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ORIGINAL PAPER

Religion, crime, and financial reporting

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Abstract
The literature provides evidence on the separate roles of injunctive and descriptive norms in explaining corporate financial reporting, ignoring that descriptive norms are likely endogenous and partly explained by injunctive norms. We jointly analyze the direct and indirect effects of religious social norms (an injunctive norm) via local crime rates (a descriptive norm) on financial reporting quality. We find that religious social norms relate negatively to corporate earnings management and tax avoidance. We also show that this association is partially explained by crime rates in the firm's geographical environment, underlining the indirect relation between religious social norms and financial reporting quality. Overall, the study highlights the importance of considering the interrelations between injunctive and descriptive norms when analyzing the effect of norms on corporate decision-making.

Keywords Injunctive norms · Religion · Descriptive norms · Crime · Earnings management · Tax avoidance

JEL Classification D22 · M14 · M40

1 Introduction

Literature in accounting and finance suggests that managers consider injunctive and descriptive norms in their decision-making, particularly when making financial reporting decisions. McGuire et al. (2012b) find that firms manage earnings less the more they are exposed to religious social norms (henceforth "religiousness") at their headquarters' location, and Cho et al. (2020) show that firms headquartered in areas

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characterized by high crime rates are more likely to manage earnings and avoid taxes.[1] However, Evans et al. (1995) show that religiousness relates to crime rates; more generally, literature in psychology and economics suggests that descriptive norms are endogenous and driven by injunctive norms (Schultz 1999; Fortin et al. 2007). Thus, it is unclear whether there is a direct relation between religious social norms and financial reporting decisions, an indirect relation via criminality, or both. We contribute to this line of research by examining the joint effects of injunctive and descriptive norms on corporate financial reporting. In particular, we address the direct and indirect relations between religiousness, crime, and financial reporting quality.

We first consider the effects of norms for individuals in the society. Following the social identity theory (Tajfel 1981; Hogg and Abrams 1988), individuals adhere to norms prevailing in their social environment, as adopting the norms increases social recognition and violating them entails the cost of social disregard (Hechter and Opp 2001; Stavrova et al. 2013). Religion encourages moral behavior, for example, by the Ten Commandments in Christianity. Thus we expect a negative relation between religiousness and individual criminality. Next, we consider the effects of norms for managerial decision-making. Following the behavioral consistency theory (Allport 1937; Epstein 1979; Funder and Colvin 1991), employees consider norms in the firm's environment in their decision-making. Thus we expect a direct effect of religiousness on corporate financial reporting. To the extent that managers consider descriptive norms in their decision-making, we also expect an indirect effect of religiousness on corporate financial reporting through crime.

To examine these predictions, we use data on religious adherence and crime measured at the German municipality level, covering 32,973 municipality-years observations. We measure religious adherence as the proportion of Christians, relative to the total population in a municipality.[2] We capture criminality as the natural logarithm of the number of all types of crime per 100,000 inhabitants, measured at the district level. To examine the prediction that religiousness directly and indirectly relates to corporate financial reporting through crime, we combine data at the municipality and district level with data at the firm level. We capture financial reporting quality via financial reporting irregularities, such as earnings management and tax avoidance.[3] The dataset covers the years 2011–2017, resulting in 1742 firm-year observations of German publicly listed firms drawn from Thomson Reuters Datastream when using earnings management as the measure of financial reporting irregularities and 782

[1] Religion relates to financial reporting (e.g., McGuire et al. 2012b) as it works as an injunctive norm, communicating moral approval or disapproval (Cialdini et al. 1990; Arruñada 2010; Küpper 2011). The crime at headquarters' location relates to financial reporting (Cho et al. 2020), as it works as a descriptive norm referring to peers' observable behavior (Cialdini et al. 1990).

[2] The proportion of Christian adherents provides a reasonable measure of the strength of religiousness in Germany. In 2015, only 8% of the total population in Germany represented non-Christian religious adherents. The largest groups were Protestants (27%), Catholics (29%), and nondenominational citizens (36%) (Source: https://fowid.de/meldung/religionszugehoerigkeiten-deutschland-2015).

[3] We classify corporate financial reporting irregularities (e.g., earnings management) as managerial opportunism. This view is consistent with regulatory interventions intended to reduce earnings management (e.g., the Sarbanes–Oxley Act). We note that earnings management can be beneficial when managers communicate private information through earnings management (e.g., Demski 1998; Arya et al. 2003).

firm-year observations when using tax avoidance as the measure of financial reporting irregularities.

We find strong support for a negative relation between religiousness and crime. Moreover, we provide evidence on a direct positive relation between religiousness and financial reporting quality. Finally, we find some support that crime serves as a descriptive norm because crime relates to financial reporting quality, and we find an indirect relation between religiousness and financial reporting quality through crime. The results highlight the importance of considering injunctive and descriptive norms as well as their interrelations when analyzing the effects of norms on firms' decision-making.

The study contributes to the accounting and finance literature that analyzes the role of personal and social norms in explaining firm behavior.[4] Consistent with the notion that personal norms can explain managerial decision-making, Chyz (2013) finds that managers with a higher propensity for personal tax aggressiveness are associated with higher firm tax avoidance. Similarly, social norms driven by cultural characteristics, such as religion, explain firm behavior as religiousness is associated with investment decisions (e.g., Hilary and Hui 2009) and financial reporting quality (e.g., Dyreng et al. 2012). Further, managers consider the behavior of corporate and individual peers when making financial reporting decisions. Kedia et al. (2015) find that firms are more likely to manage earnings when corporate peers (e.g., firms from the same industry), by publicly announcing a restatement, indicate that they manage earnings. Cho et al. (2020) show that firms are more likely to manage earnings and avoid taxes the higher the crime rates at their headquarters' locations.

We contribute to this literature by examining the joint effect of injunctive and descriptive norms on corporate financial reporting. Since injunctive and descriptive norms are conceptually and motivationally distinct, Cialdini et al. (1990) argue that disentangling the norms' effects on behavior is warranted, especially in situations where these two types of norms operate simultaneously. We confirm sociological and accounting findings on the direct effect of injunctive norms (i.e., religious social norms) on the behavior of individuals (i.e., crime) and managerial decisions (i.e., corporate financial reporting irregularities). Consistent with the results of Cialdini et al. (1991) and Kallgren et al. (2000), we find that the effect of injunctive norms captured by religiousness on corporate financial reporting is stronger than the effect of descriptive norms captured by crime. In particular, we find that religiousness is associated with earnings management as well as tax avoidance while crime only relates to earnings management. Cialdini et al. (1991) likewise argue that an individual's perception of what other individuals do in a particular setting (i.e., descriptive norms) is more situation-specific than the perception of what other individuals approve or disapprove of (i.e., injunctive norms). Thus injunctive norms stimulate norm-consistent behavior across a wider range of settings and circumstances, in contrast with descriptive norms (Kallgren et al. 2000).

Our results are interesting for investors, regulators, and the society at large. We find that norms evolving through cultural characteristics and individuals' behavior

[4] Personal and social norms refer to a norm's enforcement, where personal norms are self-based standards associated with internalized values (e.g., Cialdini and Trost 1998) and social norms relate to a group's attitude of what ought to be done (e.g., Sunstein 1996).

explain corporate financial reporting. In particular, we find that religiousness explains criminality and fosters the creation of descriptive norms, affecting firm behavior. By highlighting the continuing importance of religion in affecting individuals' behavior, despite the continuing decline in church membership, our finding contributes to the societal debate on today's role of religion.

2 Literature review and hypotheses development

2.1 Religious social norms and behavior

The first set of hypotheses addresses the relation between religion as an injunctive norm, individual behavior, and firm behavior. In societies, norms typically constrain the behavior of individuals ("statements that regulate behavior", Horne 2001, p. 4), thereby insuring the maintenance of values (Morris 1956) and prosocial or moral behavior. Specifically, injunctive norms refer to rules or beliefs as to what constitutes morally approved or disapproved behavior (Cialdini et al. 1990).

According to Arruñada (2010) and Küpper (2011), religion works as an injunctive norm that influences behavior. For instance, Christian faith enforces moral behavior via the Ten Commandments (Hechter and Opp 2001). In particular, one of the commandments prohibits its adherents from stealing. When an individual conforms with the injunctive norms formulated by Christian faith, the individual adjusts his or her behavior. Consequently, the more individuals in a community conform to Christian faith, the lower arguably are the theft rates in this community.

The social identity theory (Tajfel 1981; Hogg and Abrams 1988) suggests a framework to describe how an individual's behavior is affected by injunctive norms. According to this theory, the individual's identity derives from the membership to a social group, such as a religion, nationality, or occupation. The individual internalizes the group's norms as adopting these norms increases social recognition, whereas violating them is punished by social disregard or even an expulsion from the group (e.g., Hechter and Opp 2001; Stavrova et al. 2013). For instance, Schultz (1999) finds that feedback interventions intended to trigger norms influence recycling among community residents. Kallgren et al. (2000) provide experimental evidence that individuals conform to an injunctive norm against littering. Fortin et al. (2007) underscore the role of social interaction for individual tax evasion. Referring to religious social norms, Cornwall (1989) finds that the likelihood of an individual following religious social norms increases if this person has friends who do so.

Collectively, these arguments suggest that individuals are less likely to commit crimes the more they are exposed to religious social norms, encouraging moral behavior. The prediction is summarized in Hypothesis H1a, as follows.

H1a Religiousness relates negatively to crime.

Besides individuals' behavior, religiousness also relates to firm behavior. Behavioral consistency theory (Allport 1937; Epstein 1979; Funder and Colvin 1991) suggests that an individual behaves consistently across situations. In particular, the individual's behavior is predictable based on the behavior in previous (similar) situa-

tions. Work in accounting and finance provides evidence consistent with the behavioral consistency theory. For instance, Chyz (2013) finds that managers with a high propensity for personal tax aggressiveness are associated with high firm-level tax avoidance. Hutton et al. (2014) suggest that managers who favor the Republican Party more likely pursue conservative firm policies than managers who favor the Democratic Party. Cronqvist et al. (2012) provide evidence on a positive relation between personal and firm leverage.

Literature in accounting and finance identifies religious social norms as a driver of firm behavior. For instance, religiousness is found to affect investment (Hilary and Hui 2009), tax avoidance (Boone et al. 2012), corporate social responsibility (McGuire et al. 2012a), corporate financial reporting (Dyreng et al. 2012; McGuire et al. 2012b), ownership structure (Hofmann et al. 2020), audits (Leventis et al. 2018), and investors' decision-making (Kumar et al. 2011; El Ghoul et al. 2012).

We follow Dyreng et al. (2012) and McGuire et al. (2012b) and study the relation between religiousness and corporate financial reporting in Germany. For a firm located in a religious area, Dyreng et al. (2012) find a lower likelihood of a financial restatement and McGuire et al. (2012b) provide evidence that this firm is less likely to manage accruals. Consistently, we expect that a firm's exposure to religious social norms relates positively to financial reporting quality (i.e., negatively to earnings management and tax avoidance), as summarized in Hypothesis H1b, as follows.

H1b Religiousness relates positively to financial reporting quality.

2.2 Religious social norms, crime, and financial reporting

The second set of hypotheses addresses the relation between descriptive norms that originate in crime and firm behavior. Besides culture driving (injunctive) norms, social norms can also originate in peer behavior. We expect that individuals' engagement in crime relates to corporate financial reporting, suggesting that individuals' inclination to commit crime constitutes a descriptive norm. Considering Hypothesis H1a, we then expect an indirect relation between religiousness and financial reporting through crime. Consequently, we predict a joint effect of religiousness and crime on financial reporting quality.

While injunctive norms inform individuals about what is commonly approved and disapproved of, descriptive norms inform individuals about what is commonly done (Cialdini et al. 1990; Kallgren et al. 2000). Although the existence and role of descriptive norms is conceptually appealing, identifying the effects of descriptive norms empirically is challenging because these norms carry information about individuals' common behavior and are thus self-referential (see Küpper 2011, p. 75). For instance, if a group of firms does not manage earnings, a researcher cannot conclude that this common behavior is evidence for the existence of a descriptive norm to *not* manage earnings. Our identification strategy is to identify the specific behavior of a group of individuals and to show that this behavior enforces a distinct behavior of another group of individuals.

The literature suggests that managers consider corporate peers' behavior as well as individual peers' behavior when making financial reporting decisions, emphasizing

the role of descriptive norms in guiding behavior. For instance, Kedia et al. (2015) identify a descriptive norm at the firm level (i.e., peer firms' financial reporting) by showing that a firm's likelihood of managing earnings increases if peer firms commit misconduct. Cho et al. (2020) identifies a descriptive norm at the individual level (i.e., crime) by providing evidence that firms headquartered in areas characterized by high crime rates are more likely to manage earnings and avoid taxes. Holzman et al. (2019) provide further evidence on the interrelation between corporate and individual peers' behavior by finding that neighborhood crime increases after visible accounting frauds by firms.

Following Becker (1968), an individual's decision to commit crime can be characterized as the outcome of a cost–benefit analysis.[5] Extending the individual's cost–benefit analysis with the normative role of crime, Kahan (1997) argues that an individual's criminality is reinforced by the criminality of the person's peers. Specifically, when peers commit crimes, this suggests to the individual that the moral aversion to crime (ex-ante psychic cost), the detection risk, and the reputational loss when being arrested and convicted (ex-post psychic cost) are low. Consequently, when crime is widespread, the individual is more likely to commit crime, reinforcing a descriptive norm to engage in crime or restricting a descriptive norm to not do so.

While crime can constitute a variety of conduct, including theft, fraud, or property damage, financial reporting decisions often relate to perfectly legal earnings management or tax avoidance. However, as the detection risk and the psychic costs involved with moral aversion and reputational loss are also relevant for the trade-off associated with financial reporting decisions, widespread crime can serve as a descriptive norm that affects managers' decisions regarding financial reporting quality.

Combining the prior arguments, we expect managers to consider descriptive norms that originate in crime in the firms' environment when making financial reporting decisions. The prediction is summarized in Hypothesis H2, as follows.

H2 Crime relates negatively to financial reporting quality.

Finding evidence for a direct effect of religiousness on crime (Hypothesis H1a) as well as a direct effect of crime on financial reporting quality (Hypothesis H2) suggests that there may be an indirect relation between religiousness and financial reporting quality through crime, in addition to a direct effect of religiousness on financial reporting quality (Hypothesis H1b). We summarize our prediction in Hypothesis 3, as follows.

H3 Religiousness relates indirectly to financial reporting quality through crime.

Summarizing the prior discussion, Fig. 1 presents our conceptual framework.

[5] Additionally, the individual may have a self-imposed moral constraint constituting the upper limit of criminality.

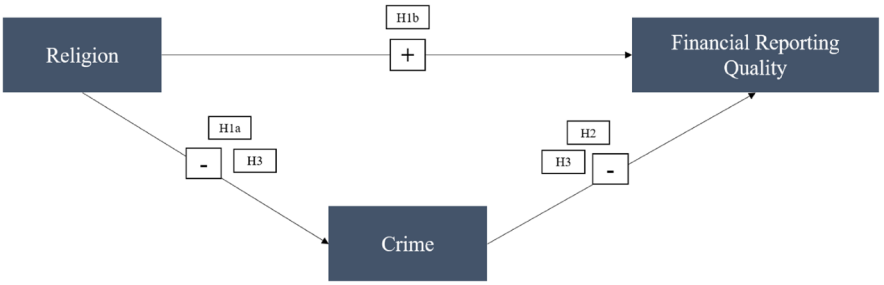

Fig. 1 Conceptual framework

3 Research design

3.1 Samples

We are generally interested in the role of norms in explaining firm behavior. For the analysis on the relation between religiousness and crime (Hypothesis H1a), we match municipality-level data on religious adherence of Germans from the *German Federal Statistical Office* with crime rate information at the district level from the *Federal Criminal Police Office* (Sample 1). The resulting dataset ranges from 2014 to 2017 and covers 32,973 municipality-years observations.

For the analysis on the relation between norms and corporate financial reporting (Hypotheses H1b, H2, and H3), we match the datasets on religious adherence at the municipality level and crime rates at the district level with firm data (Sample 2). The matched dataset includes data from 2011 to 2017 and covers 1742 firm-year observations of German publicly listed firms drawn from Thomson Reuters Datastream when using earnings management as a measure of corporate financial reporting irregularities and 782 firm-year observations when using tax avoidance as a measure of corporate financial reporting irregularities. The sample selection process is described in Table 1. Panel A reports on the sample selection process for the analysis on the relation between religiousness and crime. Panel B reports on the sample selection process for the analysis on the relation between norms and corporate financial reporting.

Table 9 in "Appendix" provides information on the geographical representativeness of both samples. For each sample, we list the number of observations per German state.[6] To evaluate the representativeness of the samples, we benchmark these statistics to state characteristics. To assess the representativeness of the sample on the analysis between religiousness and crime (Sample 1), we benchmark the number of sample observations per state to the German states' area in square kilometers. Likewise, to assess the representativeness of the sample on the analysis between norms and earnings management (Sample 2), we benchmark the number of sample observations per state to the GDP per German state.

Regarding Sample 1, most of the municipality-year observations are located in Bavaria (24.79%), Baden-Württemberg (13.29%), and Rhineland Palatinate (13.28%).

[6] A state is comprised of several districts and is the coarsest administrative classification in Germany. Germany is divided into 16 states.

Table 1 Sample on (a) religiousness and crime and (b) norms and financial reporting quality

Sample selection	# observations
(a)	
Data on religious adherence	49,645
Drop observations with missing data on crime rates	49,600
Drop observations with missings in demographic controls	32,973
Final sample	32,973
(b)	
Potential dataset datastream[a]	7344
Drop observations with missing identifier or location information or headquarter not in Germany	5168
Drop observations with missing legal form or legal form of private limited company or partnership	5120
Drop observations with missing religion information	5080
Drop observations with missing crime data	4444
Drop observations with missing data on tax enforcement effectiveness	4381
Drop observations with missings in demographic controls	4340
Drop observations with missings in earnings management controls data	1742
Final sample earnings management analysis	1742
Drop observations with missings in tax avoidance controls data	782
Final sample tax avoidance analysis	782

(a) Reports the sample selection process and presents the final sample of the analysis of religiousness and crime. The sample includes the years 2014–2017

(b) Reports the sample selection process and presents the final sample of the analysis on norms and firm behavior. The sample includes the years 2011–2017. Note that we have two samples to analyze tax avoidance. We hereby report on the sample selection process of the first sample. The second sample to analyze tax avoidance contains 1781 firm-year observations

[a]All German domestic publicly listed firms in Thomson Financial Datastream from 2010 to 2017

Since Bavaria and Baden-Württemberg are the largest and third largest German states, respectively, in terms of the area in square kilometers, the sample seems to be representative. Regarding Sample 2, most of the firm-year observations are located in Bavaria (21.41%), North Rhine-Westphalia (21.41%), and Baden-Württemberg (15.90%). Since these three states also contributed more than 50% of the GDP in 2017, the sample seems to be representative.

Table 10 in "Appendix" shows that most of the sample firms are from the manufacturing industry (42.25%), followed by the information and communication industry (19.46%).

3.2 Variable measurement and data sources

3.2.1 Norms

As Christianity represents by far the most prevalent religion in Germany, we measure the strength of religious social norms (i.e., religiousness) as the proportion of Christian adherents. We obtain data on religious adherence for 2007–2010 from the *German Federal Statistical Office*.[7] This dataset contains information on the number of Christian adherents at the German municipality level,[8] that is, the religious adherence for all German citizens delivering an income tax statement to tax authorities. The variable of interest is the religiousness in a municipality measured as the number of Christian adherents divided by the number of taxpayers in a municipality (*RELIGION*). We argue that individuals follow religious social norms in their environment to be accepted socially (e.g., Hechter and Opp 2001; Stavrova et al. 2013). Along these lines, Cornwall (1989) finds that an individual more likely follows religious social norms if that person has religious friends.

Figure 2 graphically illustrates the geographical distribution of *RELIGION* for the year 2010, where a darker color indicates a higher proportion of Christian adherents.

In the analysis of firm behavior, we follow Hilary and Hui (2009), Dyreng et al. (2012), and McGuire et al. (2012b) and use the proportion of Christian adherents at corporate headquarters' location as a proxy for the strength of religious social norms that the firm's employees (including managers) are exposed to. We consider the location of corporate headquarters, because headquarters represents the focal point of information exchange where core business activities are usually conducted (Pirinsky and Qinghai 2006; Davis and Henderson 2008). We linearly inter- and extrapolate the dataset on religious adherence to get a full dataset for the years 2010–2017.[9]

To test for the existence of a descriptive norm, we analyze the relation between individuals' commission of crimes at headquarters' location and corporate financial reporting irregularities. The variable *CRIME* captures the natural logarithm of the number of all types of crime per 100,000 inhabitants and is measured at the district level.[10] We obtain this dataset for the years 2011–2017 from the police crime statistics provided by the *Federal Criminal Police Office*. Figure 3 graphically illustrates the geographical distribution of *CRIME* for the year 2017; darker color indicates more crime.

[7] Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Lohn- und Einkommensteuerstatistik, 1995–2010, own calculations. Data received September 3rd, 2015.

[8] A municipality is the smallest administrative district in Germany. In particular, as of 2017, Germany was divided into 13,361 municipalities (Source: German Federal Statistical Office).

[9] By linearly inter- and extrapolating the religious adherence data, we assume a linear trend in religious adherence. We interpolate the data on religious adherence from 2007 and 2010 to get information on religious adherence for the years 2008 and 2009, and we use the linear trend to predict religious adherence for the years 2011–2017.

[10] A district comprises several municipalities and is the second smallest geographical administrative unit in Germany. In 2017, Germany was divided into 476 districts (Source: German Federal Statistical Office).

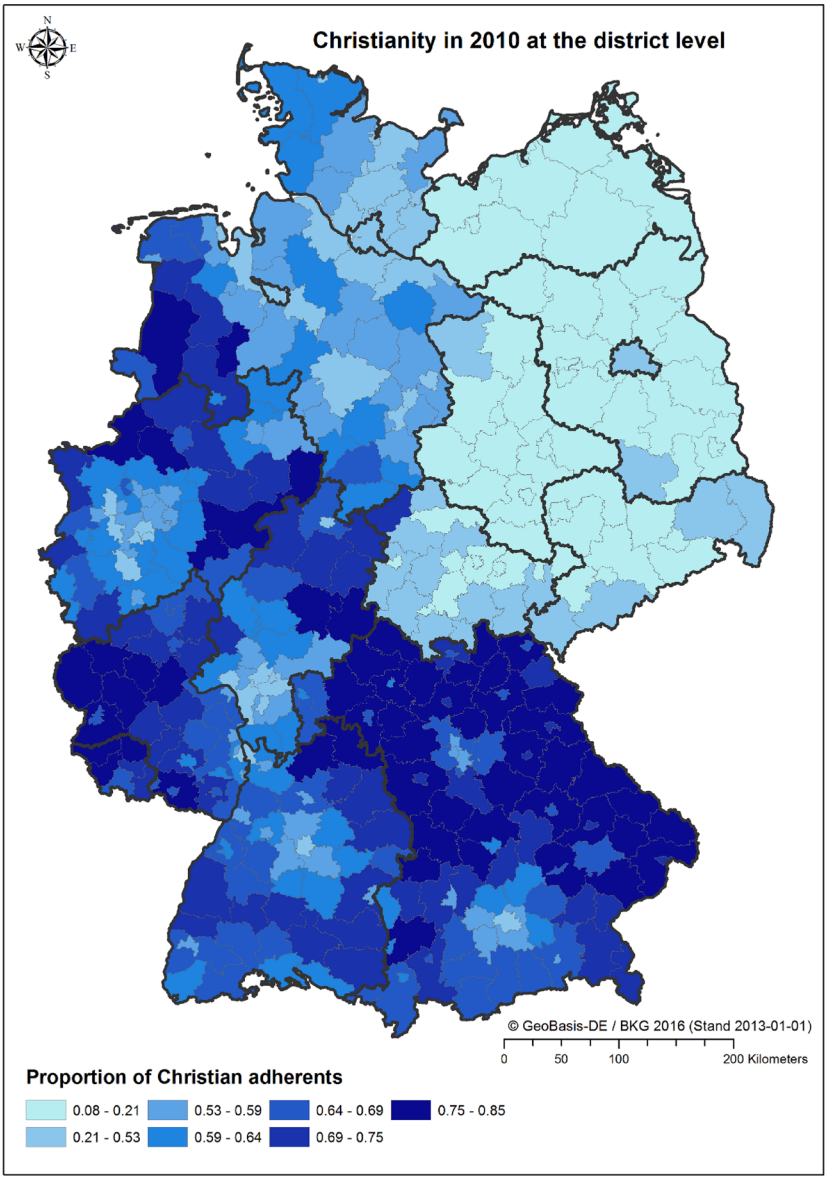

Fig. 2 Geographical distribution of Christian faith adherence in 2010 at the German district level. It illustrates the geographic distribution of Christian faith in Germany for the year 2010 at the district level. Districts (states) are marked with grey lines (bold black lines). A district comprises several municipalities and is the second smallest geographical administrative unit in Germany. Darker color indicates a higher proportion of Christian adherents within a district. The figure is created using the dataset from the German Federal Statistical Office (Source: RDC of the Federal Statistical Office and Statistical Offices of the Länder, Lohn- und Einkommensteuerstatistik, 1995–2010, own calculations) and the German Federal Agency for Cartography and Geodesy's ("Bundesamt für Kartographie und Geodäsie") administrative regions data from 2013, and is compiled with the help of ArcMap by ESRI

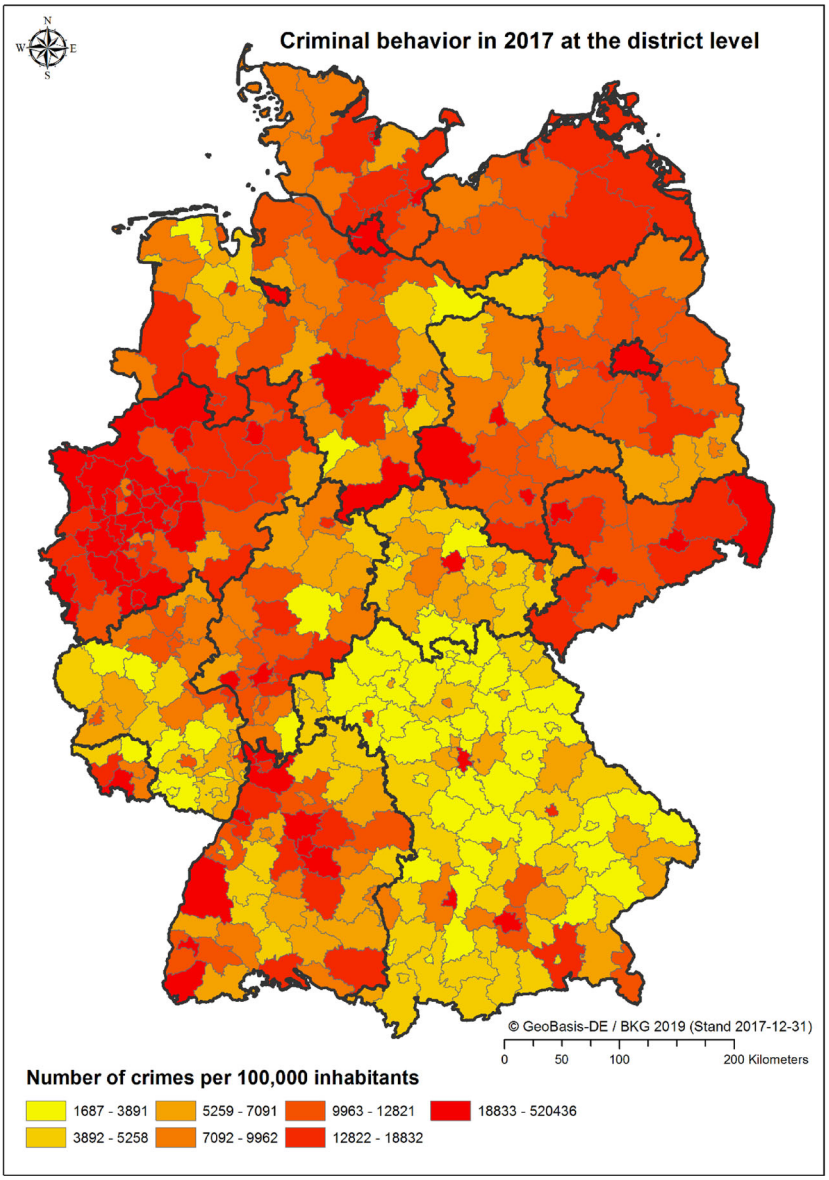

Fig. 3 Geographical distribution of crime in 2017 at the German district level. It illustrates the geographic distribution of crime in Germany for the year 2017 at the district level. Districts (states) are marked with grey lines (bold black lines). A district comprises several municipalities and is the second smallest geographical administrative unit in Germany. Darker color indicates more crimes per 100,000 inhabitants within a district. The figure is created using data from police crime statistics provided by the *Federal Criminal Police Office* and the *German Federal Agency for Cartography and Geodesy's* ("Bundesamt für Kartographie und Geodäsie") administrative regions data from 2017, and is compiled with the help of ArcMap by ESRI

3.2.2 Financial reporting quality

We focus on two types of corporate financial reporting irregularities: earnings management and tax avoidance. We use three measures for a firm's earnings management and two measures for its tax avoidance.

Regarding earnings management, we use one measure related to accrual-based earnings management and two measures related to real earnings management. First, to capture accrual-based earnings management, |*ABEM*| is the absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005).

Second, following Roychowdhury (2006), Cohen et al. (2008), and McGuire et al. (2012b), *REM1* is a measure of real earnings management calculated as the sum of abnormal discretionary expenditures (*AB_DISC*) and abnormal production cost (*AB_PROD*). *AB_DISC* is the residual of the following regression,

$$\frac{DISC\_EXP_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t},$$

where *DISC_EXP* is the sum of R&D expenses and SG&A expenses (which include advertising expenses in Thomson Reuters Datastream), *Sales* is defined as annual revenues, and *Assets* as total assets. We set R&D expenses equal to 0 if they are missing but SG&A expenses are available, and we multiply *AB_DISC* by − 1, such that higher values of *AB_DISC* indicate an increase in real earnings management. *AB_PROD* is the residual of the following regression,

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t},$$

where *PROD* is the sum of cost of goods sold and change in inventory from one year to the next. We standardize *AB_PROD* by multiplying it with − 1.

Third, following McGuire et al. (2012b), *REM2* is another measure of real earnings management calculated as the sum of abnormal discretionary expenditures (*AB_DISC*) and abnormal cash flows (*AB_CASH*). *AB_CASH* is the residual of the following regression,

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t},$$

where *CFO* is defined as cash flows from operations. We standardize *AB_CASH* by multiplying it with − 1.

Regarding tax avoidance practices, we follow Rego and Wilson (2012) and consider predicted tax benefits. Specifically, *PRED_UTB* is estimated as follows:

$$\begin{aligned} PRED\_UTB = {} & -0.004 + 0.011 \times ROA + 0.001 \times SIZE + 0.010 \times FOR\_SALE \\ & + 0.092 \times RD - 0.002 \times DISC\_ACCR + 0.003 \times LEV + 0.000 \times MB \\ & + 0.014 \times SGA - 0.018 \times SALES\_GR, \end{aligned}$$

where *ROA* is the return on assets divided by lagged total assets; *SIZE* is the natural logarithm of total assets; *FOR_SALE* is an indicator variable equal to 1 if the firm reports foreign sales, 0 otherwise; *RD* is research and development expenses divided by lagged total assets; *DISC_ACCR* is the absolute value of abnormal accruals estimated, using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005); *LEV* is the financial leverage divided by lagged total assets; *MB* is the market-to-book ratio; *SGA* is selling, general, and administrative expenses divided by lagged total assets; and *SALES_GR* is the growth in sales.

Following Wilson (2009), we also consider book-tax differences, where *BTD* is defined as:

$$BTD_t = \frac{\left| pretax\ income_t - \left(\frac{net\ income_t}{1 - tax\ rate_t} \right) \right|}{total\ assets_{t-1}}.$$

An increase in either *PRED_UTB* or *BTD* signals greater tax avoidance. We obtain data for the measures of earnings management and tax avoidance from Thomson Reuters Datastream.

3.2.3 Controls

In the regression analyses, we control for the strength of enforcement. Kahan (1997) argues that the law-enforcement policy affects a community's criminality. Specifically, the cost of crime increases in the clearance and sanctioning of crime by third parties, like judges or the police. We follow Evans et al. (1995) and proxy for enforcement at the individual level by sanction severity. The variable *SANCTION_SEVERITY* captures the relative sanction severity, defined as the average deviation in the number of years of freedom sanction per German state and year from the yearly mean over all states in Germany (see Grundies 2016).[11] Thus, *SANCTION_SEVERITY* captures regional differences in sanction severity across Germany. To proxy for regional sanction differences, we obtain data from the *German Federal Statistical Office.*[12]

Following Evans et al. (1995), we include the previous year's clearance rate as a control variable, because it signals to individuals the likelihood of crimes being detected, thereby affecting the likelihood of their commission. *CLEARANCE_RATE* is measured as the proportion of cleared crimes per district. We obtain information on clearance rates for the years 2011–2017 from the statistics provided by the *Federal Criminal Police Office*. Figure 4 graphically illustrates the geographical distribution of the number of crimes cleared for the year 2017; darker color indicates a higher clearance rate.

We proxy for enforcement at the firm level by the tax authorities' effectiveness. The variable *TAX_AUTHORITY* captures the number of employees at each tax authority

[11] The dataset on sanction severity contains anonymized information on each crime per year and state, including the type of crime and the type of sanction (i.e., money or imprisonment). To construct the variable *SANCTION_SEVERITY*, we aggregate the data first for each type of crime and then for each state-year.

[12] Source: RDC of the Federal Statistical Office and Statistical Offices of the Federal States, Strafverfolgungsstatistik, 2014–2017, own calculations.

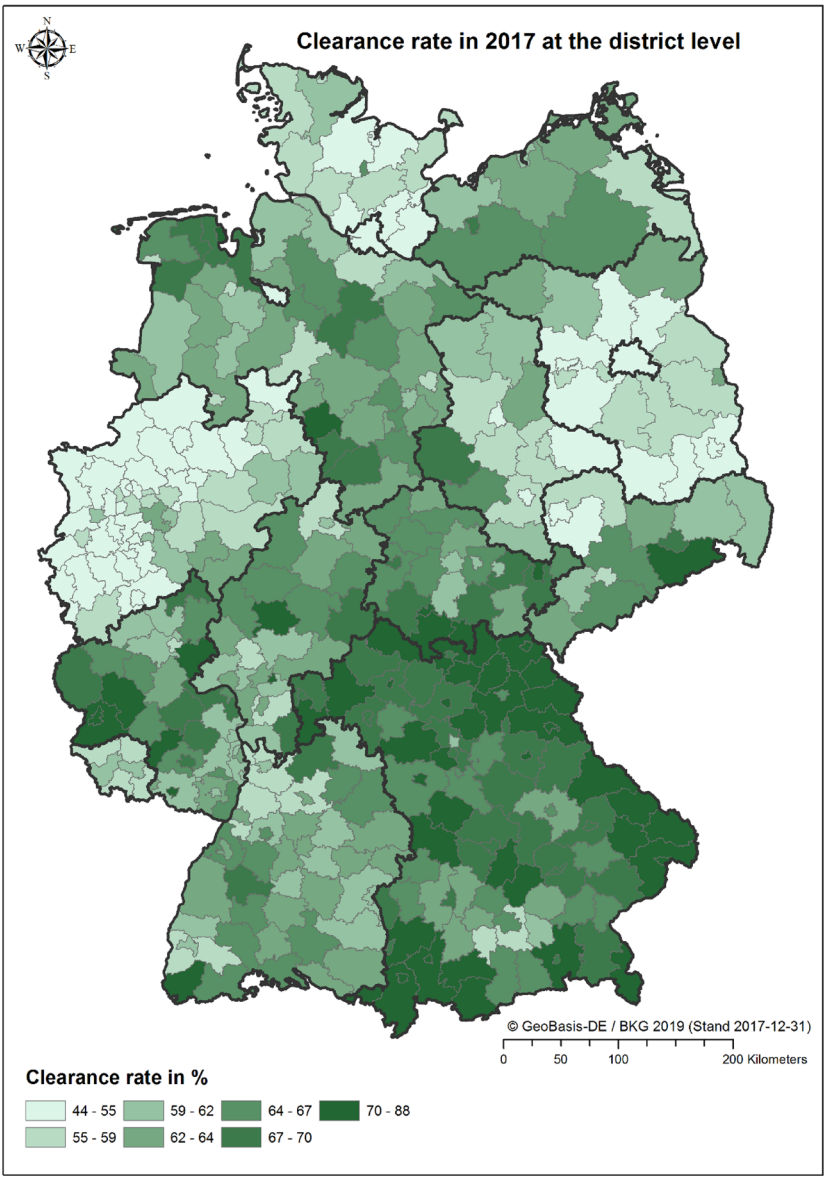

Fig. 4 Geographical distribution of the clearance rate in 2017 at the German district level. It illustrates the geographic distribution of the clearance rate in Germany for the year 2017 at the district level. Districts (states) are marked with grey lines (bold black lines). A district comprises several municipalities and is the second smallest geographical administrative unit in Germany. Darker color indicates a higher clearance rate in percent within a district. The figure is created using data from police crime statistics provided by the *Federal Criminal Police Office* and the *German Federal Agency for Cartography and Geodesy's* ("Bundesamt für Kartographie und Geodäsie") administrative regions data from 2017, and is compiled with the help of ArcMap by ESRI

site per 10,000 assigned inhabitants. *TAX_AUTHORITY* proxies for the time a tax authority's employee can spend per inhabitant. Since listed firms are usually located in cities, which are more populous than rural areas, *TAX_AUTHORITY* also captures the time a tax authority's employee can spend auditing firms. We obtain information on the number of employees per tax-authority site in full-time equivalents from the state tax authorities for the year 2014.

We include several demographic variables in the regression models. Demographic characteristics may be correlated with religious adherence, individuals' criminality, or both. In particular, we include age, gender, nationality, education, income, and marital status as control variables, as these variables may be correlated with religious adherence (see Iannaccone 1998 and Hilary and Hui 2009). *AGE* is measured as the natural logarithm of the average age of inhabitants per district. *GENDER* is the proportion of female inhabitants per district. *NATIONALITY* is the proportion of inhabitants with foreign (i.e., non-German) nationality per district. *EDUCATION* is the proportion of inhabitants having a general or subject-linked higher education entrance qualification per district. *INCOME* is the natural logarithm of the available income per inhabitant per district. *MARRIED* is the proportion of married inhabitants per district.[13]

Additionally, we control for unemployment and urbanity, as these variables may be correlated with individuals' criminality. We expect more crimes the higher the number of unemployed inhabitants and the more urban the area of investigation. *UNEMPLOYED* is the share of unemployed inhabitants on total population per municipality. *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer at the district level.[14] We obtain data on demographic characteristics from the *German Federal Statistical Office* and the *German Federal Labor Office*.

In the analysis on the relation between norms and earnings management, we follow McGuire et al. (2012b) and add the following firm-specific control variables that are found to relate to corporate financial reporting irregularities (e.g., Jones et al. 2008): *SIZE*, *ROA*, *LEV*, *BIG4*, *BM*, *LOSS*, *BENCHMARK*, *OP_RISK*, *INVEST*, and *NOA*. *SIZE* is the natural logarithm of market value of equity. *ROA* is the return on assets and captures firm profitability. *LEV* is the financial leverage defined as total debt to total capital. *BIG4* is an indicator variable equal to 1 if the firm is audited by a Big Four auditor, 0 otherwise. *BM* is the book-to-market ratio capturing growth opportunities.

We include the variables *LOSS* and *BENCHMARK* as control variables to proxy for the firms' need to manage earnings (Roychowdhury 2006; Gunny 2010; McGuire et al. 2012b). *LOSS* is an indicator variable equal to 1 if income before extraordinary items is negative in the current or previous two fiscal years, 0 otherwise. *BENCHMARK* is an indicator variable equal to 1 if either the net income divided by total assets or the change in net income divided by total assets from year $t-1$ to year t are nonnegative and less than 0.01, 0 otherwise.

OP_RISK captures the firm's operating risk, defined as the natural logarithm of the 5-year rolling standard deviation of cash flows from operations computed from the current and prior four fiscal years. We include the firm's operating risk as a control

[13] As we only have data on marital status and education for the years 2011 and 2014, respectively, we assume these variables to be constant throughout the sample period.

[14] We do not have data on the size of districts in square kilometers in 2017. Thus we assume it to be equal to the values in 2016.

variable, because Hilary and Hui (2009) find a negative effect of religious adherence on the riskiness of investment decisions. *INVEST* captures the investment rate in tangible capital, defined as the ratio of capital expenditures in year t to net property, plant, and equipment at the end of year $t-1$. We control for the investment rate in tangible capital because Hilary and Hui (2009) find that firms located in religious areas invest less. *NOA* captures the net operating assets, defined as the sum of shareholders' equity plus total debt at the beginning of the year, scaled by total assets at the beginning of the year. We control for net operating assets to capture the firms' abilities to manage earnings by manipulating accruals. Finally, *URBANITY* is potentially related to corporate financial reporting irregularities. For instance, Urcan (2007) provides evidence that firms located in rural areas display higher earnings quality.

In the analysis on the relation between norms and tax avoidance, we follow Boone et al. (2012) and add the following firm-specific control variables that are found to relate to tax avoidance (Chen et al. 2010): *ROA*, *NOL*, *SIZE2*, *LEV*, *PPE*, *INTANG*, and *MB*. *ROA* and *NOL* proxy for the firm's need to avoid income taxes (Boone et al. 2012). *NOL* is a net operating loss indicator variable equal to 1 if the firm did report an operating income smaller 0, 0 otherwise. We additionally control for firm size (*SIZE2*), leverage (*LEV*), and capital intensity (*PPE* and *INTANG*), capturing economies of scale and firm complexity that may relate to tax avoidance. *SIZE2* is the market capitalization, calculated as the natural logarithm of the beginning of year common shares outstanding times beginning of year stock price. *PPE* is net property, plant, and equipment divided by lagged total assets. *INTANG* is intangible assets divided by lagged total assets. Finally, we add the control variable *MB* defined as the market-to-book ratio capturing firm growth (Chen et al. 2010).[15] For an overview on all variables see Table 11 in "Appendix".

We match firm data from Thomson Reuters Datastream with data on religious adherence from the *German Federal Statistical Office*, using postal codes and the official municipality keys of firm locations from *Geodaten-Deutschland.de*,[16] which translates postal codes into official municipality keys.

3.3 Descriptive statistics

Table 2 reports the descriptive statistics on the dependent, independent, and control variables. *RELIGION* has a mean (median) value of 0.56 (0.62), suggesting that more than half of the inhabitants per municipality adhere to Christianity. The statistics of the variable *CRIME* suggest that on average 7700 crimes per 100,000 inhabitants are recorded per district and year. The clearance rate (*CLEARANCE_RATE*) ranges between 41 and 97% (untabulated), with a mean and median value of 62%. The statistics for *SANCTION_SEVERITY* suggest that there are high regional differences in sanction practices between the German states. In particular, the relative sanction severity in years with freedom sanction per state and year ranges between − 90 and 186% (untabulated). The corporate enforcement variable, *TAX_AUTHORITY*, indicates that

[15] Due to missing data, we do not control for the change in net operating loss carry forwards, income from foreign operations, and CEO risk incentives (see Boone et al. 2012; Rego and Wilson 2012).

[16] https://www.geodaten-deutschland.de/index.php.

tax authorities employ on average 15 employees per 10,000 assigned inhabitants with a standard deviation of 4.

Table 2 also lists the descriptive statistics on firm characteristics. In the earnings-management-analysis sample, containing 1742 firm-year observations, firms have on average a return on assets of 3% and a financial leverage of 34%. Moreover, 54% of sample firms are audited by a Big Four auditor. On average, 39% of firms experience a loss in the current or previous two fiscal years in the sample period.

Finally, Table 2 reports on the demographic characteristics. Inhabitants in the sample consisting of 32,973 municipality-year observations have an average age of 44 years (*AGE*). Women and men represent roughly half of the municipalities' inhabitants (*GENDER*). Forty-eight percent of the inhabitants are married (*MARRIED*).

Tables 3, 4 and 5 provide the results of a Pearson correlation analysis. Table 3 reports the correlations on the analysis of norms and crime using 32,973 municipality-year observations. Consistent with expectations, we find a negative relation between religiousness and crime. *RELIGION* is negatively and statistically significantly (p-value < 0.01) correlated with *CRIME*. *SANCTION_SEVERITY* and *CLEARANCE_RATE* are negatively and statistically significantly (p-value < 0.01) related to *CRIME*. Consistent with Hilary and Hui (2009) and McGuire et al. (2012b), *RELIGION* is strongly and negatively associated with *AGE* (− 0.65, p-value < 0.01) and *UNEMPLOYED* (− 0.63, p-value < 0.01). The Pearson correlation coefficients between the variables of interest and the demographic characteristics range between − 0.65 and 0.62, dispelling the concern of multicollinearity.

Table 4 reports the correlations on the analysis of norms and earnings management using 1742 firm-year observations. *RELIGION* relates negatively to the measure of accrual-based earnings management (|*ABEM*|) as well as one measure for real earnings management (*REM1*). The relation is statistically significant (one-sided p-value < 0.10) for |*ABEM*|. These findings are consistent with the expectation of a positive relation between religiousness and financial reporting quality. We find a positive and statistically significant relation (one-sided p-value < 0.01) between *CRIME* and |*ABEM*|. This finding is consistent with the expectation that crime relates negatively to financial reporting quality.

In contrast to expectations, the relation between *RELIGION* and the second real earnings management measure (*REM2*) is positive and statistically significant (one-sided p-value < 0.05), and the relation between *CRIME* and *REM2* is negative and statistically significant (one-sided p-value < 0.01). Note that the Pearson correlation analysis only considers bivariate statistics and ignores potential interrelations between *RELIGION* and *CRIME*. Thus we postpone a more detailed interpretation of the relations to the regression analyses in Sect. 4.[17]

Table 5 reports the correlations on the analysis of norms and tax avoidance using 782 firm-year observations. We find a negative but insignificant association between

[17] The measure of accrual-based earnings management (|*ABEM*|) is negatively and statistically significantly (p-value < 0.05) related to one measure for real earnings management (*REM2*), suggesting that accrual-based earnings management and real earnings management are substitutes. This finding is consistent with Graham et al. (2005), suggesting that managers trade off accrual-based earnings management and real earnings management in opportunistically altering reported earnings. The positive relation between religiousness and real earnings management (*REM2*) is consistent with McGuire et al. (2012b).

Table 2 Descriptive statistics

Variable	Obs	Mean	q25	q50	q75	Std. dev
Norms						
RELIGION	32,973	0.56	0.47	0.62	0.73	0.22
CRIME	32,973	8.95	8.43	8.90	9.44	0.65
Individual and corporate enforcement						
SANCTION_SEVERITY	32,973	0.41	− 0.48	− 0.02	1.50	0.91
CLEARANCE_RATE	32,973	0.62	0.57	0.62	0.66	0.08
TAX_AUTHORITY	1742	15.34	11.45	15.86	17.90	4.36
Earnings management						
|ABEM|	1742	0.07	0.01	0.03	0.07	0.28
REM1	1742	0.14	0.05	0.18	0.31	0.33
REM2	1742	0.03	− 0.09	0.13	0.25	0.41
SIZE	1742	5.23	3.50	5.07	6.79	2.24
ROA	1742	0.03	0.01	0.05	0.08	0.12
LEV	1742	0.34	0.10	0.31	0.51	0.29
BIG4	1742	0.54	0	1	1	0.50
BM	1742	0.79	0.36	0.63	1.01	0.72
LOSS	1742	0.39	0	0	1	0.49
OP_RISK	1742	9.34	8.04	9.06	10.55	1.85
URBANITY	1742	7.14	6.22	7.60	7.94	1.11
BENCHMARK	1742	0.23	0	0	0	0.42
INVEST	1742	0.45	0.09	0.19	0.38	1.07
NOA	1742	0.70	0.56	0.71	0.84	0.24
Tax avoidance						
PRED_UTB	782	0.03	0.02	0.03	0.03	0.04
BTD	1781	0.01	0.00	0.00	0.00	0.05
ROA	782	0.03	0.02	0.05	0.08	0.13
LEV	782	0.28	0.09	0.26	0.44	0.22
NOL	782	0.20	0	0	0	0.40
PPE	782	0.22	0.08	0.20	0.32	0.17
INTANG	782	0.21	0.05	0.14	0.32	0.19
SIZE2	782	13.06	11.67	13.14	15.01	2.69
MB	782	2.32	1.12	1.76	2.82	1.95
Demographic characteristics						
AGE	32,973	3.79	3.77	3.79	3.81	0.04
GENDER	32,973	0.51	0.50	0.51	0.51	0.01
NATIONALITY	32,973	0.07	0.04	0.06	0.09	0.04
EDUCATION	32,973	0.27	0.23	0.26	0.30	0.07
INCOME	32,973	9.96	9.89	9.98	10.04	0.10
UNEMPLOYED	32,973	0.02	0.01	0.02	0.03	0.01

Table 2 continued

Variable	Obs	Mean	q25	q50	q75	Std. dev
MARRIED	32,973	0.48	0.47	0.48	0.49	0.01
URBANITY	32,973	5.00	4.60	4.88	5.30	0.60

This table presents descriptive statistics on the independent, dependent, and control variables
RELIGION is the proportion of Christian adherents per municipality; *CRIME* is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *SANCTION_SEVERITY* captures the relative sanction severity in the number of years with freedom sanction per state; *CLEARANCE_RATE* is the proportion of cleared crimes per district; *TAX_AUTHORITY* is the number of employees in the tax authority per 10,000 assigned inhabitants; |*ABEM*| is the absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005); *REM1* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal production costs; *REM2* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal cash flows; *SIZE* is the natural logarithm of market value of equity; *ROA* is the return on assets; *LEV* is the financial leverage defined as total debt to total capital; *BIG4* is an indicator variable equal to 1 if the firm is audited by a BIG4 auditor, 0 otherwise; *BM* is the book-to-market ratio; *LOSS* is an indicator variable equal to 1 if income before extraordinary items was negative in the current or previous two fiscal years, 0 otherwise; *OP_RISK* captures the firm operating risk, defined as the natural logarithm of the five-year rolling standard deviation of cash flows from operations computed from the current and prior four fiscal years; *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer at the district level; *BENCHMARK* is an indicator variable equal to 1 if (a) net income divided by total assets is greater than or equal to 0 and less than 0.01 or (b) the change in net income divided by total assets from year t − 1 to year t is greater than or equal to 0 and less than 0.01, 0 otherwise; *INVEST* captures the investment rate in tangible capital defined as the ratio of capital expenditures in year t to net property, plant, and equipment at the end of year t − 1; *NOA* captures the net operating assets, which is defined as the sum of shareholders' equity plus total debt at the beginning of the year, scaled by total assets at the beginning of the year; *PRED_UTB* captures predicted tax benefits (see Rego and Wilson 2012); *BTD* captures book-tax-differences (see Wilson 2009); *NOL* is a net operating loss indicator variable equal to 1 if the firm did report an operating income smaller 0, 0 otherwise; *PPE* captures net property, plant and equipment divided by lagged total assets; *INTANG* captures intangible assets divided by lagged total assets; *SIZE2* captures the market capitalization calculated as the natural logarithm of beginning of year common shares outstanding times beginning of year stock price; *MB* is the market-to-book ratio; *AGE* is the natural logarithm of the average age of inhabitants per district; *GENDER* is the proportion of female inhabitants per district; *NATIONALITY* is the proportion of inhabitants with foreign nationality per district; *EDUCATION* is the proportion of inhabitants having a general or subject-linked higher education entrance qualification per district; *INCOME* is the natural logarithm of the available income per inhabitant per district; *UNEMPLOYED* is the share of unemployed inhabitants on total population per municipality; *MARRIED* is the proportion of married inhabitants per district. The variables *RELIGION* and *CLEARANCE_RATE* and the demographic characteristics variables are lagged by 1 year. All continuous firm characteristics variables are winsorized at 99% in the analyses. For an overview on the variables see Table 11 in "Appendix"

RELIGION and the measures of tax avoidance (i.e., *PRED_UTB* and *BTD*). The relation between *CRIME* and the measures of tax avoidance is insignificant. Again, note that the Pearson correlation analysis only considers bivariate statistics and ignores potential interrelations between *RELIGION* and *CRIME*; we postpone a more detailed interpretation of the relations to the regression analyses.

4 Regression models and results

We conduct two sets of empirical analyses: first, relying on a sample of 32,973 municipality-year observations, we analyze the relation between religiousness and

Table 3 Correlations between religiousness and crime

Variable	CRIME	RELIGION	SANCTION_SEVERITY	CLEARANCE_RATE	AGE	GENDER	NATIONALITY	EDUCATION	INCOME	UNEMPLOYED	MARRIED	URBANITY
CRIME	1.00											
RELIGION	− 0.30***	1.00										
SANCTION_SEVERITY	− 0.25***	0.57***	1.00									
CLEARANCE_RATE	− 0.46***	0.33***	0.43***	1.00								
AGE	− 0.01	− 0.65***	− 0.58***	− 0.09***	1.00							
GENDER	0.40***	− 0.20***	− 0.26***	− 0.33***	0.35***	1.00						
NATIONALITY	0.25***	0.36***	0.33***	0.00	− 0.58***	− 0.04***	1.00					
EDUCATION	0.38***	− 0.25***	− 0.26***	− 0.34***	0.10***	0.34***	0.19***	1.00				
INCOME	0.03***	0.50***	0.46***	− 0.03***	− 0.63***	− 0.01	0.62***	0.02***	1.00			
UNEMPLOYED	0.22***	− 0.63***	− 0.45***	− 0.25***	0.56***	0.24***	− 0.35***	0.18***	− 0.58***	1.00		
MARRIED	− 0.28***	0.18***	0.04***	0.08***	0.11***	− 0.15***	− 0.10***	− 0.16***	0.06***	− 0.11***	1.00	
URBANITY	0.54***	0.09***	0.17***	− 0.25***	− 0.36***	0.32***	0.63***	0.36***	0.45***	− 0.16***	0.04***	1.00

This table reports the Pearson correlations among the variables using 32,973 observations from 2014 to 2017 on the analysis of norms and individual behavior

CRIME is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *RELIGION* is the proportion of Christian adherents per municipality; *SANCTION_SEVERITY* captures the relative sanction severity in the number of years with freedom sanction per state; *CLEARANCE_RATE* is the proportion of cleared crimes per district; *AGE* is the natural logarithm of the average age of inhabitants per district; *GENDER* is the proportion of female inhabitants per district; *NATIONALITY* is the proportion of inhabitants with foreign nationality per district; *EDUCATION* is the proportion of inhabitants having a general or subject-linked higher education entrance qualification per district; *INCOME* is the natural logarithm of the available income per inhabitant per district; *UNEMPLOYED* is the share of unemployed inhabitants on total population per municipality; *MARRIED* is the proportion of married inhabitants per district; *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer per district. The variables *RELIGION* and *CLEARANCE_RATE* as well as the demographic characteristics variables are lagged by 1 year. For an overview on the variables see Table 11 in "Appendix"

*,**,*** Two-tailed statistical significance at the 10%, 5%, and 1% levels, respectively

Table 4 Correlations between norms and earnings management

Variable	|ABEM|	REM1	REM2	RELIGION	CRIME	TAX_AUTHORITY	SIZE	ROA	LEV	BIG4	BM	LOSS	OP_RISK	URBANITY	BENCHMARK	INVEST	NOA
|ABEM|	1.00																
REM1	− 0.01	1.00															
REM2	− 0.06**	0.32***	1.00														
RELIGION	− 0.04*	− 0.02	0.05**	1.00													
CRIME	0.07***	− 0.01	− 0.09***	− 0.68***	1.00												
TAX_AUTHORITY	0.02	0.11***	0.01	− 0.43***	0.41***	1.00											
SIZE	− 0.10***	0.13***	0.16***	0.08***	− 0.06**	− 0.08***	1.00										
ROA	− 0.03	0.32***	− 0.05**	0.09***	− 0.07***	0.00	0.21***	1.00									
LEV	− 0.01	0.04	0.18***	− 0.02	0.00	0.06**	0.05**	− 0.18***	1.00								
BIG4	− 0.06***	0.04*	0.07***	0.06**	− 0.05**	− 0.04*	0.48***	0.05**	0.09***	1.00							
BM	0.02	0.21***	0.21***	− 0.06**	− 0.00	0.06**	− 0.25***	0.09***	− 0.00	− 0.12***	1.00						
LOSS	0.04*	− 0.14***	0.03	− 0.09***	0.06**	0.05**	− 0.34***	− 0.43***	0.20***	− 0.07***	0.04*	1.00					
OP_RISK	− 0.06**	0.12***	0.23***	0.06**	− 0.04*	− 0.05**	0.84***	0.13***	0.21***	0.47***	− 0.03	− 0.12***	1.00				
URBANITY	0.04	0.00	− 0.02	− 0.62***	0.64***	0.43***	− 0.00	− 0.06**	− 0.03	− 0.05*	0.03	0.05**	0.02	1.00			
BENCHMARK	− 0.04	0.04*	0.10***	− 0.02	− 0.02	0.05**	0.12***	0.06***	0.07***	0.07***	0.07***	− 0.16***	0.10***	0.00	1.00		
INVEST	0.04	0.01	− 0.10***	− 0.08***	0.04	0.05**	− 0.11***	0.00	− 0.07***	− 0.07***	− 0.03	0.02	− 0.10***	0.04	− 0.04	1.00	
NOA	− 0.02	0.27***	0.11***	− 0.03	− 0.03	0.03	− 0.03	0.22***	− 0.06**	− 0.09***	0.31***	− 0.19***	− 0.18***	− 0.07***	0.01	0.03	1.00

This table reports the Pearson correlations among the variables using 1742 observations from 2011 to 2017 on the analysis of norms and earnings management

|ABEM| is the absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005); *REM1* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal production costs; *REM2* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal cash flows; *RELIGION* is the proportion of Christian adherents per municipality; *CRIME* is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *TAX_AUTHORITY* is the number of employees in the tax authority per 10,000 assigned inhabitants; *SIZE* is the natural logarithm of market value of equity; *ROA* is the return on assets; *LEV* is the financial leverage defined as total debt to total capital; *BIG4* is an indicator variable equal to 1 if the firm is audited by a BIG4 auditor, 0 otherwise; *BM* is the book-to-market ratio; *LOSS* is an indicator variable equal to 1 if income before extraordinary items was negative in the current or previous two fiscal years, 0 otherwise; *OP_RISK* captures the firm operating risk, defined as the natural logarithm of the five-year rolling standard deviation of cash flows from operations computed from the current and prior four fiscal years; *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer at the district level; *BENCHMARK* is an indicator variable equal to 1 if (a) net income divided by total assets is greater than or equal to 0 and less than 0.01 or (b) the change in net income divided by total assets from year t − 1 to year t is greater than or equal to 0 and less than 0.01, 0 otherwise; *INVEST* captures the investment rate in tangible capital defined as the ratio of capital expenditures in year t to net property, plant, and equipment at the end of year t − 1; *NOA* captures the net operating assets, which is defined as the sum of shareholders' equity plus total debt at the beginning of the year, scaled by total assets at the beginning of the year. For an overview on the variables see Table 11 in "Appendix"

*,**,*** One-tailed statistical significance at the 10%, 5%, and 1% levels, respectively, for the predictions and two-tailed otherwise

Table 5 Correlations between norms and tax avoidance

Variable	PRED_UTB	BTD	RELIGION	CRIME	TAX_AUTHORITY	ROA	LEV	NOL	PPE	INTANG	SIZE2	MB
PRED_UTB	1.00											
BTD	0.00	1.00										
RELIGION	− 0.04	− 0.01	1.00									
CRIME	0.03	− 0.01	− 0.62***	1.00								
TAX_AUTHORITY	− 0.04	− 0.03	− 0.39***	0.47***	1.00							
ROA	0.01	− 0.10**	0.09**	− 0.11***	0.00	1.00						
LEV	0.00	0.09**	0.20***	− 0.08**	0.00	− 0.09***	1.00					
NOL	− 0.04	0.06	− 0.12***	0.17***	0.05	− 0.47***	− 0.02	1.00				
PPE	0.01	0.03	0.25***	− 0.08**	− 0.07*	0.17***	0.32***	− 0.18***	1.00			
INTANG	− 0.07*	0.04	− 0.11***	0.02	0.11***	0.00	0.02	− 0.06*	− 0.39***	1.00		
SIZE2	− 0.02	0.05	0.04	− 0.06*	0.02	0.32***	0.19***	− 0.42***	0.09**	0.25***	1.00	
MB	0.07**	− 0.07*	− 0.01	0.06*	− 0.04	0.00	0.09**	− 0.04	− 0.08**	− 0.00	0.08**	1.00

This table reports the Pearson correlations among the variables using 782 observations from 2011 to 2017 on the analysis of norms and tax avoidance
PRED_UTB captures predicted tax benefits (see Rego and Wilson 2012); *BTD* captures book-tax-differences (see Wilson 2009); *RELIGION* is the proportion of Christian adherents per municipality; *CRIME* is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *TAX_AUTHORITY* is the number of employees in the tax authority per 10,000 assigned inhabitants; *ROA* is the return on assets; *LEV* is the financial leverage defined as total debt to total capital; *NOL* is a net operating loss indicator variable equal to 1 if the firm did report an operating income smaller 0, 0 otherwise; *PPE* captures net property, plant and equipment divided by lagged total assets; *INTANG* captures intangible assets divided by lagged total assets; *SIZE2* captures the market capitalization calculated as the natural logarithm of beginning of year common shares outstanding times beginning of year stock price; *MB* is the market-to-book ratio. For an overview on the variables see Table 11 in "Appendix"
*,**,*** One-tailed statistical significance at the 10%, 5%, and 1% levels, respectively, for the predictions and two-tailed otherwise

crime (H1a). Second, relying on a sample of 1742 (782) firm-year observations, we analyze the relation between religiousness and financial reporting quality (H1b) and the existence of a descriptive norm originated in crime (H2 and H3).

4.1 Religious social norms and crime

To analyze the relation between the exposure to religious social norms (captured by the proportion of Christian adherents) and criminality (captured by the number of crimes), we run the following regression model:

$$CRIME_{j,t} = \gamma \times RELIGION_{i,t-1} + \boldsymbol{X}_{i,j,k,t-1}\boldsymbol{\beta} + \mu_t + \varepsilon_{j,t}, \quad (1)$$

where $CRIME_{j,t}$ is the level of criminal activity per 100,000 inhabitants per district j and year t; $RELIGION_{i,t-1}$ is the proportion of Christians per municipality i and year $t-1$; $\boldsymbol{X}_{i,j,k,t-1}$ is a vector of the control variables, including *SANCTION_SEVERITY*, *CLEARANCE_RATE*, *AGE*, *GENDER*, *NATIONALITY*, *EDUCATION*, *INCOME*, *UNEMPLOYED*, *MARRIED*, and *URBANITY* measured at the municipality i or district j or state k level per year $t-1$; μ_t captures year fixed effects. To address reverse causality concerns, we lag the independent and control variables by one year (except for *SANCTION_SEVERITY* due to data constraints). All variables are described in Sect. 3.2. We expect γ in regression (1) to be negative.

We estimate the models by OLS using 32,973 municipality-year observations in the period of 2014–2017. Robust standard errors are clustered at the municipality level to consider that the strength of Christian norms at the headquarters location is quasi-fixed (Angrist and Pischke 2008).[18] We present the results from the regression analysis in Table 6.

Models (1a) and (1b) report the results on the relation between *RELIGION* and *CRIME*. Model (1a) is estimated without control variables, while model (1b) is estimated with control variables. Consistent with expectations, we find a negative and statistically significant (p-value < 0.01) relation between *RELIGION* and *CRIME* in both models. The coefficients on *SANCTION_SEVERITY* and *CLEARANCE_RATE* are negative and statistically significant (p-value < 0.01). Statistics at the end of Table 6 confirm the statistically significant effect of the variables of interest.

The results on the demographic controls are largely consistent with expectations. For instance, we find a negative and statistically significant (p-value < 0.01) association between income and crime. Moreover, we find a positive and statistically significant (p-value < 0.01) association between unemployment and crime. Finally, more urban regions are characterized by more crime (p-value < 0.01).

Overall, the results presented in Table 6 confirm Hypothesis H1a. In particular, we find that religiousness is statistically significantly negatively related to crime.

[18] As religious adherence is relatively constant in our sample period, we cannot run a firm fixed effects regression.

Table 6 Religiousness and crime

Variables	(1a) CRIME	(1b) CRIME
RELIGION	− 0.77*** (0.026)	− 0.53*** (0.036)
SANCTION_SEVERITY	− 20.85*** (0.626)	− 12.84*** (0.501)
CLEARANCE_RATE	− 2.45*** (0.113)	− 1.41*** (0.101)
AGE		− 1.47*** (0.285)
GENDER		15.71*** (1.541)
NATIONALITY		0.31* (0.163)
EDUCATION		0.27*** (0.061)
INCOME		− 1.07*** (0.079)
UNEMPLOYED		3.07*** (0.403)
MARRIED		− 8.49*** (0.566)
URBANITY		0.50*** (0.016)
Constant	10.89*** (0.063)	19.80*** (1.273)
Year fixed effects		Yes
Number of observations	32,973	32,973
F-statistic	1198.92***	1265.74***
Adjusted R-squared	0.309	0.573

This table reports the results on the effect of religiousness on crime. All models are estimated by OLS. Model (1a) is estimated without controls. Model (1b) is estimated with controls. Standard errors clustered at the municipality level are reported in parentheses
CRIME is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *RELIGION* is the proportion of Christian adherents per municipality; *SANCTION_SEVERITY* captures the relative sanction severity in the number of years with freedom sanction per state; *CLEARANCE_RATE* is the proportion of cleared crimes per district; *AGE* is the natural logarithm of the average age of inhabitants per district; *GENDER* is the proportion of female inhabitants per district; *NATIONALITY* is the proportion of inhabitants with foreign nationality per district; *EDUCATION* is the proportion of inhabitants having a general or subject-linked higher education entrance qualification per district; *INCOME* is the natural logarithm of the available income per inhabitant per district; *UNEMPLOYED* is the share of unemployed inhabitants on total population per municipality; *MARRIED* is the proportion of married inhabitants per district; *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer at the district level. All independent and control variables are lagged by 1 year except for the variable *SANCTION_SEVERITY*. Furthermore, we control for year fixed effects. For an overview on the variables see Table 11 in "Appendix"
*,**,*** Two-tailed significance at the 10%, 5%, and 1% levels

4.2 Norms and financial reporting quality

4.2.1 Norms and earnings management

To analyze the effect of religiousness and crime on managers' engagement in earnings management, we run the following mediation regression model, in which *RELIGION*

is defined as the treatment variable, *CRIME* as the mediator variable, and *EM* as the outcome variable[19]:

$$CRIME_{j,t} = \gamma \times RELIGION_{i,t} + \boldsymbol{X}_{l,i,j,t}\boldsymbol{\beta} + \mu_m + \varepsilon_{j,t}, \quad (2)$$

$$\boldsymbol{EM}_{l,t} = \gamma \times RELIGION_{i,t} + \delta \times CRIME_{j,t} + \boldsymbol{X}_{l,i,j,t}\boldsymbol{\beta} + \mu_m + \varepsilon_{l,t}, \quad (3)$$

where $CRIME_{j,t}$ is the level of criminal activity per 100,000 inhabitants per district j and year t; $RELIGION_{i,t}$ is the proportion of Christians per municipality i and year t; $\boldsymbol{EM}_{l,t}$ is a vector of the measures of earnings management, including |*ABEM*|, *REM1*, and *REM2* per firm l and year t; $\boldsymbol{X}_{l,i,j,t}$ is a vector of the firm-specific and demographic control variables, including the firm-specific variables *SIZE*, *ROA*, *LEV*, *BIG4*, *BM*, *LOSS*, *OP_RISK*, *BENCHMARK*, *INVEST*, and *NOA* per firm l and year t; *TAX_AUTHORITY* captures the effectiveness of tax authorities per municipality i; and the demographic variables are *URBANITY*, *INCOME*, *EDUCATION*, *AGE*, *NATIONALITY*, and a measure of the population size per district j and year t; μ_m is an industry control variable. All variables are described in Sect. 3.2. We expect γ to be negative in regressions (2) and (3), and δ to be positive in regression (3).

Table 7 presents the results on the analysis of norms and earnings management. Model (1) presents the estimation of the regression Eq. (2), which addresses the direct effect of religiousness on crime. Models (2) to (4) present the estimation of regression Eq. (3), which addresses the direct effect of religiousness on earnings management as well as the indirect effect of religiousness on earnings management through crime. We estimate the models using 1742 firm-year observations in the period of 2011–2017. Standard errors are clustered at the municipality level. All models are estimated by OLS.

In line with the results in Sect. 4.1, we find a negative and statistically significant (one-sided p-value < 0.01) relation between *RELIGION* and *CRIME* [see model (1)]. Consistent with Hypothesis H1b, we find a negative and statistically significant (one-sided p-value < 0.10) relation between *RELIGION* and *REM1*, suggesting that religiousness is negatively associated with real earnings management. We also find a negative relation when using *REM2* as a measure of real earnings management, but the relation is insignificant.

Consistent with Hypothesis H2, we find a positive and statistically significant (one-sided p-value < 0.05) relation between *CRIME* and accrual-based earnings management (|*ABEM*|), suggesting that crime is negatively associated with financial reporting quality and thus works as a descriptive norm.

In contrast to expectations, we find a negative and statistically significant (one-sided p-value < 0.01) association between *CRIME* and *REM2*. However, this finding is consistent with prior evidence (Graham et al. 2005; Cohen and Zarowin 2010;

[19] We run the mediator model via the *medeff* function in Stata. For continuous mediator and outcome variables, the results are identical to the Baron and Kenny method (see Baron and Kenny 1986, Hicks and Tingley 2011). We select the control variables following McGuire et al. (2012b) and include the same control variables in the first- and second-stage regression model (see Imai et al. 2011). The results are qualitatively similar when we (1) add all remaining demographic controls depicted in regression Eq. (1) and (2) lag *RELIGION* and all demographic controls by 1 year.

Table 7 Norms and earnings management

Variables	(1) CRIME	(2) |ABEM|	(3) REM1	(4) REM2
RELIGION	− 2.10*** (0.728)	0.03 (0.046)	− 0.20* (0.116)	− 0.08 (0.132)
CRIME		0.01** (0.007)	0.00 (0.012)	− 0.03*** (0.009)
TAX_AUTHORITY	0.02* (0.010)	− 0.00 (0.001)	0.01** (0.003)	0.00 (0.004)
SIZE	− 0.00 (0.029)	− 0.02*** (0.005)	0.02 (0.013)	0.02 (0.016)
ROA	− 0.06 (0.217)	− 0.03 (0.041)	0.66** (0.261)	− 0.36* (0.193)
LEV	0.08 (0.076)	− 0.01 (0.014)	0.07 (0.047)	0.17*** (0.062)
BIG4	− 0.04 (0.043)	− 0.01 (0.011)	0.01 (0.028)	− 0.03 (0.044)
BM	− 0.06 (0.042)	− 0.01 (0.009)	0.07** (0.030)	0.11*** (0.038)
LOSS	− 0.09 (0.091)	− 0.01 (0.024)	0.01 (0.028)	0.03 (0.034)
OP_RISK	0.02 (0.029)	0.02*** (0.004)	0.00 (0.013)	0.03 (0.025)
URBANITY	0.18** (0.071)	− 0.01* (0.003)	− 0.01 (0.017)	0.01 (0.019)
BENCHMARK	− 0.08 (0.101)	− 0.02 (0.011)	− 0.01 (0.013)	0.06^{***} (0.017)
INVEST	− 0.03 (0.020)	0.01 (0.006)	0.00 (0.009)	− 0.02 (0.035)
NOA	0.00 (0.089)	− 0.00 (0.023)	0.21** (0.090)	0.19** (0.083)
Constant	11.74*** (3.761)	1.26* (0.724)	2.90 (1.837)	− 0.08 (0.132)
Demographic controls	Yes	Yes	Yes	Yes
Industry control	Yes	Yes	Yes	Yes
Number of observations	1742	1742	1742	1742
F-statistic	307.73***	29.26***	12.60***	26.00***
R-squared	0.63	0.01	0.22	0.17
ACME		-0.03^{+}	− 0.01	0.06^{+}
Direct effect		0.03	-0.21^{+}	− 0.09
Total effect		− 0.01	-0.22^{+}	− 0.03
% of total effect mediated		0.40	0.04^{+}	− 0.27

This table reports the mediation results on the effect of religiousness on earnings management through crime. All models are estimated by OLS. Standard errors clustered at the municipality level are reported in parentheses

CRIME is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; |*ABEM*| is the absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005); *REM1* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal production costs; *REM2* is an aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures and abnormal cash flows; *RELIGION* is the proportion of Christian adherents per municipality; *TAX_AUTHORITY* is the number of employees in the tax authority per 10,000 assigned inhabitants; *SIZE* is the natural logarithm of market value of equity; *ROA* is the return on assets; *LEV* is the financial leverage defined as total debt to total capital; *BIG4* is an indicator variable equal to 1 if the firm is audited by a BIG4 auditor, 0 otherwise; *BM* is the book-to-market ratio; *LOSS* is an indicator variable equal to 1 if income before extraordinary items was negative in the current or previous two fiscal years, 0 otherwise; *OP_RISK* captures the firm operating risk, defined as the natural logarithm of the 5-year rolling standard deviation of cash flows from operations computed from the current and prior four fiscal years; *URBANITY* is the natural logarithm of the number of inhabitants per square kilometer at the district level; *BENCHMARK* is an indicator variable equal to 1 if (a) net income divided by total assets is greater than or equal to 0 and less than 0.01 or (b) the change in net income divided by total assets from year t − 1 to year t is greater than or equal to 0 and less than 0.01, 0 otherwise; *INVEST* captures the investment rate in tangible capital defined as the ratio of capital expenditures in year t to net property, plant, and equipment at the end of year t − 1; *NOA* captures the net operating assets, which is defined as the sum of shareholders' equity plus total debt at the beginning of the year, scaled by total assets at the beginning of the year. In addition, we control for the demographic characteristics population size, income, education, age, and nationality measured at headquarters' location in the current year. Moreover, we include an industry control variable. For an overview on the variables see Table 11 in "Appendix"

*,**,*** One-tailed significance at the 10%, 5%, and 1% levels for predictions, two-tailed otherwise

$^{+}$ Two-tailed signficant mediator effect at the 10% level

McGuire et al. 2012b), suggesting that managers influence reported earnings either through manipulating accruals or managing real activities, such as R&D or maintenance expenses. Following Graham et al. (2005), the managers' trade-off reflects that (i) real earnings management reduces long-term firm value, (ii) accrual-based earnings management is more likely detected, and (iii) managers perceive accrual-based earnings management as less ethically appropriate, compared to real earnings management, where argument (i) increases and arguments (ii) and (iii) decrease accrual-based earnings management.

The findings in Table 7 are consistent with these arguments. In particular, we find a positive association between crime (i.e., *CRIME*) and accrual-based earnings management (i.e., |*ABEM*|) and a negative association between crime (i.e., *CRIME*) and real earnings management (i.e., *REM2*). The more widespread crime, the lower are arguably the managers' reputational cost when engaging in accrual-based earnings management, suggesting that managers will engage more in accrual-based earnings management and less in real earnings management.

Consistent with Hypothesis 3, we identify crime as a mediator of the relation between religiousness and earnings management. In particular, we find a positive and statistically significant (one-sided p-value < 0.05) relation between *CRIME* and |*ABEM*| and a negative and statistically significant (one-sided p-value < 0.01) relation between *RELIGION* and *CRIME*. Statistics towards the bottom of Table 7 confirm the mediation effect of *CRIME* on the relation between *RELIGION* and |*ABEM*|. Similarly, we find a negative and statistically significant (one-sided p-value < 0.01) relation between *CRIME* and *REM2*. The mediating effect of *CRIME* on the relation between *RELIGION* and *REM2* is again confirmed by the statistics towards the bottom of Table 7.

Overall, the findings suggest that there is an indirect relation between religiousness and accrual-based earnings management through local crime rates. However, the results regarding real earnings management are inconsistent. While we find a direct relation between religiousness and our first measure of real earnings management (*REM1*), there is an indirect relation between religiousness and our second measure of real earnings management (*REM2*) through local crime rates.

4.2.2 Norms and tax avoidance

To estimate the effect of religiousness and crime on firms' tax avoidance practices, we run the following mediation regression model, where *RELIGION* is defined as the treatment variable, *CRIME* the mediator variable, and *TA* the outcome variable:

$$CRIME_{j,t} = \gamma \times RELIGION_{i,t} + \boldsymbol{X}_{l,i,j,t}\boldsymbol{\beta} + \mu_m + \varepsilon_{j,t}, \tag{4}$$

$$\boldsymbol{TA}_{l,t} = \gamma \times RELIGION_{i,t} + \delta \times CRIME_{j,t} + \boldsymbol{X}_{l,i,j,t}\boldsymbol{\beta} + \mu_m + \varepsilon_{l,t}, \tag{5}$$

where $\boldsymbol{TA}_{l,t}$ is a vector of the measures of tax avoidance, including *PRED_UTB* and *BTD* per firm *l* and year *t*; $\boldsymbol{X}_{l,i,j,t}$ is a vector of the firm-specific and demographic control variables, including the firm-specific variables *ROA*, *LEV*, *NOL*, *PPE*, *INTANG*, *SIZE2*, and *MB* per firm *l* and year *t*; *TAX_AUTHORITY* captures the effectiveness of

tax authorities per municipality i, and the demographic variables are *AGE*, *MARRIED*, *URBANITY*, *INCOME*, and *EDUCATION* per district j and year t; μ_m is an industry control variable.[20] All variables are described in Sect. 3.2. We expect γ to be negative in regressions (4) and (5), and δ to be positive in regression (5).

Table 8 presents the results on the analysis of norms and tax avoidance. We estimate the models using 782 (1781) firm-year observations in the period of 2011–2017. Standard errors are clustered at the municipality level. Model (1) presents the estimation of the regression Eq. (4), while models (2) and (3) present the estimation of regression Eq. (5). All models are estimated by OLS.

In line with Hypothesis 1b, we find a negative and statistically significant (one-sided p-value < 0.10) association between *RELIGION* and both measures of tax avoidance (*PRED_UTB* and *BTD*). Different from expectations, the coefficients on *CRIME* are insignificant, suggesting that crime does not mediate the relation between religiousness and tax avoidance. The results in Table 8 suggest that managers consider injunctive norms, rather than descriptive norms, when managing tax expenses.[21]

5 Discussion

Overall, this study provides evidence that it is important to consider both injunctive norms (captured by religiousness) and descriptive norms (captured by crime), when analyzing the role of norms in explaining firm behavior. For instance, the results of the correlation analysis (Table 4) indicate a negative and statistically significant association between religiousness and accrual-based earnings management. But in the multiple regression analysis, we find no relation between religiousness and accrual-based earnings management but a positive and statistically significant relation between crime and accrual-based earnings management. Considering the negative relation between religiousness and crime, the evidence suggests that the relation between religiousness and accrual-based earnings management is explained by the indirect relation through crime. Thus, if a researcher ignored the role of local crime rates when studying the association between religiousness in firms' geographical environment on corporate financial reporting, that person may incorrectly infer that there is a direct relation between religiousness and financial reporting quality.[22]

Moreover, while we find that managers consider religious social norms when managing earnings and avoiding taxes, managers consider local crime rates only when managing earnings. In part, this finding may be explained by the significantly smaller sample size for the tax avoidance analysis, compared to the earnings management analysis (782 versus 1742 observations). However, earnings management and tax

[20] The results are qualitatively similar when we lag *RELIGION* and all demographic controls by 1 year.

[21] A variance inflation factor analysis suggests that our analyses are not subject to multicollinearity.

[22] Similarly, while the results of the correlation analysis (Table 4) indicate a positive and significant association between religiousness and one measure of real earnings management (i.e., *REM2*), in the multiple regression analysis, we find no relation between religiousness and real earnings management but a negative and statistically significant relation between crime and real earnings management. Again, this finding suggests that the relation between religiousness and real earnings management is explained by the indirect relation through crime.

Table 8 Norms and tax avoidance

Variables	(1) CRIME	(2) PRED_UTB	(3) BTD
RELIGION	− 3.92*** (1.093)	− 0.02* (0.014)	− 0.01* (0.006)
CRIME		0.00 (0.001)	− 0.00 (0.000)
TAX_AUTHORITY	0.06*** (0.017)	− 0.00 (0.001)	0.00 (0.000)
ROA	− 0.13 (0.347)	0.00 (0.018)	− 0.04 (0.030)
LEV	0.00 (0.190)	0.00 (0.012)	− 0.00 (0.005)
NOL	0.33*** (0.120)	− 0.01 (0.010)	0.01 (0.008)
PPE	0.87** (0.341)	− 0.00 (0.015)	− 0.00 (0.003)
INTANG	0.05 (0.240)	− 0.01 (0.027)	0.01* (0.006)
SIZE2	− 0.02 (0.018)	− 0.00 (0.001)	0.00 (0.001)
MB	0.06*** (0.021)	0.00** (0.001)	0.00 (0.000)
Constant	10.17 (14.828)	− 0.07 (0.247)	0.39 (0.315)
Demographic controls	Yes	Yes	Yes
Industry control	Yes	Yes	Yes
Number of observations	782	782	1781
F-statistic	18.02***	1.49	1.92**
R-squared	0.59	0.04	0.01
ACME		− 0.00	0.00
Direct effect		− 0.02	− 0.01
Total effect		− 0.02	− 0.01
% of total effect mediated		0.17	− 0.29

This table reports the mediation results of the effect of religiousness on tax avoidance through crime. All models are estimated by OLS. Standard errors clustered at the municipality level are reported in parentheses *CRIME* is the natural logarithm of the number of all crimes per 100,000 inhabitants per district; *PRED_UTB* captures predicted tax benefits (see Rego and Wilson 2012); *BTD* captures book-tax-differences (see Wilson 2009); *RELIGION* is the proportion of Christian adherents per municipality; *TAX_AUTHORITY* is the number of employees in the tax authority per 10,000 assigned inhabitants; *ROA* is the return on assets; *LEV* is the financial leverage defined as total debt to total capital; *NOL* is a net operating loss indicator variable equal to 1 if the firm did report an operating income smaller 0, 0 otherwise; *PPE* captures net property, plant and equipment divided by lagged total assets; *INTANG* captures intangible assets divided by lagged total assets; *SIZE2* captures the market capitalization calculated as the natural logarithm of beginning of year common shares outstanding times beginning of year stock price; *MB* is the market-to-book ratio. In addition, we control for the demographic characteristics age, marital status, urbanity, income and education measured at headquarters' location. Moreover, we include an industry control variable. For an overview on the variables see Table 11 in "Appendix"

*,**,*** One-tailed significance at the 10%, 5%, and 1% levels for predictions, two-tailed otherwise

+ Two-tailed significant mediator effect at the 10% level

avoidance also arguably differ in the level of societal acceptance, which may affect the role of norms in explaining firm behavior. While religion as an injunctive norm discourages immorality, crime as a descriptive norm may encourage immorality as managers, for instance, perceive the risk of being detected to be low (Kahan 1997). To the extent that the reputational loss is higher when avoiding taxes compared to managing earnings, when deciding about tax avoidance managers will be only sensi-

tive to religiousness but not crime. Consistent with Cialdini et al. (1991) and Kallgren et al. (2000), this finding suggests that injunctive norms captured by religiousness affect firm behavior in a wider range of settings (i.e., earnings management and tax avoidance), compared to descriptive norms (i.e., just earnings management).

6 Conclusion

The study examines the joint role of injunctive and descriptive norms for corporate financial reporting. In particular, we study the direct association between the firm's exposure to religious social norms and its financial reporting quality as well as the indirect relation through crime. We contribute to research in accounting that provides evidence on the separate role of religiousness and crime rates in explaining corporate financial reporting (e.g., McGuire et al. 2012b; Kedia et al. 2015; Cho et al. 2020).

We find a negative association between religiousness and individuals' commission of crimes. This finding is consistent with the social identity theory (Tajfel 1981; Hogg and Abrams 1988), suggesting that individuals consider norms in their decision-making. Regarding firm behavior, we provide evidence of a negative direct relation between religiousness and firms' earnings management and tax avoidance, highlighting the role of injunctive norms in explaining firm behavior. Moreover, we provide partial support for the existence of a descriptive norm generated by crime in firms' geographical environment. In particular, we find that firms located in areas with high crime rates engage more in accrual-based earnings management. Interestingly, these firms engage less in real earnings management, potentially benefitting long-term firm value. Finally, jointly analyzing the role of religiousness and crime in explaining financial reporting quality, we find an exclusively indirect relation between religiousness and firms' engagement in accrual-based earnings management and an exclusively direct relation between religiousness and firms' engagement in tax avoidance. By jointly examining the effect of injunctive and descriptive norms on firm behavior, we answer the call by Cialdini et al. (1990), underlining the strong interrelations between injunctive and descriptive norms.

This study is subject to some limitations. First, based on the research design, we cannot draw causal conclusions. However, the geographical distribution of Christianity in Germany has not changed significantly since 1555 (Spenkuch 2017), suggesting that the study is less likely to be subject to reverse causality. To address the concern of correlated omitted variables, we control for demographic characteristics (e.g., gender, age, nationality) that were found to relate to religious adherence (Iannaccone 1998). Second, due to data restrictions, we focus on Christianity. Thus we cannot draw conclusions on the relation between the norms of other faiths, crime, and financial reporting quality. However, Christianity is the dominant religion in many other countries besides Germany, giving our study far-reaching implications. Third, we operationalize financial reporting quality by firms' engagement in accrual-based and real earnings management, relying on abnormal accruals (e.g., Kothari et al. 2005) and abnormal expenditures measures (e.g., Roychowdhury 2006; Cohen et al. 2008; McGuire et al. 2012a, b). Although these measures are widely used in accounting and auditing research, they may be subject to measurement error. For instance, the

measures may be driven by peer effects, are often associated with implausible economic effects, and thus should be validated ex-post (Jackson 2018). Relatedly, we capture firms' tax avoidance by predicted tax benefits (e.g., Rego and Wilson 2012) and book-tax-differences (e.g., Wilson 2009). We acknowledge that there is inconsistent evidence on whether book-tax-differences indicate opportunistic reporting (see Evers et al. 2016).

Future research might explore in more detail the differences between earnings management and tax avoidance as two types of financial reporting irregularities. We find that firms engage less in earnings management and tax avoidance the more they are exposed to religious social norms. However, while crime works as a mediator for the relation between religiousness and earnings management, it does not for the relation between religiousness and tax avoidance. Even though this finding may be partially explained by a small sample size, the finding also suggests that the interrelation between injunctive and descriptive norms may vary with the type of behavior. Research along those lines can enhance understanding of the role of norms in explaining firm behavior.

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Appendix

See Tables 9, 10 and 11.

Table 9 Geographical representativeness

State	Percent			
	Sample on the analysis between religiousness and crime	Square km (2017)	Sample on the analysis between norms and earnings management	GDP (2017)
Schleswig Holstein	11.22	4.42	1.38	2.9
Hamburg	0.01	0.21	8.96	3.6
Lower Saxony	7.10	13.34	3.90	8.8
Bremen	0.01	0.12	2.12	1.0
North Rhine-Westphalia	4.53	9.54	21.41	20.9
Hesse	4.79	5.91	12.11	8.6
Rhineland Palatinate	13.28	5.55	2.58	4.4
Baden-Württemberg	13.29	10.00	15.90	15.1
Bavaria	24.79	19.73	21.41	18.5
Saarland	0.16	0.72	0.00	1.1
Berlin	0.01	0.25	8.67	4.3
Brandenburg	4.53	8.29	0.23	2.2
Mecklenburg-Western Pomerania	0.01	6.51	0.00	1.3
Saxony	5.09	5.16	0.92	3.7
Saxony-Anhalt	2.58	5.72	0.00	1.9
Thuringia	8.61	4.53	0.40	1.9
Total	100.00	100.00	100.00	100.00

This table reports the geographical distribution of the observations from the sample on the analysis of religiousness and crime (norms and earnings management). The statistics are based on the full sample from 2014 to 2017 (2011–2017) with 32,973 (1742) observations

The benchmark to evaluate the geographical representativeness of the sample on the analysis of norms and individual behavior and norms and earnings management is the German states' area in square kilometers and the GDP per German state, respectively. Both variables are drawn from the Federal Statistical Office and the Statistical Offices of the Federal States

Table 10 Industry

Industry (NACE)	Frequency	Percent
Administrative and Support Service Activities (digits 77–82)	22	1.26
Arts, Entertainment and Recreation (digits 90–93)	35	2.01
Construction (digits 41–43)	3	0.17
Electricity, Gas, Steam and Air Conditioning Supply (digit 35)	71	4.08
Financial and Insurance Activities (digits 64–66)	129	7.41
Human Health and Social Work Activities (digits 86–88)	8	0.46
Information and Communication (digits 58–63)	339	19.46
Manufacturing (digits 10–33)	736	42.25
Other Service Activities (digits 94–96)	43	2.47
Professional, Scientific and Technical Activities (digits 69–75)	33	1.89
Real Estate Activities (digit 68)	120	6.89
Transportation and Storage (digits 49–53)	52	2.99
Wholesale and Retail Trade, Repair of Motor Vehicles and Motorcycles (digits 45–47)	151	8.67
Total	1742	100.00

This table reports the distribution of firms regarding industry and is based on the sample on the analysis of norms and earnings management. The statistics are based on the full sample from 2011 to 2017 with 1742 observations

Table 11 Variable definitions

Variable name	Variable definitions
Norms	
RELIGION	Proportion of Christian adherents per municipality
CRIME	Natural logarithm of the number of all crimes per 100,000 inhabitants per district
Individual and corporate enforcement	
SANCTION_SEVERITY	Relative sanction severity in the number of years with freedom sanction per state
CLEARANCE_RATE	Proportion of cleared crimes per district
TAX AUTHORITY	Number of employees in the tax authority per 10,000 assigned inhabitants
Earnings management	
|ABEM|	Absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005)
REM1	Aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures (*AB_DISC*) and abnormal production costs (*AB_PROD*) where *AB_DISC* is the residual of the following regression: $\frac{DISC\_EXP_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t}$ where *DISC_EXP* is the sum of R&D expenses and SG&A expenses (which include advertising expenses in Datastream), sales are defined as annual revenues, and assets as total assets. Following McGuire et al. (2012a, b), we set R&D expenses equal to 0 if they are missing, but SG&A costs are available. Furthermore, following McGuire et al. (2012a, b), we multiply *AB_DISC* by −1 such that higher values of *AB_DISC* indicate an increase in real earnings management

Table 11 continued

Variable name	Variable definitions
	AB_PROD is the residual of the following regression: $\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \beta_3 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t}$ where *PROD* is the sum of costs of goods sold and change in inventory from one year to the next. We also standardize *AB_PROD* by multiplying it with − 1
REM2	Aggregate measure of real earnings management calculated as the sum of abnormal discretionary expenditures (*AB_DISC*) and abnormal cash flows (*AB_CASH*) where *AB_CASH* is the residual of the following regression: $\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_0 \frac{1}{Assets_{i,t-1}} + \beta_1 \frac{Sales_{i,t}}{Assets_{i,t-1}} + \beta_2 \frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t}$ where *CFO* is defined as cash flows from operations. We also standardize *AB_CASH* by multiplying it with − 1
SIZE	Natural logarithm of market value of equity
ROA	Return on assets
LEV	Financial leverage defined as total debt to total capital
BIG4	Indicator variable equal to 1 if the firm is audited by a BIG4 auditor, 0 otherwise
BM	Book-to-market ratio
LOSS	Indicator variable equal to 1 if income before extraordinary items was negative in the current or previous two fiscal years, 0 otherwise
OP_RISK	Firm operating risk, defined as the natural logarithm of the five-year rolling standard deviation of cash flows from operations computed from the current and prior four fiscal years
URBANITY	Natural logarithm of the number of inhabitants per square kilometer at the district level
BENCHMARK	Indicator variable equal to 1 if (a) net income divided by total assets is greater than or equal to 0 and less than 0.01 or (b) the change in net income divided by total assets from year t − 1 to year t is greater than or equal to 0 and less than 0.01, 0 otherwise
INVEST	Investment rate in tangible capital defined as the ratio of capital expenditures in year t to net property, plant, and equipment at the end of year t − 1
NOA	Net operating assets, which is defined as the sum of shareholders' equity plus total debt at the beginning of the year, scaled by total assets at the beginning of the year
Tax avoidance	
PRED_UTB	Predicted tax benefits, which are defined as follows (see Rego and Wilson 2012): $PRED\_UTB = -0.004 + 0.011 * ROA + 0.001 * SIZE + 0.010 * FOR\_SALE + 0.092 * RD - 0.002 * DISC\_ACCR + 0.003 * LEV + 0.000 * MB + 0.014 * SGA - 0.018 * SALES\_GR$ where, ROA = return on assets divided by lagged total assets; SIZE = natural logarithm of total assets; FOR_SALE = indicator variable equal to 1 if the firm reports foreign sales, 0 otherwise; RD = research and development expenses divided by lagged total assets; DISC_ACCR = absolute value of abnormal accruals estimated using a cross-sectional performance-adjusted Jones model (see Kothari et al. 2005); LEV = financial leverage divided by lagged total assets; MB = market-to-book ratio; SGA = selling, general, and administrative expenses divided by lagged total assets; and SALES_GR = sales growth Note that higher predicted tax benefits signal higher tax avoidance

Table 11 continued

Variable name	Variable definitions
BTD	Book-tax-differences, which are defined as follows (see Wilson 2009): $BTD_t = \frac{\left\lvert pretax\ income_t - \left(\frac{net\ income_t}{1-tax\ rate_t}\right)\right\rvert}{total\ assets_{t-1}}$ note that higher book-tax-differences signal higher tax avoidance
ROA	See definition above
LEV	See definition above
NOL	Net operating loss indicator variable equal to 1 if the firm did report an operating income smaller 0, 0 otherwise
PPE	Net property, plant and equipment divided by lagged total assets
INTANG	Intangible assets divided by lagged total assets
SIZE2	Market capitalization calculated as the natural logarithm of beginning of year common shares outstanding times beginning of year stock price
MB	Market-to-book ratio
Demographic characteristics	
AGE	Natural logarithm of the average age of inhabitants per district
GENDER	Proportion of female inhabitants per district
NATIONALITY	Proportion of inhabitants with foreign (non-German) nationality per district
EDUCATION	Proportion of inhabitants having a general or subject-linked higher education entrance qualification per district
INCOME	Natural logarithm of the available income per inhabitant per district;
UNEMPLOYED	Share of unemployed inhabitants on total population per municipality
MARRIED	Proportion of married inhabitants per district; and
URBANITY	See definition above

This table lists the variables used in the empirical analysis and their description. All continuous firm characteristic variables are winsorized at 99% in the analyses. The demographic control variables and the variables *RELIGION* and *CLEARANCE_RATE* are lagged by 1 year in the analysis on norms and behavior

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