

# Preventing Islamic radicalization: Experimental evidence on anti-social behavior\*

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Forthcoming at the Journal of Comparative Economics

## Abstract:

Social tensions and violence induced by radicalized Muslims afflict many parts of the world. We collaborated with the main Islamic authority in Mozambique, which sponsored two randomized interventions to prevent violence related to youth radicalization: a religious campaign against extremist views of Islam, targeting change in beliefs; and a training module on entrepreneurship and employment, aiming to increase the opportunity cost of conflict. Our measurement focuses on anti-social behavior in a Joy-of-destruction lab game. We find that only the religious treatment decreased the propensity to destroy the payoffs of others. Consistently, surveys show increased trust in the state and decreased support for extremism. We conclude that religious sensitization is likely to be cost-effective in preventing Islamic radicalization and anti-social behavior.

**JEL Codes:** D74, C93, O55.

**Keywords:** Islamic Radicalization, Violence, Conflict, Political Economy, Field experiment, Joy-of-destruction game, Mozambique, Africa.

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\* We wish to thank Imamo Mussa and Lúcio Raúl, whose dedication, persistence, and courage have made possible the implementation of this project on the ground. We are grateful to the editor and two anonymous referees, as well as to Marijke Verpoorten and conference/seminar participants at IGC, NES, NOVAFRICA, and UNU-WIDER/UEM for useful comments. The Mozambique team of the International Growth Centre, in particular Alberto da Cruz, provided invaluable institutional support. We are particularly grateful to Conselho Islâmico de Moçambique (CISLAMO) for a fruitful collaboration, specifically Sheikh Abdul Carimo and Nze Assuate. Pinto Polini, from the Provincial Government of Cabo Delgado, Alberto Sabão from the Protestant Church of Pemba, and Denise Wright at the University of Notre Dame, also provided institutional support. Finally, we would like to extend an appreciative word to the group of enumerators with whom we worked. IRB approvals were secured from Universidade Nova de Lisboa and the University of Notre Dame (Protocol #18-02-4454). A pre-analysis plan for this study is available at the AEA Registry (AEARCTR-0003775). We wish to acknowledge financial support from the International Growth Centre. Vicente also acknowledges support by the Kellogg Institute for International Studies at the University of Notre Dame. All errors are our responsibility.

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# 1. Introduction

Islamic societies have long been associated with lower economic development (Kuran, 1997). Still, recent studies have found a complex picture, often emphasizing the role of institutions (Kuran, 2004) and of politics (Platteau, 2008, 2011) in mediating negative economic consequences.<sup>1</sup> At the same time, political Islam and Islamist political movements associated with Islamic radicalization are a likely product of particular internal conditions such as the presence of an educated middle class and minimal infrastructure (Brooke and Ketchley, 2018). Binzel and Carvalho (2017) as well as Fourati (2018) underline the role of inequality and decreased social mobility in recent Islamic revivals.<sup>2</sup> These revivals are often linked to social tensions and violence. Social tensions within Muslim communities include the withdrawal from mainstream society into subgroups with specific rituals and symbols, as well as social norms. Often these norms entail extreme levels of gender segregation as well as the shutdown of commerce. We devote our attention in this paper to ways of avoiding the (broadly-construed) violent implications of Islamic radicalization.

Indeed, in recent years, most of the major violent conflicts in the world have happened in Muslim-majority countries. Of these conflicts, a substantial and increasing share has been related to Islamist insurgents.<sup>3</sup> We can thus safely assert that Islamic radicalization is one of the main correlates of violent conflict in the world today. Although the world awoke to Islamic radicalization with the 9/11 Al-Qaeda attacks in the US and the subsequent war in Afghanistan, this phenomenon has become clear in many different Muslim-majority countries. These include Iraq and Syria, where ISIS has been particularly active, Nigeria, where Boko Haram was initiated, and Somalia, home of Al-Shaabab, as well as many other countries across the Middle East and the Caucasus, North and Central Africa, and South Asia, where ramifications of Islamist groups have become prominent.

Conflict prevention in the context of Islamic radicalization is thus a complex problem that requires attention. Different potential solutions have been tried. The obvious one is military, i.e., targeting

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<sup>1</sup> See Kuran (2018) for a comprehensive coverage of the recent literature on the link between Islam and economic development. Often findings are surprising: Campante and Yanagizawa-Drott (2015) observe that although Ramadan has negative consequences for economic output, it increases subjective wellbeing; Meyersson (2014) establishes a positive relationship between the political rule of Islamic parties and the education of women in Turkey; Delavande and Zafar (2015) deconstruct negative stereotypes associated with madrassas in Pakistan.

<sup>2</sup> Note that some Islamic practices central to these revivals, such as veiling or the Hajj, are actually associated with positive outcomes (Carvalho, 2013; Clingingsmith et al., 2009).

<sup>3</sup> See the descriptive study by Gleditsch and Rudolfson (2016).

terrorist organizations and specific (potential) aggressors within these. However, as it became clear from the very beginning of the Afghanistan war in 2001, the repression of terrorists cannot be enacted alone due to the risk of losing widespread local support.<sup>4</sup> Consistently, the US has focused on winning the ‘hearts and minds’ of the local populations in Afghanistan and Iraq through development interventions. This type of strategy became a focal point of practitioners since the work of Collier and Hoeffler (2004) and of Miguel et al. (2004), which both emphasize the idea that increasing the opportunity cost of engaging in conflict is a way to prevent it.

However, the counterinsurgency strategy based on material benefits sidelines the specificity of religious motivations behind Islamist violence. Radicalized Muslims have strong religious beliefs that may trump any material payoff. An alternative is to work with regular, non-extremist Muslims to prevent the spread of radical Islam. The setting of our study, the province of Cabo Delgado in Northern Mozambique, faced the emergence of conflict linked to Islamic radicalization<sup>5</sup> shortly after the local discovery of substantial natural resources. In 2010, there was a large discovery of natural gas in Cabo Delgado, with the potential to turn the country into one of the largest exporters of liquefied natural gas in the world (World Bank, 2014). Although production will not begin until the mid-2020s, foreign investment has already started, with major extractive multinationals embarking on the construction of refinery plants and other logistics investments. These investments stand in contrast with the nature of Cabo Delgado province: a remote and primarily rural area of the country, home to a majority Muslim population, with high poverty and child mortality rates compared to national standards.

It is in this context that several attacks have been reported in the province of Cabo Delgado, starting at the end of 2017. Although doubts persist about the motivation for these attacks, some facts are undisputed. First, although the attacks were initially made against state institutions like the police, they rapidly became widespread in rural areas, targeting civilians on roads or the destruction of entire villages, as well as foreign convoys linked to the natural gas operations. Since then, we can account for more than 2,500 people killed, many of whom were decapitated. Second, there are

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<sup>4</sup> This is a clear premise in the US Army counterinsurgency guidelines (US Army, 2007).

<sup>5</sup> Recent attacks have been acknowledged by the Islamic State. See: <https://www.nytimes.com/2018/07/06/world/middleeast/isis-global-terrorism.html> and <https://www.theguardian.com/world/2019/jun/06/isis-claims-sub-saharan-attacks-sign-africa-ambitions-islamic-extremist>.

many associations of these episodes with radicalized Muslims.<sup>6</sup> There are many reports of infiltration of local mosques by individuals with links to the Al-Shabaab movement. Although the police were able to identify some foreigners connected to the violence, there is no doubt that most perpetrators of violence are Mozambican.<sup>7</sup> Still, long-standing Muslim authorities in the region have a tradition of peaceful positions, namely in the mediation of conflict-prone Mozambican politics. This is a setting where religious sensitization by Muslim authorities against a radical version of Islam makes particular sense as a way to prevent further violence.

In this paper, we report on the results of a randomized field experiment we conducted in the capital of Cabo Delgado. We collaborated with the main Muslim authority in Mozambique, which sponsored two conflict-prevention interventions, targeting young men from local mosques. The first intervention was a religious sensitization campaign conducted by religious leaders, who provided information about the lack of theological foundation of a number of typical claims by Islamic fundamentalists. Some of these claims had a direct connection to violent behavior. The main motivation of this campaign was to change the religious beliefs of subjects, directing them toward non-extremist Islam. The second intervention was a training module on entrepreneurship and employment in the local labor market. It made specific reference to the new jobs expected in the region connected to the extraction of natural resources. The main idea of this module was to improve the economic prospects of subjects, i.e., as a way to increase the opportunity cost of engaging in conflict. Hence, we study two main conflict-prevention strategies: one, less standard, aiming to change religious beliefs and informed by the literature on political Islam; the other, more standard in both policy and research, informed by the literature on Islam and development, which aims to change the economic prospects of potential perpetrators of violence.

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<sup>6</sup> A recent qualitative study presented by Saide Habibe, Salvador Forquilha, and João Pereira in May 2018, underlines that the attacks were initiated by the group Ahlu Sunnah Wa-Jamo/Ansar al-Sunna, meaning in Arabic ‘supporters of tradition.’ This group originates from the area of Mocímboa da Praia. The study reports that the members of this movement, typically young and marginalized men, follow an extremist version of Islam, and that the movement is funded through the illegal trading of local natural resources like timber, ivory, and rubies. The authors of the study also corroborate links with extremist groups in neighboring countries. Morier-Genoud (2020) presents similar evidence.

<http://www.open.ac.uk/technology/mozambique/sites/www.open.ac.uk.technology.mozambique/files/files/Moci%CC%81mboa%20da%20Praia.pdf>

<sup>7</sup> See recent coverage: <https://www.ft.com/content/5206046a-7070-11e8-92d3-6c13e5c92914>; <https://www.economist.com/middle-east-and-africa/2018/08/09/a-bubbling-islamist-insurgency-in-mozambique-could-grow-deadlier>; <https://www.bbc.com/news/world-africa-44289512>.

In addition to studying conflict-prevention through changes in religious beliefs, we innovate through the measurement of outcomes: we focus our attention on measuring anti-social behavior by employing a Joy-of-destruction lab game (Abbink and Sadrieh, 2009; Abbink, and Herrmann, 2011). To the best of our knowledge, only Scacco and Warren (2018) have employed a version of this game in conflict-prone Nigeria to assess the impact of a conflict-prevention intervention. Specifically, they studied an intervention aimed at increasing social contact between Christian and Muslim young men. Generally, we know that behavior in the Joy-of-destruction game is associated with known determinants of conflict: Caldara et al. (2017) show that anti-social behavior in the game is associated with triggers of conflict, i.e., fear, monetary incentives, and uncertainty about an opponent's desire to cause harm; Prediger et al. (2014) show a correlation between anti-social behavior in the game and long-run resource scarcity among pastoralists in Namibia.<sup>8</sup> The Joy-of-destruction game is played in pairs. Each subject has a unique decision to make, i.e., whether to destroy the endowment of the other player at a cost. Subjects play simultaneously. In our implementation of the lab game, the main Muslim sample we follow plays against four types of opponents: local Muslims, local Christians, local public officials, and foreigners. We measure beliefs about the behavior of counterparts as well. In our study, we are able to track 1,520 experimental decisions about destruction in the Joy-of-destruction game. We complement our behavioral measurements with standard survey-based attitudes, namely on measuring extreme religious views that may lead to violence.

Our results show that the religious sensitization reduced anti-social behavior in the Joy-of-destruction game: the magnitude of the effect is 8-9 percentage points on the probability that subjects in our main Muslim sample destroy the payoffs of their opponents. Differently, we observe no effects of the training module related to entrepreneurship and employment, which aimed to raise opportunity costs of violent behavior, on the same outcome. In fact, this intervention significantly increases the belief that others will behave in an anti-social manner in the Joy-of-destruction game. We interpret this finding in light of the resource discovery in the region, which was explicitly mentioned during the training. Theory and evidence on the resource curse emphasize an increase in rent-seeking (Tornell and Lane, 1999; Baland and Francois, 2000; Torvik, 2002) and a deterioration of political behavior (Robinson et al., 2006; Vicente, 2010; Brollo et al. 2013; Armand

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<sup>8</sup> More centered on the lab behaviors related to this game, Jauernig et al. (2016) create winners and losers and observe who becomes the target of destruction in the game, and who becomes the perpetrator of destruction; Sadrieh and Schröder (2017) find that perpetrators of harm in the Joy-of-destruction game are also givers in the Dictator game.

et al., 2020) following the discovery of natural resources. We also report on suggestive evidence that our main Muslim sample targets more anti-social behavior towards public officials and foreigners, consistent with the violent attacks that have taken place in the region. Finally, we observe effects of the religious campaign on survey attitudes, namely on increased optimism regarding peace in the region, increased trust in the state, and lower support for mixing religion with politics. These findings underline the importance of religious sensitization by Islamic authorities to reduce radicalization and the politicization of Islam.<sup>9</sup>

This paper contributes to four additional strands of literature. First, the vast literature on civil wars and the mechanisms behind the emergence of conflict (Blattman and Miguel, 2010; Dube and Vargas, 2013; Blattman and Annan, 2016; Berman et al., 2017). Second, the recent literature on US counterinsurgency strategies based on aid programs that target the livelihoods of the local communities (Berman et al., 2011a; Crost et al., 2014; Hirose et al., 2017; Beath et al., 2017; Lyall et al., 2020). Third, going beyond conflict prevention based on material benefits, we contribute to the literature emphasizing the importance of the attitudes of potential insurgents (Atran 2003; Krueger and Malečková, 2003; Abadie, 2006; Lyall, 2010; Berman et al., 2011b; Lyall et al., 2013; Dell and Querubin, 2018; Bursztyn et al., 2020). Finally, we add to the literature on community-driven reconstruction, which emphasizes that promoting collective action and social cohesion can be an enduring conflict-prevention strategy (Fearon et al., 2009, 2015; Fafchamps and Vicente, 2013; Collier and Vicente, 2014).

## **2. Experimental design**

### *2.1. Treatments*

We collaborated with the Conselho Islâmico de Moçambique (Islamic Council of Mozambique, CISLAMO), the main institution representing Muslims in Mozambique. CISLAMO has a long record of political mediation in Mozambique, namely in the context of electoral observation. It played an important role in the peace agreement with RENAMO. In response to the violent events in Cabo Delgado associated with religious extremism, CISLAMO developed a sensitization

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<sup>9</sup> Hence, our paper relates to the recent literature on the determinants of Islamic radicalization: two examples are Mousseau (2011), who underlines the role of urban poverty, and Mitts (2019), who emphasizes the role of isolation and social media.

campaign against extremist views of Islam in their mosques in the capital city of the province, Pemba. The organization ended up sponsoring religious sensitization as well as a training module on business management and employment in the local labor market. Both initiatives were directed at young Muslim men recruited from CISLAMO mosques. Note that these young men correspond to likely recruitment targets of radicalized insurgents in the province. While the first intervention directly targeted the views of Muslims about Islamic doctrine as a way to oppose violence and insurgency, the second aimed to increase the opportunity cost of joining violent groups and engaging in conflict. We now turn to the details of each one of the interventions sponsored by CISLAMO.

A group of CISLAMO specialists in Islamic doctrine developed the contents of the religious sensitization campaign, which we label the *religious treatment*. Specifically, they produced a written manual that provided the basis for the campaign, which was presented verbally in classroom sessions at CISLAMO headquarters in Pemba. (The manual, in Portuguese, is available from the authors upon request.<sup>10</sup>) The manual and the sessions began by identifying the insurgents as ‘al khawarij,’ which means rebels or opponents who are not the true followers of the Prophet.<sup>11</sup> They then focused on deconstructing the main arguments presented by radicalized Muslims, with reference to passages of the Quran (which is considered by Muslims as the word of God) as well as narrations of events from the life of the Prophet (i.e., Hadiths, also considered as sacred). The targeted extremist statements included: anyone who commits a sin is no longer a Muslim and will have no forgiveness; a Muslim cannot work for a non-Muslim government; a Muslim cannot befriend a non-Muslim; a Muslim should not have an ID card because having a photo taken is forbidden; a Muslim should not go to the hospital; a Muslim should not use modern transportation; the only way to solve today’s problems is through violence; women’s rights are limited relative to men; Muslim children should attend madrassas and not secular schools; anyone who is not a believer should be considered an apostate and sentenced to death. The manual and sensitization campaign also included personal views of major religious scholars about radicalized movements. During the classroom sensitization, the participants were free to ask questions, and discussions on specific topics happened frequently. Sensitization took place in January 2019 and was chaired by two religious leaders from CISLAMO.

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<sup>10</sup> A webpage with the details of implementation of the treatments is available at <https://novafrica.org/lab-experiment-associated-to-radicalization-insurgency-in-cabo-delgado-mozambique/>.

<sup>11</sup> Campaigners reminded participants that the Prophet himself warned his followers against such groups of people who would kill in the name of Islam, who would recite the Quran but without true knowledge.

The training module on business management and employment in the labor market, which we label the *economic treatment*, was designed by a group of management teachers from a local college linked to CISLAMO, in coordination with members of our research team. They produced a manual specifically for this purpose, which was subsequently presented in the classroom. (This manual is available, in Portuguese, from the authors upon request.) The goals of the module were twofold. First, attention was devoted to business management and entrepreneurship, since a large share of the Muslim community in Cabo Delgado run their own businesses. Topics included how to make a business plan and a budget, how to get funding, especially from financial institutions in Cabo Delgado, and simple rules of thumb on business management, such as registering all transactions and separating business from personal accounting. Second, the module provided simple training on searching for jobs locally, including an overview of websites posting relevant jobs, current employers searching for collaborators, and the types of occupations and skills employers were looking for (those linked to the exploration of natural gas featured prominently). The training also covered how to present oneself for an interview, and how to structure a CV. This treatment was offered at the CISLAMO headquarters in Pemba by trained facilitators in January 2019.<sup>12</sup>

## *2.2. Sampling, assignment to treatment, and timeline*

The main sample in our field experiment is Muslim and was drawn from 21 mosques of Pemba. Individuals were selected by local religious leaders. They were then invited to participate in the study. The sample was composed of men 18-44 years of age, given that perpetrators of violence related to Islamic radicalization in Cabo Delgado are almost exclusively male and young. 241 individuals composed the main Muslim sample. Auxiliary samples were gathered for the purpose of the Joy-of-destruction lab game we played as part of the measurement in the experiment. The first auxiliary sample was Muslim and local, as it was drawn from three different mosques in the suburbs of Pemba. Thirty-seven young males were selected from there. The second auxiliary sample was Christian and local, as it was recruited from one church in Pemba. It included 37 young males. Appendix A to this paper shows the specific locations of the mosques and church of Pemba

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<sup>12</sup> Both the religious and the economic treatments were implemented in group sessions that lasted between four and five hours on average (excluding breaks), during a full day. There were multiple sessions for each treatment, happening on consecutive days. To facilitate discussion during the sessions, participants were split into smaller focus groups. Note that the control group was also invited for meetings where the main purpose was to watch unrelated documentary videos, i.e., a placebo. These control/placebo meetings were implemented before the treatments to minimize spillovers.

from where we drew participants to our study. The third auxiliary sample was selected from public officials working for the provincial government. Thirty-eight young males composed this sample. Finally, the fourth auxiliary sample was American and taken from the student population of the University of Notre Dame in the US. It consisted of 30 young males. We can then report that 383 individuals participated in our study.

The assignment of the main Muslim sample to the two treatment conditions, religious or economic, as well as to a control group followed simple randomization at the individual level. Each subject in this sample was either invited to a session on the religious treatment, invited to a session on the economic treatment, or had no treatment session assigned. The measurement activities followed and were conducted in all three groups, beginning with the Joy-of-destruction lab game and continuing with the submission of individual surveys. These measurement activities were conducted from January to March 2019. In most cases, measurement activities were conducted in a group setting, although ensuring confidentiality, but a few cases required interviewing individuals in their homes.

### *2.3. Measurement*

Our measurement of outcomes in this paper is focused on a Joy-of-destruction lab game (Abbink and Sadrieh, 2009; Abbink and Herrmann, 2011). This game measures anti-social behavior and is standard in the experimental literature. In this paper, we use the Joy-of-destruction game to measure anti-social behavior in a meaningful field context, as an evaluation tool of different real-world interventions aimed at conflict prevention. Note that the main assumptions in our design are that the Joy-of-destruction game yields meaningful and interpretable behaviors on the part of subjects, and that our treatments are able to impact those behaviors.

The Joy-of-destruction game we implemented involved two players faced with the same simultaneous binary decision: to destroy or not to destroy the other player's endowment.<sup>13</sup> Each player in the game is initially given an endowment by the experimenter, which can then be destroyed by the other player at a cost. We worked with a version of this game that included destruction of 50 percent of the other player's endowment, with prices of destruction of 10 percent

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<sup>13</sup> Note that decisions were simultaneous in the sense that players did not know about their counterparts' decisions until the end of the game.

of one's own endowment. The best-case scenario is that both players keep their endowment. This is the only Nash equilibrium of the game, which has the added feature that these are strongly dominant strategies. The worst-case scenario is that both players get 40 percent of their endowments, in case both pay to destroy the endowment of their counterpart.

All the individuals in our main Muslim sample played the game once with a player from each of the auxiliary samples, i.e., one Muslim player, one Christian player, one public official, and one foreigner. When facing their opponents, players knew their gender (male) and age range. The remaining information included the following: for the Muslim opponent, that he was born in and resided in Mozambique, as well as that he was a practicing Muslim; for the Christian opponent, that he was born in and resided in Mozambique, as well as that he was a practicing Christian; for the public official, that he was born in and resided in Mozambique, as well as that he was a public official working for the Provincial Government of Cabo Delgado; for the foreigner, that he was born in and resided in the US. The order of play with each one of the auxiliary players was randomized between players. Individuals in the auxiliary samples also faced a randomized order, when playing against the four types of opponents.

After making decisions about each one of their four opponents, players were asked to guess what their opponents (in the same order they appeared in the game) had done in the game. These responses show their beliefs about the anti-social behavior of their opponents. These beliefs were incentivized in the sense that a correct guess entailed an additional prize amounting to 10 percent of the game's initial endowment. In order to define payoffs, one of the opponents was randomly drawn from the four possibilities for each player (with equal probability). This was done in front of each subject at the end of the session. Endowments were 500 Meticais (approximately 8 USD) for the Mozambican sample and 15 USD for the US sample. The first is approximately 10 percent of an average monthly salary in Northern Mozambique, and the second adjusts the first number for purchasing power parity relative to the US. All players were separately compensated for participating in the game at a fixed rate. The full protocol of the game is available in the pre-analysis plan of this project and in Appendix B of this paper.

In addition to the Joy-of-destruction game, we implemented an individual survey, which was submitted face-to-face after the lab game was conducted. Note that, relative to behavioral measures such as the ones we collect in the context of the Joy-of-destruction game, survey measures are more prone to social desirability as they are not incentive compatible. In some cases, due to the

institutional constraints of our partners, this was done several days or weeks after the game. For Mozambican subjects, the survey started with basic demographic questions, including education, ethnicity, household income and assets, among others. Other questions were dedicated to social capital, awareness of and expectations about the exploration of natural resources in Cabo Delgado, trust in institutions, interest in politics, and views about the relationship between Islam and politics. The survey questions related to Mozambique and Islam were not submitted to the US sample. The full survey used with the Mozambican subjects is available in the pre-analysis plan of this project.

The survey-based information and attitudes we employ in our analysis are taken from the following five sets of survey questions. First, we compose a variable measuring whether respondents have heard about the natural gas discovery in Cabo Delgado. Second, we take a variable measuring whether the respondent agrees with the statement ‘The discovery of natural gas is good for peace in Mozambique.’ Third, we consider the extent of trust in the state by employing the question, answered on a scale of 0–3, ‘How much do you trust the President of Mozambique?’. Fourth, we assess interest in politics using the question, answered on a scale of 0–3, ‘How interested are you in public affairs?’. Finally, we measure support for an Islamic autocracy by averaging the answers, on a scale of 1–5, regarding the extent to which respondents agree with the following statements: ‘Democracy goes against Islam,’ ‘Non-Muslims should have less rights than Muslims,’ and ‘There should be an Islamic government, without parties or elections.’

#### *2.4. Estimation strategy*

Our main analysis relates to estimating treatment effects on the different outcome variables that we have available concerning anti-social behavior and survey attitudes of the main Muslim sample. These effects of interest, of the religious and economic treatments ( $\beta^R, \beta^E$ ) can be estimated through the specification:

$$Y_{l,i} = \alpha + \beta^R T_i^R + \beta^E T_i^E + \theta X_{l,i} + \varepsilon_{l,i}, \quad (1)$$

where  $Y$  is an outcome of interest,  $l, i$  are identifiers for neighborhoods and individuals, and  $X_{l,i}$  is a vector of neighborhood and individual demographic controls.  $T_i^R$  and  $T_i^E$  are dummy variables representing the treatments with value 1 for treated units.

Regarding the outcomes of the Joy-of-destruction lab game, we have available four different observations for each individual in the main sample, one per opponent  $j$ . For those outcomes, we also add a few important explanatory variables, as follows:

$$Y_{l,i,j} = \alpha + \beta^R T_i^R + \beta^E T_i^E + \gamma O_{i,j} + \delta C_{i,j} + \rho^R T_i^R \cdot C_{i,j} + \rho^E T_i^E \cdot C_{i,j} + \theta X_{l,i} + \varepsilon_{l,i,j}, \quad (2)$$

where  $O$  is a vector of order dummies in the game, for the four rounds of play each player in the main sample faced, and  $C$  is a vector of counterpart types in the game, for the four types of opponents each player faced. Interaction terms between the treatments and the counterpart types are also included.

For ease of interpretation and transparency, we employ OLS estimations throughout the paper.<sup>14</sup> We cluster standard errors at the level of the individual  $i$  in all regressions relating to the Joy-of-destruction game.

## 2.5. Hypotheses

We now turn to a description of the main hypotheses we test in our study. We follow a pre-analysis plan, which we published at the AEA Registry (AEARCTR-0003775). As we made clear in that plan, the emphasis is on analyzing the impact of the two treatments on behavioral measures gathered in the Joy-of-destruction game.

Our first two hypotheses are that the religious and economic interventions are effective at decreasing anti-social behavior and support for Islamic extremism, including violence. These interventions could also increase trust in institutions. While the first intervention is expected to work through a change in religious beliefs, the second is expected to work through an increase in the opportunity cost of engaging in conflict. We state these hypotheses in the following manner:

**Hypothesis 1:** Faced with the Islamic sensitization campaign, i.e., the religious treatment, young Muslim males in Cabo Delgado engage less often in anti-social behavior, are less sympathetic to

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<sup>14</sup> The results do not change significantly if we run a logit or probit model in the regressions with binary outcomes.

Islamic extremism, and show higher levels of trust in state institutions. This means we expect  $\beta^R > 0$  when the outcomes of interest are measured as positive.

**Hypothesis 2:** Faced with the training module on business management and employment in the labor market, i.e., the economic treatment, young Muslim males in Cabo Delgado engage less often in anti-social behavior, are less sympathetic to Islamic extremism, and show higher levels of trust in state institutions. This means we expect  $\beta^E > 0$  when the outcomes of interest are measured as positive.

We do not have a clear prior with respect to the difference between the two treatment effects. In the same way, we do not have strong expectations about differences in behavior in the Joy-of-destruction game among the different types of players, i.e., Muslims, Christians, public officials, and foreigners. We do, however, have the prior that anti-social behavior increases when Muslims are paired with public officials or foreigners relative to when they are paired with the other types of opponents. Indeed, as described above, public officials such as security officers, and foreigners in convoys of workers in the extractive industry have been the most prominent targets of violence motivated by Islamic extremism in Cabo Delgado. Our remaining hypothesis is thus:

**Hypothesis 3:** In the Joy-of-destruction lab game, anti-social behavior by Muslims in the main sample is most likely when they interact with public officials and foreigners. For that reason, positive treatment effects are most likely when interacting with those types of opponents.

### 3. Econometric results

#### 3.1. *The Joy-of-destruction lab game*

We start by providing an overview of the main results of the Joy-of-destruction lab game.<sup>15</sup> In Figure 1, we show the treatment effects on the decision to destroy the opponent's endowment and on the beliefs about destruction from opponents. We calculate the treatment effects using specification (1)<sup>16</sup> and show the point estimates and corresponding confidence intervals at the 10

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<sup>15</sup> Note that in Appendix C we show descriptive statistics of the sample as well as evidence that the randomization was successful.

<sup>16</sup> Controls are the lag between the end of the treatment and the measurement, neighborhood dummies, and individual demographic variables. Individual demographic variables are: age, age squared, number of adults

percent level. The religious treatment decreases anti-social behavior measured in the game. Differently, we do not find that the economic treatment reduces anti-social behavior. However, there is a large effect of the economic treatment on the belief about destruction by the opponent in the game. In the rest of this section, we go over these results in detail and discuss how the different opponents impact decisions.

<Figure 1 about here>

In Table 1, we show the treatment effects of the interventions on anti-social behavior in the lab game, i.e., assuming as outcome a binary variable taking value 1 in case the subject decided to destroy his opponent's endowment. We employ specification (2) above as well as simpler versions with a lower number of controls. We begin by reporting on a specification without any controls (column 1); we then add order dummies (column 2); subsequently, we add other controls (column 3).<sup>17</sup> In columns (4)–(5) we add counterpart dummies for Christian, public official, and foreigner opponents (the omitted category is Muslim), as well as interactions with the treatment dummies (with and without individual demographic controls). At the bottom of the table, we show tests of differences between the two treatment effects, as well as of the joint relevance of the counterpart dummies and of the differences between them.

<Table 1 about here>

We observe a negative effect of the religious treatment on the probability of destruction in the Joy-of-destruction lab game. The magnitude of the effect is consistently 8–9 percentage points, across the main specifications (1)–(3). This treatment effect is significant at the 10 percent level for columns (1) and (2) and at the 5 percent level for the specification with all the controls (3). The same magnitudes appear when including counterpart dummies. This means that Hypothesis 1 in our paper is validated. However, we do not find any effects of the economic treatment on destruction in the game, contrary to Hypothesis 2 in our paper. These effects are indeed very close to zero in terms of magnitude, leading us to state that the effects of the religious and economic treatments are significantly different from each other (at the 5 or 10 percent level of statistical significance in the main specifications). When we add counterpart dummies and the interactions of

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in the household, years of education, years of education squared, dummy for Macua ethnicity, dummy for Mwani ethnicity, monthly expenditure, and ownership of assets (fridge, oven, car, TV, and radio).

<sup>17</sup> See previous note.

these variables with the treatments to the specification, we observe statistically significant differences when comparing Muslims to foreigners, as well as when comparing Christians to public officials and Christians to foreigners: facing foreigners and public officials in the game seems to increase the propensity to destroy the payoffs of opponents, relative to other types of opponents. These patterns are suggestive that Hypothesis 3 is partly true, although we do not find any significant interaction effects between the counterpart dummies and the treatments.

Table 2 analyzes beliefs about destruction by opponents in the main Muslim sample.<sup>18</sup> The specifications and tests we implement are the same as in Table 1.

<Table 2 about here>

From the analysis of Table 2, we find the effect of the religious treatment to be consistently negative, in line with effects we found for Table 1 and Hypothesis 1 above. However, this effect is never statistically significant at standard levels. Surprisingly, we find a strong positive effect of the economic treatment, ranging between 11 and 13 percentage points across specifications, which is significant at the 5 percent level in the case of the main specifications (1)–(3). This effect suggests that the economic treatment may have triggered an expectation of added economic competition, leading to more anti-social behavior from others, consistent with the theoretical effects of a resource bonanza (which was emphasized in the economic treatment). When we add counterpart dummies and the corresponding interaction terms with treatments, we find an expectation that foreigners will destroy endowments relative to Muslims – a difference of 9 percentage points, significant at the 10 percent confidence level. The difference between Christians and foreigners is statistically significant in the same direction, i.e., foreigners are expected to be more anti-social than Christians. This pattern is similar to the one we found in Table 1, and to the one proposed in Hypothesis 3. As before, we do not find any statistically significant interactions between the counterpart dummies and the two treatment variables.

The evidence in the Joy-of-destruction game allows us to conclude that the religious treatment was effective at decreasing the extent of anti-social behavior. This stands out as different from what we find for the economic treatment, which seems to yield no effects on anti-social behavior. In fact, in the opposite direction, when faced with the economic treatment, our main Muslim sample

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<sup>18</sup> The behavior of auxiliary samples in the Joy-of-destruction game is shown in Appendix D.

believes their counterparts will be more aggressive towards them. This may be due to an added sense of competition in line with the opportunities arising from the recent discovery of natural resources in the province of Cabo Delgado. We also find suggestive evidence that our main Muslim sample behaves in a more anti-social manner when facing public officials and foreigners, which is consistent with the recent violent attacks in the region.

### 3.2. *Survey measures*

In this section, we devote our attention to the outcome variables from our survey measures of information and attitudes. We focus on the main Muslim sample.

Table 3 shows the effects of the religious and economic treatments on a set of survey questions on information and attitudes. We follow the simplest specification we introduced above, i.e., specification (1). The dependent variables we employ concern the survey questions we described above in the section on measurement. They concern awareness about the discovery of natural gas, expectations about whether the discovery of natural gas is good for peace, the extent of trust in the state, the extent of interest in politics, and the extent of support for Islamic autocracy. All dependent variables except the first, which is a dummy variable, are standardized as z-scores, i.e., determined by taking the mean of the control group and dividing by the standard deviation in the same comparison group.

<Table 3 about here>

In addition to our two effects of interest, we also display at the bottom of the table the test of the difference between them. All our regressions include full controls as when they were employed in Tables 1 and 2.

Consistent with the fact that the natural gas discovery was mentioned in both the religious and economic treatments,<sup>19</sup> we find strong effects on awareness about that discovery: these are effects of 32 and 40 percentage points for the religious and economic treatments, respectively, with both

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<sup>19</sup> While the religious treatment countered the beliefs of radicalized and violent Islamists, who are using natural resources to attract attention, the economic treatment prominently featured the economic opportunities embedded in the gas operations through jobs and demand for goods/services supplied locally and demanded by international operators.

being statistically significant at the 1 percent level. Both treatments also impact significantly the perception that the discovery is good for peace in Mozambique: the magnitudes are 0.36 (religious) and 0.24 (economic) standard deviation units. Treatment effects for the remaining outcome variables in Table 3 are all significant at the 1 percent level of statistical confidence. Trust in the state increases for both the religious and economic treatments, by 0.24 and 0.25 standard deviation units, respectively. Turning to the interest Muslims in our main sample have in politics, we find negative effects of both treatments: the magnitudes of the coefficients are 0.44 and 0.3 standard deviation units. Finally, we find that both treatments decrease the level of support for an Islamic autocracy by 0.35 and 0.27 standard deviation units. We do not find statistically significant differences between the two treatment effects for the outcome variables in Table 3, with the exception of awareness about the discovery of natural gas, which is significantly higher for the economic treatment.

We conclude that both treatments increased awareness about natural resources in Cabo Delgado, raised optimism regarding the impact of natural resources on peace, improved trust in the state, decreased interest in politics, and diminished support for Islamic preponderance over democratic politics. These effects are consistent with the impact of the religious treatment on decreasing the extent of anti-social behavior that we observed for the Joy-of-destruction lab game (Hypothesis 1). They also suggest that the religious intervention was able to change beliefs and was not limited to an exercise of authority by religious leaders.<sup>20</sup> Although rising awareness about natural resources is consistent with the previous results of the economic treatment, the remaining effects of this intervention, namely on increasing trust and decreasing the support for an Islamic autocracy, seem to add a more positive tone to the effects of the economic treatment (in line with Hypothesis 2). An alternative interpretation in face of the null results on destruction in the game is that our survey measures were prone to social desirability bias.

#### **4. Concluding remarks**

In this paper, we follow two types of randomized initiatives sponsored by an Islamic authority in Northern Mozambique aimed at preventing conflict broadly construed. This is in a context where the discovery of substantial natural resources in the region has been accompanied by the emergence

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<sup>20</sup> When analyzing heterogeneous effects of the religious treatment by demographic and attitudinal variables (Appendix E), we find suggestive evidence that those least educated, employed, and most religious are driving some of the average treatment effects we observe.

of violence related to radicalized Muslims. The first initiative is a religious sensitization campaign calling for the adoption of standard, non-extremist Islam. The second is a training module on entrepreneurship, which also facilitates employment in the local labor market. We study a sample of young men recruited from mosques and focus our attention on the impact of the referred interventions in terms of anti-social behavior as measured in a Joy-of-destruction lab game. We also employ standard survey measures of attitudes. We find that the religious intervention decreased the prevalence of anti-social behavior measured in the lab game. Importantly, we do not find effects for the economic intervention, although it increased the belief that others will be aggressive, consistent with theories of the resource curse. We also observe that young Muslims become more optimistic, more trustful in state institutions, less interested in politics, and less supportive of extremism, when faced with moderate religious campaigning.

Although the results presented in this paper do not show that the interventions we followed prevented actual conflict, our study presents suggestive evidence that religious sensitization by Islamic authorities works in the direction of conflict prevention, through less anti-social behavior and less support for extremist views of Islam. The impact on conflict could be direct, if the campaign is implemented at scale and prevents specific individuals from being recruited as insurgents, but also indirect, through depriving violent Islamists of popular support (see Berman et al., 2018). For both channels, our sample in Pemba is informative. In any case, a campaign of the type we study can be inexpensive, particularly if one employs media channels for its dissemination.<sup>21</sup> Through higher trust in state institutions and lower interest in politics, the religious intervention we study also contributes to a lower level of politicization of Islam, hence countering the mixing of religion and politics, a central source of social tensions in many Muslim-majority countries.

Together with other recent evidence in the same setting (Armand et al., 2020), which shows that information given to the local communities averted actual conflict, this paper contributes to building a body of evidence on the important role of broad-based information campaigning in conflict prevention. This is particularly relevant to policy makers, whose first reaction, when faced with the emergence of violent Islamists, is often purely repressive of the focal points of aggression. This strategy has well-known risks in the longer run, especially of losing the support of moderate

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<sup>21</sup> Although the costs per participant of the religious intervention were 7USD, most of the costs were related to design (a fixed cost) and the physical implementation of the sessions. The same contents broadcasted through the media would hence entail very small costs per targeted individual.

local populations, as it is difficult to isolate the true origins of violent behavior. Reaching the communities with moderate information is not a substitute for guaranteeing security by force. However, as this paper helps to suggest, it is likely to be a crucial element of a balanced and effective strategy of conflict prevention.

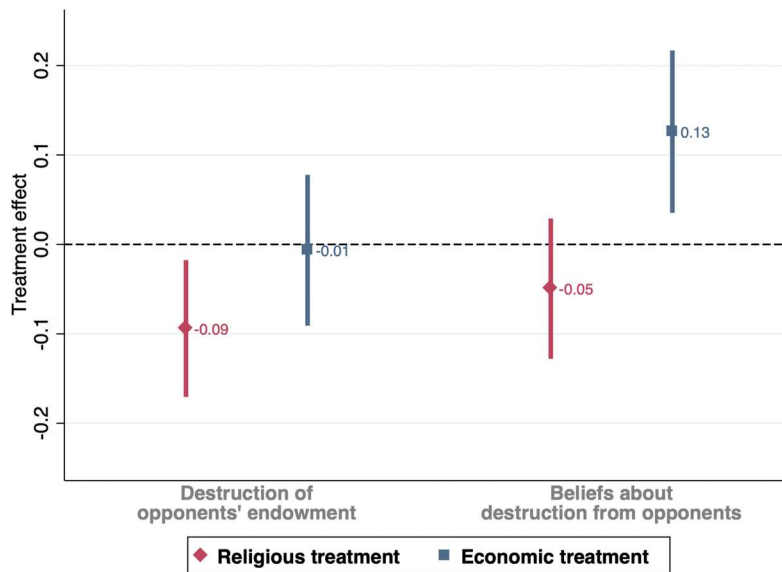
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**Figure 1: Treatment effects in the Joy-of-destruction game**



Notes: This graph shows the treatment effect estimates based on two OLS regressions following specification (1) as detailed in the paper. The dependent variable in the first regression ('Destruction in the lab game') is a dummy variable taking value 1 when the subject destroys the endowment of his partner in the Joy-of-destruction lab game. In the second regression ('Beliefs about destruction from opponents'), the dependent variable is a dummy variable taking value 1 when the subject believes his opponent will destroy the subject's endowment in the Joy-of-destruction lab game. We present the treatment effect of the religious treatment in red (diamonds) and of the economic treatment in blue (squares). Controls are order dummies, the lag between treatment and measurement, neighborhood dummies, and individual demographic variables. Demographic variables are: age, age squared, number of adults in the household, years of education, years of education squared, dummy for Macua ethnicity, dummy for Mwanu ethnicity, monthly expenditure, and ownership of assets (fridge, oven, car, TV, and radio). Confidence intervals are built using statistical significance at the 10 percent level, and standard errors are clustered at the individual level.

**Table 1: Joy-of-destruction - main results**

	Destruction of opponents' endowment				
	(1)	(2)	(3)	(4)	(5)
<b>Religious treatment</b>	<b>-0.075*</b>	<b>-0.075*</b>	<b>-0.094**</b>	<b>-0.077</b>	<b>-0.087</b>
	<b>(0.044)</b>	<b>(0.044)</b>	<b>(0.046)</b>	<b>(0.054)</b>	<b>(0.057)</b>
<b>Economic treatment</b>	<b>-0.002</b>	<b>-0.002</b>	<b>-0.007</b>	<b>0.035</b>	<b>0.030</b>
	<b>(0.049)</b>	<b>(0.049)</b>	<b>(0.051)</b>	<b>(0.059)</b>	<b>(0.061)</b>
Counterpart (omitted=Muslim)					
Christian				-0.017	-0.017
				(0.035)	(0.035)
Public official				0.069	0.069
				(0.046)	(0.046)
Foreigner				0.094*	0.094*
				(0.049)	(0.050)
Christian x religious treatment				0.012	0.012
				(0.046)	(0.047)
Public official x religious treatment				-0.084	-0.084
				(0.057)	(0.058)
Foreigner x religious treatment				-0.075	-0.075
				(0.065)	(0.066)
Christian x economic treatment				0.065	0.065
				(0.047)	(0.048)
Public official x economic treatment				-0.020	-0.020
				(0.061)	(0.062)
Foreigner x economic treatment				-0.073	-0.073
				(0.066)	(0.067)
Religious=economic (p-value)	0.087	0.087	0.048	0.043	0.03
Christian=0; official=0; foreigner=0 (p-value)				0.08	0.086
Christian=official (p-value)				0.051	0.054
Official=foreigner (p-value)				0.524	0.529
Christian=foreigner (p-value)				0.012	0.013
Number of observations	972	972	964	964	964
R-squared	0.008	0.008	0.077	0.021	0.083
Constant	0.191	0.190	1.145	0.379	1.116
Order dummies	N	Y	Y	Y	Y
Controls	N	N	Y	N	Y

Notes: This table shows OLS regressions using as dependent variable a dummy variable taking value 1 when the subject destroys the endowment of his partner in the Joy-of-destruction lab game. We are only considering the main sample of Muslim players in the experiment. We present the p-value for tests of five hypotheses. The first is for the equality of coefficients of treatments: religious=economic. Additional tests relate to coefficients of counterpart variables: we show results for jointly testing if the three coefficients of the counterpart dummies are equal to zero; then we show results for testing differences within each pair of counterparts. Specifications in columns (2)-(5) include controls for the order of the games. Specifications in columns (3) and (5) include controls. Controls are the lag between the end of the treatment and the measurement, neighbourhood dummies, and individual demographic variables. Demographic variables are: age, age squared, number of adults in the household, years of education, years of education squared, dummy for Macua ethnicity, dummy for Mwani ethnicity, monthly expenditure, and ownership of assets (fridge, oven, car, tv and radio). Standard errors are clustered at the individual level and presented in parenthesis. Levels of statistical significance: \* 0.1; \*\* 0.05; \*\*\* 0.01.

**Table 2: Joy-of-destruction - beliefs**

	<b>Beliefs about destruction from opponents</b>				
	(1)	(2)	(3)	(4)	(5)
<b>Religious treatment</b>	<b>-0.049</b>	<b>-0.049</b>	<b>-0.049</b>	<b>-0.076</b>	<b>-0.070</b>
	<b>(0.042)</b>	<b>(0.042)</b>	<b>(0.048)</b>	<b>(0.054)</b>	<b>(0.057)</b>
<b>Economic treatment</b>	<b>0.114**</b>	<b>0.114**</b>	<b>0.126**</b>	<b>0.105*</b>	<b>0.116*</b>
	<b>(0.053)</b>	<b>(0.053)</b>	<b>(0.055)</b>	<b>(0.061)</b>	<b>(0.064)</b>
Counterpart (omitted=Muslim)					
Christian				-0.041	-0.041
				(0.041)	(0.041)
Public official				0.024	0.024
				(0.049)	(0.050)
Foreigner				0.087*	0.087*
				(0.044)	(0.045)
Christian x religious treatment				0.085	0.085
				(0.052)	(0.053)
Public official x religious treatment				0.019	0.019
				(0.063)	(0.064)
Foreigner x religious treatment				-0.066	-0.066
				(0.059)	(0.060)
Christian x economic treatment				0.095	0.095
				(0.063)	(0.064)
Public official x economic treatment				0.005	0.005
				(0.063)	(0.064)
Foreigner x economic treatment				-0.019	-0.019
				(0.056)	(0.057)
Religious=economic (p-value)	0.001	0.001	0.001	0.003	0.002
Christian=0; official=0; foreigner=0 (p-value)				0.018	0.02
Christian=official (p-value)				0.172	0.177
Official=foreigner (p-value)				0.247	0.252
Christian=foreigner (p-value)				0.002	0.002
Number of observations	972	972	964	964	964
R-squared	0.030	0.032	0.079	0.042	0.085
Constant	0.176	0.157	1.077	0.338	1.068
Order dummies	N	Y	Y	Y	Y
Controls	N	N	Y	N	Y

Notes: This table shows OLS regressions using as dependent variable a dummy variable taking value 1 when the subject believes his opponent will destroy the subject's endowment in the Joy-of-destruction lab game. We are only considering the main sample of Muslim players in the experiment. We present the p-value for tests of five hypotheses. The first is for the equality of coefficients of treatments: religious=economic. Additional tests relate to coefficients of counterpart variables: we show results for jointly testing if the three coefficients of the counterpart dummies are equal to zero; then we show results for testing differences within each pair of counterparts. Specifications in columns (2)-(5) include controls for the order of the games. Specifications in columns (3) and (5) include controls. Controls are the lag between the end of the treatment and the measurement, neighbourhood dummies, and individual demographic variables. Demographic variables are: age, age squared, number of adults in the household, years of education, years of education squared, dummy for Macua ethnicity, dummy for Mwani ethnicity, monthly expenditure, and ownership of assets (fridge, oven, car, tv and radio). Standard errors are clustered at the individual level and presented in parenthesis. Levels of statistical significance: \* 0.1; \*\* 0.05; \*\*\* 0.01.

**Table 3: Survey attitudes**

	Discovery of natural gas		Trust in state	Interested in politics	Support for Islamic autocracy
	Heard about it	Good for peace			
	(1)	(2)	(3)	(4)	(5)
Religious treatment	0.317*** (0.024)	0.357*** (0.098)	0.234*** (0.078)	-0.436*** (0.103)	-0.349*** (0.084)
Economic treatment	0.403*** (0.023)	0.236** (0.095)	0.252*** (0.072)	-0.297*** (0.103)	-0.272*** (0.078)
Religious=economic (p-value)	0.000	0.144	0.807	0.111	0.346
Number of observations	241	196	237	201	235
R-squared	0.461	0.156	0.190	0.149	0.160
Constant	1.897	1.020	-2.741	-2.145	1.452

Notes: All dependent variables are presented in z-scores except column (1). The dependent variable in column (1) is a dummy variable taking value 1 when the subject heard about the discovery of natural gas. The dependent variable in column (2) is coded from a dummy variable taking value 1 when the subject agrees with the statement 'The discovery of natural gas is good for peace in Mozambique.' The dependent variable in column (3) is coded from the answer to the question 'How much do you trust the President of Mozambique?', on a scale of 0-3. The dependent variable in column (4) is coded from the answer to the question 'How interested are you in public affairs?', on a scale of 0-3. The dependent variable in column (5) is the mean level of agreement with the following three sentences, which are set on a scale of 1-5: 'Democracy goes against Islam,' 'Non-Muslims should have less rights than Muslims,' and 'There should be an Islamic government, without parties or elections.' For all the regressions in the table the coefficients we show correspond to the simple treatment variables. We are only considering the main sample of Muslim players in the experiment. Additional controls are the same as in Tables 1 and 2 and are included in all regressions. Standard errors are presented in parenthesis. Levels of statistical significance: \* 0.1; \*\* 0.05; \*\*\* 0.01.