

Religiosity, Borrower Gender and Loan Losses in Microfinance Institutions: A Global
Evidence

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Abstract

We examine the impact of religious beliefs on loan repayments in microfinance institutions (MFIs). We collect data on 770 MFIs across 69 countries over the period 2006-2015. We find robust evidence of a negative relationship between religiosity and loan losses in MFIs. We also find that the relationship between religiosity and loan losses is stronger for MFIs in Protestant-dominated countries than Catholic-dominated countries. Moreover, religiosity improves the operational self-sufficiency of MFIs through a reduction in loan losses. We find that religiosity does not improve the loan repayment behaviour of women borrowers but it reduces the loan size per borrower. Overall, our evidence suggests that although religiosity reduces loan losses through religiosity-induced lender-risk aversion, it does not improve the loan repayment behaviour of borrowers. We also use a novel approach to evaluate our results to the effects of omitted variable bias.

Keywords: Microfinance institutions, religiosity, loan losses, operational self-sufficiency,

Cross-country panel data

JEL classification: G02, G21

1. Introduction

Does the level of religiosity influence the loan portfolio performance of microfinance institutions (MFIs) in a country? While the empirical research provides extensive evidence of the impact of religiosity on corporate decisions, there is no evidence of the extent to which religious beliefs affect the operational self-sufficiency and loan performance of MFIs. The extant literature posits and finds significant evidence for the effects of religiosity on corporate decisions as well as individual personal financial decisions. Religiosity is positively related to risk aversion (Miller and Hoffman, 1995; Hilary and Hui, 2009; Adhikari and Agrawal, 2016a). Hilary and Hui (2009), El Ghoul et al. (2012), Bushman and Williams (2012) argue that religiosity constrains corporate risk-taking. In other words, corporate entities rein in their risk-taking behaviours in highly religious business locations. The empirical evidence further shows that religious beliefs enhance social capital such as trust, which increases stock market participation (Guiso et al. 2008) and the decision to buy stocks (Hong et al. 2004; Brown et al. 2008). Moreover, religiosity plays a more significant role in constraining opportunistic behaviour in a weaker corporate governance (He and Hu, 2016) and weaker legal environment (Chen et al., 2016). And it is important in designing lending contracts and defining both availability and costs of debt (He and Hu, 2016; Chen et al., 2016).

Loan repayment is influenced by borrowers' riskiness (Petersen and Rajan, 1994; Uchida et al., 2012; Moro and Fink, 2013), which can be assessed through relationship lending and prospects of borrowers' business enterprises. Godquin (2004) found evidence that factors such as nonfinancial services, group lending and dynamic incentives improve the loan repayment performance of MFIs. Also, social ties and interactions inherent in group lending enforce repayment and make defaults costly (Besley and Coate, 1995; Godquin, 2004). Thus, group lending mitigates the effects of adverse selection (Stiglitz, 1990) and moral hazard (Ghatak, 1999) due to information asymmetry. Khandker et al. (1995) and Matin (1997) asserted that area characteristics such as the economic prospects of the borrowers' business local as well as the wealth of the area determine the repayment of loans. More importantly, the assessment of the trustworthiness of borrowers underpins the amount and costs of credit to borrowers and the repayment propensity. It, therefore, seems intuitive that the level of religiosity in a country would influence debt repayment behaviours and determine the performance of MFIs loan portfolios.

Therefore, our study sheds light on the influence of religiosity on MFIs debt repayment and performance of loan portfolios. Specifically, we explore this phenomenon and provide a robust evidence for the significant role religiosity plays in default rates of MFIs loans. This cross-country evidence offers insights into the operations of MFIs and defines the extent to which they meet two main objectives of social impact and financial sustainability. Prior literature argues that religious beliefs define individual's financial responsibility, attitude to savings, investments and debt repayments (Stulz and Williamson, 2003; Renneboog and Spaenjers, 2012). The fact that religion promotes exemplary conduct and financial responsibility means it dissuades questionable corporate behaviours and managerial opportunism (Weaver and Angle, 2002; Grullon et al. 2010; McGuire et al. 2011). This is because most religious faiths promote a sense of community and belongingness. Religiosity as a national culture that hinges on corporation should lead to risk aversion and low propensity of loan defaults (Ashraf et al., 2016). For example, Baele et al. (2014) examined the default rates on conventional and Islamic loans and find lower default rates on Islamic loans than on conventional loans. Their findings highlight the impact of religiosity on loans defaults (Bolton and Scharstein, 1996; Iannaccone, 1998; Guiso et al. 2006).

To test the effects of religiosity on MFIs loan portfolio performance, we collect data for a sample of 770 unique MFIs across 69 countries from 2006-2015 from the MIX Market Database. Following prior studies (Hilary and Hui, 2009; Adhikari and Agrawal, 2016a; He and Hu, 2016), we obtain religiosity data from the Religious Congregations Membership Study hosted on the website of the American Religion Data Archive (ARDA), and measure religiosity in a country by dividing the total number of religious adherents by the total country population. Like He and Hu (2016), we argue that the behaviour of religious adherents in a country affects the overall behaviour of people in religious areas, including those who do not necessarily subscribe to a religious belief. We control for several institutional factors and country-level variables that potentially confound the results of cross-country studies. Our study explores the religiosity-induced performance of loan portfolios of MFIs. We conjecture that religiosity impacts the loan underwriting process and the probability of loan defaults.

The results of our analysis are consistent with the hypothesis that there is a significant negative relationship between religiosity and loan performance. Using a number of proxies for loan performance, we find that religiosity is associated with fewer loan losses measured

as loan loss rate, loan write-off ratio and portfolio quality. We also find a positive relationship between operational self-sufficiency and the level of religiosity. Thus, religiosity reduces loan losses and ultimately enhances operational self-sufficiency, which culminates into financial sustainability. More so, although religiosity does not improve the loan repayment behaviour of women borrowers, it reduces the loan size per borrower. Additional results provide evidence of the positive effects of religiosity on loan performance during the financial crisis, and women borrowers enhance the performance of loan portfolios. The above findings imply that religiosity reduces loan losses through religiosity-induced lender risk-aversion at the firm level that leads to a reduction in loan size per borrower. However, our evidence suggest that religiosity does not improve borrower repayment behaviour.

We conduct several tests to ascertain the robustness of our results. First, we measure loan portfolio performance using alternative proxies such as loan loss rate, write-off ratio, portfolio quality (portfolio at risk 30 days). Second, we focus on Catholic and Protestant religious groupings and re-estimate the models. Third, we partition the sample into five regional groups to deal with the potential effects of geographical clustering by clustering the standard errors at both the country and regional. In addition to fixed effects model, we also estimate the results using the random effects model to deal with time-invariant covariates. Finally, we address the issue of endogeneity and reverse causality by estimating a 2SLS and employ Oster (2017) test to deal with the issue of omitted variables bias. Our results remain robust to all the tests and alternative estimations used to analyse the data.

We contribute to the extant literature by studying the effects of religious beliefs on the performance of MFIs loan portfolios. First, we complement the body of literature that examines the effects of religiosity on corporate decisions and individual decision making (Stulz and Williamson, 2003; Hilary and Hui, 2009; Renneboog and Spaenjers, 2012; Adhikari and Agrawal, 2016a). However, while we pursue an international perspective of the phenomenon compared to most prior studies, our primary focus is on MFIs. At the informal micro level where individual financial responsibility sustains MFIs and small and medium enterprises, there has been no empirical work on this important phenomenon. We particularly focus on religion to provide a more nuanced evidence of the predictive power of religiosity on economic and financial behaviour at the micro level. In such areas with weaker corporate governance (He and Hu, 2016) and weaker legal environment (Chen et al. 2016) but strong religious influences, examining the impact of religiosity on MFI operations is imperative.

Second, our results add to the extant empirical evidence on the impact of religiosity on debt repayment. Unlike prior studies (Chen et al. 2016; He and Hu, 2016) that focus on how religious borrowers appear trustworthy to lenders and ultimately secure favourable loan terms, we provide new evidence on the loan repayment behaviour of religious borrowers in MFIs. Our evidence suggests that religiosity does not improve the loan repayment behaviour of women borrowers in MFIs. This finding challenges the popular view that religious borrowers are likely to have better loan repayment record. Third, we document that MFIs located in high religious countries are more operationally self-sufficient. From a policy perspective, the finding will be useful for donors and funding agencies that have recently committed substantial resources to MFIs with the view to ensuring operational self-sufficiency. Fourth, and consistent with Adhikari and Agarwal (2016a), we find that MFIs located in highly religious areas are less likely to suffer from the effects of financial crises. Overall, these findings lend some heft to the empirical evidence that religiosity minimizes loan delinquencies and enhances the operational sustainability of MFIs.

The rest of the paper proceeds as follows. Section 2 reviews the prior literature and develops our testable hypotheses. Section 3 describes the sample, data sources, variables definitions and empirical model. Section 4 presents the main empirical results and analysis and section 5 presents the robustness tests. We summarize and conclude in Section 6.

2. Literature Review

2.1. Religiosity, Borrower Gender, and Loan Losses

The idea that religion might affect the decisions of individuals gained prominence with Weber's analysis of Protestantism. The Weberian argument strongly suggests that the Protestant ethic underlies the emergence of the spirit of capitalism: Protestants worked harder and had greater economic attitudes than people of other religious faith (Weber, 1930). Arguably, this triggered other studies that focused on how religion might affect individual decisions regarding crime participation (Evans et al., 1995), alcohol and drug consumption (Cochran and Akers, 1989), divorce (Heaton and Pratt, 1990) and abortion (Cook et al. 1993). Several other studies have also theoretically linked religiosity to individuals' risk aversion. For example, Malinowski (1925) opined that religiosity is related to a desire to control things that cannot be controlled (e.g. sicknesses) with available technological sophistication. Others including, Cornwall (1989) and Miller (1992) likened religiosity to a risk-avoidance strategy

where individuals follow a religion with the view to avoiding the risk of not having an after-life. Commenting on these arguments Miller and Hoffmann (1995) retorted “we conceive of religious behaviour as risk-averse and non-religious behaviour as risk-taking” (Miller and Hoffmann, 1995 p.63).

Other studies have also focused on gender differences in religiosity. Miller and Hoffmann (1995) theorized that relative to women, men are more likely to be irreligious because men are more apt to engage in various forms of high-risk behaviours including being irreligious. Miller and Stark (2002) empirically investigated gender and religiosity and concluded that “women are more religious than men to the extent that being irreligious constitute risk-taking behaviour” (Miller and Stark, 2002, p.1399). Similarly, Walters and Davie (1998) found women to be more religious than men on “every” measure of religiosity. Consequently, other studies document that religiosity improves ethicality (Conroy and Emerson, 2004; Ibrahim et al. 2008; and Wong, 2008), and women are more ethical (Borkowski and Ugras, 1998; Franke et al. 1997; Peterson et al. 2010; Albaum and Petersen, 2006) and have better loan repayment (D’Espallier et al. 2010). In contrast, Chaves (2010) propose a theory of “religious congruence fallacy”. Within this view, religious adherents mostly practice their religious beliefs when they are together (with other religious adherents), whilst their personal behaviour (in the absence of other religious adherents) remain inconsistent with their religious beliefs and practices. This view suggests differential individual and group outcomes for religiosity.

He and Hu (2016) advanced two reasons why individual religiosity may impact firm behaviour. First, firms in high religious countries are more likely to have a larger proportion of religious employees. Second, irreligious people in highly religious countries are more likely to behave in a way consistent with religious adherents with whom they constantly interact. This is also consistent with social identity theory’s suggestion that much of ones’ personal identity is derived from group membership (Abrams and Hogg, 1988). Based on these arguments, other studies have investigated how religiosity might affect firm-level outcomes. For example, Hilary and Hui (2009) investigated the effect of religiosity on organizational behaviour in the US. They found that firms located in highly religious counties exhibit higher risk-aversion that manifests through lower variance in return on assets as well as lower investment rate and less growth. They noted that the effect is more consistent in counties with large proportion of Protestants. Similarly, Adhikari and Agrawal (2016a) found that US banks headquartered in more religious areas exhibit lower stock return, as well as

lower idiosyncratic and tail risk. They also reported that banks in more religious areas are less vulnerable to financial crises and exhibit conservatism by relying less on non-traditional banking. In a related study, Gao et al. (2017) reported that although local religiosity reduces both idiosyncratic and total risk, this relationship is mainly pronounced for funds for which local investors and local managers are important. Similarly, in China, Jiang et al. (2015) found that firms with religious entrepreneurs have lower leverage and also invest less in fixed assets.

Another stream of the literature also focuses on the level of risk-aversion between Catholics and Protestants. For example, Shu et al. (2012) reported that US hedge funds located in more Catholic areas exhibit lower risk aversion. Others including Legee et al. (1993); Legee (1995n); Mockabee et al. (2001) opined that Protestants are more committed to their religious beliefs than Catholics. Consistent with these, Kumar et al. (2011) found that religion-induced gambling attitudes in the US affect investors' portfolio choices. They showed that religious characteristic of the neighbourhood in which investors are located influences their portfolio choices. Thus, investors in regions with higher Catholic-Protestant ratios are more likely to hold lottery-type stocks. Consistent with this, Adhikari and Agrawal (2016b) reported that firms headquartered in US counties with higher Catholic-Protestant ratios are more innovative: they spend more on research and development and generate more and high-quality patents. This evidence is consistent with the view that Catholicism is more risk-tolerant than Protestantism (Thompson, 2001).

Studies on the effect of religion on bank loan contracting are also burgeoning. Generally, these studies focus on religiosity and corporate borrower outcomes and are based on two main arguments. First, increases in information asymmetry increase the cost of debt (Derrien et al. (2016). However, borrowers located in high religious areas exhibit observable characteristics associated with risk-aversion (Miller and Hoffmann, 1995; Dehejia et al. 2005). For example, they have lower leverage and less risky projects (Hilary and Hui, 2009) and thus present a less informational risk to lenders (McGuire et al., 2011). These reduce the level of asymmetric information and result in lower cost of debt. Second, religious social norms evoke higher ethical standards and honesty (Weaver and Angle, 2002), and fosters trust (Guiso et al. 2003). Consequently, religious firms present a lower risk for lenders and get favourable loan terms (Graham et al. 2008; Qi et al. 2010). Consistent with these arguments, He and Hu (2016) investigated the effect of religiosity on bank loan terms in the US. They reported that corporate borrowers in counties with high levels of religiosity have

larger loans, fewer loan covenants and are charged lower interest rates. More so, in a cross-country study, Chen et al. (2016) documented that religious corporate borrowers are associated with lower loan interest spread and lower upfront fees. Thus, the existing literature has three peculiar features. First, in terms of religiosity and firm-level outcomes, no study focuses on MFIs. Second, studies focusing on religiosity and loan contracting only examined how religiosity help religious borrowers to obtain favourable loan-terms and did not focus on how religious lenders make lending decisions. Finally, although existing evidence suggests that women are more religious than men and that women have better loan repayments, how religiosity may affect the loan repayment behaviour of women borrowers has not been studied.

2.2. Hypotheses Development

There are several channels through which religiosity can reduce loan losses (improve loan repayments) in MFIs. Religiosity can reduce loan losses by increasing lender risk-aversion. According to the risk-return trade-off lenders may either decline high-risk borrowers or charge a higher interest rate depending on their risk appetite (Campbell and Viceira, 2005; Porteous, 2006). However, religiosity evokes risk-aversion. This is because most religions require followers to be conservative, modest and place greater (lesser) emphasis on spiritual gain (financial gain), whilst trusting in God when faced with financial difficulty (Adhikari and Agrawal, 2016b). Yonker (2015) suggests that managers and employees of firms are either located locally or adopt local norms. In fact, in high religious countries, even irreligious individuals may behave in a way consistent with the norms of religious adherents due to their constant interaction at work and outside work (He and Hu, 2016). Consequently, firms located in high religious areas become risk-averse because corporate decisions essentially reflect the character and risk preferences of the individuals that manage the entities. For example, religious firms have a lower idiosyncratic risk (Adhikari and Agrawal, 2016a; Gao et al. 2017) and lower variance in return on assets (Hilary and Hui, 2009). Subsequently, lenders in high religious countries may exhibit higher risk aversion. He and Hu (2016) suggested that risk-averse lenders may reduce loan losses by either declining high-risk borrowers (rather than charging higher interest rates) or only grant them smaller loans.

Religion promotes exemplary conduct and a sense of financial responsibility, which dissuades questionable corporate behaviour and managerial opportunism (Weaver and Angle, 2002; Grullon et al. 2010; McGuire et al. 2011). Thus, religious borrowers of money from

MFIs are expected to also exhibit similar positive attitudes of trust and honesty. Consequently, MFIs located in religious countries are less likely to record significant loan losses. Religious beliefs reduce default rates on loans due to the emphasis on contractual responsibility enshrined in religious doctrines (Stulz and Williamson, 2003; Baele et al., 2014). Therefore, higher levels of religiosity in a country should constrain irresponsible borrowing culture among borrowers that could potentially threaten the opportunity for future debt financing for their business operations. The hypothesis is consistent with religiosity-induced lending and religiosity-induced debt repayment culture of borrowers that encourages loan repayments. The overall effects of religiosity lead to fewer loan losses of the loan portfolios in the books of the MFIs. We, therefore, hypothesise that:

H1: MFIs in countries with higher levels of religiosity have fewer loan losses

The MFI architecture has been known to foster economic opportunities to the poor, the majority of whom are women. MFIs emphasise entrepreneurship and local economic development at the micro level, which is an important developmental tool necessary for the economic liberation of women at the local areas in developing countries (Yunus, 1999, 2007). The evidence suggests that women are generally better credit risks in MFIs than men (D'Espallier et al., 2011; Schafer and Fukasawa, 2011). Consequently, MFIs strategically target women (Morduch, 1999), which is associated with lower portfolio-at-risk, lower write-offs, and lower credit-loss provisions (D'Espallier et al., 2011; Schafer and Fukasawa, 2011). Since MFIs target more women than men due to its strategic objective of women empowerment and poverty alleviation, it, therefore, stands to reason that women are largely dependent on MFIs for capital for their businesses. Thus, women are expected to repay their debts to continue to receive the financial assistance from the MFIs. However, women are also more religious than men (Miller and Stark, 2002; Miller and Hoffmann, 1995; Walters and Davie, 1998) and religiosity improves ethicality (Conroy and Emerson, 2004; Wong and Vinsky, 2008) transparency (Dyrenge et al. 2012) and honesty (Weaver and Angle, 2012). Therefore, to the extent that such qualities may improve loan repayments, we argue that religiosity will improve the loan repayment behaviour of women borrowers. We, therefore, hypothesize that:

H2: The effect of religiosity on loan losses is more negative for MFIs for which women borrowers are more important

The hypothesis of a negative relationship between religiosity and loan losses suggested that MFIs in high religious areas will have fewer loan losses. In line with this thinking, Kanagaretnam et al. (2015) documented that banks located in religious countries are less likely to experience bank trouble or failure due to religiosity-induced risk aversion. In contrast, Adhikari and Agrawal (2016a) found that religiosity-induced risk aversion results in lower Tobin's-q for banks. Nevertheless, unlike Tobin's-q, operational self-sufficiency is different from other measures of market valuation because it is concerned with an MFI's ability to cover its costs through operating income. For MFIs, the loan portfolio is of utmost importance because it is by far the largest asset (Yimga, 2016a). Thus, for most MFIs, the proportion of investments in other assets is negligible (Gul et al. 2017; Ahlin et al. 2011). Consistent with this, Schaffer and Fukasawa (2011) documented a negative relationship between loan losses and the operational self-sufficiency of MFIs. Therefore, to the extent that religiosity-induced risk aversion reduces loan losses, it will result in higher operational self-sufficiency. We, therefore, hypothesize that:

H3: MFIs in countries with higher levels of religiosity are more operationally self-sufficient.

3. Research Design

3.1. Sample

Data for this study may be classified into three: data relating to microfinance institutions (MFIs), religiosity and country. MFI-specific data is obtained from the Microfinance Information Exchange Database (MIX Market). The MIX Market database hosts high-quality data on MFIs around the world (Servin et al. 2012) and has been used extensively in several recent studies (Blanco-Oliver et al. 2016; Wijesiri, 2016; Bogan, 2012; Servin et al. 2012; Gul et al. 2017). The study uses data on MFIs located in developing countries where intra-country religiosity data is not available. Therefore, in contrast to previous religiosity studies (Hilary and Hui, 2009; Adhikari and Agrawal, 2016a; He and Hu, 2016) that focused on the United States, we use data from 69 countries to test our hypotheses. This provides an interesting setting to study religious diversity relative to the USA where religious diversity is low (Cooperman et al. 2014).

In determining the sample size, all MFIs in the MIX Market Database from 1996-2017 were considered. Consistent with prior MFI literature we applied several filters. First, in consonance with Ahlin et al. (2011) MFIs for which data was not annual or the fiscal year does not end in December were excluded from the sample. Second, following Gul et al. (2017) MFIs without at least 5 years' data were also dropped. Lastly, we noted that most of the country level data were not available for the sampled countries prior to 2006. Therefore, the sample was started from 2006 and ended in 2015.

In studies involving the use of panel data, a choice is made between balanced and unbalanced panels. Baum (2006) noted that often an unbalanced panel is preferable. This is due to two main reasons. First, loan losses are the major cause of MFI collapses. By allowing for entry and exit we capture much of the MFI-level heterogeneity in loan losses required for this study. Second, most panels are unbalanced in the real world (Greene, 2008), consequently, an unbalanced panel makes the sample more representative of the population. Based on these we favour the use of an unbalanced panel. The final sample thus consists of an unbalanced panel of 770 unique MFIs across 69 countries over a 10-year period (2006-2015). Compared to previous studies that used MIX Market data (Gul et al, 2017; Blanco-Oliver et al. 2016; Wijesiri, 2016; Bogan, 2012; Servin et al. 2012), the sampling technique yielded the largest number of observations and this augurs well for improving the power of the tests.

3.2. Dependent variables

This study investigates the effect of religiosity on loan losses and operational self-sufficiency in MFIs. The dependent variables include operational self-sufficiency (*OSS*) and loan losses. Following D'Espallier et al. (2010), we carefully employ three different proxies to capture loan losses at different stages. First, we use portfolio quality (*Par30*) measured as the portfolio at risk for 30 days. This measures loan losses at the early stages where loans are 30 days past due but not necessarily written off. Second, we employ the write-off ratio (*writeoffratio*) to capture the total value of loans written-off and removed from the balance sheet. Lastly, we use the loan loss rate (*loanlossrate*) which represents written-off loans less amounts recovered from written-off loans. Data relating to the dependent variables are obtained from the MIX Market database and are as defined below:

$$\text{Operational self-sufficiency} = \frac{\text{Operating Revenue}}{(\text{Financial Expense on funding liabilities} + \text{Net impairment loss on gross loans} + \text{Operating expense})} \quad (1)$$

$$\text{Loan Loss Rate} = \frac{\text{Loan write offs} - \text{Recovered loans}}{\text{Average gross loan portfolio}} \quad (2)$$

$$\text{Portfolio Quality} = \frac{\{(\text{Outstanding balance} + \text{Portfolio Overdue}) > 30 \text{ days} + \text{Renegotiated loans}\}}{\text{Gross loan portfolio}} \quad (3)$$

$$\text{Write-off ratio} = \frac{\text{Value of loans written off}}{\text{Average gross loan portfolio}} \quad (4)$$

3.3. Main Independent Variable- Religiosity

Following prior studies (McGuire et al. 2015; Adhikari and Agrawal, 2016a; Hilary and Hui, 2009; He and Hu, 2016), we obtain religiosity data from the Religious Congregations Membership Study hosted on the website of the American Religion Data Archive (ARDA). The ARDA website hosts survey data on country-level religiosity statistics every 10 years. Specifically, ARDA measures religiosity in a country by dividing the total number of religious adherents by the total country population. We use dataset for 2000 and 2010 and linearly interpolate the decennial data for the other years. This approach is consistent with previous studies in this area (Adhikari and Agrawal, 2016a; Hilary and Hui, 2009; He and Hu, 2016).

3.4. MFI-Specific Controls

We include a number of MFI-level characteristics. In particular, we control for the average outstanding loan amount (*Outstanding loan*), risk coverage (*Risk coverage*), loan officer efficiency (*Loan officer efficiency*), cost per borrower (*Cost per borrower*), outreach (*Outreach*),

number of depositors (*Depositors*) and MFI size (*Size*). Existing studies suggest that these firm characteristics may influence loan losses. For example, Navajas et al. (2000) argued that to reduce loan losses MFIs rely on soft information to effectively monitor borrowers. Consistent with this, Tchuigoua, (2016) found smaller MFIs to be better users of soft information suggesting that smaller MFIs have fewer loan losses. Further, D’Espallier et al. (2011) opined that loan officer efficiency, the cost per borrower and the amount of outstanding loan may impact loan write-offs. More so, with a high number of depositors, MFIs are able to reduce loan losses by using customer deposits as collateral. Again, given that MFIs focus on the provision of financial services (credit and savings) to the poor, low-income persons and informal businesses (Becchetti and Castriota, 2011; D’Espallier et al. 2011; Rai and Ravi, 2011), loan losses may be higher in MFIs with larger outreach. Lastly, risk coverage is an indication of how much of the loan portfolio risk is covered by the loan loss allowance. Risk-averse managers are conservative (Choma et al. 2014) and are more likely to have higher loan loss allowance (risk coverage). Thus, higher risk coverage is an indication of managerial risk aversion and should impact negatively on loan losses.

3.5. Country-Level controls

Our regressions also control for a number of country-level variables namely: population, unemployment, inequality, gross national income per capita (GNIpercapita), inflation, rule of law, contract cost, and control of corruption. Following Adhikari and Agrawal (2016a) we include country population in our regressions. MFIs in high populated countries face higher competition (He and Hu, 2016) and this incentivises borrowers to take multiple loans resulting in repayment problems (Mcintosh, 2015). In a theoretical model, Kumhof et al. (2015) argued that income inequalities increase loans contracted by the poor, and this results in loan defaults. We, therefore, control for the level of income inequality (*inequality*). Also, subsequent to the findings of Ghosh (2015) that suggested a positive relationship between non-performing loans and unemployment, we include unemployment in our list of control variables. We also control for the rate of inflation because higher inflation increases prices of goods and services, reduce purchasing power and increases the probability of loan defaults (Chandra and Bahner, 1985). Further, in consonance with Balgova et al. (2016), we control for country-level corruption, GNI per capita and rule of law. Lastly, we argue that the average costs of enforcing a contract may affect loan losses. That is, relative to traditional banks, MFIs grant smaller loans. Therefore, MFI in countries where loan contracts are costly to enforce may have higher loan losses. This is particularly true when the cost of enforcing a

loan contract is higher than the loan itself. Consequently, we include contract costs in our lists of control variables.

3.6. Econometric Specification.

A fixed effects model² is employed to test all our hypotheses. To test the effect of religiosity on loan losses as well as operational self-sufficiency we adopt the following estimation:

$$\text{Loanlosses or OSS}_{i,c,t} = \alpha + \beta \text{Religiosity}_{c,t} + \gamma \text{MFIControls}_{i,c,t} + \psi \text{CountryControls}_{c,t} + \text{Year}_t + \delta_{i,c,t} + \varepsilon_{i,c,t} \quad (5)$$

To examine the effect of religiosity on the borrower-loan losses relationship we adopt the following estimation:

$$\text{Loanlosses or OSS}_{i,t} = \alpha + \beta \text{Religiosity}_{c,t} * \text{Gender}_{i,c,t} + \gamma \text{MFIControls}_{i,c,t} + \psi \text{CountryControls}_{c,t} + \text{Year}_t + \delta_{i,c,t} + \varepsilon_{i,c,t} \quad (6)$$

Where i , c and t index MFI, country and time respectively. The dependent variable *loanlosses* is one of three measures of loan losses (loan loss rate, write-off ratio, and loan portfolio quality), and *OSS* as a measure of operational self-sufficiency. *Gender* refers to the fraction of female borrowers. *MFIControls* is a vector of MFI-specific control variables. Specifically, these include size, risk-coverage, outreach, depositors, loan officer efficiency, outstanding loan, and cost per borrower. *CountryControls* is a vector of country control variables which includes Unemployment, inequality, population, GNI per capita, inflation, rule of law, contract cost and corruption. Consistent with Adhikari and Agrawal, (2016a), all regressions include year fixed effects and are clustered at the firm level (MFI) to correct for heteroscedasticity. Appendix A provides definitions for variables used in the regressions.

3.7. Descriptive Statistics

Results of the descriptive statistics are presented in Table 1. Panel A and B show results for the dependent variables and religiosity measures. It indicates that *loan loss rate*, *the write-off*

² This is based on the results of the Hausman test (Hausman, 1978) that rejects the null hypothesis that individual effects are uncorrelated.

ratio and the *Par30* have means of 1.37%, 1.93% and 5.70% respectively. These indicate the average *loan loss rates*, *write-off ratios* and *portfolio quality* of MFIs in our sample. The results are similar to those reported by D’Espallier et al. (2011). Further, *OSS* has a mean of 1.16 indicating that most of the sampled MFIs are operationally self-sufficient ($OSS > 1$). Again, *religiosity* has a mean of 57.04% and a standard deviation of 40.56%. The higher standard deviation relative to previous intra-country studies³ confirms the argument of Adhikari and Agrawal (2016a) that inter-country variation in religiosity is more salient. More so, in the sampled countries 10.68% of the population are Protestants whilst 35.57% are Catholics.

Panel C presents results for the MFI-specific characteristics. It shows that *Gender* has a mean of 50.08% indicating that over 50% of people who borrow from MFIs are women. This is consistent with Strom et al. (2014) assertion that MFIs target women borrowers. Interestingly, some MFIs have 100% women borrowers whilst others have no women borrowers as indicated by the minimum and maximum values of *Gender*. On average MFIs incur a cost of \$215 per active borrower (Mean *costofborrower* = 215). MFIs in our sample have an average *riskcoverage* of 2.5719 indicating the preparedness of MFIs to absorb credit loan losses. Further, *size*, *depositors* and *outstandingloan* have means of 16.225, 4.2099 and 0.7748 respectively. Interestingly, *loanofficerefficiency* has a mean of 319.03. This implies a 319:1 borrower-to-loan officer ratio.

Results in Panel D show descriptive statistics for the country-level control variables. The mean *unemployment* rate is 7.7110% and that of *inflation* is 6.3792%. These imply that MFIs are mainly located in developing countries with relatively high unemployment and inflation rates. Again, the average level of *inequality* is 44.228. This is comparable to Seven and Coskun (2016) who reported an average *inequality* (Gini Index) of 40.34 across 45 emerging markets. However, compared to the 29.625 reported in Europe (Baiardi and Morana, 2017), it can be argued that inequalities are higher in our sampled countries. Again, the mean for *population* is 17.890 and that of *GNIpercapita* is \$3569.9. The lower per capita GNI imply that MFIs are mainly located in poor countries. Further, *ruleoflaw* has a mean of -0.5935 indicating poor quality of contract enforcement in the countries where MFIs are located. This is coupled with higher *contractcosts* (mean of 47.237) and high level of *corruption* (mean of 33.739).

³ Previous US studies including Hilary and Hui, (2009); He and Hu (2016); and Adhikari and Agrawal (2016) reported standard deviations of 0.119, 0.124, and 0.129 respectively.

[INSEERT TABLE 1 ABOUT HERE]

4. Empirical Results

4.1. Multivariate Regression Analysis

To check for multicollinearity, a correlation matrix of the independent variables is presented in Table 2. Generally, a correlation greater than or equal to 0.7 is an indication of multicollinearity (Liu et al. 2014). However, results of the correlation matrix show that all the correlations are less than 0.4. This indicates that multicollinearity is not a major concern in our regression estimates. Following Adhikari and Agrawal (2016a), we cluster the standard errors at the MFI level to reduce heteroscedasticity.

[INSEERT TABLE 2 ABOUT HERE]

Columns 1-3 of Table 3 present results of the regressions of different measurement of loan losses and *religiosity*. Results in columns 1 show that *religiosity* has a negative relationship with the *write-off ratio* and the relationship is statistically significant at the 1% level. This result indicates that MFIs located in more religious areas have lower loan losses measured as the fraction of loans that have been removed from the balance of gross loan portfolio because they are highly unlikely to be repaid. In terms of economic significance, the estimated coefficient (-0.0197) suggests that a one standard deviation increase in the level of *religiosity* reduces the *write-off ratio* by 0.007 (i.e. -0.0197×0.4056). Also, in column 2 *religiosity* obtains a negative and statistically significant coefficient in explaining *loanlossrate*. The estimated coefficient of -0.0206 imply that MFIs in more religious countries experience lower loan loss rates after controlling for several MFI and country level characteristics. Specifically, a one standard deviation increase in *religiosity* reduces *loanlossrate* by 0.008. The results in column 3 are similar when we consider *Par30*, which captures the portion of loans (including the value of all renegotiated loans) greater than 30 days past due over the gross loan portfolio. Again, *religiosity* exhibits a negative and statistically significant relationship suggesting that religiosity improves loan portfolio quality. Specifically, the coefficient estimate of -0.0390 indicates that a one standard deviation increase in *religiosity* reduces loan portfolio at risk for 30 days by 0.0158.

We offer a comparison of the economic significance of the national religiosity-loan losses relationship to that of local religiosity and risk. Similar calculation by Adhikari and Agrawal (2016a) showed that a one standard deviation increase in local *religiosity* leads to a decrease of about 0.0007, 0.0015, and 0.0007 in *total risk*, *tail risk* and *idiosyncratic risk* respectively, which are lower than the impact of national religiosity on *writeoffratio* (0.007), *loanlossrate* (0.008), and *Par30* (0.0158).

These results are consistent with H1 and indicate that MFIs located in high religious countries have fewer loan losses. After reporting a negative relationship between religiosity and risk-taking in US banks, Adhikari and Agrawal (2016a) suggested that religiosity induces risk-aversion at the firm level. However, Hu and He (2016) argued that risk-averse lenders may reduce loan losses by either declining risky borrowers or by granting them small loans. Therefore, the findings could be attributed to religiosity-induced lender risk-aversion that results in the granting of small loans or in declining loan applications of high-risk borrowers and ultimately reducing loan losses. More so, Weaver and Angle (2002) suggest that religiosity promotes exemplary conduct and dissuades questionable behaviour. Indeed, loan default is a questionable behaviour. Therefore, to the extent that lenders in high religious countries may lend to religious borrowers, the result could also be attributed to better religiosity-induced loan repayment records of religious borrowers.

We next examine whether the negative religiosity-loan losses relationship is more negative when there are women borrowers. The results are presented in columns 4-6 of Table 3. In column 4, the religiosity-woman borrower interaction (*religiosity*Gender*) assumes a positive relationship with *writeoffratio* but the relationship is not statistically significant. However, the coefficient of women borrowers (*Gender*) as well as that of *religiosity* obtains negative and statistically relationships with *writeoffratio*. Similar results are reported in columns 5&6 where *religiosity*gender* obtain positive but statistically insignificant coefficients in explaining both *loanlossrate* and *Par30*. This is in contrast to H2 and suggests that religiosity does not improve the loan repayment record of women borrowers. Prior studies suggest that religiosity, evokes ethicality (Wong and Vinsky, 2008) and honesty (Weaver and Agle, 2012) and that relative to men women are more religious. Based on these, He and Hu (2016) document that religious borrowers enjoy better loan terms. Further, D'Espallier et al. (2011) reported that women borrowers have better loan repayment records. However, our evidence suggests that the better repayment records of women are not religiosity-induced. Our result is reminiscent of Chaves (2010) “religious congruence fallacy”

where religiosity does not fully determine the behaviour of individual religious adherents so that religiosity does not improve borrower repayment behaviour.

Finally, we examine the effect of *religiosity* on the operational self-sufficiency (*OSS*) of MFIs. Results in column 7 show that *religiosity* positively predicts *OSS* and the relationship is statistically significant at the 1% level. This is consistent with H3 and implies that on average MFIs in more religious countries are more operationally self-sufficient. In economic terms, the estimated coefficient of 0.0910 on *religiosity* indicates that a one standard deviation increase in *religiosity* increases *OSS* by 0.0369. The results are consistent with H3 and indicate that MFIs in high religious countries are more operationally-self-sufficient. The results are consistent with the findings of Hilary and Hui (2009) who reported evidence of religiosity induced risk-taking. Thus, given that the loan portfolio is the biggest asset of an MFI (Yimga, 2015), loan losses can render MFIs operationally self-insufficient. Therefore, to the extent that religiosity reduces loan losses it will improve the operational self-sufficiency of MFIs.

[INSEERT TABLE 3 ABOUT HERE]

4.2. Further Analyses: Catholics versus Protestants

Religious commitment is an embodiment of three aspects of religion: beliefs, belonging and behaviour (Wald and Smidt, 1993; Johnstone, 1992; Stark and Bainbridge, 1985). Based on these measures prior literature suggests that Protestants are more committed to their religion than Catholics (Leege et al. 1993; Mockabee et al. 2001). For instance, church attendance is more normative among Protestants (Leege, 1995), Catholics exhibit strikingly lower levels of Bible reading relative to Protestants (Leege et al. 1993) and gambling propensities are stronger in regions with a higher concentration of Catholics compared to Protestants (Kumar et al. 2011). Based on these, we investigate how the religiosity-loan losses relationship varies among Catholics and Protestants.

Table 4 presents the results of Catholics and Protestants on the various measures of loan losses. For brevity we only present results for the independent variables. The results in columns 1-3 show that the coefficients of both *Religiosity-Catholics* and *Religiosity-Protestants* assume a negative relationship in explaining all three measures of loan losses. This indicates that MFIs in either Catholic or Protestant dominated countries have lower loan

losses. Interestingly, the point estimate on *Religiosity-Protestants* is higher than that of *Catholics-Protestants*, suggesting that the religiosity-loan losses relationship is more negative for MFIs in Protestant-dominated countries.

4.3. Religiosity, Loan Losses and Operational Self-Sufficiency

It was argued in the third hypothesis that religiosity will improve MFIs operational self-sufficiency through a reduction in loan losses. We then captured loan losses with three different proxies (loan portfolio at risk, loan write-off ratio and loan loss rate). However, as explained in section 3.2, each of these proxies captures loan losses at different stages. For example, *Par30* captures loan portfolio quality including loans that are overdue for 30 days, *writeoffratio* focuses on loans that have been written off from the balance, whilst *loanlossrate* takes into account the amount recovered from written off loans.

We, therefore, investigate the channel through which *Religiosity* improves *OSS*. To achieve this, we include loan losses (*Par30*, *loanlossrate*, *writeoffratio*) and an interaction variable for each of the loan losses proxies and *Religiosity* (*religiosity*Par30*, *religiosity*writeoffratio*, *religiosity*loanlossrate*) in equation 5. The results are presented in Table 4. In columns 4, 5 & 6, *writeoffratio*, *loanlossrate* and *Par30* obtain negative and statistically significant coefficients in explaining *OSS*. These results suggest that higher loan losses reduce MFIs' operational self-sufficiency. The finding is intuitive because the loan portfolio is the largest asset (Yimga, 2016) and the main source of operating revenue (Ahlin et al. 2011; Gul et al. 2017) for MFIs. For the interaction terms, results in columns 4&5 show that both *religiosity*writeoffratio* and *religiosity*loanlossrate* obtain positive and statistically significant coefficients in explaining *OSS*. Interestingly, although *religiosity*Par30* assumes a positive relationship with *OSS* the relationship is not statistically significant. Given that *Par30* merely captures loans which are 30 days or more overdue (not loans written off from the balance sheet) the insignificance of *religiosity*Par30* in explaining *OSS* is not surprising. Overall, the results indicate that the write-off ratio and loan loss rates are the channels through which religiosity improves operational self-sufficiency.

4.4. Religiosity and Loan Size per Borrower

Existing studies suggest a positive link between religiosity and personal risk-aversion (Osoba, 2003; Diaz, 2000). There is also evidence that this relationship exists at the corporate level:

firms located in areas with higher levels of religiosity display higher degree of risk-aversion (Hilary and Hui, 2009). More specifically, Adhikari and Agrawal (2016a) reported evidence of religiosity-induced risk-aversion in US banks. Their results suggest that banks headquartered in religious areas follow a more defensive risk-culture. We, therefore, investigate the proposition that MFIs in high religious countries will exhibit religiosity-induced risk aversion. He and Hu (2016) noted that banks reduce their risk exposure to loan defaults by giving small loans. In fact, Rosenberg (2010) opined that for MFIs the average loan size per borrower is a reflection of MFIs risk policy rather than the borrower's need and repayment capacity. Thus, risk-averse managers will favour smaller average loan size. Consequently, we expect religiosity to impact negatively on the average loan size per borrower due to religiosity-induced risk aversion.

To test this conjecture, we re-estimate equation 5 by replacing the dependent variable with the loan size per borrower (*loansize*). The results are presented in Table 5. In column 7, religiosity obtains a negative and statistically significant relationship in explaining loan size. This indicates that MFIs in highly religious countries demonstrate religiosity-induced risk aversion by offering smaller loans to borrowers. The result is consistent with previous US studies (Adhikari and Agrawal, 2016a; Hilary and Hui, 2009) that documented evidence of risk-aversion in US banks located in high religious areas. He and Hu (2016) reported that borrowers located in high religious areas obtain larger loan amounts. Our evidence suggests that MFIs (lenders) in high religious areas offer small loan sizes.

[INSEERT TABLE 4 ABOUT HERE]

5. Robustness Tests

In consonance with related studies in this area, we conduct a rich set of robustness tests.

5.1. The Financial Crisis

Our sample period covers the 2008-2009 global financial crisis that affected financial institutions around the world. Therefore, a concern is whether the results are driven by the crisis period. We address this issue in two ways and present the results in Table 5. First, we re-examine the religiosity-loan losses relationship by considering the crisis period. The objective is to determine whether religiosity impacted loan losses differently during the crisis.

Results in columns 1-3 show that *religiosity*crisis* exhibit a negative and statistically significant relationship in explaining *writetoffratio*, *loanlossrate* and *Par30*. Further, across columns 1-3 *religiosity (crisis)* exhibits a negative (positive) and statistically significant relationship with all the measures of loan losses. These imply that, although the crisis generally increased loan losses in MFIs, the loan losses were less severe for MFIs in high religious countries.

Second, we test how religiosity affects loan losses in normal periods. Specifically, we repeat the regressions by excluding the 2008 and 2009 fiscal years. The results as presented in columns 4-6 of Table 5 indicate that *religiosity* has a negative and statistically significant relationship with loan losses and imply that the negative religiosity-loan losses relationship is not peculiar to the crisis period. These suggest that our results are not driven by the financial crisis.

[INSEERT TABLE 5 ABOUT HERE]

5.2. Impact of Geographical Clustering

Although we clustered all our regressions at the MFI level, our measure of religiosity is calculated at the country level. Consequently, our results might be biased if the policies of different MFIs in a given country are correlated. Consequently, we adjust standard errors for clustering effect at the country level. In Table 6 (Columns 1-3), the results remain unchanged. Further, MIX Market classifies the countries in our sample into five regions: Sub-Saharan Africa, South and East Asia and the Pacific, Eastern and Central Asia, Latin America and the Caribbean, as well as Middle East and North Africa. Consequently, we adopt a more conservative approach and cluster standard errors at the regional level. In Table 6 (Columns 4-6) the results remain essentially unchanged. More so, as an improvement to previous studies (Hilary and Hui, 2009; Kumar et al. 2011; He and Hu, 2016; Adhikari and Agrawal, 2016a), we employ the *cluster2* command in Stata to simultaneously adjust standard errors for both country and region. The results (untabulated) remain unchanged when we do so. These indicate the robustness of our results to geographical clustering.

5.3. Endogeneity and Two-Stage Least Square (2SLS)

Another concern is that our results are affected by endogenous movements in demographics. To address this, we follow previous religiosity studies (Hilary and Hui, 2009; He and Hu, 2016; Adikahri and Agrawal, 2016a) and address this using a two-stage least squares

regression. Hilary and Hui (2009) argued that the 2SLS mitigates issues of reverse causality, removes potential measurement errors in the level of religiosity, and eradicates estimation biases that may arise as a result of omitted correlated variables. In identifying suitable instruments for the 2SLS we follow previous studies in this area. Kumar et al. (2011), as well as Hilary and Hui (2009), employed three-year lagged value of religiosity as instruments in their 2SLS estimation. In more recent US studies, He and Hu (2016) used religiosity in 1980 as an instrument whilst Adhikari and Agrawal (2016a) employed religiosity measures in 1952-the first time that religiosity data was collected by ARDA. However, our study involves several countries for which religiosity data was only available from 1990. Therefore, we employ religiosity data for 1990 as instruments.

As argued by Adhikari and Agrawal (2016aa), the level of religiosity in 1990 satisfies the relevance and exclusion criteria. Thus, on the one hand, it is expected to be highly correlated with present levels of religiosity due to path dependence. On the other hand, our sample spans from 2006-2015 making it improbable that religiosity levels 16 years ago will directly impact loan losses except through current levels of religiosity. Results of the second stage regression estimates of the 2SLS are presented in Table 6 (Columns 7-9). It indicates that the predicted value of religiosity ($\hat{Religiosity}$) obtains a negative and statistically significant relationship with *writeoffratio*, *loanlossrate*, and *Par30*. These confirm the earlier religiosity-loan losses relationship imply that our results are robust to endogeneity and omitted variables.

[INSEERT TABLE 6 ABOUT HERE]

5.4. Coefficient Stability and Omitted Variable Bias.

Another concern is the possibility that our results are driven by unspecified omitted variables so that our measure of religiosity merely captures other factors that are omitted from our estimation technique. To address this, we specifically investigate the possibility that our religiosity-loan losses relationship is driven by omitted variable bias. In doing so, we adopt the novel method developed by Oster (2017) for assessing bias from unobservable factors. Within the Oster (2017) test, our regression estimates are not driven by omitted variables if the bias-adjusted coefficient of religiosity moves further away from zero in both directions and the changes in the bias-adjusted coefficient fall within the 95% confidence intervals of the main controlled regression. Although this method has recently been used in the

economics literature (Mian and Sufi, 2014; Jha, 2015), it is new to the religiosity and social finance literature.

The results are presented in Table 7. Columns 1 and 2 show the coefficient and the confidence intervals of the controlled regressions presented in Table 2 (Columns 1-3). Column 3 of Table 7 shows the identified set of bounds for the coefficient of both the controlled (β^{\wedge}) and the uncontrolled (β^*) regressions which are calculated based on the values of R_{max} and $\delta = 1$ using Stata command *psacalc* provided by Oster (2017). In column 4, we report whether the bias-adjusted coefficient moves further away from zero in both directions. Finally, Column 5 reports whether the changes in the bias-adjusted coefficient falls within the 95% confidence intervals of the estimated coefficient in the main controlled regression. The results in Table 7 indicate that all the identified sets of bounds move away from zero and the identified set of all regressions are within the confidence intervals of the controlled effects. These imply that omitted variables are unlikely to drive our results.

Second, we adopt the approach used by previous studies in this area (Hilary and Hui, 2009; He and Hu, 2016; Adhikari and Agrawal, 2016a) to address the issue of omitted variables bias by adding additional control variables. Thus, we add several country-level control variables to our baseline model. Specifically, we include bank non-performing loans to gross loans, domestic credit by the financial sector, borrowers from commercial banks, literacy rates, net domestic credit, net foreign assets, political stability, creditor participation index, and ease of doing business. The results (untabulated) still hold when we include these set of country-level controls. We further follow Chen et al. (2016) and include another set of control variables such as common law, creditor rights and uncertainty avoidance. Again, our results (untabulated) remain unchanged. The results are consistent with the Oster (2017) test and confirm that our regression estimates are not driven by omitted variable bias.

[INSEERT TABLE 7 ABOUT HERE]

5.5. *Diamond Star Greater than 3*

The study utilizes data from the MIX Market database. MIX Market provides self-reported MFI data which may be either audited or un-audited, raising issues of data reliability. Nevertheless, Mix Market assigns diamond ratings of 1-5 to MFIs based on the quality and reliability of information reported, where MFIs with diamond star 4 and above have financial

statements audited by a third party auditing firm. Therefore, in consonance with previous MFI studies (Quayes, 2012; Assefa et al. 2013; Louis and Baesens 2013; Gul et al. 2017), we check whether our results would be different if we restricted our sample to only MFIs with diamond star 4 and above.

The results are presented in Table 8. In column 1, the coefficient of religiosity assumes a negative and statistically significant relationship in predicting *writeoffratio*. Similarly, the coefficient of *religiosity* obtains a negative and statistically significant relationship in explaining *loanlossrate* and *Par30* in columns 3 &4 respectively. These indicate that our results in the full sample continue to hold in this sub-sample.

5.6. Alternative Estimation Technique

There is generally a lack of unanimity regarding the extent of time series variation in the *religiosity* measure. For example, Hilary and Hui (2009) assumed low time series in their religiosity measure and thus adopted an OLS model. A major caveat of this approach is that firm-specific unobserved heterogeneity could impact the results if the individual firm effects are correlated. In contrast, Adhikari and Agrawal (2016a) noted large time series variations in the religiosity measure. They thus retorted “if the explanatory variable of interest has substantial time-series variation, unobserved heterogeneity is best controlled by using a fixed effects model” (Adhikari and Agrawal, 2016a p.13). Due to these, we adopted a safer approach and used a fixed effects model based on the result of the Hausman test. However, to deal with the assumption of limited time-series variation in religiosity, we follow Adhikari and Agrawal (2016a), and re-estimate our regressions using a random effects model which is better able to deal with time-invariant covariates in panel data.

The results are presented in Table 8. In Columns 4-6, *religiosity* obtains a negative and statistically significant relationship with *writeoffratio* (Column 1), *loanlossrate* (Column 2) and, *Par30* (Column 3). These indicate that our results are not driven by the choice of estimation technique.

[INSEERT TABLE 8 ABOUT HERE]

5.7. Other Tests

We also conduct several other tests which are untabulated. First, our main independent variable is *religiosity*; therefore a concern is that our results are driven by few MFIs in high religious countries. Following previous studies, we address this by first excluding the five most religious countries (Palestine, Panama, Philippines, Bolivia, and Armenia). The results remain unchanged when we do so. The results also remained unchanged when we exclude the five least religious countries (Afghanistan, Cambodia, Nepal, India, and Azerbaijan). Further, as discussed in section 3.1, we used an unbalanced panel due to its numerous advantages. However, our focus on MFIs means that there is more entry and exit in our data due to rampant collapses and subsequent formation of new MFIs relative to traditional firms. Consequently, although we used data from 770 MFIs across 69 countries our regressions show approximately 3200 observations. Nevertheless, this is generally the case with MFI data and it is consistent with other studies. For example, D’Espallier et al. (2011) using data on 350 MFIs across 70 countries had 830 observations. More recently, Gul et al. (2017) using data for 619 MFIs across 75 countries over 16 years also reported 1554 observations. However, to ensure that the frequent entry and exits does not affect our results we re-run our regressions using a balanced panel and our results remained unchanged. This indicates that the results are not affected by the frequent entry and exits.

6. Conclusion

Existing studies suggest that religion influence economic decisions and it impacts both corporate decisions and individual financial decisions. In particular, the extant literature has provided evidence that the level of religious affects corporate risk-taking in the banking sector. However, the extent of the impact of religious beliefs on the operations of MFIs has not been explored. For MFIs this is very important given the prevalence of religious beliefs in developing countries where most MFIs are located. Using a cross-country sample of 770 MFIs across 69 countries, we investigate the effect of religion on MFI outcomes. Specifically, we focus on loan losses and operational self-sufficiency due to their importance to the survival of MFIs. The results suggest that MFIs in high religious countries have fewer loan losses and are more operationally self-sufficient. Further, our findings suggest that religiosity does not improve the loan repayment behaviour of women borrowers.

The results have important implications for policymakers, governments and development agencies who have committed substantial resources to support MFIs with the view to making them operationally self-sufficient. The results also have practical implications for individuals

that make lending decisions in MFIs. This is important given the level of information asymmetry that exists in most developing countries where MFIs operate, especially information about the credit risks of potential borrowers.

Appendix A

Variable Definitions and Data Sources

Variables		Description/Measurement	Source
Full Name	Acronym		
<i>Dependent Variable</i>			
Loan Loss Rate	Loanlossrate	(Write-offs - Amount recovered from written-off loans) / Average gross loan portfolio	Mix Market
Write-Off-Ratio	Writeoffratio	Value of loans written-off / Average gross loan portfolio	MIX Market
Portfolio at risk for 30 Days	Par30	(Outstanding balance, portfolio overdue > 30 days + Renegotiated loans)/ Gross loan portfolio	MIX Market
Operational Self-Sufficiency	OSS	Financial Revenue (Total)/ (Financial Expense on funding liabilities + net impairment loss on gross loans + Operating Expense)	MIX Market
Loan Size	Loansize	Ln(Gross loan portfolio/ Total number of active borrowers)	MIX Market
<i>Main Independent Variables</i>			
Religiosity	Religiosity	Number of Religious Adherents in a Country/ The total Population	ARDA
Protestant	Protestant	Number of Religious Adherents(Protestants) in a Country/ The total Population	ARDA
Catholic		Number of Religious Adherents(Catholics) in a Country/ The total Population	ARDA
<i>MFI-Specific Characteristics</i>			
Women Borrowers	Gender	Number of active female borrowers/ Number of active borrowers	MIX Market
Cost per borrower	Costperborrower	Operating expenses/ Number of active borrowers	MIX Market
Average Outstanding loan	Outstandingloan	Gross loan portfolio/ Number of loans outstanding	MIX Market
Outreach	Outreach	Indicator variables for MFI with number of borrowers <10,000, between 10,000 and 30,000, and greater than 30,000	MIX Market
Risk-Coverage	Riskcoverage	Impairment loss allowance/ PAR > 30 days	MIX Market
Size	Size	Natural logarithm of total assets.	MIX Market

Depositors	Depositors	Natural logarithm of total depositors	MIX Market
Loan Officer Efficiency		Number of Borrowers/number of loan officers	MIX Market
<i>Country-Level Control Variables</i>			
Unemployment	Unemployment	Unemployment refers to the share of the labour force that is without work but available for and seeking employment.	WDI
Gini Index	Inequality	Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.	WDI
GNI per Capita	GNIperCapita	GNI per capita is gross national income divided by midyear population. GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.	WDI
Inflation	Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres	WDI

		formula is generally used.	
Rule of Law	Ruleoflaw	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Ranges from approximately -2.5 (weak) to 2.5 (strong) governance performance.	WDI
Contract Cost	Contractcost	Measures the cost for resolving a commercial dispute through a local first-instance court. It is calculated as the cost to enforce a contract per claim.	WDI
Control of Corruption	Corruption	Reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Ranges from approximately 0 (lowest) to 100(strong).	WDI

Appendix B
Summary of Religiosity and Other Country Measures

	Religiosity	GNI per Capita	Rule of Law	Inequality	Contract Cost
Afghanistan	0.00061724	555.4528	-1.60211	44.22836	29.000000
Albania	0.25227586	3872.702	-0.58746	39.80579	37.269232
Argentina	0.85880683	9708.946	-0.66633	45.25231	17.361538
Armenia	0.94279165	3518.281	-0.40155	31.69903	20.000000
Azerbaijan	0.02673534	4826.170	-0.76823	41.82305	18.500000
Bangladesh	0.06928772	827.9174	-0.80325	42.14603	66.800003
Benin	0.38031734	760.7573	-0.62143	44.13423	64.699997
Bolivia	0.94472679	1922.107	-1.00487	49.96511	33.200001
Bosnia and Herzegovina	0.51704244	4724.054	-0.37475	41.98183	34.958333
Brazil	0.86598192	10568.43	-0.19235	52.42573	17.393617
Bulgaria	0.82639502	6445.653	-0.12325	35.67828	23.799999
Burkina Faso	0.22857609	565.6434	-0.37480	43.03014	83.195120
Cambodia	0.00835833	771.7759	-1.05127	38.90289	103.20909
Cameroon	0.48185801	1182.646	-1.08190	44.22598	46.599998
Chile	0.89987274	10990.45	0.510751	47.04502	28.600000
China	0.05768000	4541.023	-0.40053	43.76613	14.974667
Colombia	0.91109686	6185.191	-0.41133	52.50626	47.608335
Congo DRC	0.90743636	400.9443	-1.58167	44.01007	136.76410
Costa Rica	0.91171640	7958.464	0.459375	48.96390	24.299999
Cote d'Ivoire	0.32769677	1177.877	-1.25415	44.11188	41.700001
Dominican Republic	0.86934938	5249.462	-0.64332	47.31586	40.900002
Ecuador	0.84987898	4732.664	-1.10105	49.02481	27.200001
Egypt	0.13900149	2440.448	-0.22582	44.22836	26.200001
El Salvador	0.91197701	3419.148	-0.69177	44.53349	19.200001
Georgia	0.81820488	2872.927	-0.21867	40.97853	30.882608
Ghana	0.60415626	1322.006	-0.03595	44.07485	23.000000
Guatemala	0.93157767	2763.172	-1.08453	46.53733	26.500000
Haiti	0.84709190	697.2235	-1.39152	45.09149	42.599998
Honduras	0.91019194	1868.497	-0.97632	54.06783	35.200001
India	0.02224455	1362.912	-0.01137	43.24034	39.599998
Indonesia	0.09639068	2879.160	-0.64607	44.04535	137.34903
Jordan	0.05900952	3597.336	0.373058	44.22836	31.200001
Kazakhstan	0.36220188	7864.056	-0.71526	29.72083	22.000000
Kenya	0.60016065	983.0348	-0.83689	44.46190	38.254545
Kosovo	0.27674364	3355.675	-0.68740	34.06810	33.045161
Kyrgyzstan	0.09270089	838.2631	-1.22008	31.68565	40.762376
Laos	0.17380000	1068.777	-0.82573	43.25323	31.600000
Lebanon	0.41816000	7650.113	-0.64736	44.22836	30.799999
Macedonia	0.57615998	4290.324	-0.32735	43.48557	29.755555
Madagascar	0.61304527	417.1688	-0.61948	43.21307	41.651065
Malawi	0.24738438	434.5681	-0.18529	44.42405	114.77241

Mali	0.02926667	665.6934	-0.34379	42.03013	52.000000
Mexico	0.90581551	9143.079	-0.55877	46.46801	32.356707
Mongolia	0.35093170	2763.404	-0.34453	39.10159	30.6.0000
Morocco	0.17632471	2750.240	-0.19605	43.86385	25.200001
Mozambique	0.64715833	431.9078	-0.65308	44.35124	125.40909
Nepal	0.01454937	575.3564	-0.80504	42.76414	26.799999
Nicaragua	0.24513691	1557.493	-0.74145	44.33119	26.799999
Nigeria	0.80466667	2186.162	-1.14120	44.08032	82.584314
Pakistan	0.80296023	1105.211	-0.85146	38.51121	22.739285
Palestine	0.97908076	2510.625	-0.46920	40.47900	27.000000
Panama	0.95930244	7786.917	-0.14749	52.34324	43.513514
Papua New Guinea	0.93150436	1283.535	-0.93157	44.19518	110.30000
Paraguay	0.93277141	2964.323	-0.90288	50.49218	30.000000
Peru	0.92085173	4665.505	-0.65544	47.39711	35.700001
Philippines	0.94847983	2634.390	-0.48886	43.98268	26.613913
Romania	0.77291818	8098.905	-0.00022	33.98484	25.300000
Russia	0.83106609	10229.26	-0.84441	41.44802	13.932450
Rwanda	0.13692000	549.7016	-0.40066	45.95186	78.864945
Senegal	0.82571481	982.3388	-0.27878	43.51985	28.924490
Serbia	0.55049998	5191.148	-0.46057	33.81723	30.153846
South Africa	0.82098462	7147.968	0.098731	49.18197	33.200001
Sri Lanka	0.07343067	2627.735	0.014874	42.21651	22.799999
Tajikistan	0.82151881	832.0490	-1.16146	37.95008	25.500000
Tanzania	0.77711529	699.1975	-0.44927	43.10107	14.300000
Togo	0.03688493	441.3416	-0.92752	44.20431	47.500000
Uganda	0.82114167	576.3788	-0.38523	43.81608	41.190910
Uzbekistan	0.58304999	1403.794	-1.25942	44.22836	20.935898
Vietnam	0.81179490	1271.024	-0.43853	41.56792	29.557143

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Table 1
Descriptive Statistics-Full sample

The table reports descriptive statistics of our key variables of interest. Panel A shows the descriptive statistics of the dependent variables. Panel B shows the descriptive statistics of the independent variables. Panel C provides the descriptive statistics of MFI-specific characteristics whereas Panel D shows the descriptive statistics of the country-specific characteristics. The sample consists of MFIs in MIX Market database from 2006 to 2015. All variables in the table are defined in the Appendix A.

Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Dependent Variables						
<i>Panel A: Loan Losses and Operational Self-Sufficiency</i>						
Loan loss rate	6,865	0.0137	0.0000	0.0295	0.0000	0.1940
Write-off ratio	5,552	0.0193	0.0100	0.0341	0.0000	0.2106
Portfolio at risk 30days	5,914	0.0570	0.0300	0.0777	0.0000	0.4829
OSS	6,237	1.1600	1.1300	0.3400	0.2100	2.6000
Loan Size	6,466	6.4500	6.4600	1.2400	4.0800	9.3800
Independent Variables						
<i>Panel B: Religiosity</i>						
Religiosity	6,758	0.5704	0.8300	0.4056	0.0008	0.9800
Religiosity-Protestant	6,758	0.1068	0.0300	0.1564	0.0000	0.7700
Religiosity-Catholic	6,758	0.3557	0.2000	0.3638	0.0000	0.9650
<i>Panel C: MFI-Specific Characteristics</i>						
Women borrowers	6,865	0.5008	0.5100	0.3568	0.0000	1.0000
Cost per borrower	5,692	215.42	146.00	265.41	6.0000	1789.0
Risk-coverage	5,441	2.5719	0.9500	7.6580	0.0000	63.193
Size	6,584	16.225	16.200	1.9469	12.073	20.878
Depositors	6,865	4.2099	0.0000	5.1559	0.0000	13.722
Loan officer efficiency	5,604	319.03	260.00	242.40	41.000	1580.0
Outstandingloan	6,563	0.7748	0.8000	0.1627	0.2225	1.1713
<i>Panel D: Country-Specific Characteristics</i>						
Unemployment	5,098	7.7110	6.4700	5.5180	0.3000	31.100
Inequality	6,865	44.228	44.230	5.7376	27.360	58.470
Population	6,865	17.280	16.890	1.6922	14.542	20.994
GNI per capita	6,573	3569.9	265.70	2890.2	400.94	11191
Inflation	6,612	6.3792	5.5800	4.0457	-0.6610	21.271
Rule of law	6,865	-0.5935	-0.6100	0.4230	-1.6081	0.5107
Contract Cost	6,841	37.237	32.000	22.773	13.400	139.40
Corruption	6,865	33.739	33.180	15.786	3.4146	72.985

Table 2
Correlation Matrix

The table reports Pearson correlation coefficients among select independent and control variables.

Religiosity	1															
Gender	-0.106	1														
Outstanding loan	-0.020	0.101	1													
Unemployment	0.024	-0.148	0.005	1												
Gini	0.301	0.039	0.035	-0.173	1											
Population	-0.243	0.236	0.065	-0.370	0.039	1										
GNI per capita	0.038	-0.113	0.096	0.050	0.125	-0.027	1									
Inflation	-0.177	0.129	-0.015	-0.081	-0.221	0.141	-0.207	1								
Rule of law	-0.185	0.086	0.091	0.160	-0.032	0.304	0.153	0.014	1							
Contract Cost	-0.271	-0.017	-0.138	0.016	0.001	0.105	-0.335	0.038	-0.105	1						
Cost per borrower	0.224	-0.377	-0.151	0.118	-0.059	-0.276	0.341	-0.092	-0.063	-0.067	1					
Depositors	0.074	0.014	-0.184	-0.118	0.059	0.016	-0.186	-0.034	-0.184	0.193	-0.010	1				
Loan officer efficiency	-0.099	0.144	0.144	-0.152	0.081	0.220	-0.128	0.032	0.167	0.019	-0.336	0.067	1			
Corruption	0.150	0.000	0.089	0.188	0.195	0.019	0.315	-0.164	0.722	-0.139	0.039	-0.167	0.084	1		
Risk-coverage	-0.124	0.120	0.083	-0.052	-0.044	0.165	-0.107	0.060	0.061	0.031	-0.100	-0.035	0.089	-0.008	1	
Size	0.027	-0.174	0.018	0.085	0.018	-0.029	0.007	-0.142	-0.040	0.011	0.159	0.321	0.155	-0.014	0.020	1

Table 3
Religiosity, Borrower Gender, and Loan Losses

The table reports regression estimates of loan losses (*writeoffratio*, *loanlossrate* and *Par30*) on the religiosity proxy, *Religiosity* as shown in Columns 1-3. Columns 4-6 show the regression estimates of loan losses and borrower gender on the religiosity proxy. Column 7 shows the regression estimates of operational self-sufficiency (*OSS*) on the religiosity proxy, *Religiosity*. All the variables are defined in the Appendix A. All regressions include year fixed effects. Standard errors are corrected for heteroscedasticity and are clustered at the MFI level, and *p-values* are in parentheses. *, **, and *** show significance at the 10%, 5%, and 1% level, respectively.

	Religiosity and Loan Losses			Religiosity, Borrower Gender and Loan Losses			Religiosity and OSS
	(1) Writeoffratio	(2) Loanlossrate	(3) Par30	(4) Writeoffratio	(5) Loanlossrate	(6) Par30	(7) OSS
Religiosity	-0.0197*** (0.000)	-0.0206*** (0.000)	-0.0390*** (0.002)	-0.0276*** (0.003)	-0.0275*** (0.000)	-0.0573** (0.029)	0.0910** (0.015)
WBorrowers				-0.0189* (0.059)	-0.0161** (0.040)	-0.0648** (0.035)	
Religiosity*Gender				0.0133 (0.268)	0.0118 (0.222)	0.0323 (0.336)	
Unemployment	0.0002 (0.389)	0.0003 (0.219)	0.0005 (0.412)	0.0002 (0.444)	0.0003 (0.255)	0.0004 (0.502)	-0.0057 (0.162)
Outstandingloan	-0.0361*** (0.001)	-0.0274*** (0.004)	0.0064 (0.734)	-0.0360*** (0.001)	-0.0274*** (0.004)	0.00629 (0.736)	0.210*** (0.001)
Gini Index	0.0002 (0.185)	0.0002* (0.079)	0.0004 (0.139)	0.0002 (0.166)	0.0002* (0.071)	0.0004* (0.093)	0.0023*** (0.009)
Population	-0.0184 (0.532)	-0.0214 (0.404)	-0.0611 (0.241)	-0.0165 (0.570)	-0.0197 (0.438)	-0.0522 (0.321)	-0.332 (0.410)
Risk-Coverage	-0.0001* (0.077)	-0.0001* (0.072)	-0.0007*** (0.000)	-0.0001* (0.082)	-0.0001* (0.089)	-0.0007*** (0.000)	0.0011 (0.187)
GNIperCapita	-0.0000 (0.468)	-0.0000 (0.283)	-0.0000 (0.747)	-0.0000 (0.445)	-0.0000 (0.272)	0.0000 (0.801)	0.0000 (0.206)
Loanofficerefficiency	-0.0011*** (0.006)	-0.0012*** (0.005)	0.0220 (0.458)	-0.0877*** (0.009)	-0.0793*** (0.006)	0.0011 (0.361)	0.2730 (0.934)
Inflation	-0.0204	-0.026	-0.0540	-0.0230	-0.0280	-0.0640	0.0303

	(0.357)	(0.187)	(0.299)	(0.312)	(0.163)	(0.216)	(0.121)
Rule of Law	-0.0981*	-0.0111**	-0.0152	-0.0950*	-0.0109**	0.0136	-0.109*
	(0.084)	(0.032)	(0.206)	(0.096)	(0.035)	(0.257)	(0.060)
Contract Cost	-0.0197	-0.0180	0.0348	-0.0230	-0.0200	0.0216	-0.0377
	(0.279)	(0.283)	(0.496)	(0.212)	(0.221)	(0.668)	(0.129)
Cost per Borrower	-0.0835***	-0.0806**	0.0816	-0.0891*	-0.08506	0.0506	-0.0238***
	(0.003)	(0.034)	(0.514)	(0.086)	(0.117)	(0.647)	(0.0000)
Corruption	-0.0234*	-0.0002	-0.0028	-0.0002***	-0.0002**	-0.0003**	0.0017*
	(0.093)	(0.126)	(0.241)	(0.003)	(0.013)	(0.015)	(0.087)
Depositors	0.0198	0.0080	0.0623*	0.0002	0.0082	0.0612*	0.0026
	(0.447)	(0.717)	(0.087)	(0.474)	(0.716)	(0.091)	(0.210)
Size	-0.0032**	-0.0023***	-0.0096***	-0.0032**	-0.0023***	-0.0097***	0.0558***
	(0.029)	(0.001)	(0.002)	(0.029)	(0.001)	(0.001)	(0.000)
Constant	0.431	0.459	1.212	0.412	0.441	1.103	5.781
	(0.393)	(0.298)	(0.175)	(0.409)	(0.314)	(0.222)	(0.408)
χ^2	20.13***	4.91***	4.73***	4.50***	4.75***	4.99***	4.98***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Outreach	YES	YES	YES	YES	YES	YES	YES
Year	YES	YES	YES	YES	YES	YES	YES
N	3124	3224	3224	3124	3224	3224	3224
Adj. R-sq	0.48	0.44	0.60	0.47	0.45	0.61	0.62

Table 4
Further Analyses

The table reports regression estimates of loan losses (*writeoffratio*, *loanlossrate* and *Par30*) on the religious denominations, *Religiosity-Catholics* and *Religiosity-Protestants* (Columns 1-3). In Columns 4-6, the regressions show the results of effects of interaction between loan losses and religiosity (*Religiosity*Writeoffratio*, *Religiosity*Loanlossrate*, and *Religiosity*Par30*) on operational self-sufficiency (*OSS*). Column 7 shows the regression estimates of loan size (*loan size*) on the religiosity proxy, *Religiosity*. All the variables are defined in the Appendix A. Other control variables, not reported for brevity, are the same as in Table 3. All regressions include MFI-level controls, Country-level controls and year fixed effects. Standard errors are corrected for heteroscedasticity and are clustered at the MFI level, and *p-values* are in parentheses. * and *** show significance at the 10% and 1% level, respectively.

	Catholics Vs Protestants			Religiosity, Loan Losses and OSS			Religiosity and Loan Size
	(1) Writeoffratio	(2) Loanlossrate	(3) Par30	(4) OSS	(5) OSS	(6) OSS	(7) Loan Size
Religiosity-Catholics	-0.0210*** (0.000)	-0.0201*** (0.000)	-0.0167* (0.074)				
Religiosity-Protestants	-0.0273*** (0.000)	-0.0297*** (0.000)	-0.0561*** (0.005)				
Religiosity				0.0137 (0.734)	0.0213 (0.590)	0.0556 (0.167)	-0.0807 (0.082)
Writeoffratio				-2.157*** (0.000)			
Loanlossrate					-2.127*** (0.000)		
Par30						-0.804*** (0.000)	
Religiosity*Writeoffratio				1.761*** (0.000)			
Religiosity*Loanlossrate					1.616*** (0.000)		
Religiosity*Par30						0.115 (0.649)	
MFI-Level Controls	YES	YES	YES	YES	YES	YES	YES

Country-Level Controls	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES
χ^2	4.64***	4.98***	4.16***	11.23***	10.34***	10.52***	56.01***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	3124	3224	3214	3124	3224	3224	3224

Table 5

Robustness Tests-Religiosity, Loan Losses and Financial Crisis

The table reports regression estimates of loan losses (*writeoffratio*, *loanlossrate* and *Par30*) on the crisis period dummy, *Crisis*, religiosity proxy, *Religiosity* and its interaction with the crisis period dummy, *Religiosity*Crisis* as shown in Columns 1-3. Column 4-6 shows the results for the subsample without the crises period. All the variables are defined in the Appendix A. Other control variables, not reported for brevity, are the same as in Table 3. All regressions include MFI-level controls, Country-level controls and year fixed effects. Standard errors are corrected for heteroscedasticity and are clustered at the MFI level, and *p-values* are in parentheses. ** and *** show significance at the 5% and 1% level, respectively.

	Religiosity and Crisis			Without Crises Years		
	(1) Writeoffratio	(2) Loanlossrate	(3) Par30	(4) Writeoffratio	(5) Loanlossrate	(6) Par30
Crisis	0.0248*** (0.000)	0.0247*** (0.000)	0.0465*** (0.000)			
Religiosity	-0.0151*** (0.003)	-0.0163*** (0.000)	-0.0284*** (0.009)			
Religiosity*Crisis	-0.0085*** (0.002)	-0.0079*** (0.002)	-0.0192*** (0.000)			
Religiosity				-0.0165*** (0.001)	-0.0178*** (0.000)	-0.0249** (0.012)
MFI-Level Controls	YES	YES	YES	YES	YES	YES
Country Level Controls	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
χ^2	4.55*** (0.000)	4.84*** (0.000)	4.26*** (0.000)	4.27*** (0.000)	4.90*** (0.000)	4.24*** (0.000)
N	3124	3224	3214	2403	2487	2487

Table 6
Robustness Tests- Geographical Clustering and Endogeneity

The table reports regression estimates of loan losses (*writeoffratio*, *loanlossrate* and *Par30*) on the religiosity proxy, *Religiosity* clustered by country (Columns 1-3), clustered by region (Columns 4-6) and the results for the 2SLS (Columns 7-9). All the variables are defined in the Appendix A. All regressions include MFI-level controls, Country-level controls and year fixed effects. Standard errors are corrected for heteroscedasticity and *p-values* are in parentheses. *, ** and *** show significance at the 10%, 5% and 1% level, respectively.

	Cluster By Country			Cluster by Region			Two-Stage Least Square		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Writeoffratio	Loanlossrate	Par30	Writeoffratio	Loanlossrate	Par30	Writeoffratio	Loanlossrate	Par30
Religiosity	-0.0197*** (0.002)	-0.0206*** (0.000)	-0.0387** (0.014)	-0.0197** (0.013)	-0.0206*** (0.006)	-0.0387* (0.078)			
Religiosity [^]							-0.0228*** (0.000)	-0.0223*** (0.000)	-0.0301** (0.023)
MFI-Level Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country-Level Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year-Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES	YES
N	3124	3224	3214	3124	3224	3214	2928	3027	3017

Table 7

Robustness Test- Coefficient Stability Method- Omitted Variable Bias Test

The table reports the results of addressing the omitted variable bias using the coefficient stability method (Oster, 2017).

Regression	Variables	Controlled Regression		Adjusted Regression	Interpretation	
		(1)	(2)	(3)	(4)	(5)
		Coefficient from the Regression	95% confidence intervals of the estimated coefficient	Identified set of bounds (Controlled- Full set)	Coefficient moves away from zero	Coefficient falls within the 95% confidence intervals
Table 3						
Column 1	Religiosity	-0.0197***	(-.02980 - 0.0096)	(-0.0197; -0.0262)	YES	YES
Column 2	Religiosity	-0.0205***	(-0.0298 - 0.0112)	(-0.0205; -0.0270)	YES	YES
Column 3	Religiosity	-0.0390***	(-0.0631 - 0.0148)	(-0.0390; -0.0463)	YES	YES

Table 8

Robustness Tests: Diamond Star Greater than 3 and Alternative Estimation Technique

The table reports regression estimates of loan losses (*writeoffratio*, *loanlossrate* and *Par30*) on the religiosity proxy, *Religiosity* using MFIs with diamond ratings greater than 3 as shown in Columns 1-3. Column 4-6 shows the results of the random effects estimation. All the variables are defined in the Appendix A. Other control variables, not reported for brevity, are the same as in Table 3. All regressions include MFI-level controls, Country-level controls and year fixed effects. Standard errors are corrected for heteroscedasticity and are clustered at the MFI level, and *p-values* are in parentheses. ** and *** show significance at the 5% and 1% level, respectively.

	Diamond Greater 3			Random Effects		
	(1) Writeoffratio	(2) Loanlossrate	(3) Par30	(4) Writeoffraio	(5) Loanlossrate	(6) Par30
Religiosity	-0.0220*** (0.000)	-0.0231*** (0.000)	-0.0474*** (0.001)	-0.00685** (0.037)	-0.00761** (0.011)	-0.0217** (0.018)
MFI-Level Controls	YES	YES	YES	YES	YES	YES
Country-Level Controls	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
χ^2	4.38*** (0.000)	5.02*** (0.000)	4.00*** (0.000)	127.21*** (0.000)	116.45** (0.000)	112.63*** (0.000)
N	2180	2249	2249	3124	3224	3224