PUTTING RELIGIOUS BIAS IN CONTEXT: HOW OFFLINE AND ONLINE CONTEXTS SHAPE RELIGIOUS BIAS IN ONLINE PROSOCIAL LENDING[1]

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Biases on online platforms pose a threat to social inclusion. We examine the influence of a novel source of bias in online philanthropic lending, namely that associated with religious differences. We first propose religion distance as a probabilistic measure of differences between pairs of individuals residing in different countries. We then incorporate this measure into a gravity model of trade to explain variation in country-to-country lending volumes. We further propose a set of contextual moderators that characterize individuals' offline (local) and online social contexts, which we argue combine to determine the influence of religion distance on lending activity. We empirically estimate our gravity model using data from Kiva.org, reflecting all lending actions that took place between 2006 and 2017. We demonstrate the negative and significant effect of religion distance on lending activity, over and above other established factors in the literature. Further, we demonstrate the moderating role of lenders' offline social context (diversity, social hostilities, and governmental favoritism of religion) on the aforementioned relationship to online lending behavior. Finally, we offer empirical evidence of the parallel role of online contextual factors, namely those related to community features offered by the Kiva platform (lending teams), which appear to amplify the role of religious bias. In particular, we show that religious team membership is a double-edged sword that has both favorable and unfavorable consequences, increasing lending in general but skewing said lending toward religiously similar borrowers. Our findings speak to the important frictions associated with religious differences in individual philanthropy; they point to the role of governmental policy vis-à-vis religious tolerance as a determinant of citizens' global philanthropic behavior, and they highlight design implications for online platforms with an eye toward managing religious bias.

Keywords: Religion, contextual factors, crowdfunding, prosocial lending, peer-to-peer lending

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[1] Corey Angst was the accepting senior editor for this paper. Ling Xue served as the associate editor.

Introduction ▬▬▬▬▬

Microfinance institutions have demonstrated the potential to lift people out of poverty (World Bank Report, 2013), and digital microfinance platforms, in particular, have facilitated billions of dollars in loans over the past two decades. Kiva.org—one such platform—is perhaps the best example, having raised $1.4B since 2005, helping borrowers pursue a variety of projects across 77 countries. Kiva is a prosocial lending platform wherein borrowers seek funding in small increments from individual lenders. Because the crowd decides which borrowers receive funding, funding outcomes will inherently reflect any social biases lenders may have (Burtch et al., 2014). Such biases, if present, are undesirable for platform operators and society because they can lead to inefficiencies in the market, i.e., a suboptimal allocation of resources, and because they pose a threat to social inclusion (Shane, 2009).

This work builds on prior literature that has documented various sources of in-group social biases in online philanthropic lending by exploring the role of religious differences. Prior work has documented religion's motivating role in philanthropy, generally (e.g., Saroglou et al., 2005), and on Kiva in particular (Liu et al., 2012). No prior work, however, has examined how *religious differences* between borrowers and lenders may influence online philanthropy—in particular, where religious differences are likely to be more prevalent (due to the global nature of the platform) and where platform features have the potential to enable or dispel such bias.

The role that religious differences may play in this context is characterized by a tension. On the one hand, prior research has proposed the idea of religious-motivated lending (Harrell, 2012). Religion may motivate prosociality because philanthropy is a core tenet of many religious faiths. On the other hand, social identity theory (Tajfel et al., 1979) suggests that lenders may utilize borrowers' religion as a basis for social categorization, employing religious membership as a heuristic for borrower evaluation. Further, prior work suggests that lenders may draw on these social categorizations as a basis for targeting, seeking to allocate their contributions toward favored in-groups (Pavlou et al., 2007; Liu et al., 2015).

Accordingly, the basic influence that religious differences may have on philanthropy is not immediately clear. While lenders with religious motivation may participate in Kiva to a greater degree (Liu et al., 2012), their lending actions have the potential to be more concentrated toward similar others, including those who exhibit similarity on the basis of religion. Given the general importance of religion in society (McCleary & Barro, 2006), there is a notable dearth of

research on how religious differences may influence digitally mediated peer interactions. Our work addresses this gap, particularly in online philanthropy (Liu et al., 2012).

Beyond frictions attributable to persistent religious differences, several aspects of an individual's context may combine to determine the role of religious differences in their decisions about where and with whom to transact (Weber, 2004). The *interactional view of behavior* suggests that behavior is a result of the multidirectional relationship between the characteristics of a person and their situation (i.e., Religion × Sociopolitical macrolevel factors or Religion × Online factors; Endler & Magnusson, 1976). In online philanthropy, contextual factors like social hostilities, diversity of the local population, state policies regarding religion, etc., have the potential to influence a lender's behavior. Ongoing increases in the prevalence of religiously motivated social hostilities in many countries are particularly notable in this regard (Pew Research Center, 2019). Beyond the local physical context, a lender's online (digital) context also has the potential to influence perceptions and behavior. For example, the availability of features that enable social group formation, such as Kiva lending teams, may serve to enhance social identity mechanisms (Chen et al., 2017). Broadly, however, whether and how online and offline contexts moderate the role of religious differences in online philanthropy has not been explored previously. We address these gaps here, pursuing the following two research questions:

RQ1: *What effect do religious differences have on rates of peer-to-peer prosocial lending?*

RQ2: *How and to what degree is the effect of religious differences moderated by offline and online contextual factors?*

We draw on data from Kiva.org to construct a panel of lender-borrower country pairs, capturing annual lending activity between each lender and borrower location, in tandem with a measure of religion distance between each pair. We introduce the novel measure of *religion distance*, based on public data capturing countries' religious compositions from the Association of Religion Data Archives (ARDA).[2] Our measure reflects the probability that a random pair of individuals (one drawn from each of two countries) will ascribe to different religions. Using the ARDA dataset, we similarly incorporate a measure of religious diversity, reflecting the probability that a random pair of individuals (drawn from the same country) will ascribe to different religions. We also incorporate time-varying, contextual measures of religious freedom in borrower and lender countries based on recent data constructed by Pew,[3] including yearly, location-specific measures of governmental favoritism

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[2] https://www.thearda.com/

[3] http://www.pewresearch.org

of religion, and religiously motivated social hostilities. We supplement the panel with Kiva religious team membership, reflecting the time-varying proportion of lenders with religious team membership from each lender country. Lastly, we supplement our data with several other publicly available country-pair differences measures that have been examined in past work, including measures of geographic distance, cultural differences, and GDP differentials.

To evaluate our hypotheses, we estimate a set of gravity models, incorporating our measure of religion distance, as well as the other various difference measures (Guiso et al., 2006; Hortacsu et al., 2009; Burch et al., 2014). Our findings provide evidence that religion distance has a significant negative effect on lending activity, one that manifests over and above previously established factors. Considering the offline context, we demonstrate that (1) the negative effect of religion distance is amplified in the presence of religiously motivated social hostilities in the lender's or borrower's country, (2) lenders who reside in countries characterized by greater religious diversity exhibit weaker religious biases, and (3) lenders who reside in countries wherein the government exhibits religious favoritism demonstrate greater religious biases. Finally, considering online context, namely online community features in the form of Kiva lending teams, we demonstrate additional moderating effects. We present a series of results indicating that although membership in Kiva communities (i.e., Kiva Teams) appears to increase lending, consistent with past work (Ai et al., 2016), it simultaneously skews lending toward religiously similar borrowers.

Our work contributes to theory and practice in several ways. First, we empirically examine the influence of religion distance on online, peer-to-peer economic exchange. Several prior studies have explored how various social identity facets may influence individuals' digitally mediated peer interactions. Aspects of social identity that have been examined include location (Lin & Viswanathan, 2016), race (Edelman et al., 2017), culture (Burch et al., 2014), political ideology (Mosleh et al., 2021), and gender (Greenberg & Mollick, 2015). We contribute to this research stream by exploring the role of religion. Notably, despite a relative lack of prior empirical research on religion, theoretical work has shown the increasing importance of religion in economic development (McCleary & Barro, 2003; North & Gwin, 2004; Grim & Finke, 2006). Second, we consider an interactional view of bias deriving from religious differences, highlighting that users' preferences can be determined in part by contextual factors. The vast majority of prior peer-to-peer lending research has focused on individual-level differences as drivers of lending behavior; in contrast, we highlight the impact of contextual factors that can amplify or attenuate the salience of individual differences. Third, we extend the interactional view of behavior theory to the online context, showing that online community design features can potentially influence the manifestation of social biases. Previous studies have found many favorable consequences of establishing online communities for platform businesses, e.g., platform growth and value-based content creation (Blanchard & Markus, 2004; Chua et al., 2007; Ren et al., 2012; Faraj et al., 2015; Ai et al., 2016). Here, we identify unintended negative consequences of Kiva communities by showing that they can exacerbate religious biases.

Literature Review

Many digital platforms facilitate peer-to-peer transactions and link geographically separated individuals. Past work in information systems has discussed the potential of digital platforms to facilitate either balkanization or integration (Van Alstyne & Brynjolfsson, 2005). The potential for integration derives from the fact that technology enables global interconnectivity and trade by breaking down physical barriers. At the same time, the potential for fracture derives from the technology's affordances to curate one's digital experience and interactions in ways that conform to and even amplify existing beliefs and biases. In line with these possibilities, several studies have explored how various sources of identity-based biases (e.g., race, culture, political ideology, gender, and home biases) may influence individuals' digitally mediated peer interactions (Burch et al., 2014; Greenberg & Mollick, 2015; Lin & Viswanathan, 2016; Edelman et al., 2017; Mosleh et al., 2021). Religion is an equally important dimension of identity that has received relatively less attention in that body of research, despite receiving greater attention from scholars in other disciplines in recent years, such as economics (Karlan et al., 2017; Haliassos et al., 2017; Acquisti & Fong, 2020; Sutanto et al., 2021).

While individuals' perception as belonging to an out-group (or other groups) may be based on a broad range of identity characteristics, religion's role in digitally mediated peer interactions and social biases is unique. As with other features that contribute to social identity, religion forms the basis of in-group and out-group categorizations (Batson et al., 1993; Preston et al., 2010). At the same time, religion is a unique aspect of social identity in that key tenets of most major religions include empathy, understanding, and inclusion (Coward, 1986). To the extent that religiosity forms a basis for one's social identity, one should be motivated to overcome out-group biases. Thus, in considering religion as a basis for social identity, its ultimate influence on the manifestation of bias is relatively unclear in that it is subject to tension.

Religion is also a unique aspect of social identity because it is frequently the subject of governmental policy and regulation. As reported by the Pew Research Center (2017), half of the world's countries have specific opinions about religion, favoring or limiting a particular religion's practice. Accordingly, religious membership is often made salient to citizens of a particular country due to the strident focus and attention it receives as a matter of policy. Research has shown that state-religion relationships and religiously motivated violence influence the manifestation of religiosity and religious bias (e.g., Johnson et al., 2012; Driessen, 2014). Emotions experienced in specific encounters may be evoked when an out-group violates in-group norms or when an out-group is perceived to accrue unjust benefits, e.g., from governmental programs (Hewstone et al., 2002). Such emotions can be translated into fear, hatred, disgust, or threat, which shape the perceptions of the out-group and action tendencies (Smith, 1993; Mackie et al., 2000). The diversity of one's neighbors is another element of one's offline context that may shape the salience of religion and the extent of religiosity. Local diversity may not directly affect someone's religious identity; however, it may foster a superordinate identity through social interactions with diverse others that erode differences between the in-group and out-group (Stolle et al., 2008).

Online social behavior often mirrors offline behavior, being a product of the individual's social identity. Just as online behavior may reflect offline contextual factors, it may also be shaped by online contextual factors. That is, just as the offline political or social context may influence the salience of particular elements of social identity, e.g., shaping perceptions about nonbelievers (Helland, 2007; Campbell, 2010; Campbell, 2013), so too may the design of an online platform's policies and features influence social biases. Several scholars in the IS literature have discussed the impact of digital context on users' behavior (Wu & Lederer, 2009; Dou et al., 2010). By highlighting certain forms of information or by enabling certain types of social interaction, e.g., group formation, online platforms have the potential to amplify or attenuate identity-based biases.

Fundamental to this developing stream of literature is the assumption that contextual factors contribute to individuals' preferences. This assumption has been validated in various studies dealing with environmental scanning for enhancing organizations' management and strategy (c.f., Huber, 1991; Deresky, 2000; Lau et al., 2012). For example, in organization research, studies assess the political, economic, social, and technological (PEST analysis) context as major external factors influencing organizations' operations.

Based on the above discussion, we argue that any examination of social identity's role in digitally mediated peer interactions should incorporate religious identity, considering how it may

shape peer interactions online, and what moderating role participants' offline and online context may play. In the next section, we develop a series of hypotheses based on the interactional view of the behavior (e.g., Endler & Magnusson, 1976) to focus on the contextual forces that shape religiously motivated behavior in online prosocial lending. Notably, among all external forces, economic considerations have been studied previously at length (e.g., Galak et al., 2011; Agrawal et al., 2014; Belleflamme et al., 2014; Burtch et al., 2014) and thus are not the focus of this work. That said, we account for economic context via controls for GDP differentials.

Hypothesis Development

In-Group Preferences in Prosocial Peer-to-Peer Lending

Our first hypothesis derives from the previously established role of in-group preferences in online philanthropic lending. The extant literature has shown that users on online platforms exhibit different behaviors based on proximate identities. Studies show that lenders on the Kiva platform prefer culturally similar and geographically proximate borrowers (Burtch et al., 2014). Kiva lenders are also more likely to join lending teams based on geographic location similarities, and, upon joining a team, lenders contribute to more loans (Ai et al., 2016). These studies, along with other research (e.g., Lin & Viswanathan, 2016; Kanat et al., 2018), suggest that participants on online platforms exhibit preferences for similar groups. Various studies on religion have also shown that while religiosity increases unconditional love for fellow human beings (Coward, 1986), it is also linked to biases (Batson et al., 1993), such that religiously motivated "prosocial" actions can be undertaken, at least to some extent, as a means of supporting one's own religious in-group, at the expense of the out-group, e.g., nonbelievers (Hunsberger & Jackson, 2005; Preston et al., 2010). Considering religion as a social in-group, we predict a *religion prosociality* link (Harrell, 2012) on Kiva. That is, we predict that religion will serve as a source of in-group preference in lending activity on Kiva, yielding the following formal hypothesis:

H1 (religion effect): *Religion distance between a lender and a borrower country will have a negative effect on lending volumes.*

Religion Distance and Social Hostilities

It is generally accepted that violence, even temporarily, affects individuals' preferences, such as their altruistic priorities (Tedeschi & Calhoun, 2004; Voors et al., 2012). The

psychology literature has shown that victims of a conflict have a higher level of altruistic behavior toward their neighbors (Voors et al., 2012). There is also evidence of a positive association between social cohesion and conflict intensity (Bellows & Miguel, 2009); as such, "conflict and social solidarity are mutually re-enforcing" (Murphy, 1957, p. 1018). On the one hand, conflict enhances the social integration of an in-group and, on the other hand, the group's solidarity requires collective action in favor of in-group members and against an out-group. As a result, conflict with an out-group increases cohesion between in-group members (Coser, 1998). Considering religion as a uniquely powerful force shaping individuals' social groups (Ysseldyk et al., 2010), we therefore expect a shift in the religion prosociality link (i.e., religious philanthropy) with a rise in religiously motivated social hostilities.

Conflict theory (Bobo, 1988) suggests that social hostilities raise individuals' concerns about the welfare and shared interests of in-group members (Bloom et al., 2014). An out-group that violates in-group norms affects individuals by evoking emotions like disgust and anger, shifting preferences and action tendencies (Smith, 1993; Mackie et al., 2000). While weaker emotions like disgust only entail avoidance, stronger emotions like contempt and anger may lead to a movement that harms the out-group (Brewer, 2001; Hewstone, 2015). The emergent emotions due to social hostilities decrease individuals' self-esteem, which, in turn, leads to more salient group boundaries (Abrams & Hogg, 1990). Conflicts with out-groups threaten the in-group's self esteem (Turner, 1982). Therefore, in the presence of social conflicts, individuals are likely to avoid out-groups and prioritize in-group members.

The impacts of social conflict on intergroup relations are well documented. For example, a great deal of literature related to religion began to focus on the boundaries between Christianity and Islam following the terrorist attacks of September 11, 2001, i.e., 9/11. Analyzing evangelical books, Cimino (2005) documented a significant shift in the content of books around the time of the 9/11 attacks, emphasizing the greater truth of Christianity relative to Islam in the years following. Religious studies also tend to draw a sharper line between Islam and Christianity after 9/11 (Cimino, 2005). Haddad (2007) discusses how the hijab (headscarf) became the symbol of Muslim authenticity and pride in the United States following 9/11, particularly among second-generation Muslims. Given these sorts of dynamics, we might expect that religious hostilities in a particular country will promote higher cohesion among each religion's group members at the out-group's

expense. As such, lenders who have encountered a religiously motivated conflict in their home country may be expected to increase their focus on support for their in-group (same religion). When social hostilities involving religion increase in a borrower country, we anticipate a similar result. Again, following conflict theory, social hostilities raise individuals' concerns about the welfare and shared interests of in-group members (Bloom et al., 2014). As a result, when religiously motivated hostilities occur in a borrower's country, lenders from out-group religions may sympathize with the opposing group, drawing their help away from the country, whereas lenders from in-group religions may shift their help toward that location. Given this expectation, we propose our next formal hypotheses:

H2a (moderating effect of social hostilities in a lender country): *Social hostilities in a lender country will amplify the negative effects of religion distance on lending volumes.*

H2b (moderating effect of social hostilities in a borrower country): *Social hostilities in a borrower country will amplify the negative effects of religion distance on lending volumes.*

Unity in Diversity

Unity, the successful integration of social groups with different or opposite values, can be achieved by emphasizing a diverse society's common identity (Huo & Molina, 2006). Diversity facilitates attitudes that value subgroup identities (or even minorities) and is consistent with a unified society's goal. Related to such notions, research in psychology has addressed the *contact hypothesis*, which suggests that intergroup biases, under certain conditions, can be reduced when individuals from different groups interact with each other socially (Gaertner et al., 1994). For example, cultural diversity within a country has been shown to reduce employers' home bias in online labor markets (Liang et al., 2018). Notably, the above notions are consistent with recent findings reported by Pew, that the least diverse countries tend to have the highest rates of religious violence.[4]

Religious diversity, the interconnection between individuals of one religion and those of other religions, may lead to greater religious tolerance and broader social membership (unity), reducing religious identity (Ben-Ner et al., 2009). Indeed, social ties with out-groups in a diverse neighborhood overcome threat perceptions and foster greater trust between social groups (Stolle et al., 2008). In this sense, diversity can be an important force to build trust that transcends group boundaries (Stolle et

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[4] https://www.pewforum.org/2014/01/14/religious-hostilities-reach-six-year-high/ and http://economicsandpeace.org/wp-content/uploads/2015/06/Peace-and-Religion-Report.pdf

al., 2008). Notably, a deep level of interpersonal relationship will be achieved when different subgroups are equal partners in a community (Huo & Molina, 2006); that is when there is a higher interaction with religious out-groups (Ben-Ner et al., 2009). Diversity may also increase awareness and recognition through a dual identity process—i.e., a combination of subgroup and superordinate identities (Dovidio et al., 2009; Verkuyten & Yogeeswaran, 2017). In particular, minority group members in society prefer dual identity, acknowledging their differences in the context of a superordinate identity (Dovidio et al., 2009). Raising the level of dual identity between members of society may also reduce out-group avoidance and in-group favoritism. These mechanisms, in aggregate, change the way people process social information about out-group members and consequently eliminate ignorance about out-group members and the feeling of intergroup anxiety (Gaertner et al., 1994).

Thus, based on the above discussion, lenders from countries with high religious diversity may draw their attention away from religion when narrowing down their lending choices. We argue here that religious diversity in a lender country should similarly alleviate in-group favoritism and opposition toward out-groups in online prosociality (out-group avoidance). We hypothesize that higher religious diversity within a lender country will attenuate the effects of intercountry religion distance. More formally:

H3 (moderating effect of religious diversity in a lender country): *Religious diversity in a lender country will attenuate the negative effects of religion distance on lending volumes.*

State-Religion Relations

The state-religion relationship continues to play an active role in state economic development, international relations and trade, and human conflict by fostering honesty and hospitality toward states that favor the same religion or by disputing disagreements to reduce the severity of conflicts among countries with a religious orientation (McCleary & Barro, 2006; Henne, 2012). Similarly, state favoritism of a religion can influence locals' online behavior and, in particular, their online philanthropy. Religious favoritism is defined as "subsidies, privileges, support, or favorable sanctions provided by the state to a select religion or a small group of religions" without necessarily opposing any religious groups or minorities (Grim & Finke, 2006, p. 5). At one end of the

spectrum of religious favoritism, political authorities attempt to co-opt the social control developed by religious organizations. At the other extreme (the secular end of the spectrum), political authorities impose secular authority and marginalize religious leaders from public life (Htun & Weldon, 2015). For example, Iran and the United Kingdom have an official state religion and offer group benefits that are not available to other religions; Turkey and Italy do not officially endorse any religion but favor religions by granting financial or legal benefits; the United States and Brazil have explicitly secular constitutions; and, China is hostile to religion and makes it hard for any faith group to freely practice (Pew Research Center, 2017). Variation in the institutionalization of religious favoritism manifests from historical state-building patterns and has been shown to impact church attendance, volunteering, and the level of religiosity in general (Driessen, 2014; Htun & Weldon, 2015).

Prior literature has indicated that religious favoritism is positively correlated with the level of religiosity within society. Religiosity is not only measured by the proportion of religious citizens but also by the level of their aversion to secularization (Driessen, 2014). There are different mechanisms through which favoritism of religion may impact religiosity and inter-religious relations. Religious entities in countries with a high level of religious favoritism coordinate welfare activities (such as elderly care and charity for the poor) that build trust, religious adherence, and increased religiosity. Such welfare activities increase the level of religiosity and church attendance since welfare goods cannot be obtained from secular sources. In contrast, governmental welfare crowds out church attendance (Chen & Lind, 2007). Further, the level of religiosity in society also tends to be associated with a higher level of in-group favoritism and out-group avoidance (Johnson et al., 2012). For example, religious fundamentalists and individuals with intrinsic religiosity[5] exhibit higher levels of religious bias (Altemeyer & Hunsberger, 1992; Kirkpatrick, 1993). In summary, we expect that lenders from countries exhibiting a higher level of religious favoritism will be more likely to prefer borrowers who support the same religion. Hence, we present our next formal hypothesis as follows[6]:

H4 (moderating effect of religious favoritism in a lender country): *Religious favoritism in a lender country will amplify the negative effects of religion distance on lending volumes.*

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[5] Intrinsic religious orientation is an ultimate, rather than instrumental, religious motivation (Hoge 1972). Individuals having an intrinsic religious orientation sincerely believe in a religion and all of its teachings; they attempt to live their life in accordance with their religion's teachings. Individuals with an extrinsic religious orientation, on the other hand, look at religion as a means to an end.

[6] It is worth noting that the state-religion relationship disaggregates into two dimensions of favoritism and restriction (c.f., Grim & Finke 2006; Driessen 2010; Htun & Weldon 2015). There is little consensus in the literature about the impact of governmental restrictions on religiosity (for more information, see Norris & Inglehart, 2011). Given this, we refrain here from studying the implications of governmental restrictions on religion for online prosociality.

Religion Distance and Online Community Features

A growing number of online platforms enable the creation of online communities, with little platform control over the community's social interactions (Faraj et al., 2015). On Kiva, communities form lending teams, wherein self-organized groups of lenders with common interests coordinate their lending. Researchers have found many favorable consequences of such communities, e.g., on knowledge creation and creating value-based content (Tajfel et al., 1979; Blanchard & Markus, 2004; Chua et al., 2007; Ren et al., 2012; Faraj et al., 2015). Further, research has shown that Kiva lending teams, in particular, drive platform growth and increase lender participation (Ai et al., 2016). However, to date, prior literature has overlooked the potentially unfavorable consequences of these teams insofar as they may amplify social categorization and identity-based biases.

Based on *groupthink theory*, a team of like-minded individuals may make suboptimal decisions as a result of group membership; social influence from other group members can deteriorate efficient search, reality testing, mental efficiency, moral judgment, and the appraisal of information (Turner & Pratkanis, 1998; Lorenz et al., 2011). This can occur because team membership may heighten social identity salience, driving conformity to identity prototypes, e.g., behavioral role models within the social group (Hogg & Reid, 2006), and amplify the salience of in-group out-group distinctions (Turner, 1981). On Kiva, a large portion of active lending teams is formed on the basis of shared religion. Digital interaction between team members sharing a common religion may lead to increases in religion-based in-group bias, causing an increase in lending toward borrowers of the same religion at the expense of out-group borrowers of different religions (Tajfel et al., 1979). We thus expect that a lender country with a greater number of lenders participating in religious teams will exhibit a higher degree of support for borrowers of the same religion; that is, we hypothesize that a higher number of lenders having religious team membership within a lender country will amplify the previously hypothesized effect of intercountry religion distance. More formally:

H5 (moderating effect of religious team membership in a lender country): *Religious team membership in a lender country will amplify the negative effects of religion distance on lending volumes.*

Figure 1 summarizes our hypotheses with the predicted direction in parentheses.

Study Context

Kiva is an international philanthropic crowdfunding platform founded in 2005. Microfinance institutions (MFIs) serve as mediators between borrowers and the Kiva platform, operating as Kiva's partners on the ground in borrower countries and facilitating all loan transactions. MFIs handle the required correspondence to post the loan on the Kiva platform, distribute funded money to borrowers, and then collect money from borrowers to repay loans. Lenders on Kiva supply funds to borrowers in increments of $25. Lenders supply funds without any expectation of earning interest on the loans; however, borrowers pay interest to the MFIs to help cover expenses related to managing the loan (typically 2% of the loan amount). The Kiva platform itself subsists off philanthropic grants and donations and does not earn revenue from lenders or borrowers. Borrower requests on Kiva are filled only if the crowd covers the entire loan; that is, Kiva is an all-or-nothing platform.

There are several noteworthy points related to MFIs. First, in practice, most MFIs use their available funds to distribute money to borrowers before posting their loan requests on Kiva. However, from a lender's perspective, they are funding the individual borrower request; thus, this inverted sequence by which loans are first supplied on the ground and then backfilled on Kiva should not have a meaningful effect on Kiva lenders' selection of borrowers. Second, some MFIs operating in Islamic countries do not charge their borrowers any interest because usury is prohibited under Shariah law. This distinction may amplify in-group religious preferences among Muslim lenders, in particular, by construction. Third, some borrowers in the United States can request loans directly from the platform without using an MFI. Although this may influence lenders' preference for borrowers from the U.S., our estimations will eventually incorporate borrower country dummies. Fourth, it is perhaps worth noting that not all borrowers speak English. Although borrower requests that exhibit lower-quality written English may be judged less credible (Lev-Ari & Keysar, 2010), Kiva operates solely in English, employing expert volunteers to translate all borrower requests written in other languages into English. As such, spoken language differences should not play a significant role. That said, to rule out the possible confounding impact of language, we did eventually employ a robustness check in our empirical analysis, controlling for *common native language* between lender and borrower countries; we found consistent results.
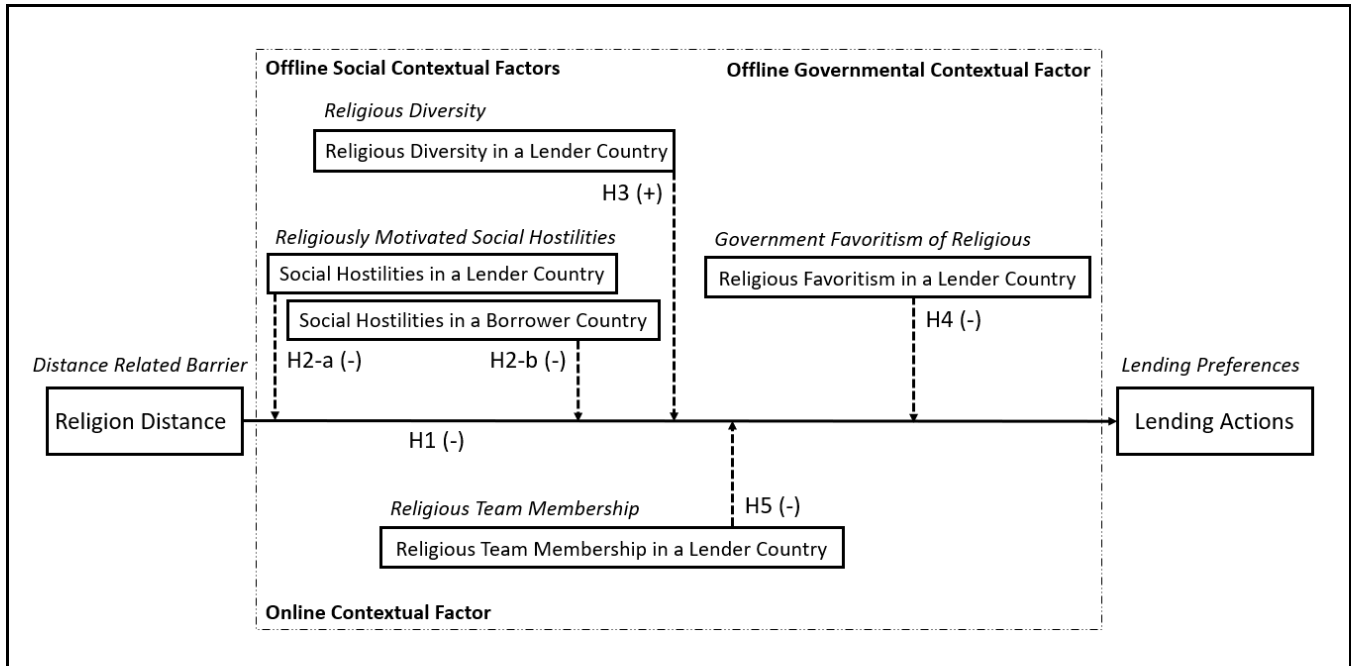
Figure 1. Hypotheses (Direction of Effects in Parentheses)

Data

We began by retrieving Kiva's published lending data via Kiva's public API. Each observation in the raw (unaggregated) dataset represents a lending action between a particular lender and a particular borrower. The raw data includes more than 26 million such observations. We aggregated these lending actions to the level of *lending country-borrowing country pairs per year* and aggregated our data to the level of *country-country yearly pairs* for two reasons. First, our explanatory variables of interest are at the country level. Second, any simplifications for users' religion would be difficult to justify and interpret. Blum and Goldfarb (2006) and Burtch et al. (2014) speak to similar measurement issues as a rationale for aggregating their individual discrete choice data to bilateral country-to-country counts. In our final dataset, the outcome of interest is the count of lending actions between directed (asymmetric) pairs of countries in each year. For pairs of countries with no lending actions observed in a given year, we constructed an observation that we populated with a zero value. We combined the aggregated Kiva dataset with our constructed measures of religion distance between countries, as well as other country-to-country measures obtained from external sources. In the final dataset, the variables of interest are *religion distance*, *social hostilities* indices in lender and borrower countries, as well as *religious diversity*, *religious favoritism,* and *religious team membership* in lender countries.

Independent Variables

Religion distance and religious diversity: The independent variable of interest is religion distance in the first set of analyses. *Religion distance* refers to religious dissimilarities between pairs of countries. This measure is calculated as the probability (ranging from 0-1) that a pair of people drawn randomly from the two countries will belong to different religion groups. Following Pew, we chose to focus on the seven major religion groups: Christians, Muslims, Hindus, Buddhists, Folk religions, Jews, and Unaffiliated.[7] We opted for higher-level groupings because using minor religion groups runs the risk of overstating religion distance by exploding the set of nominal alternatives. Second, lenders on the Kiva platform are unlikely to be aware of all minor religions in the world. As such, we argue that lenders are unlikely to be concerned with minor religions when making their lending choices. Hence, our main analysis is conducted at the level of major religions. As a robustness check, we used a measure of religion distance based on 29 minor religion

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[7] Religiously unaffiliated individuals, including atheists and agnostics, form a distinct ideology. Although these individuals do not have specific beliefs about God, they are homogeneous in that regard. This is particularly true of atheists, who do in fact have a common social identity that is quite strong

and well established (Smith 2011). For more details, we refer the reader to Pew's research on religiously unaffiliated individuals, available at https://www.pewforum.org/2012/12/18/global-religious-landscape-unaffiliated/

groups (e.g., Roman Catholics, Eastern Orthodox, Shia, Sunni, etc.) and found consistent results. Equation (1) shows the formula used to calculate *religion distance* between lender-borrower country pairs. Note that our measure is inspired by that proposed by Melitz and Toubal (2014) to operationalize bi-country linguistic differences.

$$ReligionDistance_{kj} = 1 - \sum_{i=1}^{7} Pr_{ik} \cdot Pr_{ij} \qquad (1)$$

Here, $ReligionDistance$ is the probability that a pair of random people from countries k and j will have a different religion. In this calculation, i indexes each of seven religious' groups, and Pr_{ik} is the probability that a random person in the country k follows religion i. We drew on the RCS-Dem dataset[8] from the Association of Religion Data Archives (ARDA) to construct the estimates of religion overlap (differences) (Brown & James, 2018). For our research, we only used yearly data from 2006 (Kiva's founding year) to 2015. We also used 2015 demographic data to proxy the religious demographics of countries in 2016.[9]

We utilized a similar approach to measure *religious diversity* within a country (Equation 2). We define a country's *religious diversity* as the probability of two random persons from a country being of different religions. This definition is preferable to simply counting the number of distinct religion groups within a country, which would fail to consider each group's proportional representation. Notably, a deep level of diversity will be achieved when there is a higher level of interactions with religious out-groups (Ben-Ner et al., 2009).

$$ReligiousDiversity_k = 1 - \sum_{i=1}^{7} (Pr_{ik})^2 \qquad (2)$$

i again indexes each of the seven religious' groups, and Pr_{ik} is the probability that a random person in the country k follows religion i (see Appendix A for a world religious diversity map).

Social hostilities: We drew on Pew data to construct our measures of religious persecution and hostilities. We collected nine years' worth of data from the Social Hostilities Index (SHI). Specifically, this measure was obtained from the Global Restrictions on Religion 2007-2016 dataset.[10] This index is reported each year for nearly 200 countries and self-governing territories around the world. The SHI is based on 13 survey questions capturing various ways individuals and social groups interfere with

individuals' religious beliefs and practices. It is important to note that SHI is neither entirely stable over time nor monotonic; that is, it varies within a country—for example, due to a regime change or transfer of power to a different political party (Grim, 2014).

Governmental favoritism of religion: We again draw on data from Pew to construct our measures of governmental favoritism of religion (Religious Favoritism Index, or RFI). RFI is a categorical variable indicating the level of lender countries' governmental favoritism in four categories: *official state religion*, *preferred religion*, *no official/preferred religion*, and *hostile to religion*. A few points are important to bear in mind regarding the RFI measure. First, unlike the SHI measure, religious favoritism is time-invariant and hence does not explain the variation of religious favoritism *within* a country over time. Second, we chose this measure over other measures of religious favoritism because it is relatively up to date and does not rely solely on a single source (Fox, 2011). We also collected the Governmental Restriction on Religion Index (GRI) measure from the Pew dataset to control other forms of state-religion relations, e.g., governmental harassment and restrictions against religious groups. To check whether the results are consistent using different measures of religious favoritism, we also ran robustness checks using the Government Favoritism Index drawn from Grim and Finke (2006) and the Government Favoritism of Religious Groups[11] measure drawn from the Pew Research Center (2019). Finally, we note that only a few countries are hostile to religion; among these, only China has had active lenders on the Kiva platform. To ensure the consistency of our results, we chose to only consider the first three categories of countries.

Religious team membership: To measure the rate of lenders with religious team membership, we began by extracting data on 40,000 lending teams via the Kiva API. This data included the teams' category, start date, description, members, and the members' join date since the first team was formed in 2008. We flagged a team as a religious team if it was in the "religious congregations" category or if it had religious description content, using Linguistic Inquiry and Word Count (LIWC)[12] text analysis. We manually verified the accuracy of this label for all of the largest religious teams. Also, we removed inactive teams, i.e., teams with average yearly lending of less than 0.1 per member or those with less than 20 members. Finally, we created a country-level measure of religious team membership,

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[8] http://thearda.com/Archive/Files/Downloads/RCSDEM2_DL.asp
[9] We had a choice to use several other data sources to predict the demographic of country religion groups. We chose to use ARDA dataset since it is checked for reliability on a random 5% sample from other religious datasets (e.g., CIA World Factbooks). Also, some other religious datasets like a survey published by the Pew Forum are neither systematized nor historical (c.f., Brown & James 2018).

[10] http://www.pewforum.org/dataset/global-restrictions-on-religion-2007-2016/
[11] This measure is a subcategory of GRI (from Pew Research Center, 2019) that is measured by computing the interitem correlations of five Pew survey questions using Stata command alpha.
[12] http://liwc.wpengine.com/

religious teams—i.e., the fraction of unique lenders with religious team membership from each lender country each year. Similarly, we created a country-level measure of nonreligious team membership, *nonreligious teams*—i.e., the fraction of unique lenders with nonreligious team membership from each lender country, in each year—to run a robustness check, controlling for nonreligious team membership (e.g., "businesses," "schools," and "families" categories).

Control Variables

Following prior literature (e.g., Blum and Goldfarb, 2006; Hortacsu et al., 2009; Burtch et al., 2014), in our gravity model, we controlled for variables that could potentially impact supply and demand forces between countries. In particular, we focused on *cultural distance*, *gross domestic product (GDP) differentials*, and *physical (geographic) distances* between lender and borrower countries. To measure *cultural distance*, we drew on data from the World Value Survey (WVS) Wave 6[13]; to measure the *physical distance* between pairs of countries, we drew on a dataset[14] constructed by Mayer and Zignago (2011) for their study of international trade. Additional data for missing geographic distances was supplemented using the Google Maps API.[15] We used the log of physical distance between countries, initially recorded in units of 1000 km. We drew on a yearly GDP dataset from The World Bank to calculate the log transformation of differences in GDP (in billions of dollars) between directed country pairs to measure GDP differentials. Finally, we included the log of the number of unique lenders and borrowers at the country-year level each year to control for demand and supply around loans in lender and borrower countries. Tables 1 and 2 present variables, data sources, descriptive statistics, and the correlation between variables.

Empirical Model ▬▬▬▬▬

We aggregated the lending data to an annual measure per lender country-borrower country pair between 2006 and 2017. Each country-country panel is thus uniquely identified by a pair of lender and borrower country IDs. Our primary analyses are based on a gravity equation, which relates lending activity to the volume of active lenders and borrowers in each respective country.

The so-called gravity model of trade is inspired by Newton's law of gravity. The gravitational force between two objects is proportional to the product of their masses and inversely proportional to the square of the distance between them (Anderson, 2011). Prior work in economics dealing with international trade has adopted an analogous formulation to explain trade relationships, postulating that bilateral trade volumes will vary in proportion to the size of two economies yet will vary inversely with the distance between them. Distance is explored in many forms throughout the literature on trade, such as spatial separation like physical distance, or other factors, e.g., cultural and linguistic differences, legal systems, colonial ties, and so on. Note that our model parallels those of Hortaçsu et al. (2009) and Burtch et al. (2014), where we assume lenders on the Kiva platform face a multinomial choice setup, in which available borrowers are represented as potential alternatives that the lender can choose from.[16]

Empirical Specification

We utilized Poisson regressions to model each year's lending actions among country pairs. In Equation (3), the outcome of interest is the count of lending actions from lenders in country *i* to borrowers in country *j* in year *t*. In this model, our variable of interest is the dyadic *religion distance* between country pairs each year. The model also incorporates dyadic measures for *cultural distance*, *physical distance*, and *GDP differential*. We also controlled for the number of active lenders from each lender country in each year (*NumberOfLenders*), the number of borrowers from each borrower country in each year (*NumberOfBorrowers*), lender country fixed effects (ϕ), borrower country fixed effects (δ), and year fixed effects (λ). Finally, ε denotes the error term. It should be noted that our measures for *cultural distance* and *physical distance* do not vary over time between a pair of countries; thus, the variation we exploit is cross-sectional.

$$LendingActions_{ijt} = \beta_0 + \beta_1 \cdot ReligiousDistance_{ijt} + \beta_2 \cdot CulturalDistance_{ij} + \beta_3 \cdot Log(PhysicalDistance_{ij}) + \beta_4 \cdot Log(GDPDifference_{ijt}) + \beta_5 \cdot Log(NumberOfLenders_{it}) + \beta_6 \cdot Log(NumberOfBorrowers_{jt}) + \phi_i + \delta_j + \lambda_t + \varepsilon_{ijt}$$

(3)

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[13] http://www.worldvaluessurvey.org/WVSContents.jsp?CMSID=Findings
[14] Adopted from http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=6
[15] https://developers.google.com/public-data/docs/canonical/countries_csv
[16] This formulation is a simplification of the lending scenario on Kiva, as the model assumes that loan requests are matched to lenders on a one-to-

one (mutually exclusive) basis, namely to the lender who holds the highest valuation. The results of our model will nonetheless generalize to multiple lenders per loan request if we treat loan requests as comprised of multiple "shares" that are allocated independently to lenders in the market.

Table 1. Definition of Variables and Data Sources		
Variable	**Definition of the variable**	**Data source**
Dependent variable	**Lending actions** (country-pair year observations) The count of lending actions from a lender country to a borrower country in each year (2006-2017).	Kiva crowdfunding platform (kiva.org)
Variables of interest	**Religion distance** (country-pair year observations) Probability (0-1) that a pair of people at random from two countries have a different religion group (2006-2016).	Measured using ARDA dataset (thearda.com)
	Lender SHI (country-year observations) Lender country social hostilities because of religion index (2007-2016).	Pew Research Center (pewresearch.org)
	Borrower SHI (country-year observations) Borrower country social hostilities because of religion index (2007-2016).	Pew Research Center (pewresearch.org)
	Religious diversity (country-year observations) Probability (0-1) that a pair of people at random from a country have a different religion group (2006-2016).	Measured using ARDA dataset (thearda.com)
	Lender RFI (country observations) Lender country governmental favoritism of religion measured in three categories (*official state religion*, *preferred religion*, and *no official/preferred religion*).	Pew Research Center (pewresearch.org)
	Religious teams (country-year observations) The fraction of unique lenders with religious team membership from each lender country (2008-2017).	Kiva crowdfunding platform (kiva.org)
Control Variables	**Cultural distance** (country-pair observations) Cultural distance between undirected pairs of countries (Survey data conducted between 2010 and 2014).	World Value Survey (WVS) wave 6 (worldvaluessurvey.org)
	Physical distance (country-pair observations) Measures of physical distance between undirected pairs of countries using the latitude and longitude of the most populated city of a country.	GeoDist dataset (cepii.fr) and Google API
	GDP difference (country-pair year observations) GDP difference between a lender country and a borrower country (2006-2016).	The World Bank (data.worldbank.org)
	Number of lenders (country-year observations) The number of unique lenders (IDs) from each lender country in each year (2006-2017).	Kiva crowdfunding platform (kiva.org)
	Number of borrowers (country-year observations) The number of unique borrowers (the number of requested loans) from each borrower country each year (2006-2017).	Kiva crowdfunding platform (kiva.org)

Table 2. Statistics Summary and Matrix of Correlation															
Variables	**Obs.**	**Mean**	**Std. dev.**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
(1) LA	74,272	298	3029	1											
(2) RD	56,525	0.64	0.307	-0.05	1										
(3) RV	56,525	0.38	0.225	0.07	0.28	1									
(4) LS	60,959	2.66	2.454	-0.01	0.02	-0.24	1								
(5) BS	67,713	3.01	2.69	-0.03	0.16	-0.01	0.03	1							
(6) RF	60,895	0.11	0.716	-0.15	-0.04	-0.33	0.43	0.02	1						
(7) RT	74,218	0.08	0.101	-0.03	-0.02	-0.1	0.11	0.01	0.29	1					
(8) CD	11,137	0.16	0.096	0.02	0.32	0.25	-0.17	0.13	-0.22	-0.06	1				
(9) PD	73,223	8.77	0.812	0.03	0.28	0.17	-0.18	-0.18	-0.21	-0.11	0.19	1			
(10) GD	57,798	9.86	0.325	0.17	0.03	0.09	0.01	0.04	-0.11	-0.04	0.04	-0.04	1		
(11) NL	74,272	4.25	2.365	0.35	0.12	0.36	-0.09	0.02	-0.46	-0.14	0.36	0.24	0.18	1	
(12) NB	73,387	10.2	1.333	0.09	-0.13	-0.11	0.07	-0.13	0.12	0.06	-0.14	0.01	-0.08	-0.19	1

Note: lending actions (LA), religion distance (RD), religious diversity (RV), lender SHI (LS), borrower SHI (BS), religious favoritism (RF), religious teams (RT), cultural distance (CD), physical distance (PD), Log-GDP difference (GD), Log-number of lenders (NL), and Log-number of borrowers (NB)

In Equation (4), our interest is the interaction term between *religion distance* and *contextual factors* to test Hypotheses 2, 3, 4, and 5. *ContextualFactors* indicate each of our four contextual macrolevel factors—social hostilities, religious diversity, and religious favoritism—and online religious team membership in lender country i in year t (we do not show all the interaction terms for the sake of simplicity). Notably, our measure of *religious favoritism* does not vary over the years; it captures the level of governmental favoritism of religion in lender country i.

$$LendingActions_{ijt} = \beta_0 + \beta_1 \cdot ReligiousDistance_{ijt} + \beta_2 \cdot ContextualFactors_{it} + \beta_3 \cdot ReligiousDistance_{ijt} \cdot ContextualFactors_{it} + \beta_4 \cdot CulturalDistance_{ij} + \beta_5 \cdot Log(PhysicalDistance_{ij}) + \beta_6 \cdot Log(GDPDifference_{ijt}) + \beta_7 \cdot Log(NumberOfLenders_{it}) + \beta_8 \cdot Log(NumberOfBorrowers_{jt}) + \phi_i + \delta_j + \lambda_t + \varepsilon_{ijt}$$

$$(4)$$

Results

Our focal model is the Poisson regression model with two high-dimensional fixed effects in all five tables, which we refer to as "Poisson" for the sake of simplicity. The interpretation of our main and interaction effect coefficients is similar to a Poisson-fixed effects panel regression (Wooldridge, 2015). We report robust standard errors clustered by directed country pairs. We employed a residual centering approach to test for moderating effects, which addresses potential multicollinearity between interaction terms and their constituent main effects (Lance, 1988). To implement residual centering, we first regressed the interaction terms on their constituent variables using OLS. We then included the residuals from that regression as the interaction term in our models (intuitively, the residual captures variation in the product of two variables that are not explained by variation in either individual, constituent variable). For example, in Table 4, the interaction variable *Religion distance × Lender SHI* is regressed against the individual constituent terms, *Religion distance* and *Lender SHI*. The residuals from that regression were then incorporated into our final regression in our models in Table 4, where the residual serves as our interaction term (*Religion distance × Lender SHI*).

Religion as a Distance Barrier in Online Prosocial Platforms

Columns 1, 2, 3, and 4 of Table 3 show that the results support the predicted impact of religion distance on lending actions between the borrower and lender countries (H1). In Column 1, the significant coefficient on religion distance ($p = 0.004$) indicates its negative association with the number of lending actions between lender and borrower countries. One standard deviation increase in religion distance between a lender country and a borrower country is associated with an 8.7% decrease in lending.

Robustness checks: To assess the stability of our finding for H1, we conducted additional robustness checks. For Column 2 (Table 3), we ran the same model as for Column 1, but we used minor religion groups for the measure of *religion distance*. Using data from The Correlates of War Project,[17] we recalculated Equation (1) to obtain a measure of *minor religion distance*. We used 29 minor religion groups, including Protestants, Roman Catholics, Eastern Orthodox, Shia, Sunni, Mahayana, Theravada, etc.[18] For Column 3, we used OLS estimation with the log of lending actions as the outcome. Finally, for Column 4, drawing on the GeoDist dataset,[19] we controlled for *common native language* (CNL). As mentioned earlier, while all loans on Kiva are translated into English, we controlled for CNL in our gravity model to capture confounding economic, cultural, and institutional determinants in our cross-country analyses (Melitz & Toubal, 2014). Moreover, our control variable, *cultural distance*, constructed based on WVS, only included 60 countries, significantly reducing the number of observations used in our main analysis. Running the robustness check using CNL overcame any possible confounding impact of WVS countries' selection bias on the association between religion distance and lenders' lending preferences.

Flat world null model robustness check: The evidence shown in our analysis for H1 is reliable under the *assumption* of the correct specification of the conditional mean, as explained by Silva and Tenreyro (2006). In Appendix B, we present a nonparametric analysis to evaluate the violation of that assumption, attempting to avoid any assumptions about the form of the relationship or the distribution of the dependent variable (Gotelli & Graves, 1996).

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[17] http://www.correlatesofwar.org/data-sets/world-religion-data/wrp-national-data-1/view

[18] The full list of all religion minor groups that we used for the measure of

minor religion distance is available in the World Religions Codebook Version 1.1.

[19] http://www.cepii.fr/cepii/en/bdd_modele/presentation.asp?id=6

Table 3. Religion Distance Regressions				
DV: Lending actions (LA)	**(1) Poisson LA**	**(2) Poisson LA**	**(3) OLS Log (LA +1)**	**(4) Poisson LA**
Religion distance	**-0.294*** (0.103)**		**-0.237*** (0.0494)**	**-0.328*** (0.0479)**
Minor religion distance		**-0.841*** (0.161)**		
Physical distance	-0.176*** (0.0281)	-0.174*** (0.0250)	-0.363*** (0.0300)	-0.132*** (0.0135)
Cultural distance	-0.399 (0.497)	-0.0173 (0.487)	0.0610 (0.209)	
Log (GDP difference)	0.608*** (0.0779)	0.569*** (0.0678)	0.108* (0.0635)	0.452*** (0.114)
Common native language				0.160** (0.0768)
Observations	8,769	9,135	8,769	44,771
Lender effects	YES	YES	YES	YES
Borrower effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES

Note: Clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

In particular, we conducted a degree-preserving network randomization test by randomizing Kiva lending transactions and calculating the distribution of *religion distance* in a randomized network. We then compared the observed distribution of religion distance in the true data against the distribution we might expect if religion distance were not driving lending decisions. Based on the result of this analysis, we reject the null hypothesis that religion distance is uncorrelated with lending actions on the Kiva platform (empirical *p*-value = 0.004). The methodological details and results of the network randomization test are provided in Appendix B.

Religious priming (evidence from Christmas): In our empirical analysis for H1, we were interested in the causal effect of religion distance on lending actions. However, in the absence of random assignment, the results may be confounded by differences in unobserved characteristics, such as similarities in countries' constitutions. To address this issue, we controlled for lenders' and borrowers' fixed effects, as well as observed characteristics suggested by the literature. This approach, however, still does not allow for causal effects identification. In order to rule out the confounding impact caused by factors such as culture, we employed a difference-in-differences (DID) design, where the Christmas holiday served as an exogenous shock, in that lenders do not have direct control over the event itself. Research has indicated that the Christmas holiday increases religious practices and has a priming effect on Christians' level of religiosity (Iannaccone & Everton, 2004). As a result, we show that while Christian

lenders increase their lending during the month of Christmas, such an increase in lending has a greater impact on lending to borrowers with proximate religion than distant religion. The methodological details and results of the DID model are provided in Appendix C.

Religiously Motivated Social Hostilities as a Mechanism to Boost Religion Distance

Columns 1, 2, 3 and 4 of Table 4 show the results, including robustness checks, of our models for H2. Our focal model in Column 1 yields estimates consistent with the anticipated moderating effects of religiously motivated social hostilities in a lender country (H2a) and a borrower country (H2b) on lending actions. We find that social hostilities in both lender and borrower countries significantly increase the negative impact of religion distance on lending actions. One standard deviation increase in religiously motivated social hostilities in a lender country (borrower country) increases the religious bias by 13.3% (16.6%), conditional on religion distance. The results are robust to an alternative OLS model (see Column 2). For Column 3, we conducted a robustness check using the number of *fatalities* from terrorist attacks as a proxy for SHI in lender and borrower countries.[20] Using the number of *fatalities* in borrower and lender countries, we found continued support for H2a but no support for H2b ($p = 0.23$). Finally, for Column 4, we used the one-year lag of SHI in our Poisson model. Again, the results for both H2a and H2b are robust in terms of coefficient direction and significance at the 10% level.

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[20] The literature demonstrates that religiously motivated issues, especially in recent decades, facilitate conflicts and terrorism across the globe

(Juergensmeyer 2005). Data Retrieved from https://ourworldindata.org/terrorism (available for 150 countries and territories).

Table 4. Religiously Motivated Social Hostilities				
DV: Lending actions (LA)	(1) Poisson LA	(2) OLS Log (LA +1)	(3) Poisson LA	(4) Poisson LA
Physical distance	-0.186*** (0.0284)	-0.369*** (0.0309)	-0.191*** (0.0333)	-0.188*** (0.0284)
Cultural distance	-0.207 (0.475)	0.165 (0.211)	-0.398 (0.613)	-0.239 (0.476)
Log (GDP difference)	0.584*** (0.0780)	0.105 (0.0641)	0.542*** (0.0862)	0.568*** (0.0799)
Religion distance	-0.306*** (0.0982)	-0.215*** (0.0488)	-0.612*** (0.166)	-0.303*** (0.0984)
Lender SHI	0.00295 (0.00491)	-0.00145 (0.00788)		
Borrower SHI	-0.000629 (0.00389)	-0.00518 (0.00764)		
Lag lender SHI				0.02*** (0.00501)
Lag borrower SHI				-0.0006 (0.00432)
Religion distance × Lender SHI	**-0.055*** (0.0186)**	**-0.058*** (0.0203)**		
Religion distance × Borrower SHI	**-0.065*** (0.0191)**	**-0.039** (0.0171)**		
Religion distance × Lag lender SHI				**-0.062*** (0.0188)**
Religion distance × Lag borrower SHI				**-0.058*** (0.0197)**
Lender fatality			-0.000277 (0.000187)	
Borrower fatality			-8.07e-06 (6.83e-06)	
Religion distance × Lender fatality			**-0.00088*** (0.000313)**	
Religion distance × Borrower fatality			**-2.06e-05 (2.59e-05)**	
Observations	8,697	8,697	4,973	8,395
Lender effects	YES	YES	YES	YES
Borrower effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES

Note: Clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Diversity as a Mechanism to Attenuate Religion Distance

We next consider the attenuating effect of *religious diversity* on the religion distance-lending relationship (H4). First, we delved into the cross-country heterogeneity of *religious diversity*, using Poisson and OLS models. In Column 1 (Table 5), the interaction term coefficient is positive and significant, such that a one standard deviation increase in religious diversity eliminates the negative effect of religion distance on lending**.** The estimate from the OLS regression in Column 2 is also positive, though statistically insignificant ($p = 0.21$). Together, these estimates provide partial evidence that *religious diversity* attenuates the negative effect of *religion distance*.

As an additional analysis, we considered substituting two distance-related barriers (*Religion distance × Physical distance*). Column 3 (Table 5), we provide evidence that the negative impact of religion distance decreases as the physical distance grows. As the physical distance increases, lenders' awareness of the borrower country's religious makeup is likely to reduce. As a result of ethnocentrism (Watson, 1993), individuals are more likely to assume that their own religion is the norm among other parties in the absence of information. Also, because of prominence bias (Baron & Szymanska, 2011), donors usually focus on a single most prominent attribute when donating. As such, the extreme physical distance may draw lender attention away from religion distance. This substitution effect is similar to the effect observed in Burtch et al. (2014).

Table 5. Religious Diversity, Substitution Effect, and Religiously Unaffiliated				
DV: Lending actions (LA)	(1) Poisson LA	(2) OLS Log (LA +1)	(3) Poisson LA	(4) Poisson LA
Physical distance	-0.175*** (0.0258)	-0.362*** (0.0297)	-0.187*** (0.0250)	-0.169*** (0.0255)
Cultural distance	-0.559 (0.509)	0.0319 (0.212)	-0.151 (0.461)	-0.506 (0.523)
Log (GDP difference)	0.612*** (0.0777)	0.108* (0.0637)	0.636*** (0.0687)	0.612*** (0.0778)
Religion distance	-0.570*** (0.108)	-0.222*** (0.0530)	-0.570*** (0.112)	-0.359*** (0.105)
Religious diversity	2.868* (1.591)	4.126*** (0.849)		
Religion distance × Religious diversity	**2.170*** (0.517)**	**0.311 (0.251)**		
Religion distance × Physical distance			**0.525*** (0.102)**	
Religion distance × Log (lender religiously unaffiliated)				**0.203** (0.0971)**
Observations	8,769	8,769	8,769	8,769
Lender effects	YES	YES	YES	YES
Borrower effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES

Note: Clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Finally, we ran a falsification test and examined how the percentage of religiously unaffiliated individuals, including atheists and agnostics, within a lender country influences the relationship between religion distance and lending actions. Here, we expected to observe weaker religious bias in the presence of more religiously unaffiliated individuals. Data drawn from the ARDA dataset indicates that the share of religiously unaffiliated lenders varies widely across different countries, comprising less than 0.1% of the population in 12 countries (e.g., Kenya and Afghanistan) but more than 30% in 9 countries (e.g., China and Netherlands). Column 4 (Table 5) provides evidence that the percentage of religiously unaffiliated individuals in a lender country attenuates the negative impact of religion distance on lending actions, as expected.[21]

Governmental Favoritism of Religion as a Mechanism to Boost Religion Distance

The combined dataset includes information on whether a lender country's government has an official state religion, a preferred religion, or no official/preferred religion. Considering these three categories, we ran two separate analyses with different levels of religious favoritism. First, we

examined whether lenders from countries with an official state religion or preferred religion have a higher level of religious bias than countries without an official/preferred religion (Table 6, Column 1). Second, we examined whether lenders from countries with an official state religion have a higher level of religious bias than all other countries (countries with a preferred religion or without an official/preferred religion) (Table 6, Column 2). As shown in Column 1, lenders from countries with an official state religion or preferred state religion have higher religious bias than lenders without a state or preferred religion. In Column 2, we observe that lenders from countries with an official state religion have a higher religious bias than lenders from other countries. In particular, lenders from a country with an official state religion (preferred state religion) tend to have 66% (37%) more religious bias than lenders from a country with no state or preferred religion. The results are robust to alternative religious favoritism measures from Grim and Finke (2006) in Column 3, and the Pew Research Center (2019) in Column 4. In Column 3, the Government Favoritism Index is a continuous variable, indicating the state's privileges awarded to religion or set of religions. In Column 4, the Government Favoritism Index is a continuous variable, indicating governmental support through funding for religious education, property, clergy, etc.

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[21] It is worth noting that atheists are not just "nonreligious"; they are "antireligious." In this sense, atheists are probably biased against all religions. Hence, we expect the moderating effect to be stronger for atheists than agnostics (i.e., those who neither believe nor disbelieve in God).

Unfortunately, we cannot further investigate this effect here since our dataset does not provide us with further information about the fraction of atheists and agnostics in the unaffiliated category.

Table 6. Religion-State Relations and Religiosity				
DV: Lending actions (LA)	(1) Poisson LA	(2) Poisson LA	(3) Poisson LA	(4) Poisson LA
Physical distance	-0.183*** (0.0283)	-0.178*** (0.0281)	-0.371*** (0.0511)	-0.193*** (0.0291)
Cultural distance	-0.226 (0.510)	-0.220 (0.509)	0.153 (0.481)	-0.177 (0.487)
Log (GDP difference)	0.605*** (0.0772)	0.613*** (0.0773)	0.0879 (0.102)	0.590*** (0.0763)
Religion distance	-0.463*** (0.0923)	-0.397*** (0.0955)	-0.562*** (0.105)	-0.511*** (0.101)
Lender GRI	-0.031** (0.0144)	-0.031** (0.0144)	-0.06*** (0.0161)	-0.029** (0.0146)
Religion distance × Official state religion	**-1.116*** (0.384)**	**-1.004*** (0.374)**		
Religion distance × Preferred state religions	**-0.473*** (0.136)**			
Religion distance × Government Favoritism Index			**-0.088*** (0.0245)**	**-0.403*** (0.0844)**
Observations	8,697	8,697	8,465	8,697
Lender effects	YES	YES	YES	YES
Borrower effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES

Note: Clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Religious Team Membership as a Mechanism to Boost Religion Distance

We created a *religious teams* variable, the fraction of unique lenders with religious team membership from each lender country each year, and incorporated it into our gravity model. In particular, we evaluated whether a greater number of lenders with religious team membership increases the negative impact of religion distance on the volume of lending actions (i.e., *Religion distance × Religious teams*). As we report in Table 7 (Column 1), the main effect of religious teams shows that higher levels of religious team membership within a lender country are associated with greater lending volumes. Further, the interaction term shows that such an increase in lending actions comes with a greater religious bias, suggesting that joining Kiva religious teams strengthens religious biases. We found that an increase of one standard deviation in religious team membership in a lender country increases the religious bias by 28.8%, conditional on religion distance. [22] The results are robust to an alternative OLS model (see Column 2). We further ran a robustness check by controlling for the fraction of lenders who belonged to nonreligious teams (Columns 3-4).

Religious priming (evidence from loan requests): The online context role is not limited to religious team membership and can be extended to include loan-level characteristics. In other words, incorporating or signaling religious information (e.g., the indication of religious identity) in loan requests can have a priming effect on the feelings and behavior of lenders, eliciting bias by raising the salience of out-group categorizations. To better understand this mechanism at the loan level, we ran two sets of subsample analyses, described in Appendix D. We first report four subsample analyses, corresponding to a 2×2 breakdown of lenders and loans based on lenders' religious team membership (vs. not) and borrower indications of religiosity in their loan requests (vs. not). Analyzing the effect of religious bias across the resulting subgroups shows that religion distance negatively impacts lending volumes most heavily when religion-oriented text appears in the loan description and when lenders belong to a religious lending team. This relationship is the weakest (though still negative) when a loan text has no religious orientation and lenders have no religious membership. Additionally, we examined whether religious biases are also more evident for certain loan categories, namely those most associated with religion (e.g., food, clothing, education), and weaker for others (e.g., manufacturing, services).

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[22] As a robustness check, we ran an alternative model to investigate the relationship between religious team membership and the degree of religious bias in lending at the individual lender level. We find evidence that joining a religious team decreases the average religion distance between a focal lender and the array of borrowers that the lender lends to. Note that we do not focus on this result, because the analysis is based on a subsample of individual lenders who acquire membership in exactly one lending team. Notably, many lenders join multiple teams.

Table 7. Religious Team Membership and Religiosity				
	(1) Poisson	**(2) OLS**	**(3) Poisson**	**(4) OLS**
DV: Lending actions (LA)	LA	Log (LA +1)	LA	Log (LA +1)
Physical distance	-0.182***	-0.377***	-0.188***	-0.377***
	(0.0284)	(0.0319)	(0.0284)	(0.0318)
Cultural distance	-0.392	0.109	-0.310	0.106
	(0.506)	(0.220)	(0.502)	(0.220)
Log (GDP difference)	0.604***	0.0746	0.586***	0.0760
	(0.0775)	(0.0656)	(0.0798)	(0.0656)
Religion distance	-0.0587	-0.0842	0.252	-0.00140
	(0.158)	(0.0723)	(0.173)	(0.103)
Religious teams	5.850***	1.995***	5.710***	1.903***
	(0.901)	(0.454)	(1.012)	(0.466)
Religion distance × Religious teams	**-3.348***	**-1.888***	**-2.437**	**-1.777***
	(1.105)	**(0.526)**	**(1.102)**	**(0.543)**
Nonreligious teams			0.436	0.263
			(0.441)	(0.198)
Religion distance × Nonreligious teams			-1.659***	-0.301
			(0.427)	(0.273)
Observations	7,988	7,988	7,988	7,988
Lender effects	YES	YES	YES	YES
Borrower effects	YES	YES	YES	YES
Year effects	YES	YES	YES	YES

Note: Clustered robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Discussion and Conclusion

Through digital online platforms, entrepreneurs have the potential to access distant resources from peers, resources that have traditionally been available only locally. However, the extent to which that potential is realized is unclear, as those peers' behavior may exhibit biases, leading to market inefficiencies. In recent research, scholars have provided numerous insights concerning distance-related barriers in digital markets (e.g., Galak et al., 2011; Brynjolfsson et al., 2019). In this vein, we expand the scope of such a mechanism to consider the role of religious affiliation in driving individuals' selection of transaction partners in global, digital markets. We further show the contextual moderators of the religion distance effect, as well as the role of online communities in exacerbating religious biases. Results from this paper provide a glimpse into religion as an important factor in the context of prosocial lending.

Implications for the Literature

The lack of grounded empirical research on the effects of religion on crowdfunded markets, especially at the country level, along with growing interest in the importance of religion on economic growth (North & Gwin, 2004; Grim & Finke, 2006; Karlan et al., 2017; Acquisti & Fong, 2020; Sutanto et al., 2021) motivated us to study the impact of religion in online markets. In particular, we chose to focus on prosocial

crowdfunding platforms because prior literature has discussed the importance of religion in this market (Liu et al., 2012) yet has arrived at few conclusions about the implications of that fact on patterns of lending activity. While the social psychology literature has looked at individuals' preferences as a function of both social identity and context (e.g., Everett et al., 2015), no prior work has adequately integrated these internal and external forces into a holistic decision-making model. Here, we adopt the interactional view of behavior to present a unified framework emphasizing person-context interactions to motivate a model of lender decision-making on Kiva. Notably, bringing contextual macrolevel and online factors into consideration makes the implications of our findings more dynamic, complex, and nuanced.

Our finding that religion distance has a negative effect on individual lending sheds light on the importance of religion as a barrier to prosocial behavior. That negative impact suggests that while online markets eliminate many distance-related frictions (e.g., search costs in distant markets), they are perhaps unsurprisingly incapable of resolving or eliminating all barriers. This research also sheds light on the importance of inter-religious offline contextual factors and their contribution to the biases of online prosocial platforms. In particular, we represent three different mechanisms that shift religious bias—namely, social factors (i.e., social hostilities and religious diversity), a governmental factor (i.e., favoritism of religion), and an online factor (i.e., religious team membership).

We contribute to the stream of literature on in-group preferences in online markets (e.g., Kanat et al., 2018; Liang et al., 2018) by providing evidence that offline contextual factors change online users' behavior. These factors can specifically explain the dynamic trends on online prosocial platforms. In particular, religiously motivated social hostilities shift individuals' preferences to support borrowers with the same religion. Such an increase in in-group favoritism seems to stay significant over one year of increase in social hostilities and when social hostilities increase in both lender and borrower countries. We find that religious diversity acts to decrease the negative impact of religion distance. Lenders from countries with diverse religions tend to emphasize religion dissimilarities less. Our findings also indicate that governmental religious favoritism increases the impact of religion distance on lending actions. In particular, lenders from countries with an official state religion or preferred religion have higher religious biases than lenders with no official or preferred religion. Finally, we show that online communities can also shape religious bias. Specifically, we find evidence that joining online religious communities (i.e., Kiva religious teams) exacerbates religious biases.

These findings jointly suggest that while prior work has shown that social biases influence online prosociality, the extent to which lenders exhibit those biases is not constant but varies with the environment and design of online platforms. As a result, in addition to any innate biases or group-level performance, the economic success of religious minority founders may be influenced by the environmental salience of religion. For example, exposure to religious cues can cause a significant shift in lending priorities, which in turn influences funding propensity, particularly for underrepresented groups.

Implications for Managerial Practices

We have shown that religious differences can significantly influence peer-to-peer interactions and exchanges on global online platforms. Although the offline context is difficult to manipulate, the online context is certainly under the purview of platform operators. Our findings imply that platform operators may thus benefit from considering the role of religion in the design and management of platforms. For example, operators might consider the extent to which platform features such as communities may enable religious salience and bias. To mitigate religious bias, platform owners might seek to make religiously distant borrower options more conspicuous (for example, via trending projects, matching algorithms, or email campaigns). Further, platform operators might explore interventions that aim to boost religious diversity, exposing users to different peers. For example, Kiva might seek to engage users in lending contests, assigning users to teams rather than encouraging homophilous team formation.

Further, it is important to consider the influence of religion in personal profile data to amplify religious biases among users. Through religious priming, religious cues may affect the feelings and behavior of users, eliciting bias by raising the salience of out-group categorizations. As discussed in Appendix D, borrower requests and descriptions that allude to religious affiliations (e.g., religion identity indications in loan requests and loan categories) may drive lenders' attention to religious categorizations. In this sense, revealing more information, unlike what we observe in other two-sided markets, may lead to adverse selection, where some lower-quality loans have a higher chance of getting funded and vice versa. Notably, this adverse selection occurs at the expense of social welfare. This could be unfavorable for a network like the Kiva platform, where there is a heterogeneous distribution of religion groups in lenders' and borrowers' populations (i.e., most lenders are from primarily Christian countries, while most borrowers are from non-Christian countries). Bearing this all in mind, we predict that incorporating or signaling religious information (e.g., highlighting nonverbal indications of religious identity) boosts marginalization, especially for non-Christian borrowers.

Employing debiasing techniques has the potential to counteract religious bias. One feasible strategy would be to acknowledge religiously motivated biases in the prosocial lending network—e.g., informing less-representative borrowers that salient identities may negatively impact their fundraising success or informing lenders that such biases make the whole market less efficient. For example, the platform could employ cues to encourage lenders to critically assess loans based on their social impact, rather than evaluating the borrowers' social groups. Also, reducing religion-specific platform cues (e.g., discouraging religion-related pictures) may be a fruitful approach.

Finally, our study results speak to policy makers about a novel association between the governmental regulation of religion and online trade markets. The relationship between national religiosity and international trade is ambiguous in that religion can encourage or discourage international trade (Lewer & Van den Berg, 2007). For example, religion can suppress economic transactions because of priniciples common to many major religions that discourage short-term happiness in favor of ultimate satisfaction. Meanwhile, religion can generally boost economic transactions by promoting honesty, diligence, and welfare-enhancing economic activities. To this end, our research highlights that the secular view of government can impede additional costs associated with religion in international trade in online markets.

Limitations and Future Research

The results of our study need to be understood in light of certain limitations. First, our dataset did not allow us to draw a direct association between individuals' religion and their preferences. We were not able to determine heterogeneity between lenders from the same country as we only observed lenders' behavior in aggregate. Second, given the observational nature of our research, the identified relationships may be correlational rather than causal. An experimental setup could perhaps enable the measurement of direct causality. However, it is difficult, if not impossible, to manipulate religion in loan transactions through an experiment. Moreover, any attempt to manipulate some aspect of a subject's religiosity would raise ethical issues (Nielsen, 2015). Hence, we leveraged our access to publicly available data to derive the relationship between religion and lenders' behavior on crowdfunding platforms.

Further, it is not clear whether the population of lenders on Kiva from a country is representative of that country's whole population. In essence, lenders on Kiva may exhibit different religious preferences from that of the population as a whole. However, we anticipate that our result is conservative, considering that religiosity is actually a driver of online prosociality (Liu et al., 2012). Moreover, perceptions of a borrower's religious context likely also influence lenders' decisions. For example, lenders may have a higher religious bias for borrowers from less diverse countries or countries with high governmental religious favoritism. However, we were unable to capture this effect here, perhaps for two reasons. First, unlike borrowers' level of social hostilities, borrowers' diversity and governmental favoritism are time-invariant. Hence, we could not measure the within-country variation of diversity and governmental favoritism of religion. Second, unlike social hostilities, borrowers' diversity and governmental favoritism are not intensively covered in the news; therefore, lenders may not be aware of such information.

While religious differences can lead to different lending outcomes (perhaps through different discrimination mechanisms: taste-based or statistical discrimination; Guryan & Charles, 2013), we cannot study that here. Almost all loans (more than 95%) are fully funded with a 97% repayment rate, which leaves us with little variation to measure the role of religion on loan success rates regarding being fully funded or in terms of loan repayment. Meanwhile, our dataset offered no further detail about the repayment of loans. Also, early-stage lenders may have different social biases than middle-stage lenders (c.f., Kuppuswamy & Bayus, 2017; for an example attributed to herding behavior, see Younkin & Kuppuswamy, 2018); however, we did not study that here. In fact, the Kiva dataset did not identify the order of lending actions for a given loan; hence, we could not identify the hierarchy of lending actions in archival data. Whether early-stage lenders have a role to play in creating the bias in lending activity on online platforms would require a different analytic approach and is outside of the scope of this research; we identify this as an important direction for future research. Further, we did not study whether suppressing religious information (i.e., nonverbal indication of religious identity) may reduce total fundraising. Future work might explore the implications of removing such information, bearing in mind that a decline in out-group avoidance may be paired with a decline in in-group preference, potentially raising difficulties for borrower fundraising.

Future research could also build on this research by using the measure of religion distance and religious diversity on funding and project outcomes from other types of crowd-funded markets as well as other two-sided markets, e.g., labor markets and e-commerce. Although we consider donation-based crowdfunding here, our findings may be generalizable to reward-, equity-, and lending-based markets. In essence, religion may be a mechanism that can be used to alleviate information asymmetry and build trust between individuals from distant markets without a direct link to in-group favoritism. Future research might also explore other sociopolitical factors that might alleviate the religious bias on online platforms. For example, the literature on identity suggests that identity is not necessarily a fixed state between similar individuals; consequently, it can be manipulated in some circumstances (Jans et al., 2012). In this case, social identities may be dedduced from group members' contributions, based on a shared perception of intergroup relations instead of group similarities (Jans et al., 2012).

In conclusion, given crowdfunding's significant economic impact, the design of these platforms requires a good deal of caution. In two-sided markets, revealing users' information, such as names, locations, and photos, can have a long-standing impact on establishing trust between online users. Highlighting such socially salient characteristics, however, may lead users to discriminate against different groups and jeopardize social inclusion. Hence, making some information more prominent, available, or unavailable may establish patterns of bias and trust between strangers transacting online. Therefore, designing for market efficiency and social inclusion first requires an understanding of sources of bias and trust in online markets. This work presents an initial step toward that objective by providing insight into how religious motivations impact behavior in online markets. We hope that this work will spur additional interest in understanding the role of religion in online markets for philanthropy, commerce, and trade. Finally, it is our hope that this work will provide insights to scholars and practitioners that inform design as well as policy and regulations going forward.

Acknowledgments

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Appendix A

Religious Diversity

Religious diversity is the probability (0-1) that a pair of people at random from a country have different religion groups. Figure A1 shows the mean of religious diversity between 2006-2016.
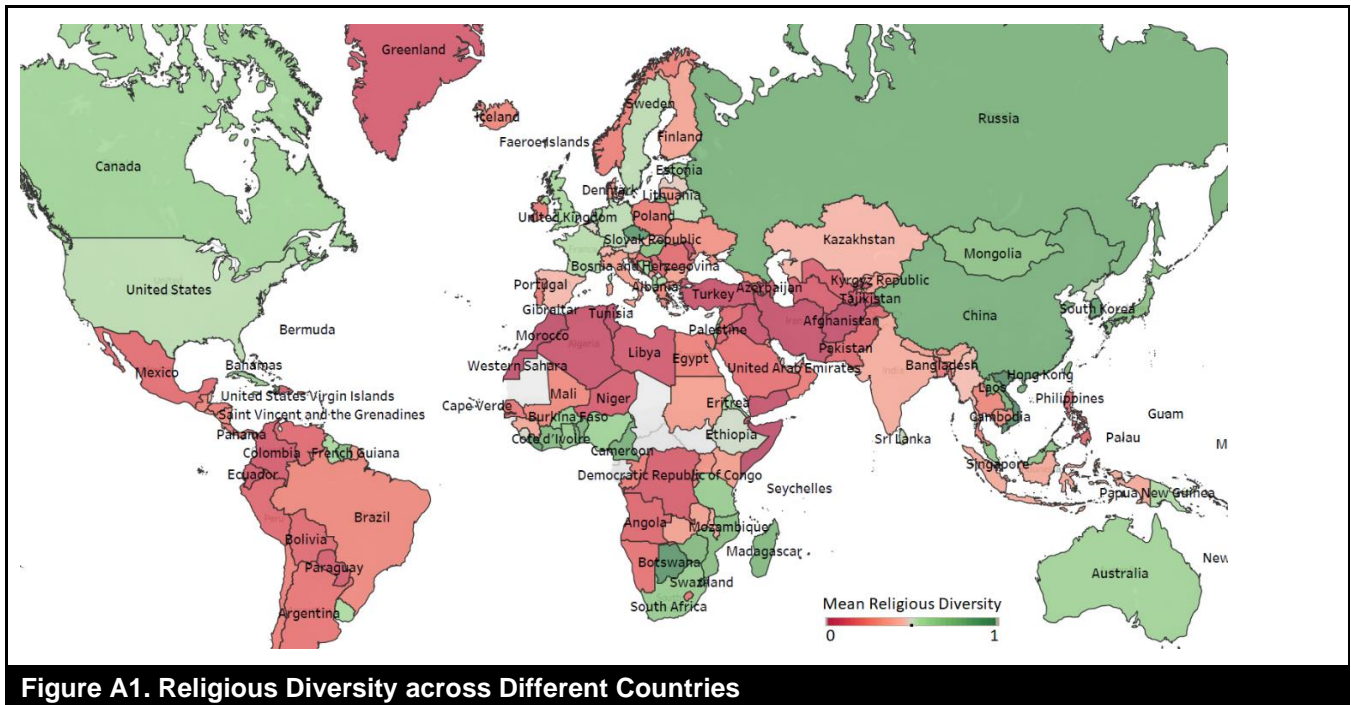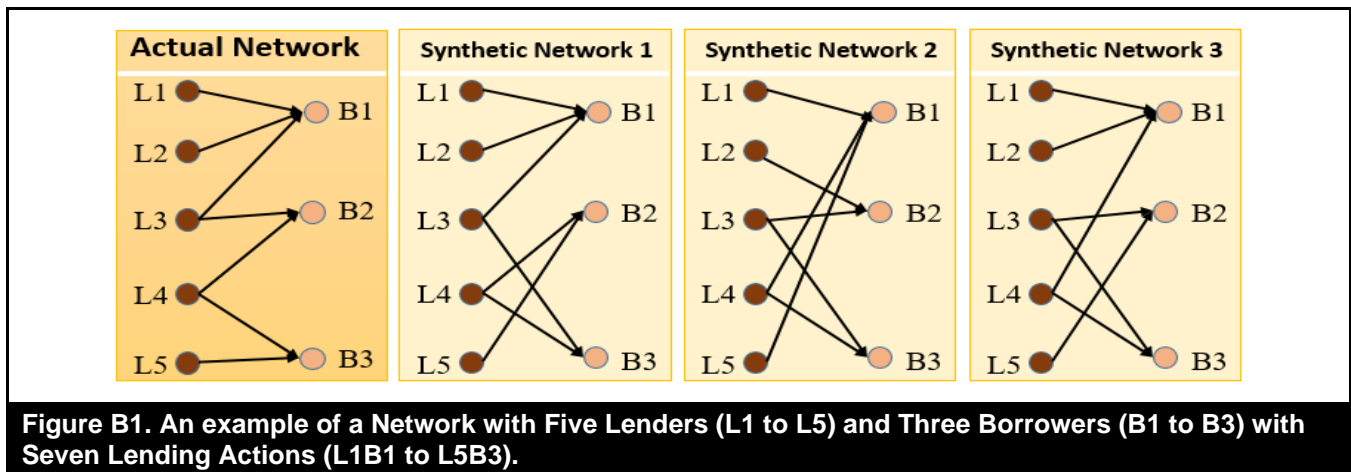

Figure A1. Religious Diversity across Different Countries

Appendix B

Randomized Lending Network

Degree-preserving network randomization is a common technique designed to distinguish patterns in an actual network from randomness (Gotelli & Graves, 1996). To assess the statistical significance of the observed network properties, we randomly rewired the loan transaction network and generated many synthetic (shuffled) networks (Galak et al., 2011; Singh et al., 2018). In our example (see Figure B1), each lender or borrower comprises a node, and each loan transaction comprises a directed edge. Preserving the in- and out-degree of each node, we randomly reassigned lenders to borrowers to create many synthetic networks. Leveraging the distribution of our variables of interest across synthetic networks, e.g., the average *religion distance* across linkages, we can examine how extreme the values from the actual (true) network are in those null distributions.

Figure B1. An example of a Network with Five Lenders (L1 to L5) and Three Borrowers (B1 to B3) with Seven Lending Actions (L1B1 to L5B3).

Note: We shuffled our network by randomly assigning lenders to different borrowers, as in synthetic networks 1 to 3. We preserved the number of lending actions associated with each lender and borrower, allowing us to determine how far actual network properties (observed properties) are from the expected distribution obtained from synthetic networks.

Similar to this network, in Kiva, we had a network with 22 million lending transactions associated with 2.3 lender nodes and 1.3 million borrower nodes with known countries. We shuffled the Kiva network 200 times. A comparison between the observed network and the null model derived from the synthetic networks enabled us to observe country-level religious bias and calculate the associated empirical *p*-value. In detail, we calculated the empirical *p*-value as below:

1. First, we calculated the average religion distance between lenders and borrowers in the observed network. This number is simply the mean of all religion distances between countries of a lender and a borrower in our actual network, denoted by religion distance in the actual network (*RA*).
2. Second, we shuffled our network 200 times by randomly assigning lenders to borrowers. Here we used the Stata command *shufflevar* to shuffle borrowers relative to the lenders (Rossman, 2011). In each shuffle, we calculate the average religion distance between lenders and borrowers in our shuffled network, denoted by religion distance in shuffle *i* of the null model (*RN_i*). Similar to the bootstrap procedure, the distribution of religion distance in 200 randomized synthetic networks can serve as a null against the observed religion distance from the actual network.
3. Third, we estimated the empirical *p*-value as follows (North et al., 2002):

$$p-value = \frac{r+1}{n+1},\tag{A1}$$

where *n* is the number of shuffled samples, and *r* is the number of shuffles with the average religion distance smaller than or equal to that calculated for the actual data (i.e., *n* is 200, and *r* is the number of synthetic networks with $RN_i \leq RD$).

Figure B2 shows the distribution of average religion distances (over simulated lending actions). We found that virtually all random synthetic networks exhibit larger religion distance (*RN_i*) than is observed in actuality (*RA*). Given Equation (A1), we reject the null hypothesis that religion distance is uncorrelated with lending ($p = 0.004$). Figure B2 highlights that the observed religion distance in Kiva loans is significantly smaller than would be expected by chance, i.e., a simulated system that lacks any religious bias (Itzkovitz et al., 2003).
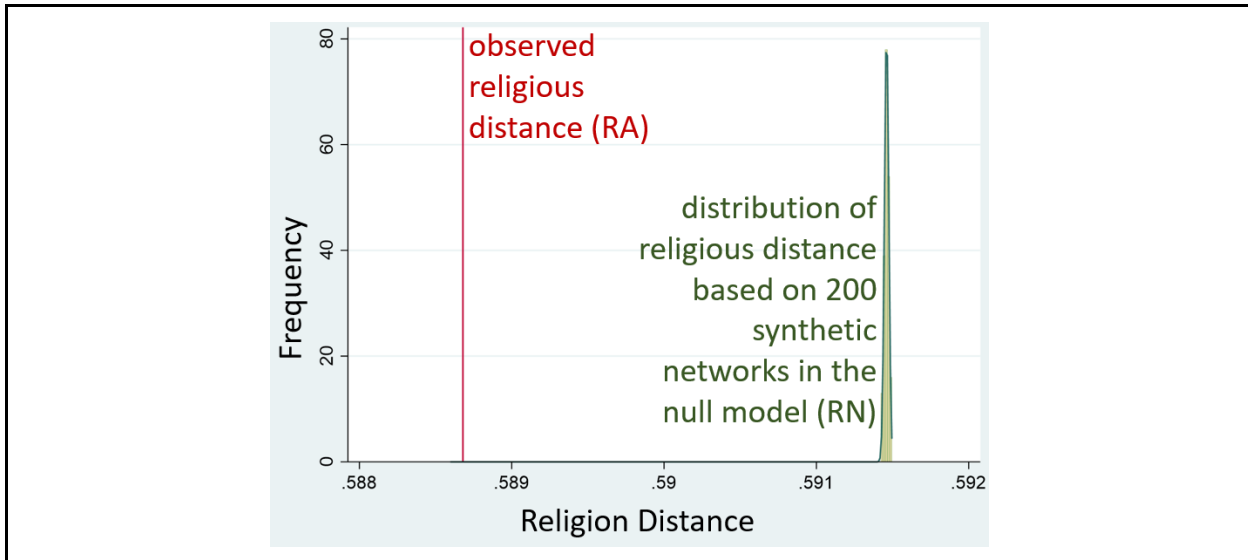
Figure B2. Religion Distance Comparison Using Degree-Preserving Loan Networks

This comparison provides additional evidence for our first hypothesis that religious bias exists on Kiva, in which lenders prefer borrowers who share the same religion. We further checked the robustness of our result by running a subsample analysis within each year. Considering different years ensures the consistency of our result in different years. It also provides evidence that a time-variant random shock did not derive our result. The results are consistent with our finding that the observed religion distance on the Kiva network is smaller than that of the same network without religious bias. The results are omitted for brevity and are available upon request.

Appendix C

Religious Priming (Evidence from Christmas) ███████████████

In our empirical analysis (H1), we are interested in the effect of religion distance on lending actions. However, in the absence of random assignment, the results may be confounded by differences in observed characteristics, such as cultural similarities or unobserved characteristics, such as similarities in countries' constitutions. Culture, for example, is inseparable from religion (Tarakeshwar et al., 2003; Paloutzian & Park, 2014). Religion contains critical aspects of culture, such as shared values, norms, and practices (Paloutzian & Park, 2014). They both are regarded as an established aspect of one's identity and coexist in the history of human evolution. To rule out the confounding impact caused by factors such as culture, we employed a difference-in-differences (DID) design, where the Christmas holiday is an exogenous shock in that lenders do not have direct control over the event itself. In particular, we exploited variation in the number of lending actions associated with lenders from Christian countries, due to the observance of *Christmas*, compared with non-Christian countries. Given the priming effect of Christmas on increasing Christians' level of religiosity (c.f., Ritter & Preston, 2013; Campante & Yanagizawa-Drott, 2015; Shariff et al., 2016), we ran three separate analyses to explore changes in the *total* number of lending actions, the number of *proximate* lending actions (lending actions with low religion distance), and the number of *distant* lending actions (lending actions with high religion distance) during the period of Christmas. Based on the large stream of literature on religion prosociality, we expected to see that Christmas would increase Christian lending in all three analyses. However, we predicted that such an effect should be stronger for proximate lending due to in-group favoritism (i.e., religion prosociality; Saroglou et al., 2005; Harrell, 2012).

The literature indicates that the Christmas holiday increases religious practices and has a priming effect on Christians' level of religiosity (Iannaccone & Everton, 2004). There is a sharp increase in demand for church services during Christmas. Such an increase in demand is described as a holy-day effect, where people are particularly interested in attending church (to avoid feeling guilty, among other motivations) (Iannaccone & Everton, 2004). This increase is also associated with a higher level of inclusion among celebrators and a feeling of exclusion among nonbelievers (i.e., temporal in-religion favoritism and out-religion avoidance; Schmitt et al., 2010). Here we argue that the Christmas holiday increases religiously motivated behavior and raises religious members' concern about the welfare of the in-group. Notably, a similar approach was used for the study of religion's effect on economic growth and happiness during the month of Ramadan in Muslim countries (Campante & Yanagizawa-Drott, 2015).

To estimate the effect of Christmas on religious bias, we constructed a panel of individual lenders, reflecting their lending actions before, during, and after Christmas. We utilized a Poisson pseudo-maximum likelihood (PPML) regression to model the changes in the number of lending actions during Christmas for Christian lenders (individuals from Christian populated countries, i.e., >80% Christians) and non-Christian lenders (individuals from non-Christian populated countries, i.e., <20% Christians). Our outcome of interest in our three separate analyses, associated with total, proximate, and distant lending actions, is each period's number of lending actions. As a cutoff to label proximate and distant lending actions, we used the *mean* of religion distance from all lending transactions from a focal individual lender country. For example, if a lender is from the United States, all of that lender's lending actions with religion distance that are lower than the average of U.S. lending actions are labeled as proximate lending and, otherwise, distant lending. In our PPML models, our variable of interest is the interaction between six periods (before, during, and after Christmas) and *Christian* (the lender's religion). The detailed design and empirical results are available upon request.

The results show that Christmas increases lending actions across all three analyses; however, the effect size is greater for proximate lending. The observance of Christmas increases prosocial lending by 8%. However, the effect size is greater for proximate lending. As shown in Figure C1, Christmas increased religiously motivated proximate lending by 10%, significantly greater than the 4% increase in distant lending. These results indicate that religiously motivated prosocial actions are partially undertaken to support one's own religious in-group.
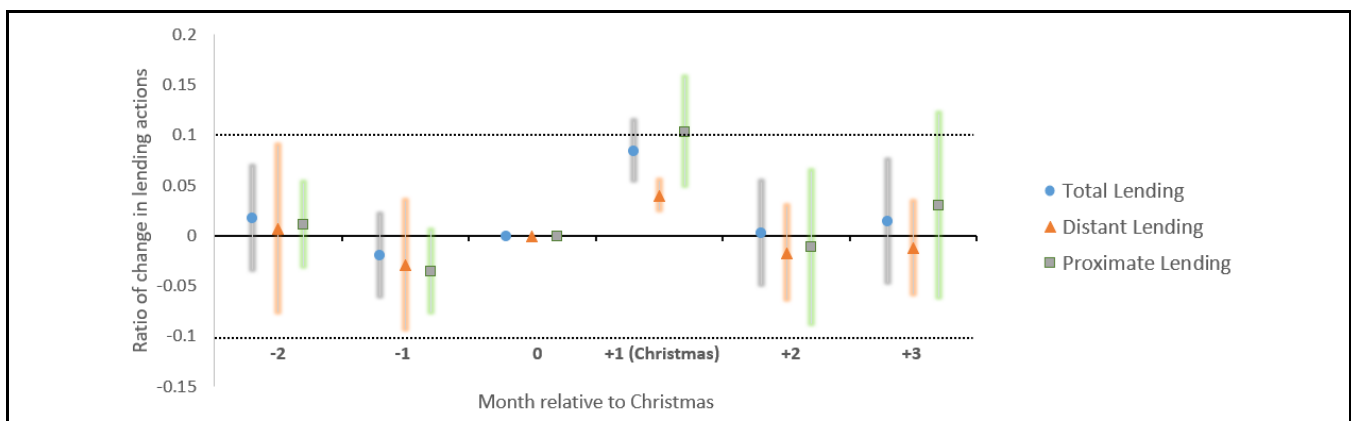

Figure C1. Ratio of Change in Lending Actions Relative to Christmas (bars indicate 95% confidence intervals)

Appendix D

Religious Priming (evidence from loan requests)

For our empirical analysis (H5), we were interested in the effect of online contextual factors on the religion distance-lending relationship. Here we extend this effect by empirically showing that religion cues present in loan profiles may amplify religious biases among users. Especially, religious priming may elicit religious bias by raising the salience of out-group categorizations (Ritter & Preston, 2013). We ran a set of subsample analyses to understand this potential to observe religious bias across different loans' characteristics.

In the first analysis, we show that the indication of borrowers' religiosity in loan descriptions can foster biased lending. We identified the religious identity indications of loans by running text analyses of borrower loan requests using LIWC. We also identified lenders' religiosity by identifying lender membership in religious teams. We then ran four subsample group analyses, each corresponding to loans with/without religious context in the loan description (i.e., religious loans) and borrowers with/without religious team membership (i.e., religious lenders). As shown in Figure D1, analyzing the effect of religious bias across the resulting subgroups of lenders and borrowers shows that religion distance negatively impacts lending volumes most heavily when religion-oriented text appears in the loan description and when lenders belong to a religious lending team. This relationship is the weakest (though still negative) when the loan text has no religious orientation and lenders have no religious membership.

Figure D1. Religious Bias across Four Subsample Analyses
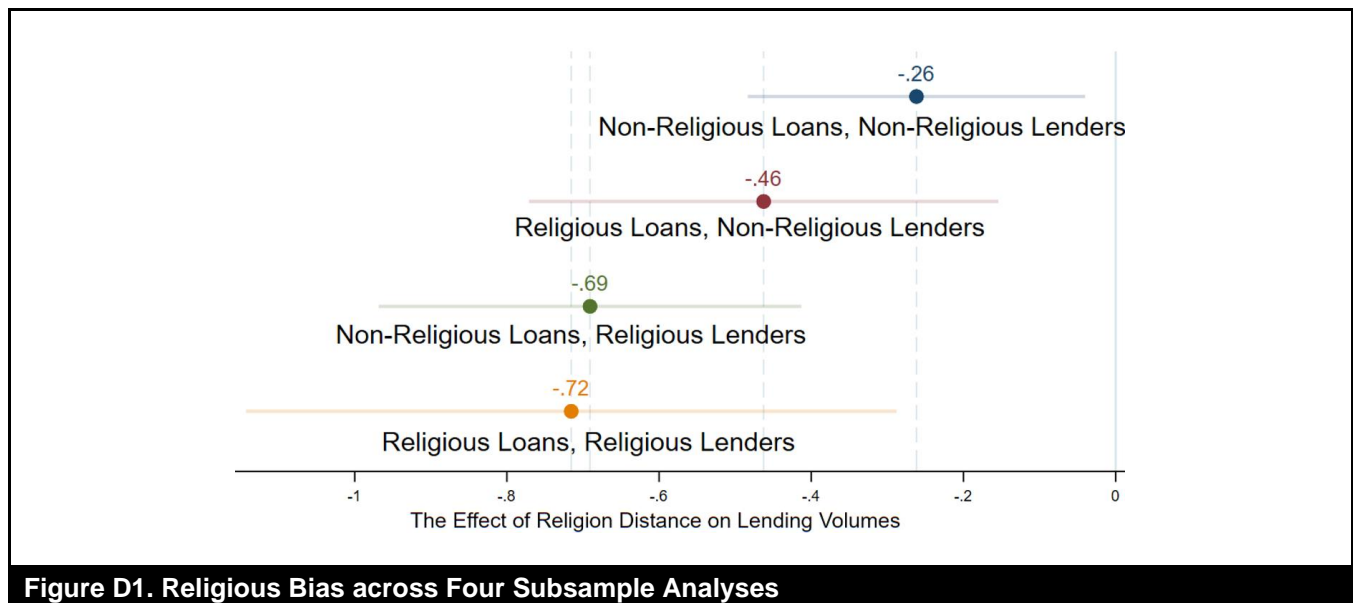
Our second descriptive analysis shows that some loan categories may manifest religious identity and automatically lead to biased lending. To further investigate this potential, we looked at the variation in religious bias across different loan sectors (e.g., food, housing, services, and art). We ran 15 separate models, each corresponding to a loan category. We then explored how the impact of religion distance on lending volumes varies across different sectors. As shown in Figure D2, we observe that religion distance has a greater negative impact on some sectors than others. These results suggest that religious lenders may prefer to contribute to deficiency needs in Maslow's hierarchy (e.g., food and clothing) compared to nonreligious lenders, who may choose higher-order needs (e.g., art and entertainment). Second, these results suggest that loan sectors may have nonverbal signals that have a priming effect on lenders (Burgoon et al., 2011). For example, there is a strong link between food and religion, where food can powerfully reinforce religious boundaries (c.f., Mintz & Bois, 2002; Bahloul, 1989). While camel is common food among Arabs (Muslim majority), Israelites (Jewish majority) neither eat nor sacrifice camels (Smith, 1907). Clothing is another nonverbal communication channel through which individuals locate their religious identity (Burgoon et al., 2011).

Figure D2. Religious Bias across Different Loan Categories