasting on acquittal verdicts. Specifically, we estimate the following equation using Muslim and non-Muslim judge samples:

$$Y_{cjd,t} = \beta_0 + \eta \text{ Ramadan hours}_{dt} + \mathbf{X}_{cjd,t} \boldsymbol{\gamma}' + \mu_t + \delta_d + \epsilon_{cjd,t} \quad (1)$$

The subscripts *c, j, d* and *t* index cases, judges, districts and time, respectively. *Y* denotes acquittals, an indicator variable that switches on for acquittal verdicts. Ramadan hours represent the average daily number of prescribed fasting hours in Ramadan. We also control for Ramadan month fixed effects, daylight hours, case and judge characteristics, **X**, while μ_t and δ_d denote time and district fixed effects, respectively. β_0 is the intercept term, η is the coefficient of interest and represents the impact of an hour increase in Ramadan hours, $\boldsymbol{\gamma}'$ is the coefficient on the control variables and ϵ denotes the error term. Our specification is hence close to that of a recent study investigating the impact of Ramadan hours on economic growth. The summary statistics of the data used in the paper are reported in Supplementary Table 1. Further details on data construction and sources can be found in the Supplementary Information. Importantly, the above specification with

our daily judicial decision data frame allows us to account for both the independent effect of Ramadan (extensive margin) and that of daylight hours (length-of-day effects), unlike the previous work, which was based on cross-country yearly data. In particular, we know the month and year of decisions for Pakistan and the exact date of decisions for India. Because we expect the Ramadan fasting ritual to meaningfully affect decision-making only for Muslim judges, we estimated equation (1) using the subsamples of Muslim and non-Muslim judges separately, where the effect of Ramadan fasting on non-Muslim judges serves as an important placebo check, since cases are randomly assigned across Muslim and non-Muslim judges. We report whether the estimates are significantly different at the bottom of Table 1.

Reporting summary

Further information on research design is available in the Nature Portfolio Reporting Summary linked to this article.

Data availability

The data and code of the paper are replicable and reproducible using publicly available data. The dataset and code for the current study are available at the following link: https://www.dropbox.com/s/i9ssu2mzi8zbcwb/replication_files.rar?dl=0. The link contains zipped folders that include the code and data used to run the analysis along with a README file to explain the steps needed to run the code and replicate the results of the paper.

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Author contributions

S.M., A.S. and D.L.C. conceived the research, put together the data, conducted the analyses and wrote the manuscript.

Competing interests

The authors declare no competing interests.

Additional information

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Research sample	Our study uses quantitative econometric methods to evaluate impact of Ramadan fasting on judicial leniency. We randomly sample cases from available high court registries and use all available i.e. near universe of cases for India from E-Courts web portal. The rationale for collecting this data was resource and administrative constraints as well as our desire to collect representative sample. The Indian court data in particular ensures it by us sampling the entire database. We estimate the impact of the Ramadan fasting ritual on criminal sentencing decisions for Pakistan and India from half a century of daily data.
Sampling strategy	Near universe of court cases from Indian district courts and random sample of cases from Pakistani high courts. The sample size in Pakistan was determined by administrative allowance to sample (randomly) 1% of the case archives at court registries in Pakistan. For India near universe is collected because e-Courts database already contains the near universe that is 1997 to 1999 has partial data in e-Courts but from 2000-2018 complete universe of Indian criminal cases are recorded. These sample sizes are sufficient as we observe statistical significant results even after we accounted for multiple hypotheses statistical tests and randomization inference tests.
Data collection	The data collection was done by a team of 2 research assistants who were blinded to the research question. The collection procedure involved handcoding the data from judgement text sitting in the office of High Court registry and for Indian court data e-Court data on the information on cases that were collected from scrapping e-Courts and Kanoon.com websites are used. Since this was not an randomized experiment, the researcher was not completely blinded to the hypothesis but the individuals who scrapped the data were.
Timing	The data is from 1950 to 2016 for Pakistan and for India it is from 1997-2018. The timing of when the collection was done is not relevant as we collected all the time period the data was available for our analysis.
Data exclusions	no data exclusion and the data is available at the google drive link provided.
Non-participation	No participants were involved in the study, as it is an observational study using publically available data on court decisions.
Randomization	Observational study using district, judge, Ramadan month and length of day fixed effects. No randomization was performed in this

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