Religiosity, Financial Distress and R&D Accounting Treatment in US Context

Ines Gharbi

Faculty of Economic Sciences and Management of Tunis, UR17ES07 FCF Research Unit, University of Tunis El Manar, Tunis, Tunisia

Mounira Hamed

Faculty of Economic Sciences and Management of Tunis, UR17ES07 FCF Research Unit, University of Tunis El Manar, Tunis, Tunisia

Khaled Hussainey

School of Accounting, Economics and Finance, Faculty of Business and Law, University of Portsmouth, Richmond Building, Portland Street, Portsmouth, PO1 3DE, United Kingdom

Abstract

Purpose

Prior research shows that religiosity affects the degree of managers' risk aversion. As a result, religious firms are less likely to invest in R§D activities. Moreover, US GAAP treats these investments as expenses. For this reason, religious firms have fewer expenses in their earnings and are less likely to be in financial distress.

Design/methodology/approach

Data are collected from Worldscope and the Churches and Church Membership files of the American Religion Data Archive website from 1985 to 2018. With 18 199 observations in US context, we used the marginal effect to test the mediating effect of R&D accounting treatment.

Findings

We find that the marginal effect of religiosity on financial distress with US GAAP is higher than the marginal effect of religiosity on financial distress with capitalization of R&D costs, which means that accounting treatment can explain the relation between religiosity and financial distress in the US context.

Originality

This may be the first study that investigates why religious firms are less likely to be in financial distress. Our paper notes that religious firms are less likely to be in financial distress because their conservative behavior towards R&D activities coincides with the conservative R&D accounting treatment. In fact, the mismatch between expenses and revenues from R&D activities can cause financial distress.

Keywords: Religiosity – R&D activities accounting treatment - Financial distress–Marginal effect method –Risk Aversion

Introduction

The most recent list of the top 100 companies in the United States contains many firms having a high corporate Religious Equity, Diversity & Inclusion index like: Alphabet,

Google, Facebook, the Intel Corporation…(2021 Corporate Religious Equity, Diversity and Inclusion (REDI) Index). This index measures the importance of faith in the workplace environment. In fact, many firms are increasingly interested in giving faith the same attention as other sources of diversity (David Crary, February, 2020). Religiosity contributes to the American economy in three ways: Congregations, Religious institutions and Businesses. Religious firms contribute to the economybyabout $438 billion each year (Brian J. Grim, Religious Freedom and Business Foundation, 2020). Given that CEO characteristics influence decision-making (Rijsenbilt and Commandeur, 2013; Leng et al., 2018), many CEO associations aim to teach how to manage a business morally and ethically (Brian J. Grim, Religious Freedom and Business Foundation, 2020). Many academics, including Lewis et al. (2010) and Nelson (2017), have blamed the proliferation of business scandals for a lack of morals. Some of them were interested in studying the effect of morals emanating from religiosity on financial decisions (Dyreng et *al*., 2012) and firm values (Callen and Fang, 2015). The first paper underlying the importance of religiosity was that of Hilary and Hui (2009). They note that religious firms perform better than non-religious firms in the US context. Lu and Wu (2020) confirmed this idea; they found that religious firms have good accounting performance in China. Some studies by Hilary and Hui (2009), Callen and Fang (2015) and Lu and Wu (2020) found that religious firms have higher performance. Gharbi et *al.,*(2021) mention that religious firms are less likely to be in financial distress. Two concepts are underlined in this field of research: ethics and risk aversion (Cai et al., 2020).

The majority of research dealing with corporate religiosity has been conducted in an American setting. Indeed, this is a rich context for many reasons. In fact, studying religiosity in the same context can separate the influence of legal and institutional factors from the impact of religiosity. Moreover, the USA has a dominant religion. According to the Pew Research Center, most Americans (70%) identify as Christians. 23% of Americans say they have no religious affiliation, while 5% say they follow a non-Christian religion. As a consequence, the majority of research has studied religiosity at the level of Christianity. Moreover, the map of the USA illustrates a broad range of religiosity. In fact, the Northeast, Midwest, South, and Southwest areas have a comparatively high level of religiosity, whereas the West and Southeast have a relatively low level.

Regarding ethics, Chintrakarn et *al.,*(2017) showed that religiosity can constitute a good alternative to corporate governance by reducing agency costs. Hilary and Hui (2009) mention that religious firms take fewer risks. So, they invest less in R&D activities. Farooq et *al.* (2020) mentioned that religious firms are more at risk averse, so they prefer to pay dividends rather than invest. For this reason, investors appreciate this behavior and they reward the risk aversion of religious firms with a positive stock market reaction. Our paper extends this field of research by exploring how the accounting treatmentof R&D activities can explain the relationship between religiosity and financial problems. In fact, in 1974, the FASB obliged US firms to expense R&D activities. This accounting treatment has many impacts on making decisions. Many managers noted that this change would reduce R&D activities. Some firms choose to buy R&D activities instead of making them. In fact, according to US GAAP, the accounting treatment of making research and development is not the same as buying it. To illustrate, in the first case, firms have to expense research and development activities. In the second one, US GAAP allows capitalization in the case of acquisition. Therefore, firms that choose to make research and development are less likely to have good accounting performance than firms that choose to buy research and development activities. For this reason, we predict that religious firms are more likely to have good accounting performance because they don't invest in intangible assets due to their risk aversion. The conservative treatment has a negative impact on accounting performance for firms with intensive research and development activities.

Take the example of the company WorldCom. In 2002, WorldCom, the second-largest United States long-distance telephone operator, was involved in a huge accounting controversy. In order to preserve WorldCom's stock price from 1999 to 2002, WorldCom's senior management and CEO Bernard Ebbers inflated earnings. In June 2002, the company's internal audit department headed by vice president Cynthia Cooper, detected false balance sheet entries totaling over $3.8 billion. WorldCom was finally obliged to declare that it had inflated its assets by more than $11 billion. It was the greatest accounting scandal in American history with Enron.This firm was accused of accounting fraud since it capitalized expenses instead of charging them. The chief accountant was forced to capitalize expenses because accounting performance would be negatively impacted. In fact, the amount of 3.8 billion dollars was recognized as an asset to protect the accounting profit. Based on these assets, an amortization is recorded each year. However, the US GAAP stipulates that this amount must be recognized as operating expenses.The case of WorldCom clearly demonstrates that the two accounting treatments have distinct effects on the balance sheet and earnings. The accounting treatment of

SFAS 2 reduces the accounting performance since it obliges the companies to put the expenses in research and development as a charge. For this reason, we think that companies with low R&D activities are less impacted by this rule. Regarding the fact that religious firms invest less in R&D, they are less likely to be affected by this rule.

Few studies have explained the channel by which religiosity influences the economic output of the firm.Oh and Shin (2020) mention that religiosity affects corporate disclosure through social trust. Our study tries to fill some literature gaps by exploring another channel based on the conservative rule of US GAAP. For this reason, our research question is to test the mediating effect of research and development accounting treatment on the relationship between religiosity and financial distress. In other words, treating R&D expenditures as expenses can explain the impact of religiosity on financial distress or not.

Using 18,199 observations and the marginal effect approach, we discover that the conservative rule of SFAS2 explains the negative relationship between religiosity and financial distress.

This paper is organized as follows. Section 2 presents the theory and the literature review explaining the relation between religiosity, R&D accounting treatment and financial distress. Data and variables are provided in section 3. Section 4 reports empirical findings. The conclusion, finally, is in section 5.

Theory and literature review

Researchers have undertaken attempts to determine how personal attributes of managers, in addition to financial and institutional issues, might influence effective management. Moreover, social variables like religiosity can also have an impact on the managers' decisions. This is due to the fact that religion is a significant social norm that exerts an influence on thoughts and behaviors (Santos et *al.,* 2022).

According to the Social Norm Theory, managers, whether religious or not, are impacted by the religious social rules of the dominant group in the geographic location (McGuire et al., 2012). The more religiosity there is in a geographic area, the more the manager's decisions will be affected by social norms. Given that religious behavior is characterized by two aspects: ethics and risk aversion, religious companies maintain good relations with stakeholders, manage their results less, have fewer tax problems, and benefit from advantageous interest rates. Huang *et al.,* (2016) mention that the religious are less likely to invest in R&D activities. This kind of investment is very risky. It looks like gambling, which is forbidden by religion. During the most

recent financial crisis, Adhikari and Agrawal (2016) discovered that religious banks had a greater likelihood to avoid taking risks. He and Hu (2016) discovered that the religious cautiously expand their assets while engaging less in research and development projects. Interesting,Gharbi*et al.,* (2021) note that religiosity helps firms to avoid financial distress by minimizing the costs related to risks and increasing the revenues related to reputation. Similarly, Hilary and Hui (2009) find that religious companies are more profitable than other firms because their managers are less likely to take risks. Moreover, given that religious firms invest less in R&D activities, they have a good accounting performance because the US GAAP chooses the conservative rule by treating all research and development costs as expenses.

Prior to 1975, US companies were free to select their own ways of accounting for research and development on an individual basis. As a direct consequence of this, a wide variety of accounting and reporting techniques developed, which made it difficult to achieve uniformity and compare results. Because there was no theoretical and operational framework for R&D, the Financial Accounting Standards Board (FASB) decided to issue Statement No. 2: Accounting for Research and Development Costs. The following are the definitions of research and development that are qualified:

Research*: It is a planned search or critical investigation aiming at the discovery of new knowledge with the hope that such knowledge will be useful in developing a new product or service or a new process or technique or in bringing about a significant improvement to an existing product or process.*

Development: *is the translation of research findings or other knowledge into a plan or design for a new product or process or significant improvement…It does not include routine or periodic alterations…and it does not include market research or market testing activities (FASB 2, par. 8).*

The basic principle that was adopted by the FASB is that all research and development expenses are to be expensed when they are incurred, except in some industries. In 1981, more exceptions were created for the recording and music industries (FASB 50), the cable television industry (FASB 51), and the film industry (FASB 53). In 1985, capitalization of R&D in the computer software industry was permitted when a certain technological feasibility threshold was attained (FASB 86).

US GAAP chooses the conservative rule by treating all research and development costs as expenses due to the absence of a direct relationship between costs and future economic benefits. The problems of assets' overstatements are avoided in this case. However, another problem that can arise is related to the overstatement of the expenses and therefore the understatement of profit. In contrast, the international accounting standards allow the development expenses to be capitalized under some conditions related to the technical feasibility, the intention to complete the project, the availability of technical and financial resources... This method respects the match between costs and revenues.

The act of recognizing an expense or an asset as a capital expenditure is known as capitalization when it is considered that the advantages of such spending would be realized for an extended period of time. Expensing treats any expense as an operating expense in the current year. If one decides to capitalize on any asset versus expense, this results in increased earnings, which in turn leads to an increase in taxes and an improvement in the value of the firm. Choosing costs rather than capitalization for any asset, on the other hand, will result in decreased earnings and firm value. The research and development accounting treatment constitutes the most crucial difference between US GAAP and IFRS (Chen *et al.,* 2017), given that the balance sheet and income statement are heavily influenced. Therefore, Turlington*et al.,* (2019) observe that financial ratios are very affected by the choices of the accounting framework. Table I mentions the principals' effects of accounting treatment on financial statements.

Insert Table I

Franzen et *al.,* (2007) noted that US GAAP accounting treatment negatively influences the accounting performance. For this reason, some US firms decided to make or buy research and development projects. In fact, when the compensation depended on the accounting performance, the manager decided to buy in order to maintain a good performance (Xue, 2007). In fact, doing research and development increases expenses, which affects accounting performance.

The conservative behavior of religious firms towards R&D activities is accompanied by a conservative rule of US GAAP accounting treatment. This treatment promotes the conservative behavior of religious firms, which invest less in R&D activities, and therefore, they will have

fewer costs, higher profits, and a lower probability of financial distress. The theoretical framework of our paper is summarized in figure 1. For this reason, we expect the following hypothesis:

H: Research and development accounting treatment has a mediating effect in the relationship between religiosity and financial distress.

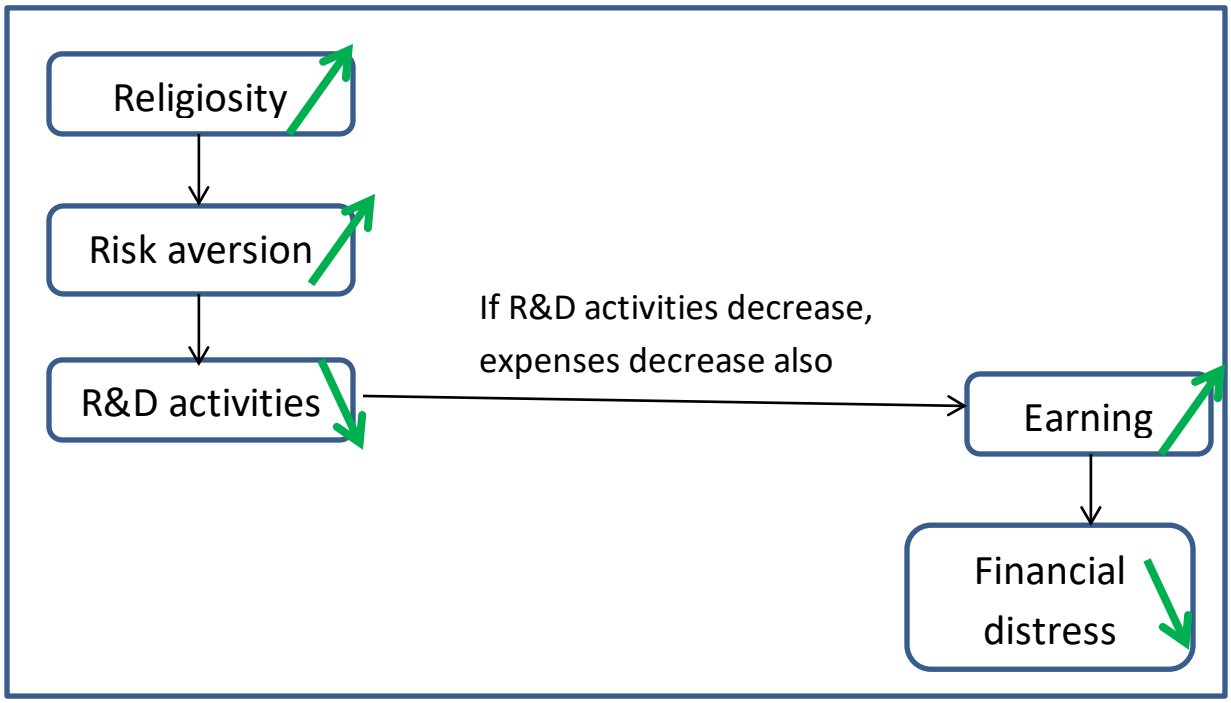


Figure 1: Theoretical framework

Research Design

To test our hypothesis, we used the Worldscope database. We focus only on US firms for the same reason presented by Hilary and Hui (2009) and Adhikari and Agrawal (2016). Basically, religiosity differs from one countyto another in the USA. So, we can isolate the impact of a country's legal and institutional characteristics from the effect of religiosity. We consider a firm's location to be the location of its headquarters. Pirinsky and Wang (2006) suggest that headquarters are usually close to a firm's main activities. Also, following prior studies, we admit a contagion effect of local norms. Individuals are affected by the dominant local culture, even if they do not share it.

Data on religiosity took from the Churches and Church Membership files of the American Religion Data Archive (ARDA) website, which has county-level religion statistics on Judeo-Christian bodies every ten years. Religiosity data is available for five years 1971, 1980, 1990, 2000, and 2010. Following Hilary and Hui (2009), we obtain estimates for the intermediate years by linearly interpolating the decennial data and linear extrapolation from 2011 to 2018.

The locations of firms' headquarters are obtained from worldscope database to match firm and county-level data. However, the number of observations is very low. We determine the location of missing firms manually by matching postal code and state. We exclude all financial services (2-digit SIC codes between 60 and 69) from the sample because high leverage in financial firms does not have the same meaning in the other firms (Fama and French, 1992) and we eliminate 209 observations because these firms do not use US GAAP. We have an initial sample (61371). After that, we eliminate firms with missing values regarding R&D activities. We exclude firms operating in the software industry (SIC CODE 7371-7374) because US GAAP permitted the capitalization of R&D activities in this industry (SFAS 86).The period of our study extends from 1985 to 2018.

Many observations have been eliminated due to the creation of missing values (following the adjustment made by capitalizing expenses).Our final sample consists of 5190 different firms and **18,199** firm-year observations using US GAAP.

Measuring religiosity

Following Hilary and Hui (2009), we estimate the religiosity of a firm by the ratio of religious members to the population of the county where the firm is headquartered. Two reasons can explain the efficacy of this ratio. First, in the USA, employees are likely to work in their local

communities. So, firms located in religious areas have a high proportion of religious employees. Second, according to the social norm theory, people tend to follow the dominant beliefs and the behavior of people around them.

Measuring financial distress

We use the accounting approach to detect financial distress. We think that accounting data can reveal the difference between religious firms and non-religious firms because the religiosity concept includes two aspects: ethics and risk aversion. The financial approach, on the other hand, is heavily influenced by investor behavior and market reaction.For this reason, we chose the Altman Z score (Altman, 1968) to detect how religious firms behave and make decisions.

Z = 1.2 (working capital divided by total assets) + 1.4 (retained earnings divided by total assets) + 3.3 (earnings before interest and taxes divided by total assets) + 0.6 (market value of equity divided by total liabilities) +0.999 (sales divided by total assets)

The Altman Z score is composed of five ratios and it measures the financial health of the firm. To detect financial problems, we need to generate a new variable named zscore_1968.

Z score_1968= 0 if Z > 3 Safe zone

Z score_1968 =1 if 1.81 <Z< 2.99 Gray zone

Z score_1968= 2 if Z < 1.81 Distress zone

Measuring control variables

The control variables are related to the corporate characteristics and counties aspects. The financial distress of the firm is linked to the audit opinion (Muñoz-Izquierdo et al., 2020) and the leverage and size (Hilary and Hui, 2009).In fact, distressed firms are more likely to have a qualified audit report, a high degree of leverage, and a small size.

Regarding the counties traits, following Hilary and Hui (2009), we control for population, percapita income, the ratio of males to females, the ratio of married and education. In fact, these characteristics vary across counties which can influence the relationship between financial distress and religiosity.

The aim of our paper is to test the mediating effect of R&D accounting treatment on the relationship between religiosity and financial distress. The KHB method is recommended when

testing the mediator effect in a nonlinear regression. However, this method cannot be applied. In fact, the effect of accounting treatment cannot be isolated from the effect of research and development activities. In this case, we will opt for the marginal effect method. This approach is recommended when we have the same independent variable (religiosity) which explains two dependent variables (the z scores calculated according to the two accounting treatments). We will try to test the marginal effect of religiosity using the first accounting treatment (expensing; US GAAP) and the second accounting treatment (capitalization).

We have two models:

Model A: R&D activities are an expense:

$$\textbf{ZSCORE\_1968 it} = \beta 0 + \beta 1\ \textbf{RELIGIOSITYit} + \beta\ \textbf{(control variables) it} + \varepsilon$$

Financial distress: Z score_1968= 0 if Z > 3, Z score_1968 =1 if 1.81 <Z< 2.99 and Z score_1968= 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered

Model B: R&D activities are assets:

$$\textbf{Zscore\_adj it} = \beta 0 + \beta 1\ \textbf{RELIGIOSITYit} + \beta\textbf{(control variables) it} + \varepsilon$$

Financial distress: Zscore_adj = 0 if Z > 3, Zscore_adj =1 if 1.81 <Z< 2.99 and Zscore_adj = 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered.

The marginal effect of religiosity is calculated in each model through the "mfx" command. The difference between the two marginal effects constitutes the effect of accounting treatment.

The processus of Adjusting Accounting performance and models

The motivation for studying the relationship between R&D intensity and the measures of financial distress is inspired by evidence that rising R&D investment over time greatly impacts accounting-based measures of performance (Franzen et *al.,* 2007). The result of mandating that all research and development costs be expensed as incurred is that reported income and net assets are typically lower than they would be under a less cautious policy that allowed for the capitalization of R&D expenditures.

Moreover, Chan *et al.,* (2001) discover that, across all industries, research and development expenditure as a percentage of profits has more than doubled between 1975 and 1990, which means that these expenses are very important. So, the accounting measures of financial distress could be misinterpreted. For these reasons, we have to adjust the measure of financial distress. Table II lists the components being modified.

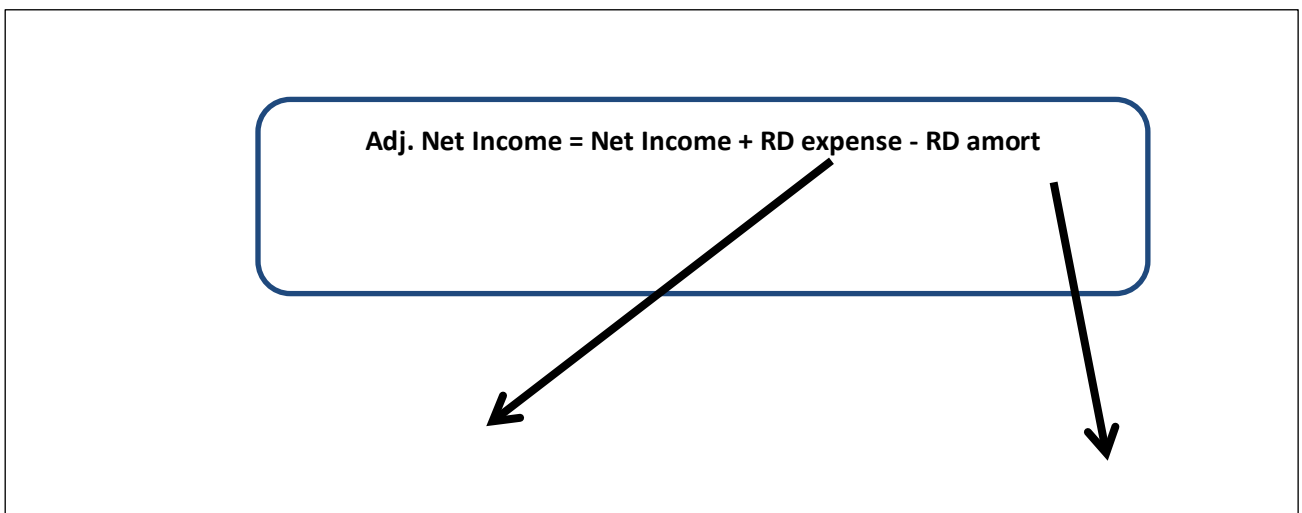
Insert Table II

Altman Z score 1968 = *1.2 (working capital divided by total assets) + 1.4 (retained earnings divided by total assets) + 3.3 (earnings before interest and taxes divided by total assets) + 0.6 (market value of equity divided by total liabilities) +0.999 (sales divided by total assets)*

Adjusted Altman Z score 1968 = *1.2 (working capital divided by adjusted total assets) + 1.4 (after-tax adjusted returned earning divided by adjusted total assets) + 3.3 (adjusted earnings before interest and taxes divided by adjusted total assets) + 0.6 (market value of equity divided by after-tax adjusted liabilities) +0.999 (sales divided by adjusted total assets)*

The adjustment technique developed by Lev and Sougiannis (1996) enables R&D expenses to be considered as an intangible asset, which is capitalized on the balance sheet and amortized over an anticipated useful life of five years.

Figure 2 illustrates the adjustments that have taken place with regard to the net income.



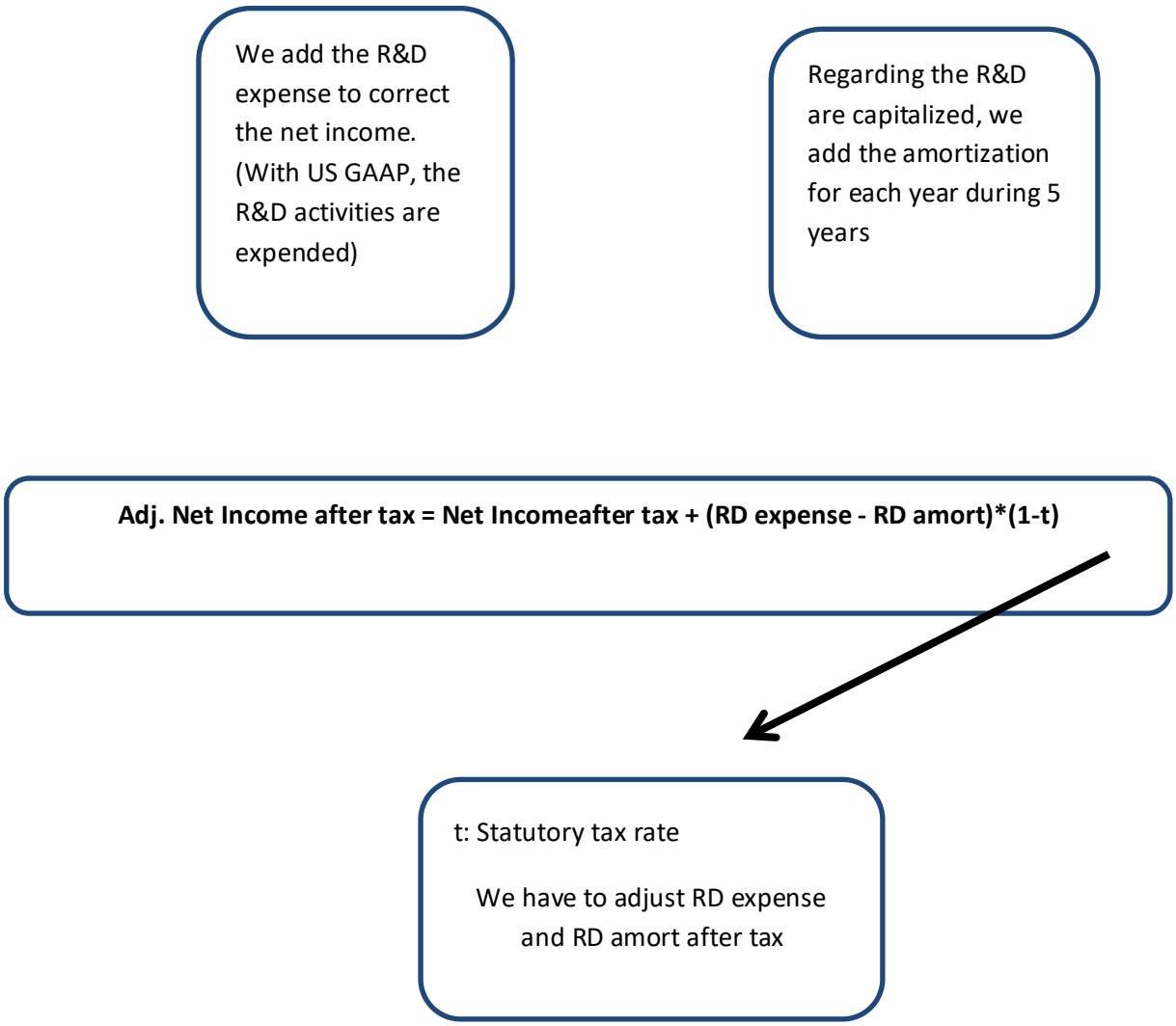


Figure 2: An explication of the earning changes

There have been two significant modifications made. First, we need to make some adjustments to the net income and add back the costs of research and development because, under US GAAP, these investments are considered an expense. Because of this, we need to make the necessary adjustments to the net income by putting back these costs.

Second, we will capitalize the R§D expenditures. In this case, these charges should be treated as assets; as a result, we should subtract an amount equal to the annualized amortization from

the net income during the next 5 years (20%). The same approach is followed by Chan et al. (2001), Franzen*et al.,*(2007) and Kapons (2020).

Adj. Net Income = Net Income + RD expense - RD amort

Where.
RD expense: the amount of R&D expenses in this year
*RD amort = 0.2 * (RDit-1 + RDit-2 + RDit-3 + RDit-4 + RDit-5)*

The same changes are made for earnings before interest and tax and returned earning

Adj. Earnings before interest= EBIT + RD expense – RD amort
Adj. Returned earning= Re + RD expense - RD amort

Where.
RD expense: the amount of R&D expenses in this year
*RD amort = 0.2 * (RDit-1 + RDit-2 + RDit-3 + RDit-4 + RDit-5)*

Due to the fact that amounts spent on research and development are capitalized, the total value of these expenditures is added to assets, taking into account the amortization applied each year for 5 years.

Adj. Total Assets = Total assets + RD Capital

Where.
*RD Capital = RDit + 0.8 * RDit-1 + 0.6 * RDit-2 + 0.4 * RDit-3 + 0.2 * RDit-4*

However, tax consequences arise as a result of these modifications. The prospective tax consequences of our adjustment method are based on two assumptions that we make. For tax

reasons, firms may elect to deduct research and development expenditures. Second, we assume that corporations with a negative net income will not be subject to any tax consequences.

As a result of the capitalization of research and development for financial reporting purposes, our initial assumption leads to the recognition of a deferred tax liability in the amount of (RDCapital * (t)) (but not for tax reporting purposes).

After-tax adjustments have no effect in cases when net income is negative, hence the statement above remains unchanged. The following are the after-tax (AT) changes to our adjusted z score:

Adj net income after tax= Net Income + (RD expense - RD amortization) * (1 - t)
Adj returned earning after tax= re + (RD expense - RD amortization) * (1 - t)
ATAdjusted Total Liabilities = Total liabilities + Deferred Tax Liability(DTL)

Where

*Deferred Tax Liability = RD Capital * t*

t: yearly statutory tax rate

In this equation, t represents the proper yearly statutory tax rate: 46 percent during the 1980 to 1986, 40 percent in 1987, 34 percent over the 1988 to 1992 period, 35 percent over 1993 to 2017, and 21 percent in 2018.

We employ these after-tax adjusted returned earnings, adjusted earnings before interest and taxes, adjusted total assets, and after-tax adjusted liabilities into z score's bankruptcy prediction model. As for earning before interest and taxes, it is not affected by the tax impact.

The change in accounting treatment impacts not just our dependent variable (z score), but also a few other model variables.

Our principal model is:

ZSCORE_1968 it =β0 + β1 RELIGIOSITYit + β2 AUDITOPNit +β3 LEVERAGEit + β4 SIZEit + β5 Population it+ β6 Education it +β7 Married it + β8 Percapita_income it +β9male_female it + β10Yrit+ β11 Indit + ε

Insert Table III

TableIII lists the variables involved. We have just leverage and size. Given that their computation necessitates total assets, we have only modified these variables.

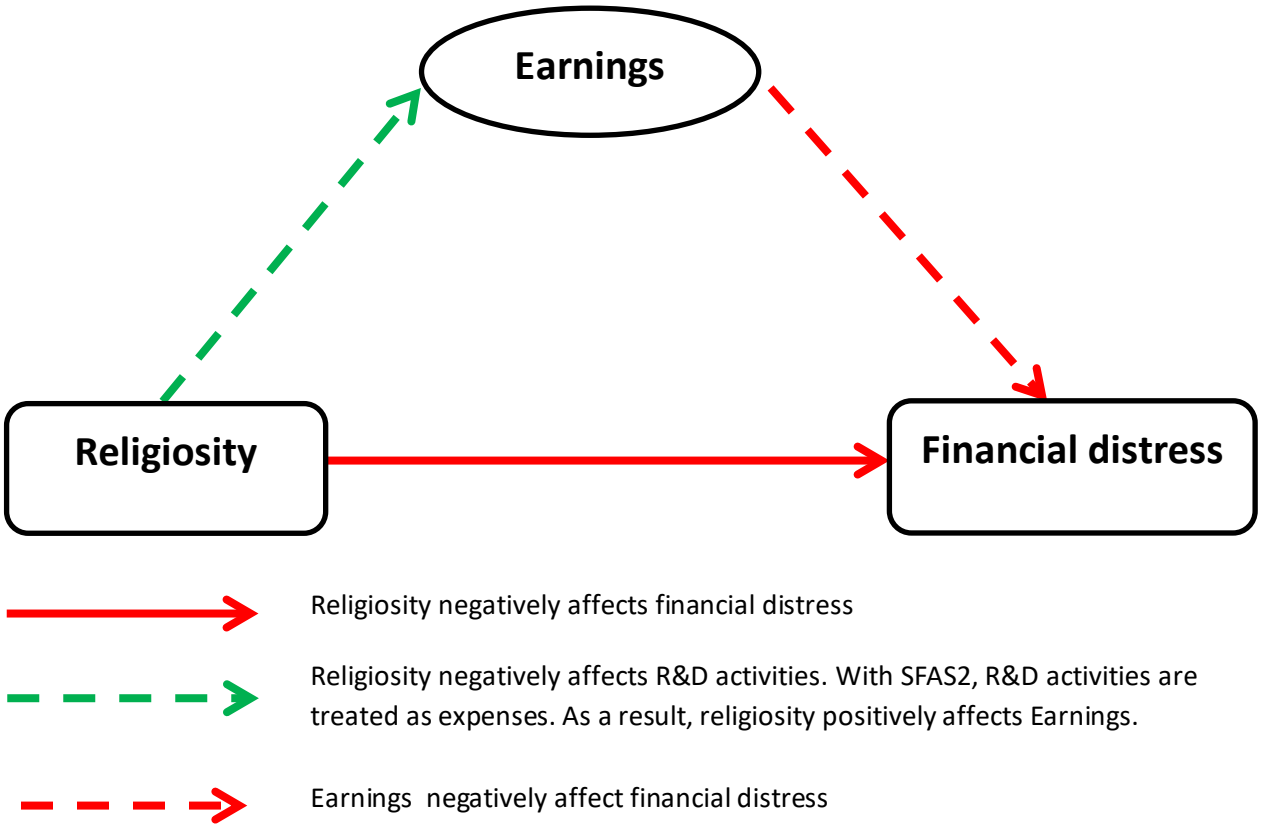


Figure 3: Summary figure of the mediating effect of R&D Accounting treatment

Empirical Results

We have two models:

Model A: R&D activities are an expanse:

ZSCORE_1968 it =β0 + β1 RELIGIOSITYit + β2 AUDITOPNit +β3 LEVERAGEit + β4 SIZEit + β5 Population it+ β6 Education it +β7 Married it + β8 Percapita_income it +β9male_female it + β10Yrit+ β11 Indit + ε

Financial distress: Z score_1968= 0 if Z > 3, Z score_1968 =1 if 1.81 <Z< 2.99 and Z score_1968= 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage is the ratio of total debt/total assets, Size is the natural logarithm of total assets, Audit opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total

population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county

Model B: R&D activities are assets

$$\textbf{Zscore\_adj}_{it} = \beta_0 + \beta_1 \textbf{RELIGIOSITY}_{it} + \beta_2 \textbf{AUDITOPN}_{it} + \beta_3 \textbf{LEVERAGE\_ADJ}_{it} + \beta_4 \textbf{SIZE\_ADJ}_{it} + \beta_5 \textbf{Population}_{it} + \beta_6 \textbf{Education}_{it} + \beta_7 \textbf{Married}_{it} + \beta_8 \textbf{Percapita\_income}_{it} + \beta_9 \textbf{male\_female}_{it} + \beta_{10} \textbf{Yr}_{it} + \beta_{11} \textbf{Ind}_{it} + \varepsilon$$

Financial distress: Zscore_adj = 0 if Z > 3, Zscore_adj =1 if 1.81 <Z< 2.99 and Zscore_adj = 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage_ADJ is the ratio of total debt/total adjusted assets, Size_ADJ is the natural logarithm of total adjusted assets, Audit opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county

The classification of companies according to their financial situation is given in table IV, which compares the two measures of financial distress. This table confirms the notion that accounting treatment has a significant impact on accounting performance. In fact, 38% of firms were in financial distress when we used US GAAP. The percentage decreases to 33% if we capitalize the R&D activities.

Insert Table IV

A priori, the accounting treatment has an influence; nonetheless, in order to validate this result, it is necessary to continue with the regressions. In the first step, we have to run two models. After that, we use the "mfx" command of STATA to compare the marginal impact of religiosity in the two models. This method is preconized [1]when we have two models with two different dependent variables (Z score_1968 and Zscore_adj) with the same independent variable (religiosity).

Considering the fact that our dependent variable is classified into three categories, we employ the ordinal logit. However, in order to ensure that the model is appropriate, it is required to check the assumption of the parallel lines assumption.

[1] https://www.stata.com/support/faqs/statistics/marginal-effects-methods/

There are two tests that we will refer to in order to validate this assumption. The likelihood-ratio test is the first test that is connected to the "omodel". The assumption behind this test's null hypothesis is that the coefficients of the various models are equal.

Insert Table V

Table V mentions that the null hypothesis is rejected (p value is significant). The coefficient of one independent variable at least varies across the values of Z score_1968. Table VI notes that the assumption of proportional odds is violated for all variables, except Religiosity, Audit opinion, and Education.

Because of this, we use STATA's pls option to find the variables that meet the assumptions of proportional odds.

Insert Table VI

The results of regressions of financial distress using US GAAP are shown in Table VII. The pseudo R2 is about 28%. Religiosity has a negative coefficient in explaining financial problems, and this coefficient is statistically significant at the five percent level of significance.

Insert Table VII

We have to move now to the second model (model B). We follow the same approach as with model C.

Table VIII and Table IX show that all variables don’t meet the assumption except religiosity.

Insert Table VIII

Insert Table IX

The results of gologit model are shown in table X. With adjusted accounting variables, the Pseudo R2 decreases from 28% to 15%. This result confirms that the conservative rules of US GAAP have an impact on financial distress.

The result is also consistent with our prediction, which implies that firms located in more religious regions have fewer financial troubles than other firms, even after adjusting for research and development accounting treatment.

Insert Table X

Now we are going to compare the marginal effect of religiosity between two models (Model A and Model B). The comparison is conducted based on the company's financial status.

Table XI shows that the marginal impact of religiosity with US GAAP is less than the marginal impact with R&D expense capitalization, but it is positive in both models, which means that the impact of religiosity doesn't matter if the firm uses US GAAP or no US GAAP when it is situated in the safe zone.

Insert Table XI

Table XII notes that the marginal impact of religiosity is positive in the first model using US GAAP. That is to say, the religiosity plays a positive role in keeping the firm in the gray zone. For this reason, religious firms are protected from financial distress. However, the marginal impact of the second model becomes negative, which implies that religiosity has an impact on financial distress despite using the capitalization method of R&D activities.

Insert Table XII

Table XIII notes that the marginal impact of religiosity is negative with the two models. This result confirms the finding which stipulates that religiosity has a negative impact on financial distress. With US GAAP, the impact is about 0.21. With the capitalization method, this effect decreases to 0.17. The difference between the two impacts is due to the change in accounting treatment. We can conclude that accounting treatment explains the relationship between religiosity and financial distress.

Insert Table XIII

Conclusion

This paper explores the channel by which religiosity affects financial distress. Academic scholars note that human behavior can influence financial decisions. Religiosity in particular can affect risk aversion in the firm and consequently influence its investment preferences. In fact, religious firms tend to make less risky investments, and they are likely to invest more in material assets than intangible assets. However, If religious firms invest less in R&D activities, they have fewer costs, and consequently, they have fewer expenses in their earnings given that US GAAP preconizes the expensing of R&D investments. We suppose that religious firms are less likely to be in financial distress because they have good accounting performance given that they have fewer R&D expenses.

Using 18,199 obserevations and the marginal effect approach, we find that the negative relation between religiosity and financial distress is explained by the accounting treatment of US GAAP. This conservative behavior of religious firms is completed by the conservative rule of SFAS2.

This study adds to research and practice in several ways. This paper highlights the importance of taking into account the risk aversion of religious firms when studying accounting performance. This criterion is very important to guarantee the comparability of the financial statements. It should be of interest to the users of financial statements because treating R&D activities as expenses can destroy the accounting performance of firms that prefer investing in

risky projects. This favoritism prevents the comparison between two firms in the same industry with different risk-taking behaviors.

Second, this paper extends the studies that have criticized the accounting treatment of R&D activities. Indeed the mismatch between revenues and expenses related to research and development activities can cause financial distress. It should be of interest to the regulator.

Third, this paper explores the complementarity between the conservatism of the accounting rule and the risk aversion of religious companies. This admixture between behavior and accounting rule can protect the company from short-term financial distress.

Finally, investors and practitioners have to adjust the earnings of US firms using US GAAP. Otherwise, another problem can arise. Expensing R&D activities influences the accounting performance in the short term, but this accounting rule may also cause the volatility of earnings in the long term. In fact, the revenues of firms with intensive R&D activities will suddenly increase. On the other hand, religious firms have stable earnings. For this reason, they tend to have a lower level of crash risk.

Our paper suffers from a major limitation related to data availability. We used linear interpolation and linear extrapolation data to be able to conduct this research over a period of 1985–2018.

For future research, we propose to carry out this research over several years and test the mediating effect of R&D accounting treatment on the relationship between religiosity and financial distress. In other words, take into consideration at the same time the expenses and revenues of research and development activities. Moreover, given that religiosity is based on two aspects: risk aversion and ethics, we may also investigate additional characteristics that may help to explain the relationship between religiosity and financial distress based on the ethics component, such as corporate social responsibility.

References

- ✓ Adhikari, B.K., & Agrawal, A. (2016). Does Local Religiosity Matter for Bank Risk-Taking?. *Journal of Corporate Finance,* 38, pp. 272-293.
- ✓ Altman E.I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance.* Sep;23 (4), pp. 589–609.
- ✓ Cai, G., Li, W. & Tang, Z. (2020). Religion and the Method of Earnings Management: Evidence from China, *Journal of Business Ethics*, 161, pp.71–90.
- ✓ Callen, J. L. & Fang, X. (2015). Religion and stock price crash risk. *Journal of Financial and Quantitative Analysis*, 50, pp. 169–195.
- ✓ Chan, L, Lakonishok, J. & Sougiannis, T. (2001). The Stock Market Valuation of Research and Development Expenditures. *Journal of Finance*, Vol. 56, No. 6, pp. 2431–2457.
- ✓ Chen, E., Gavious, I. & Lev, B. (2017). The positive externalities of IFRS R&D capitalization: Enhanced voluntary disclosure. *Review of Accounting Studies*, 22(2), pp. 677—714.
- ✓ Chintrakarn, P., Jiraporn, P., Tong, S. & Chatjuthamard, P. (2017). Exploring the Effect of Religious Piety on Corporate Governance: Evidence from Anti-takeover Defenses and Historical Religious Identification. *Journal of Business Ethics*, volume 141, pp. 469–476.
- ✓ Duarte, J., Siegel, S., & Young, L. (2012). Trust and credit: the role of appearance in peerto-peer lending. *Review of Financial Studies*, 25, pp. 2454–2483.
- ✓ Dyreng, S.D., Mayew, W.J. & Williams, C.D. (2012). Religious Social Norms and Corporate Financial Reporting. *Journal of Business Finance & Accounting*, Vol 39 Issue. 7-8, pp. 845–875.
- ✓ Farooq, O. (2020). Geographic Variation in Religiosity and Its Impact of Dividend Policies. Asian Academy of Management. *Journal of Accounting and Finance* (AAMJAF), vol. 16, issue 1, pp. 109-125.
- ✓ Franzen, L., Rodgers, K. & Simin, T. (2007). Measuring distress risk: the effect of R&D intensity. *The Journal of Finance,* 62, pp. 2931– 2967.
- ✓ Gao, L., Wang, Y., & Zhao, Y. (2017). Does local religiosity affect organizational risk-taking? Evidence from the hedge fund industry. *Journal of Corporate Finance*, 47, pp. 1–22.

- ✓ Gharbi, I., Hamed-Sidhom, M., Hussainey, K. & Ganouati, J. (2021). Religiosity and fnancial distress in U.S firms. *International Journal of Finance and Economics*, Volume26, Issue3. July 2021, pp. 3902-3915.
- ✓ He, W., & Hu, M. R. (2016). Religion and bank loan terms. *Journal of Banking and Finance*, 64, pp. 205–215.
- ✓ Hilary, G., & Hui, K.W. (2009). Does religion matter in corporate decision making in America?. *Journal of Financial Economics*, 93, pp. 455–473.
- ✓ Huang, D., Lu, D. & Luo, J .H. (2016). Corporate Innovation and Innovation Efficiency: Does Religion Matter?. *Nankai Business Review International*, vol. 7(2), pp. 150-191.
- ✓ Kapons, M. (2020). R&D expenses, R&D capitalization, the book-to-price ratio and the crosssection of returns. Working paper, Tilburg School of Economics and Management, Tilburg University. Presented at the Accounting Design Project Forum. Athttps://www8.gsb.columbia.edu/ceasa/sites/ceasa/files/20200918_ADP_Kapons.pdf
- ✓ Leng, J., Trzeciakiewicz, A., & Ozkan, A. (2018). CEO Overconfidence and the Probability of Corporate Failure: Evidence from the UK. Working paper. (February 28, 2018). Available at SSRN: https://ssrn.com/abstract=3184199.
- ✓ Lev, B.& Sougiannis, T. (1996). The capitalization, amortization, and value-relevance of R&D. *Journal of Accounting and Economics*, 1996, vol. 21, issue 1, pp. 107-138.
- ✓ Lewis, V., Kay, K.D., Kelso C. & Larson J. (2010). Was the 2008 financial crisis caused by a lack of corporate ethics?. *Global Journal of Business Research*, 4(2), pp. 77-84.
- ✓ Lu, L., & Wu, Y. (2020). Does religion enhance firm performance? Evidence from private firms in China. *China Economic Review*, 62(3):101480.
- ✓ McGuire, S.T., Omer, T.C., & Sharp, N.Y. (2012). The Impact of Religion on Financial Reporting Irregularities. *The Accounting Review*, 87 (2), pp. 645–673.
- ✓ Muñoz-Izquierdo, N., Laitinen, E.K., Camacho-Miñano, M. & Pascual-Ezama, D. (2020). Does audit report information improve financial distress prediction over Altman's traditional Z-Score model?. *Journal of International Financial Management & Accounting*, Vol31, Issue1, pp. 65-97.
- ✓ Nelson, R.H. (2017). The Financial Crisis as a Religious Crisis. *Journal of International Business and Law*, Vol 17, Issue 1.
- ✓ Oh, F-D. & Shin, D. (2020). Religion and Corporate Disclosure Quality. *Hitotsubashi Journal of Economics*, 61, pp. 20–37.
- ✓ Pirinsky, C., & Wang, Q. (2006). Does corporate headquarters location matter for stock returns?. *Journal of Finance*, 61, pp. 1991-2015.

- ✓ Rijsenbilt, A. & Commandeur, H. (2013). Narcissus Enters the Courtroom: CEO Narcissism and Fraud. *Journal of Business Ethics*, 117(2), pp. 413–429.
- ✓ Santosa, S-M., Lemes, S. & Almeida, N-S. (2022). Evidence of the impact of religiosity on earnings management in Brazil. *Revista de Contabilidade e Organizações*, v.16:e186587.
- ✓ Turlington, J., Fafatas, S., & Oliver, E.G. (2019). Is it U.S. GAAP or IFRS? Understanding how R&D costs affect ratio analysis. *Business Horizons*, Volume 62, Issue 4, pp. 427-436.
- ✓ Xue, Y. (2007). Make or buy new technology: The role of CEO compensation contract in a firm's route to innovation. *Review of Accounting Studies* 12, pp. 659–690.

Table I: The effect of the accounting treatment on financial statement (Balance sheet and Earning statement

	Capitalization	Expensing
Balance sheet		
Total Assets	Higher	Lower
Total Liabilities	Higher	Lower
Earning statement		
Profitability (current year)	Higher	Lower

Table II: The difference between Altman Z score 1968 and adjusted Altman Z score 1968

	Components without change	*Components with changes*
Working capital	✓	
Total assets		✓
Retained earnings		✓
Earnings before interest and taxes divided		✓
Market value of equity	✓	
Total liabilities		✓
Sales	✓	

Table III: The variables concerned with the change in Accounting treatment

	Components without changes	*Components with changes*
Religiosity	✓	
Audit opinion	✓	
Levreage		✓
Size		✓
Demographic variables	✓	

Table IV: Comparative table between z_score and zcore_adj (percentage)

	Z score_1968	zcore_adj
0	44.76	49.45
1	17.12	16.85
2	38.12	33.70
Total	100.00	100.00

Financial distress (US GAAP): Z score_1968= 0 if Z > 3, Z score_1968 =1 if 1.81 <Z< 2.99 and Z score_1968= 2 if Z < 1.81

Financial distress (R&D as assets): zcore_adj = 0 if Z > 3, zcore_adj =1 if 1.81 <Z< 2.99 and zcore_adj = 2 if Z < 1.81

Table V: Results of "omodel "test (Model A)

chi2(9) = 1276.67
Prob> chi2 = **0.0000**

Table VI: Brant test of parallel regression assumption (Model A)

	chi2	p>chi2	df
All	1261.370	0.000	9
Religiosity	0.790	0.373	1
Size	286.570	0.000	1
Leverage	187.560	0.000	1
Audit opinion	0.090	0.759	1
Percapita income	20.320	0.000	1
Population	4.050	0.044	1
Married	13.030	0.000	1
Education	0.030	0.858	1
Male female	37.140	0.000	1

Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage is the ratio of total debt/total assets, Size is the natural logarithm of total assets, Audit

opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county

Table VII : Impact of Religiosity on zscore_1968

zscore_1968	Coef.	Std.Err.	Z	P>z	[95%Conf.	Interval]
0						
Religiosity	-0.861	0.350	-2.460	0.014**	-1.547	-0.175
Leverage	6.126	0.371	16.510	0.000***	5.399	6.853
Audit_opiO	1.353	0.169	8.010	0.000***	1.022	1.684
Male female	0.318	1.372	0.230	0.816	-2.370	3.007
Education	0.009	0.009	1.050	0.293	-0.008	0.026
Married	-1.446	0.873	-1.660	0.098*	-3.156	0.265
log_population	0.035	0.046	0.770	0.441	-0.054	0.124
log_percapita_income	0.162	0.359	0.450	0.652	-0.542	0.866
Size	-0.217	0.022	-9.740	0.000	-0.261	-0.174
1						
Religiosity	-0.861	0.350	-2.460	0.014**	-1.547	-0.175
Leverage	4.963	0.251	19.800	0.000***	4.471	5.454
Audit_opiO	1.353	0.169	8.010	0.000***	1.022	1.684
Male female	1.554	1.392	1.120	0.264	-1.175	4.282
Education	0.009	0.009	1.050	0.293	-0.008	0.026
Married	-1.101	0.921	-1.200	0.232	-2.905	0.703
log_population	0.089	0.046	1.920	0.055*	-0.002	0.180
log_percapita_income	0.269	0.364	0.740	0.460	-0.445	0.983
Size	-0.366	0.022	-16.690	0.000	-0.409	-0.323
Year effect	Yes					
Industry effect	Yes					
Cluster Cusip	Yes					

Generalized Ordered Logit Estimates Number of obs = 18,199
Wald chi2(172) = 3805.29 Prob> chi2 = 0.0000
Log pseudolikelihood = -13471.305 Pseudo R2 = 0.2810

Financial distress: Z score_1968= 0 if Z > 3, Z score_1968 =1 if 1.81 <Z< 2.99 and Z score_1968= 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage is the ratio of total debt/total assets, Size is the natural logarithm of total assets, Audit opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county.

Table VIII : Results of "omodel "test (Model B)

chi2(9) =	1444.81
Prob> chi2 =	**0.0000**

Table IX: Brant test of parallel regression assumption (Model B)

	chi2	p>chi2	df
All	1876.940	0.000	9
Religiosity	1.870	0.172	1
Leverage_ADJ	23.200	0.000	1
Size_ADJ	686.470	0.000	1
Audit opinion	45.060	0.000	1
Male female	65.390	0.000	1
Education	5.300	0.021	1
Married	13.410	0.000	1
Population	7.880	0.005	1
Percapita income	7.540	0.006	1

Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage_ADJ is the ratio of total debt/total adjusted assets, Size_ADJ is the natural logarithm of total adjusted assets, Audit opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county.

Table X: Impact of Religiosity on adjusting zscore_1968

		Robust				
zcore_adj	Coef.	Std.Err.	Z	P>z	[95%Conf.	Interval]
0						
Religiosity	-0.817	0.311	-2.630	0.009***	-1.427	-0.207
Leverage_ADJ	1.870	0.192	9.750	0.000***	1.494	2.246
Audit opinion	0.413	0.102	4.050	0.000***	0.213	0.613
Male female	-1.557	1.171	-1.330	0.184	-3.852	0.738
Education	0.006	0.008	0.830	0.405	-0.009	0.021
Married	-0.604	0.720	-0.840	0.401	-2.015	0.807
Population	0.023	0.039	0.590	0.553	-0.053	0.098
Percapita income	-0.066	0.326	-0.200	0.841	-0.705	0.573
Size_ADJ	-0.028	0.017	-1.610	0.107	-0.062	0.006

1						
Religiosity	-0.817	0.311	-2.630	0.009***	-1.427	-0.207
Leverage_ADJ	1.825	0.185	9.870	0.000***	1.463	2.188
Audit opinion	0.675	0.100	6.760	0.000***	0.479	0.871
Male female	1.711	1.201	1.430	0.154	-0.642	4.065
Education	0.002	0.008	0.230	0.821	-0.013	0.017
Married	-1.628	0.767	-2.120	0.034**	-3.131	-0.126
Population	0.053	0.041	1.280	0.201	-0.028	0.133
Percapita income	0.574	0.334	1.720	0.085*	-0.080	1.228
Size_ADJ	-0.185	0.019	-9.800	0.000***	-0.221	-0.148
Year effect	Yes					
Industry effect	Yes					
Cluster Cusip	Yes					

Generalized Ordered Logit Estimates Number of obs = 18,199
Wald chi2(172) = 10805.86 Prob> chi2 = 0.0000
Log pseudolikelihood = -15700.444 Pseudo R2 = 0.1499

Financial distress (R&D as assets): zcore_adj = 0 if Z > 3, zcore_adj =1 if 1.81 <Z< 2.99 and zcore_adj = 2 if Z < 1.81, Religiosity is the ratio of Christian religious members to the population of the county where the firm is headquartered, Leverage_ADJ is the ratio of total debt/total adjusted assets, Size_ADJ is the natural logarithm of total adjusted assets, Audit opinion : 1 Unqualified, 2 Qualified, 3 Partial audited, 4 Not audited, Population is the natural logarithm of Total population of the county, Percapita income is natural logarithm of the per capita personal income, Male-female is the ratio of the male population to the female population, Education is the proportion of county population above age 25 that has completed a bachelor's degree or higher, Married: The percent of married people in the county

Table XI: Marginal effect of religiosity in the safe zone

	Altman Z score 1968	**Altman Z score 1968 adjusted**
Marginal effect	0,12	0.204
P value	0.014**	0.009***

Table XII: Marginal effect of religiosity in the Gray zone

	Altman Z score 1968	**Altman Z score 1968 adjusted**
Marginal effect	0.091	-0.029
P value	0.017**	0.011**

Table XIII: Marginal effect of religiosity in the distress zone

	Altman Z score 1968	Altman Z score 1968 adjusted
Marginal effect	-0.211	-0.175
P value	0.014**	0.009***