INDERSCIENCE PUBLISHERS
Linking academia, business and industry through research

Middle East J. of Management

ISSN online: 2050-3644 - ISSN print: 2050-3636
https://www.inderscience.com/mejm

Idiosyncratic risk and capital structure: the mediating role of corporate reputation and moderating role of corporate social responsibility

Yu-Sheng Kong, Faiza Siddiqui, Vikesh Kumar

DOI: 10.1504/MEJM.2024.10063510

Article History:

Received:	03 August 2023
Last revised:	09 September 2023
Accepted:	09 September 2023
Published online:	30 November 2024

Idiosyncratic risk and capital structure: the mediating role of corporate reputation and moderating role of corporate social responsibility

Yu-Sheng Kong

School of Finance and Economics,
Jiangsu University,
Zhenjiang, 212013, China
Email: yshkong@ujs.edu.cn
and
School of Finance and Economics,
Taihu University of Wuxi, China

Faiza Siddiqui*

School of Finance and Economics,
Jiangsu University,
Zhenjiang, 212013, China
Email: faizasiddiqui790@gmail.com
*Corresponding author

Vikesh Kumar

Department of Business Administration,
Sukkur IBA University,
Sukkur, 65200, Pakistan
Email: vikeshkumar@iba-suk.edu.pk

Abstract: This study examines the impact of idiosyncratic risk (I.Risk) and corporate reputation (CR) on the capital structure of non-financial companies. The study incorporated a generalised method of moments (GMM) model to examine the proposed association of firm-specific factors and capital structure. The Baron and Kenny modelling is used to estimate the mediating relationship of the study. The analysis is performed on panel data from the 2010 to 2019 period of 284 listed firms on the Pakistan Stock Exchange (PSX). The research findings state that I.Risk has a negative significant effect on capital structure. In addition, the Sobel test findings evidenced that CR has significantly mediated the relationship between I.Risk and capital structure. Moreover, corporate social responsibility has significantly moderated the relationship between I.Risk and CR.

Keywords: capital structure; idiosyncratic risk; corporate reputation; corporate social responsibility; CSR; generalised method of moments; GMM; generalised least squares; GLS.

JEL codes: C1, G10, G12, G32, F65.

Reference to this paper should be made as follows: Kong, Y-S., Siddiqui, F. and Kumar, V. (2025) 'Idiosyncratic risk and capital structure: the mediating role of corporate reputation and moderating role of corporate social responsibility', *Middle East J. Management*, Vol. 12, No. 1, pp.98–123.

Biographical notes: Yu-Sheng Kong is a distinguished scholar and Doctoral Supervisor at the School of Finance and Economics, Jiangsu University, Zhenjiang, China, has made significant contributions to the fields of financial management, accounting control and decision-making, and industrial economy and accounting. He is not only a dedicated educator but also an accomplished researcher, with an extensive teaching portfolio that includes courses in accounting, financial management, management accounting, accounting theories and methods, and taxation accounting. In recognition of his exceptional contributions, he has received a multitude of honours and awards, including the 'Excellent Prize of Young Teachers' Teaching and Cultivating' and the 'First Award of Science and Technology Advancement of Chinese General Chamber of Commerce'.

Faiza Siddiqui is presently engaged in the pursuit of her PhD within the esteemed School of Finance and Economics at Jiangsu University, located in the vibrant city of Zhenjiang, China. Her research interests are multifaceted, spanning the domains of behavioural finance, environmental sustainability, corporate governance, and capital stock. Her scholarly contributions have been featured in well-respected and peer-reviewed journals, including the *Journal of Innovation & Knowledge*, *Heliyon*, and the *Journal of Retailing and Consumer Services*, showcasing her dedication to advancing knowledge within her areas of expertise. In addition, she possesses a strong skill set that extends beyond academia.

Vikesh Kumar is a PhD student at the School of Financial Planning- Texas Tech University. He used to be a Lecturer in Finance (study leave). His areas of interest are household finance, behavioural finance, portfolio management and household investments. Currently, he is working on the 'Consistencies and Inconsistencies of US households Investment decisions'. During his PhD, he also received an Outstanding Doctoral Research Award for current project.

1 Introduction

The decision-making process concerning capital structure is recognised as a critical factor for achieving strategic success within the organisation (Hirdinis, 2019). In this pursuit, management's responsibility is to form an optimal capital structure with minimal cost. This process involves numerous factors when determining the optimal debt-to-equity ratio, which serves as a crucial element in maximising a firm's value (Hirdinis, 2019). A recent study by O'Dwyer and Unerman (2020) emphasised the importance of managerial caution in financing future investments, emphasising a thorough assessment of the associated risk. In addition, existing studies stated that numerous factors need to be considered (Lee et al., 2021; Ogbanufe et al., 2021; Santamaria et al., 2021; Sharma et al., 2022).

Furthermore, a significant body of literature about capital structure exists, including notable works by Griner and Gordon (1995), Marsh (1982), Ross (1977), and Walsh and Ryan (1997). In this vein, Campbell and Rogers (2018) addressed corporate finance

dualism, which arises when companies want to make decisions regarding their debt, cash holdings, and incentive stock policies simultaneously but fail to do so. They showed that substantial discrepancies in capital structures were created between 2006 and 2016 for businesses located in the main markets of the UK, Germany, France, and Portugal, Italy, Ireland, Greece, and Spain (PIIGS) (Campbell and Rogers, 2018).

Contrary to the above studies, classical scholars such as Modigliani and Miller (1958) proposed a theory concerning the influence of capital structure on firm performance. This motivated researchers to study the implications of Modigliani and Miller's model in the real world where markets are imperfect and information asymmetry. In response, various theories evolved which illuminates the significance of optimal capital structure. For instance, the trade-off theory (ToT) suggests that their optimal level of debt and equity is required to have a balance between bankruptcy cost and tax savings.

Pecking order theory (PoT) posits that there is no optimal debt-to-equity. Similarly, 'agency theory' explains how the conflict of interest between shareholders and managers escalates agency costs. Capital structure theories have provided a context for understanding how financial decisions have been made. Moreover, Modigliani and Miller (1963) suggested that firms should use more debt to get tax benefits on interest payments. DeAngelo and Roll (2015) documented that the firm can use other ways (depreciation, investment tax credits, tax loss carryforwards, and, others) rather than using debt for a tax shield.

It is a valuable intangible resource that can create market entry barriers, foster customer retention, and thus strengthen competitive advantages (Gündüz Çekmecelioğlu and Kaya Özbağ, 2019). The empirical evidence also confirms that it enhances firm performance (Chang and Zhu, 2011; Roberts and Dowling, 2002). Regarding corporate reputation (hereafter called CR), previous studies have a major focus on developed countries (Awan et al., 2021; Neves et al., 2020) but less on developing countries.

Our research is conducted in Pakistan, characterised by weak market efficiency and a tapestry of cultural, economic, and political nuances. This environment potentially complicates capital structure decisions in developing countries. Previously, in the context of Pakistan, Ahsan et al. (2016) unveil contradictions with mainstream capital structure theories due to Pakistan's less efficient fund utilisation.

This paper adopts profitability, tangibility, non-debt tax, growth, firm size, and liquidity as control variables due to their frequent usage in previous studies. The study also fills a gap by examining the mediating role of CR on the capital structure of non-financial listed firms within the context of the emerging market of Pakistan. The analysis spans 284 non-financial firms listed on the Pakistan Stock Exchange (PSX) from 2010 to 2019. The study concludes that idiosyncratic risk (*hereafter called I.Risk*) exerts no discernible influence on CR, while CR partially mediates the influence of I.Risk variables on capital structure. This study's research gap, focusing on the mediating role of CR and the moderating role of corporate social responsibility (CSR) in the context of non-financial companies in Pakistan, is well highlighted.

By introducing the mediating role of CR in the relationship between I.Risk and capital structure, this study contributes to both theoretical and practical understanding. Moreover, its focus on an emerging market provides valuable insights for policymakers, managers, and researchers grappling with the complexities of capital structure decisions in unique economic contexts. Through empirical analysis of non-financial firms listed on the PSX, this study seeks to enhance our understanding of the intricate web of factors influencing capital structure choices, thereby advancing the field of corporate finance.

The rest of the study proceeds as follows: Section 2 presents the literature and develops hypotheses; Section 3 defines data and outlines methodology; Section 4 contains analysis and discusses results; the final section concludes the study and proposes policy guidelines.

2 Literature review and hypotheses development

2.1 CR and capital structure

CR is a valuable intangible asset that can affect a firm's access to capital, cost of capital, and financial performance (Gangi et al., 2020). A firm with a good reputation is more likely to be able to obtain debt financing at a lower cost, as creditors are more willing to lend to firms that they believe are less likely to default (Sheikh et al., 2023). Additionally, a good reputation can lead to lower costs of equity, as investors are more willing to invest in firms that they believe are well-managed and have a strong track record (Endri and Fathony, 2020).

Two main theoretical frameworks can be used to understand the relationship between CR and capital structure: the PoT and the ToT. The PoT suggests that firms prefer to finance their investments internally, then with debt, and lastly with equity (Tascón et al., 2021). This is because internal financing is the cheapest source of capital, followed by debt, and then equity. As a result, firms with good reputations are more likely to be able to finance their investments internally, which means that they will use less debt (Frank et al., 2020; Tascón et al., 2021). Furthermore, the ToT suggests that firm's trade off the costs and benefits of debt when determining their capital structure (Yakubu et al., 2021). The benefits of debt include the tax shield benefits of interest payments and the ability to increase shareholder returns through leverage (Kulwizira Lukanima, 2023). The costs of debt include the risk of bankruptcy and the agency costs associated with debt. As a result, firms with good reputations may be able to use more debt, as they are less likely to default on their loans (Tascón et al., 2021).

The empirical evidence on the relationship between CR and capital structure is mixed. Some studies have found a negative relationship, while others have found a positive relationship. The relationship may depend on the specific factors that are being considered, such as the type of debt or the maturity of the debt. A study by Midiantari and Agustia (2020) found that CR is negatively related to debt levels. The study found that firms with a good reputation are more likely to be able to finance their investments internally, which means that they have less need for debt financing. Similarly Li et al. (2019) found that CR is positively related to the use of long-term debt. The study found that firms with a good reputation are more likely to be able to obtain long-term debt at a lower cost, which makes it more attractive to use this type of debt.

Blagoeva et al. (2020) also suggested that a firm's reputation enhances investors' expectations regarding a firm's motives and gives the firm a competitive advantage by holding a low financing cost. On the other hand, attractiveness reduces investors' uncertainty regarding a firm's ability and generates a competitive advantage from great flexibility in choosing different financing instruments. Blagoeva et al. (2020) find that high-reputation companies enjoy a lower cost of debt, but the effect of reputation on equity financing is largely unexplored. Therefore, we are going to explore the subjection relationship by mediation.

H1 CR has a significant effect on capital structure.

A study by Mueller (2008) identifies the entrepreneur's exposure to I.Risk is an important determinant of the demand for loans and the capital structure. The study suggests that I.Risk can have a significant effect on the capital structure of private companies. Therefore, strong evidence of I.Risk provides mixed results in the literature. While, according to Goetzmann (2004) and Hanif and Naveed (2020) investors reduce the I.Risk assumes that the risk does not need to be separated from the portfolio investment. However, this assumption would not apply if the debt is interest-free.

Suyono and Amin (2022) examine the effect of capital structure and I.Risk on the value of energy companies. The study finds that I.Risk has a significant negative effect on company value. A study by Pérez-González and Yun (2013) suggests that I.Risk matters in determining the average stock risk. The study finds that I.Risk is a significant determinant of stock risk and can have a significant effect on the capital structure of firms. Furthermore, the literature review on capital structure and firm performance Javeed and Lefen (2019) concludes that the relation between capital structure and firm performance can be different due to differences in variables. The study suggests that a CR can be an important determinant of capital structure.

Previously, Warmana et al. (2020) analysed the impact of CR (*hereafter called CR*) on firms' risk in a developing country using a sample of 256 Indonesian firms during 2011–2015. They used a two-step GMM approach, and found that:

a Firms with higher reputation have low stock return volatility (lower risk)and insignificant effect on default risk.

b The reputation effect reduces total risk, tail risk, and default risk for high leverage companies.

c Low leverage firms enjoy the reputation effect only on less total risk, but do not experience the reputation effect on default risks.

d The reputation of high-profit companies reduces default risk; the reputation of low-profit companies reduces tail risk.

Allah Bakhsh et al. (2020) assessed the impact of CR on the risk exposure of the firms listed at the PSX, ranked by the Pakistan Credit Rating Agency (PACRA). They used the credit ratings of the firm as a proxy for CR during 2007-2016. They found a significant negative relationship between CR and the total and systematic risk of the firm. However, CR insignificantly explains the unsystematic risk of the firms. In addition to contributing to the literature, these findings reveal a previously unknown determinant of risk, namely reputation.

Although, there are several studies on the direct impact of I.Risk and CR on capital structure. However, limited empirical research is available on the mediation of CR on the relationship between I.Risk and capital structure. Furthermore, Suyono and Amin (2022) stated that the type of industry can moderate the effect of I.Risk on company value. Besides, these authors evidenced that CR can play a mediating role in the relationship between I.Risk and capital structure. Following the Suyono and Amin (2022) recent call regarding the mediating and moderating mechanism between the I.Risk and capital structure. Therefore, we hypothesise that

H2 I.Risk has a significant effect on capital structure.

H3 CR significantly mediates the relationship between I.Risk and capital structure.

2.2 The moderating role of CSR

A firm's risk can be divided into systematic and unsystematic risks. A firm's unsystematic risk can represent its unique asset-specific risk (Lakhal et al., 2021) in contrast to systematic risk, which remains related to market risk. Many scholars suggest that an integrated approach to assessing firm risk involves both systematic and unsystematic risk since not only does market risk affect profitability, but also firm-specific risk (Fan and Xiao, 2023; Kedarya et al., 2023; Sciarelli et al., 2023; Swaminathan et al., 2022). The present study approaches firm risk as a total risk, which includes both systematic and unsystematic risks (Sciarelli et al., 2023). A method of quantifying unsystematic risk is to use the log-transformed standard deviation of daily stock returns, while a method of quantifying systematic risk is to utilise the beta coefficient obtained by computing the least squares linear formula.

The risk mitigation perspective of corporate social responsibility (*hereafter called CSR*) posits that devoting resources toward social, environmental, and corporate governance initiatives may effectively diminish the potential risks faced by a company. A number of research investigations have been conducted to examine the association in question. Specifically, Liao et al. (2021), Matos (2020), Salvioni and Gennari (2019) and Dautaj (2023) have all reported findings that indicate a negative correlation between CSR and risk. Several potential factors may contribute to this connection, including enhanced risk management practices, increased accessibility to financial markets, the presence of insurance-like security measures, enhanced transparency of information, and the ability to attract clients in the market (Landi et al., 2022). According to Abu Alia et al. (2022), the capital asset pricing model (CAPM) demonstrates that as businesses exhibit lower levels of risk, their cost of equity is expected to decline.

The concept that CSR initiatives can have an impact on financial risk has been widely discussed in the existing body of CSR literature. According to the findings of Al Mutairi and Bakar (2023), the relationship between risk and CSR is negative, as reported in Fortune magazine's annual study on CR. In contrast, Ademi and Klungseth (2022) conducted a study that examined the impact of CSR ratings on stock price fluctuations in the context of product shortages. Their findings indicate that S&P 500 companies with higher CSR ratings see fewer anomalous swings for them in company value. Ying et al. (2021) integrated the model by combining CSR and corporate governance structures. This model is used to investigate how CSR moderates the relationship between corporate governance and firm risk. The results show that foreign ownership and board size have a significant and negative relationship with firm risk. Prior research indicates that CR is beneficial for company social practices (Ullah et al., 2022). Because CR has a significant influence on companies, environmental performance is linked with their actions, and when large shareholders are prepared to spend on environmental rules, CR improves itself (Lu et al., 2021). Thus, we hypothesise that

H4 CSR moderates the relationship between I.Risk and CR such that their significant relationship is stronger when the CSR has higher integrity.

2.3 Control variables

Recent literature suggests that several factors can impact a firm's capital structure, including profitability, tangibility, liquidity, non-debt tax, size, and growth as control variables. Here is a summary of the recent literature on these factors.

A study by Sheikh et al. (2023) found that firm profitability, represented by return on equity (ROE) and return on assets (ROA) was associated with liquidity and debt. The study suggests that profitability can be an important determinant of capital structure. Furthermore, Panda and Nanda (2020) identified tangibility as a very important factor impacting the capital structure of selected Indian firms. The study found a significant positive relationship between tangibility and leverage, following the predictions of the ToT.

Recent literature does not provide much information on the relationship between liquidity and capital structure as a dependent variable. However, Khan and Muhammad Mazhar (2022) found that liquidity was associated with firm profitability and debt. Moreover, the literature does not provide much information on the relationship between non-debt tax shields and capital structure as a dependent variable. However, a study by Panda and Nanda (2020) included a non-debt tax shield as an independent variable in their analysis of the determinants of target capital structure and adjustment. A firm's size can be an important determinant of capital structure.

Previously, Panda and Nanda (2020) found a positive relationship between size and total debt, following the PoT of capital structure. The study suggests that firms with greater growth prospects tend to earn more profits and enjoy higher returns. Furthermore, the literature suggests that firm growth can be an important determinant of capital structure. The literature suggests that profitability, tangibility, size, and growth can be important determinants of capital structure. However, there is limited information on the relationship between liquidity and non-debt tax shield as dependent variables. Further research is needed to fully understand the impact of these factors on capital structure.

3 Methodology

3.1 Data

The study uses panel data of firms listed on PSX. This study uses the Datastream database for data collection, which contains firm accounting data and market data. Financial companies are excluded because the financial industry is subject to many rules, including minimum equity requirements, and most of them have great potential. The final sample of this study is 284 firms for ten years from 2010–2019. This creates panel data that was measured using 1,480 annual observations.

3.2 Model specification

Equation (1) for balanced panel data expresses the linear relationship between capital structure and firm-specific variables in Pakistan. Equation (2) for balanced panel data illustrates the direct relation between CS and company-specific characteristics in Pakistan, while equation (3) discusses the direct connection between CS and CR. 'The

GMM and GLS estimators are used; they are more efficient than other static panel data methods like pooled OLS, FE, and RE'. The equation for the base model is:

$$CSit = \beta 0 + \beta 1(I.Riskit) + \beta 2(X) + \varepsilon \quad (1)$$

$$CRit = \beta 0 + \beta 1(I.Riskit) + \varepsilon \quad (2)$$

$$CSit = \beta 0 + \beta 1(CRit) + \varepsilon \quad (3)$$

where *I.Risk* is the idiosyncratic risk variable that is the monthly I.Risk value is evaluated by obtaining the residual regression (SD) and dividing it by the number of trading days in that month, and CR is the corporate reputation variable, calculated with the help of content analysis.

CS denotes the capital structure. The profitability (PROF) is determined by calculating the ratio of earnings before interest and taxes (EBIT) to total assets. The tangibility variable (TG) is determined by calculating the ratio of net fixed assets to total assets. The non-debt tax shields variable (NDTS) is determined by calculating the ratio of depreciation to total assets. These variables are denoted by the index *i*, where *i* can take on values of 1, 2, and on. In the context of a particular company, denoted as 'N', the variable 't' represents discrete time periods, namely t = 1,2, … In this context, T represents time, αi represents the individual impacts of firms, and εit represents the error term.

We tested the moderation hypothesis of CSR on the relation between I.Risk and firm CS. By following Nirino et al. (2022), we used GMM regression as a base methodology to estimate the following regression equation.

$$CSit = \beta 0 + \beta 1 I.Risk + \sum_{i=1}^{n} \beta CV + \varepsilon it \quad (4)$$

$$CRit = \beta 0 + \beta 1 I.Risk + \beta 2 I.Risk * CSRit + \sum_{i=1}^{n} \beta ixCV + \varepsilon it \quad (5)$$

In equation, (4) *CS* representing the capital structure, is the proxy to measure the firm financial performance. *I.Risk* representing the idiosyncratic risk of the Firm. $\beta 0$ is the intercept of firm financial performance, $\beta 1$ is the coefficient of the independent variable, and $\sum ni = 1 \beta nCVit$ represents all control variables related to firm capital structure. εit represents the standard error.

In equation (5), *CR* represents the corporate reputation. *I.Risk* representing the idiosyncratic risk of the Firm. $\beta 0$ is the intercept of firm financial performance, $\beta 1$ is the coefficient of independent variable (I.Risk), $\beta 2$ is the coefficient of moderating variable (I.Risk*CSR) and $\sum ni = 1 \beta nCVit$ represents all control variables related to firm financial performance. εit represents the standard error. The description of the variables is in Table 1.

In this equation, the 'X' variable represents the control variable. The ten years of annual data for 284 firms in the 14 sectors traded on the Karachi Stock Exchange (KSE) are obtained from the Public Disclosure Platform (https://www.kse.gov.org) for the 2010–2019 periods. These firms lie in fourteen sub-sectors and are selected according to data availability.

These 14 sub-sectors are: sector 1 is the textile, wearing apparel, and leather sector; sector 2 is sugar; sector 3 is the food, beverage, and tobacco sector; sector 4 is chemicals, chemical products, and pharmaceuticals sector; sector 5 is manufacturing, sector 6 is mineral products; sector 7 is cement, sector 8 is motor vehicles, trailers, and auto parts sector; sector 9 is fuel and energy sector; sector 10 is information, communication and transport services sector; sector 11 is coke and refined petroleum products sector; sector 12 is the paper, printing and publishing sector; sector 12 is the paper, paperboard, and products sector; sector 13 is the electrical machinery and apparatus sector; sector 14 is the other services activities sector.

Table 1 Suggested proxies of explanatory variables

Variables	*Proxies*
I.Risk	The monthly i. risk value is evaluated by obtaining the residual regression SD and dividing it by the number of trading days in that month.
CR	Content analysis
CSR	Content analysis
Capital structure	Debt-to-equity (D/E) ratio
Size	Log of total firm's assets
Growth	Growth %ag change into sales
Liquidity	Total current assets/total current liabilities
Profitability	(EBITDA)/total assets
Tangibility	The sum of fixed assets)/total assets
Non-debt tax shield (NDTS)	Depreciation and amortisation/total assets

The suggested proxies of mediator and the determinants of the capital structure.

3.3 Variable analysis methodology

There is an extensive discussion on mediation in Hayes (2018). Baron and Kenny are providing a key of mediation testing (1986). Three regression models are suitable for this method:

$$M \sim N(\mu M, \sigma 2M) \text{ and } X \sim N(\mu x, \sigma 2X).$$

1 $M = \theta 0 + \theta XX + eM, eM{\sim}N\,(0, \sigma 2eM)$

2 $Y = \beta^{*}0 + \beta^{*}XX + eY^{*}$

3 $Y = \beta 0 + \beta XX + \beta MM + eY, eY{\sim}N\,(0, \sigma eY2).$

These coefficients have the following interpretations: βX is called the direct effect of X on Y, $\theta X \beta MM$ is called the indirect effect of X on Y, and $\beta\beta XX^{*}$ is called the total effect of X on Y. The indirect effect comes from substituting the equation for M in (1) into equation (3) and then rearranging terms.

$$
\begin{aligned}
Y &= \beta 0 + \beta XX + (M) + eY \\
&= \beta 0 + \beta XX + (\theta 0 + \theta XX + eM) + eY \\
&= \beta 0 + \beta XX + \beta M\theta 0 + \beta M\theta XX + \beta MeM + eY \\
&= (\beta 0 + \beta M\theta 0) + (\beta X + \boldsymbol{\beta M\theta X}) + (\beta MeM + eY)
\end{aligned}
$$

Comparing coefficients, we can see that the total effect is exactly equal to the direct effect plus the indirect effect. Mediation is likely if all four of the following tests are significant:

1 Test of θX.

2 Test βX*.

3 Test of βM.

4 Sober's (1982) Test of whether $\beta\beta XX$ is significantly smaller than βX* using

$$z = \frac{\theta X \beta M}{\sqrt{\theta\theta XX\, 2V(\beta\beta MM) + \beta\beta MM\, 2V(\theta\theta XX)}}$$

$$V(\theta X = \frac{\sigma e}{N\sigma}, V(\beta M) = \frac{\sigma e}{N\sigma ee}, \rho\rho XXXX \frac{\theta X\sigma\sigma}{\sigma\sigma}, \wedge \sigma eMM\, 2 = \sigma\sigma MM\, 2(1 - \rho XX\, 2)$$

3.4 Data testing

Normality, multicollinearity, heteroskedasticity, and model specification analyses have been conducted to ensure that the data is credible and serves its purpose. 'So, the estimating methodology, the multivariate generalised method of moments (GMM), offers several ideal qualities these assumptions have to be tested'. As a result, the hypothesis testing for the coefficient estimates proved valid.

3.4.1 Preliminary data analysis

The preliminary test of data is used to detect whether a data set is well-modelled by a normally distributed or not and quantify how probable an underlying random variable is to be regularly dispersed'.

3.4.2 Test of multicollinearity

Table 2 shows pair-wise correlation matrices of the chosen variables (STATA output of the multicollinearity) to evaluate the potential level of multicollinearity among some of the explanatory factors. The variable inflation factor (VIF) method is also used to identify and improve our study of the multicollinearity issue (Vörösmarty and Dobos, 2020). Multicollinearity may also be detected using the VIF method, with statistics generated for each model variable (Qalati et al., 2022). The conclusion of the VIF in Table 2 indicates that, because none of the VIFs are too high, there is no strong or perfect correspondence among the explanatory variables.

Table 2 Pair-wise correlation matrix and VIF between explanatory variables

Variables	*Mean*	*Std. dev.*	*Min*	*Max*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*VIF*
CS	–1.664	1.609	–8.979	4.465	1.000									
Profitability	–2.562	1.074	–9.944	2.034	–0.094 (0.001)	1.000								0.93
Tangibility	–0.843	0.98	–9.421	.11	0.215 (0.000)	–0.101 (0.001)	1.000							1.05
Growth	–3.498	1.96	–10.414	17.841	0.112 (0.000)	0.019 (0.518)	0.039 (0.148)	1.000						1.01
I.Risk	–2.447	0.652	–4.345	1.125	0.060 (0.029)	–0.140 (0.000)	0.003 (0.912)	0.021 (0.447)	1.000					1.02
CR	–0.381	0.256	–1.427	–0.041	–0.011 (0.676)	0.174 (0.000)	–0.048 (0.077)	0.027 (0.321)	–0.061 (0.023)	1.000				1.01
CSR	0.187	0.823	–5.538	2.771	–0.345 (0.000)	0.194 (0.000)	–0.204 (0.000)	0.007 (0.792)	–0.147 (0.000)	0.131 (0.000)	1.000			1.09
Liquidity	1.868	0.279	–2.008	2.205	–0.002 (0.942)	–0.130 (0.000)	0.089 (0.001)	–0.083 (0.002)	–0.089 (0.001)	0.226 (0.000)	0.047 (0.084)	1.000		1.24
Firm size	0.019	0.533	–4.787	4.554	–0.007 (0.798)	–0.003 (0.907)	0.126 (0.000)	0.005 (0.856)	–0.089 (0.001)	0.066 (0.015)	0.031 (0.247)	0.282 (0.000)	1.000	1.08

Multicollinearity may be detected using the VIF approach, which calculates a value for each variable in the model. In theory, a VIF larger than 10 indicates that the variable in question is multi-collinear with others in the model and should be removed. Consequently, the VIF result in Table 5 indicates no perfect or significant collinearity between all the explanatory variables.

3.4.3 Test of heteroscedasticity

Heteroscedasticity refers to a systematic pattern of errors in which the variances of the errors are not constant (Gujarati and Porter, 2003). Due to heteroscedasticity, OLS estimators are inefficient because the estimated variances and covariance of the variables (βi) are biased and inconsistent, rendering the tests of hypotheses invalid.

The Cook-Weisberg and White's tests are used to determine heteroscedasticity in this research, and the results are presented in Tables 3 and 4.

Table 3 Cameron and Trivedi's decomposition of IM-test and Breusch-Pagan/Cook-Weisberg for heteroskedasticity

Cameron and Trivedi's decomposition of IM-test				*Breusch-Pagan/Cook-Weisberg test*
Source	chi2	df	p	Ho: Constant variance
				Variables: fitted values of cs
Heteroskedasticity	26.88	14	0.0199	chi2(1) = 90.28
Skewness	4.61	4	0.3297	Prob. > chi2 = 0.0000
Kurtosis	2.26	1	0.1324	
Total	33.76	19	0.0196	

Note: The researcher's own computation is based on the financial statement.

The STATA result of the white's test shown in Table 3 also illustrates a significant heteroskedasticity problem with the dataset.

3.5 Econometric methodology

The static technique employed in this instance is generalised least squares (GLS). One-step and two-step systems, as well as different GMM estimators, are dynamic techniques. Equation (1) is calculated using static panel estimation techniques to determine Pakistan's firms' capital structure. The GLS method is insensitive to first-order autoregressive disturbances within unbalanced panels, as well as cross-sectional correlation and/or heteroscedasticity between panels (Haschka, 2022). The authors argue that the GLS model is more appropriate because it incorporates data-related issues such as normality and homoscedasticity.

According to Jiang et al. (2021) and Antill and Grenadier (2019), capital structure is inherently dynamic. GMM is more efficient than other methods since it considers normalcy, autocorrelation heteroscedasticity, and endogeneity (Oppong et al., 2019). As a result, this study also employs the panel difference and system GMM approaches, which are often regarded as the best methods for estimating target capital structure parameters in the presence of firm-specific effects and lagged dependent variables (Rydsmo and Sandequist, 2023). Because debt exhibits persistent behaviour, the model is estimated using difference and system GMM estimators (Liaqat et al., 2021).

Additionally, we employ GMM to account for the possibility of reverse causation between debt and managers' experience and between debt and other explanatory variables.

4 Results analysis

The following table summarises the discussion on the determinants of capital structure and their measures and the expected relationship with leverage as per our hypotheses.

Table 4 Effect of IV and DV with considering mediator

Variables	*GMM*		*GLS*	
	MODEL 1	*MODEL 2*	*MODEL 4*	*MODEL 5*
CR		–1.7338 ***		–0.06985
		(0.6478)		(0.0032)***
Profitability	–0.0897***		–0.0040***	
	(0.0284)		(0.0008)	
Tangibility	0.0256***		0.0129***	
	(0.0068)		(0.0044)	
Non-debt tax shield	–0.0678***		0.0046***	
	(0.0124)		(0.0004)	
I.Risk	–1.835***		–0.0072***	
	(0.8227)		(0.0015)	
Liquidity	–0.2415		–0.6953***	
	(0.1121)***		(0.0983)	
Size	0.1930		1.7090	
	0.1483		(1.1230)	
Growth	–0.0234		–0.0272	
	0.0828		(0.1375)	
Arellano-Bond test for AR (1)	Z = –3.82			
	Pr > z = 0.000			
Arellano-Bond test for AR (2)	Z = 0.44			
	Pr > z = 0.662			
Sargan test	0.22			
Hansen test	0.21			

Note: Significance levels ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

As shown in Table 4, the two-step system dynamic GMM estimator indicates that the influence of profitability on all measures of the capital structure's book and market value is negative and statistically significant at the 1% level. This suggests that more profitable businesses in Pakistan take on less debt. This might be explained by the fact that Pakistani businesses' reinvestment plans should be re-evaluated in light of the necessity to rely on financial capabilities rather than debt. According to which highly profitable companies take out credits to gain from tax savings, this finding contradicts the ToT. It does, however, corroborate pecking order and asymmetric information theories, which assert that businesses with higher profitability keep more internal money. This also

confirms *H1*, given in Table 4, that profitability has a major influence on Pakistan's companies' capital structures.

Dynamic two-step system The GMM estimator indicates that I.Risk has a negative but substantial influence on regressions explaining total debt and equity. The study's findings are consistent with those of IHe (2011), who interpret manager effort as a form of firm investment; this prediction is also consistent with Rajverma et al. (2019), who find that as a firm's I.Risk increases, and the investment level of a risk-averse manager decreases. Finally, we observe that PPS diminishes as (idiosyncratic) volatility increases (firm risk). This finding is consistent with Goyal and Santa-Clara (2003) Jin (2002) and Sullivan and Spong (2007).

4.1 Effect of IV on MV with considering DV

The following table summarises the discussion on the firm-specific variables and their measures and the expected relationship with mediator (CR) as per our hypothesis.

Table 5 Effect of IV on MV without considering DV

	GMM	*GLS*
	MODEL 3	*MODEL 6*
Profitability	0.00138***	0.3004***
	(0.0007)	(0.0109)
Tangibility	–0.00146***	–0.1882***
	(0.00070)	(0.0066)
Non-debt tax shield	0.00920***	0.0013***
	(0.00203)	(0.0004)
I.Risk	–0.00079***	–0.1832***
	(0.00081)	(0.00317)
Arellano-Bond test for AR (1)	0.0262	
Arellano-Bond test for AR (2)	0.462	
Sargan test	0.13	
Hansen test	0.16	

Note: Significance levels ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

Table 5 shows the results of independent and mediating variables without considering the Dependent variable. This table shows the independent variable's effect on the mediator – first, I.Risk indicates a negative but significant effect on the mediator. I.Risk is the volatility of stock returns that is not caused by systematic risk and reflects a firm's I.Risk.

I.Risk makes for a significant percentage of a firm's total risk (Gaspar and Massa, 2006; Goyal and Santa-Clara, 2003) and significantly affects stock returns. High I.Risk suggests that the stock price has a relatively poor steering role in capital flow and that the capital market may have resource allocation flaws (Ben-Jebara et al., 2023; Chen et al., 2023). The results align with Pérez-Cornejo et al. (2019), where the Spanish market has the same relationship. So we can accept our proposed hypothesis.

4.2 Effect of I.Risk on CS through CR

As evident from Table 6, that CR is a (mediator) between I.Risk (independent variable) and CS (dependent variable) in the study. Moreover, 'A' represents the direct effect of I.Risk to CR and 'B 'represents the direct effect from CR to CS.

Table 6 Significance of mediated path

Direct effect	I.Risk → CS
B	–1.83
Std. error	0.822
P-values	0.02
T	–2.23
Mediated path	Risk → CR → CS
Sobel Z	21.11
Decision	Yes

Source: Author's calculations

In pursuance of checking the mediation effects, the Sobel Z test was employed following the previous guidelines of Preacher and Hayes (2004). The results are given in Table 3, where profitability indicates the relationship between I.Risk and CS were significantly positively mediated by CR. Thus, it supported the proposed hypothesis.

4.3 Moderating role of CSR on the relation between I.Risk and CR

The hierarchical regression results using the GMM method for moderating the effect of CSR are presented in Table 5. The results show that interaction is significantly and positively associated with a CR for the three indicators of CSR ($\beta = 83.654$ and $p = 0.015$ when CSR was proxied by sale-to-asset ratio; Therefore, our hypothesis is accepted.

4.4 Discussion of results

First and foremost, a positive association between capital structure and reputation contradicts (Modigliani and Miller, 1958) 'debt irrelevance theorem' which states that the option between debt and equity has no material impact on the firm results. However, Pakistani companies take on more debt than is essential. The results implies that Pakistani companies stop increasing funds from fresh equity due to a fear of losing leverage or a high transaction expense, focusing instead on debt funding. As a result, this over-leveraging could increase the lenders' power by imposing strict debt covenants, restricting the managers' freedom to work freely and negatively impacting the firm's integrity.

Furthermore, the observational findings show that factors other than capital structure significantly affect the CR. Our findings suggest that Pakistani companies are frequently required to put up collateral for long-term financing. More significantly, because the debt structure is more stable, companies with larger tangible assets incur fewer short-term obligations, resulting in a more flexible financing structure. In general, our research supports *H2* and indicates that companies with higher tangibility utilise more debt to sustain higher debt levels.

It implies that reputation is an important factor in market-based risk, particularly in emerging capital markets like Indonesia. Furthermore, our results suggest that the different loan amounts and levels of profitability would have a different credibility impact. The most realistic consequence of our results is that the firms must strategically organise their image to gain better risk visibility in the stock market. Even though profitability affects a firm's reputation in general, firms with high debt and high profitability also need a high reputation to mitigate their default risk. If a company's reputation is poor, creditors, customers, vendors, and other stakeholders can lose confidence in doing business with it, resulting in higher default risk.

Table 7 GMM results of CSR as a moderator

CR	*MODEL 10*	*MODEL 11*	*MODEL 14*
Moderator variables			
CSR		270.747**	7,747.772***
		(0.022)	(0.004)
Independent variables			
I.Risk			37.494**
			(0.019)
Control			
Profitability	77.079***	74.370***	70.979***
	(0.000)	(0.000)	(0.007)
Tangibility	0.774**	0.779**	0.039
	(0.020)	(0.037)	(0.709)
Non-debt tax shield	–7.449**	–7.797**	–0.992
	(0.047)	(0.042)	(0.732)
Growth	0.079***	0.074***	0.079***
	(0.000)	(0.000)	(0.000)
Size	3.70***	9.790***	–7.790***
	(0.000)	(0.000)	(0.000)
Liquidity	–0.047	–0.777	0.407
	(0.947)	(0.304)	(0.447)
AR 2	3,588	3,588	3,588
SARGN	0.183	0.186	0.133

Note: Significance levels ***$p < 0.01$, **$p < 0.05$, and *$p < 0.1$.

5 Conclusions and implications

This study aims to examine the determinants of capital structure and the mediation effect of a CR for the listed non-financial companies of Pakistan. This study employed profitability, tangibility, non-debt tax shield, I.Risk, and CR for analysis. The empirical results show that the I.Risk has a negative but significant impact on capital structure. Our variables' total effects of IV to DV have elaborated with these hypotheses; besides this, we also test the mediation impact of CR on the capital structure.

The Sobel test results show that I.Risk has a Positive relationship when duly mediated by the CR to the capital structure. We can conclude that the I.Risk is minimal to the firm's capital structure change unless it has a combined effect with the other variables. Overall, this model is feasible to assess the proposed hypotheses. We can say that our mediator has an incredible impact on estimating the correlation between the independent and dependent variables of the study as its effect has made all the relationships significant. The quantitative findings show that the capital structure and the CR have a significant relationship.

5.1 Theoretical implications

In this study, an analysis of the determinants of capital structure and the mediating effect of CR for listed non-financial companies in Pakistan has resulted in several notable theoretical contributions.

The theorem of debt irrelevance as proposed by Modigliani and Miller (1958) is challenged by the findings of a positive relationship between capital structure and CR, as highlighted in this study. The tendency of Pakistani companies to incur more debt than necessary, as highlighted by this study, contradicts this theorem and underscores the role of external factors, such as market perceptions and reputation, in financing decisions. Consequently, this study expands the theoretical discourse by emphasising the practical implications of reputation on capital structure choices.

This contribution enhances understanding of the complex interplay between financial and non-financial factors that shape corporate financing decisions. This is in contrast to the emphasis on financial indicators that is often seen. The identification of I.Risk as a major determinant, along with its mediating effect through CR, highlights the necessity of considering non-financial elements when explaining variations in capital structure. Therefore, this research adds to the knowledge base of the interdependence between financial and non-financial factors that shape corporate financing decisions.

The present study offers a novel theoretical perspective by identifying the mediation effect of CR on the relationship between I.Risk and capital structure. This finding implies that the influence of risk on capital structure is not only a direct relationship, but also a function of the perception of CR. This theoretical insight highlights the crucial role that reputation plays in transforming risk-related factors into tangible financial outcomes, thus providing a better understanding of the psychological and market-driven mechanisms that govern capital structure decisions.

5.2 Managerial implications

The results obtained from this research have various managerial implications that can effectively guide the decision-making process for companies that are operating in non-financial sectors in Pakistan.

An excessive reliance on debt can have negative consequences, despite its potential benefits. Although debt can offer certain advantages, an excessive reliance on it may lead to unfavourable consequences. Therefore, managers must assess the trade-offs between debt and equity, considering their impact on the CR, covenant restrictions, and managerial autonomy, to make informed decisions. Striving to strike the right balance between these two financing sources is imperative for maintaining financial stability and upholding the integrity of the firm.

The mediation effect of a CR implies that the establishment and maintenance of a favourable reputation can have a substantial impact on the decisions made regarding capital structure. Given this, it is recommended that firms should prioritise investing in measures that enhance their reputation, such as transparent communication, ethical business practices, and consistent value delivery. A strong reputation not only reduces the risk of default but also boosts stakeholders' confidence, thereby improving access to capital markets and financing options.

The importance of I.Risk as a determinant of capital structure highlights the significance of comprehensive risk management strategies. Firms should adopt approaches to risk assessment that account for both financial and non-financial risk factors, to address I.Risk. By mitigating this type of risk, firms can enhance their reputation and subsequently positively influence their capital structure choices.

5.3 Limitations and future research directions

While this study contributes valuable insights, certain limitations provide avenues for future research:

1 Contextual generalisation: the results have been derived from the specific framework of non-financial firms in Pakistan, thereby restricting its applicability to other geographic regions and industries. Future investigations may expand the scope of this examination to various regions and domains to determine whether analogous correlations exist in heterogeneous circumstances.

2 Mediation mechanisms: the current study posits the mediating role of organisational reputation, though the underlying mechanisms driving this mediation are insufficiently examined. Future inquiry could delve into the psychological, behavioural, and market dynamics that foster the observed mediation effect.

3 Dynamic effects: the study primarily focuses on the cross-sectional relationships between variables. Future research could adopt longitudinal or panel data approaches to capture dynamic effects and better understand how capital structure decisions and reputation evolve.

4 Causality and endogeneity: the study's cross-sectional nature raises questions about causality and potential endogeneity issues. Future research could employ advanced econometric techniques, such as instrumental variable approaches, to address these concerns and establish more robust causal relationships.

5 Other non-financial factors: the analysis of I.Risk and CR has been conducted; however, other non-monetary factors could potentially affect the decisions of capital structure, including CSR practices. Delving into the interplay of these supplementary factors may offer a more all-encompassing comprehension of the determinants of capital structure.

Note: Results that use panel (GLS) data techniques are comparable to those of GMM; however, we do not give space-saving results. The authors can, therefore, provide the results on request.

Acknowledgements

All authors have an equal level of contributions (i.e., conceptualisation, data curation, formal analysis, methodology, software, supervision, validation, writing – review and editing).

This study is supported by the Research on the Evolution Mechanism and Optimisation of Rural Governance System under the Dual Change of System-Culture (71973054).

References

Abu Alia, M., Abdeljawad, I., Jallad, S.E. and Rashid, M. (2022) 'Voluntary disclosure-cost of equity nexus and the moderating role of corporate governance: evidence from an extremely politically unstable context', *International Journal of Islamic and Middle Eastern Finance and Management*, Vol. 15, No. 6, pp.1035–1052, DOI: 10.1108/IMEFM-02-2021-0069.

Ademi, B. and Klungseth, N.J. (2022) 'Does it pay to deliver superior ESG performance? Evidence from US S&P 500 companies', *Journal of Global Responsibility*, Vol. 13, No. 4, pp.421–449, DOI: 10.1108/JGR-01-2022-0006.

Ahsan, T., Wang, M. and Qureshi, M.A. (2016) 'Firm, industry, and country level determinants of capital structure: evidence from Pakistan', *South Asian Journal of Global Business Research*, Vol. 5, No. 3, pp.362–384, DOI: 10.1108/SAJGBR-05-2015-0036.

Al Mutairi, A.M.S. and Bakar, S.B. (2023) 'Firm performance, disclosure of corporate social responsibility and the effect of corporate reputation and corporate governance: a cross country analysis', *WSEAS Transactions on Environment and Development*, Vol. 19, No. 2023, pp.740–761, DOI: 10.37394/232015.2023.19.71.

Allah Bakhsh, K., Muhammad Hanif, A. and Adeel, A. (2020) 'Impact of corporate reputation on firm risk: an analysis of Pakistan Stock Exchange listed and PACRA rated firms', *Review of Economics and Development Studies*, Vol. 5, No. 2, pp.365–372, DOI: 10.26710/reads.v5i2.622.

Antill, S. and Grenadier, S.R. (2019) 'Optimal capital structure and bankruptcy choice: dynamic bargaining versus liquidation', *Journal of Financial Economics*, Vol. 133, No. 1, pp.198–224, DOI: https://doi.org/10.1016/j.jfineco.2018.05.012.

Awan, U., Sroufe, R. and Shahbaz, M. (2021) 'Industry 4.0 and the circular economy: a literature review and recommendations for future research', *Business Strategy and the Environment*, Vol. 30, No. 4, pp.2038–2060, DOI: https://doi.org/10.1002/bse.2731.

Ben-Jebara, M., Mishra, S., Modi, S.B. and Mahar, S. (2023) 'Product personalization focus in the pharmaceutical industry and shareholder wealth: the roles of marketing capability and financial leverage', *Journal of Business Research*, Vol. 159, p.113685, DOI: https://doi.org/10.1016/j.jbusres.2023.113685.

Blagoeva, R.R., Kavusan, K. and Jansen, J.J.P. (2020) 'Who violates expectations when? How firms' growth and dividend reputations affect investors' reactions to acquisitions', *Strategic Management Journal*, Vol. 41, No. 9, pp.1712–1742, DOI: https://doi.org/10.1002/smj.3155.

Campbell, G. and Rogers, M. (2018) 'Capital structure volatility in Europe', *International Review of Financial Analysis*, Vol. 55, pp.128–139, DOI: https://doi.org/10.1016/j.irfa.2017.11.008.

Chang, T-L.S. and Zhu, W. (2011) 'Enhancing corporate reputation for market expansion in China: customer orientation and the mediating effect of product and service quality', *Journal of Strategic Marketing*, Vol. 19, No. 2, pp.153–170, DOI: 10.1080/0965254X.2011.557738.

Chen, Y., Wang, Y., Zhao, H. and Xu, W. (2023) 'Will R&D make investors more tolerant? Analysis based on the performance forecast of Chinese listed companies', *Plos One*, Vol. 18, No. 1, p.e0280237.

Dautaj, E. (2023) *Exploring the Relationship between Corporate Social Responsibility and Firm Value: The Role of Market Volatility and Investor Sentiment*, SSRN: 4508723.

DeAngelo, H. and Roll, R. (2015) 'How stable are corporate capital structures?', *The Journal of Finance*, Vol. 70, No. 1, pp.373–418, DOI: https://doi.org/10.1111/jofi.12163.

Endri, E. and Fathony, M. (2020) 'Determinants of firm's value: evidence from financial industry', *Management Science Letters*, Vol. 10, No. 1, pp.111–120.

Fan, D. and Xiao, C. (2023) 'Firm-specific political risk: a systematic investigation of its antecedents and implications for vertical integration and diversification strategies', *International Journal of Operations & Production Management*, Vol. 43, No. 6, pp.984–1007, DOI: 10.1108/IJOPM-02-2022-0094.

Frank, M.Z., Goyal, V.K. and Shen, T. (2020) *The Pecking Order Theory of Capital Structure: Where Do We Stand?*, Social Science Research Network (SSRN), pp.1–43, DOI: 10.2139/ssrn.3540610.

Gangi, F., Daniele, L.M. and Varrone, N. (2020) 'How do corporate environmental policy and corporate reputation affect risk-adjusted financial performance?', *Business Strategy and the Environment*, Vol. 29, No. 5, pp.1975–1991, DOI: https://doi.org/10.1002/bse.2482.

Gaspar, J.M. and Massa, M. (2006) 'Idiosyncratic volatility and product market competition', *The Journal of Business*, Vol. 79, No. 6, pp.3125–3152, DOI: 10.1086/505251.

Goyal, A. and Santa-Clara, P. (2003) 'Idiosyncratic risk matters!', *The Journal of Finance*, Vol. 58, No. 3, pp.975–1007, DOI: https://doi.org/10.1111/1540-6261.00555.

Griner, E.H. and Gordon, L.A. (1995) 'Internal cash flow, insider ownership, and capital expenditures: a test of the pecking order and managerial hypothesis', *Journal of Business Finance & Accounting*, Vol. 22, No. 2, pp.306–686.

Gujarati, D.N. and Porter, D.C. (2003) *Basic Econometrics*, McGraw-Hill, New York.

Gündüz Çekmecelioğlu, H. and Kaya Özbağ, G. (2019) 'Examining the effects of dimensions of corporate reputation on firm performance', *European Proceedings of Social and Behavioural Sciences*, p.54.

Haschka, R.E. (2022) 'Handling endogenous regressors using copulas: a generalization to linear panel models with fixed effects and correlated regressors', *Journal of Marketing Research*, Vol. 59, No. 4, pp.860–881.

Hirdinis, M. (2019) 'Capital structure and firm size on firm value moderated by profitability', *International Journal of Economics and Business Administration*, Vol. 7, No. 1, pp.174–191.

Javeed, S.A. and Lefen, L. (2019) 'An analysis of corporate social responsibility and firm performance with moderating effects of CEO power and ownership structure: a case study of the manufacturing sector of Pakistan', *Sustainability*, Vol. 11, No. 1, DOI: 10.3390/su11010248.

Jiang, X., Shen, J.H., Lee, C-C. and Chen, C. (2021) 'Supply-side structural reform and dynamic capital structure adjustment: evidence from Chinese-listed firms', *Pacific-Basin Finance Journal*, Vol. 65, p.101482, DOI: https://doi.org/10.1016/j.pacfin.2020.101482.

Kedarya, T., Elalouf, A. and Cohen, R.S. (2023) 'Calculating strategic risk in financial institutions', *Global Journal of Flexible Systems Management*, Vol. 24, No. 3, pp.361–372, DOI: 10.1007/s40171-023-00342-3.

Khan, S. and Muhammad Mazhar, I. (2022) 'The impact of intangible assets on market value of firms: evidence from Pakistan's Stock Exchange', *Journal of Economic Sciences*, Vol. 1, No. 2, pp.97–108, DOI: 10.55603/jes.v1i2.a2.

Kulwizira Lukanima, B. (2023) 'An overview of capital structure and cost of capital', in Kulwizira Lukanima, B. (Ed.): *Corporate Valuation: A Practical Approach with Case Studies*, pp.323–337, Springer International Publishing, Cham.

Lakhal, F., Ajina, A., Bacha, S. and Ben Saad, S. (2021) 'How does corporate social responsibility performance influence the cost of debt? Evidence from France', *Bankers, Markets & Investors*, Vol. 167, No. 4, pp.2–16 [online] https://www.cairn.info/revue-bankers-markets-etinvestors-2021-4-page-2.htmhttps://www.cairn.info/load_pdf.php?ID_ARTICLE=BMI_167_0002.

Landi, G.C., Iandolo, F., Renzi, A. and Rey, A. (2022) 'Embedding sustainability in risk management: the impact of environmental, social, and governance ratings on corporate financial risk', *Corporate Social Responsibility and Environmental Management*, Vol. 29, No. 4, pp.1096–1107, DOI: https://doi.org/10.1002/csr.2256.

Lee, C-C., Lee, C-C. and Xiao, S. (2021) 'Policy-related risk and corporate financing behavior: Evidence from China's listed companies', *Economic Modelling*, Vol. 94, pp.539–547, DOI: https://doi.org/10.1016/j.econmod.2020.01.022.

Li, L., Chen, J., Gao, H. and Xie, L. (2019) 'The certification effect of government R&D subsidies on innovative entrepreneurial firms' access to bank finance: evidence from China', *Small Business Economics*, Vol. 52, No. 1, pp.241–259., DOI: 10.1007/s11187-018-0024-6.

Liao, C-H., San, Z., Tsang, A. and Yu, L. (2021) 'Board reforms around the world: the effect on corporate social responsibility', *Corporate Governance: An International Review*, Vol. 29, No. 5, pp.496–523, DOI: https://doi.org/10.1111/corg.12372.

Liaqat, I., Khan, M.A., Popp, J. and Oláh, J. (2021) 'Industry, firm, and country level dynamics of capital structure: a case of Pakistani firms', *Journal of Risk and Financial Management*, Vol. 14, No. 9, DOI: 10.3390/jrfm14090428.

Marsh, P. (1982) 'The choice between equity and debt: an empirical study', *The Journal of Finance*, Vol. 37, No. 1, pp.121–144, DOI: https://doi.org/10.1111/j.1540-6261.1982.tb01099.x.

Matos, P. (2020) *ESG and Responsible Institutional Investing around the World: A Critical Review*.

Midiantari, P.N. and Agustia, D. (2020) 'Impact of intellectual capital on firm value through corporate reputation as a mediating variable', *Journal of Security and Sustainability Issues*, Vol. 9, No. 4, pp.1203–1213.

Modigliani, F. and Miller, M.H. (1958) 'The cost of capital, corporation finance and the theory of investment', *The American Economic Review*, Vol. 48, No. 3, pp.261–297 [online] https://www.jstor.org/stable/1809766 (accessed 20 March 2023).

Modigliani, F. and Miller, M.H. (1963) 'Corporate income taxes and the cost of capital: a correction', *The American Economic Review*, Vol. 53, No. 3, pp.433–443 [online] https://www.jstor.org/stable/1809167 (accessed 21 March 2023).

Neves, A., Godina, R., Azevedo, S.G. and Matias, J.C.O. (2020) 'A comprehensive review of industrial symbiosis', *Journal of Cleaner Production*, Vol. 247, p.119113, DOI: https://doi.org/10.1016/j.jclepro.2019.119113.

Nirino, N., Battisti, E., Ferraris, A., Dell'Atti, S. and Briamonte, M.F. (2022) 'How and when corporate social performance reduces firm risk? The moderating role of corporate governance', *Corporate Social Responsibility and Environmental Management*, Vol. 29, No. 6, pp.1995–2005, DOI: https://doi.org/10.1002/csr.2296.

O'Dwyer, B. and Unerman, J. (2020) 'Shifting the focus of sustainability accounting from impacts to risks and dependencies: researching the transformative potential of TCFD reporting. *Accounting, Auditing & Accountability Journal*, Vol. 33, No. 5, pp.1113–1141, DOI: 10.1108/AAAJ-02-2020-4445.

Ogbanufe, O., Kim, D.J. and Jones, M.C. (2021) 'Informing cybersecurity strategic commitment through top management perceptions: the role of institutional pressures', *Information & Management*, Vol. 58, No. 7, p.103507, DOI: https://doi.org/10.1016/j.im.2021.103507.

Oppong, G.K., Pattanayak, J.K. and Irfan, M. (2019) Impact of intellectual capital on productivity of insurance companies in Ghana. *Journal of Intellectual Capital*, Vol. 20, No. 6, pp.763–783, DOI: 10.1108/JIC-12-2018-0220.

Panda, A.K. and Nanda, S. (2020) 'Determinants of capital structure; a sector-level analysis for Indian manufacturing firms', *International Journal of Productivity and Performance Management*, Vol. 69, No. 5, pp.1033–1060, DOI: 10.1108/IJPPM-12-2018-0451.

Pérez-Cornejo, C., de Quevedo-Puente, E. and Delgado-García, J.B. (2019) 'How to manage corporate reputation? The effect of enterprise risk management systems and audit committees on corporate reputation', *European Management Journal*, Vol. 37, No. 4, pp.505–515, DOI: https://doi.org/10.1016/j.emj.2019.01.005.

Pérez-González, F. and Yun, H. (2013) 'Risk management and firm value: evidence from weather derivatives', *The Journal of Finance*, Vol. 68, No. 5, pp.2143–2176, DOI: https://doi.org/10.1111/jofi.12061.

Preacher, K.J. and Hayes, A.F. (2004) 'SPSS and SAS procedures for estimating indirect effects in simple mediation models', *Behavior Research Methods, Instruments and Computers*, Vol. 36, No. 4, pp.717–731, DOI: 10.3758/BF03206553.

Qalati, S.A., Qureshi, N.A., Ostic, D. and Sulaiman, M.A.B.A. (2022) 'An extension of the theory of planned behavior to understand factors influencing Pakistani households' energy-saving intentions and behavior: a mediated–moderated model', *Energy Efficiency*, Vol. 15, No. 6, p.40, DOI: 10.1007/s12053-022-10050-z.

Rajverma, A.K., Misra, A.K., Mohapatra, S. and Chandra, A. (2019) 'Impact of ownership structure and dividend on firm performance and firm risk', *Managerial Finance*, Vol. 45, No. 8, pp.1041–1061, DOI: 10.1108/MF-09-2018-0443.

Roberts, P.W. and Dowling, G.R. (2002) 'Corporate reputation and sustained superior financial performance', *Strategic Management Journal*, Vol. 23, No. 12, pp.1077–1093, DOI: https://doi.org/10.1002/smj.274.

Ross, S.A. (1977) 'The determination of financial structure: the incentive-signalling approach', *The Bell Journal of Economics*, Vol. 8, No. 1, pp.23–40, DOI: 10.2307/3003485.

Rydsmo, A. and Sandequist, J. (2023) *Determinants of Capital Structure: An Empirical Study on the European Technology Industry in a Dynamic Panel Difference-GMM Analysis*, MSc, University of Gothenburg [online] https://hdl.handle.net/2077/77569 (accessed 15 March 2023).

Salvioni, D.M. and Gennari, F. (2019) 'Stakeholder perspective of corporate governance and CSR committees', *Symphonya. Emerging Issues in Management (symphonya. unicusano. it)*, Vol. 1, pp.28–39.

Santamaria, R., Paolone, F., Cucari, N. and Dezi, L. (2021) 'Non-financial strategy disclosure and environmental, social and governance score: Insight from a configurational approach', *Business Strategy and the Environment*, Vol. 30, No. 4, pp.1993–2007, DOI: https://doi.org/10.1002/bse.2728.

Sciarelli, M., Landi, G., Turriziani, L. and Prisco, A. (2023) 'Does corporate sustainability mitigate firm risk? An empirical analysis on S&P 500 controversial companies', *Social Responsibility Journal*, ahead-of-print(ahead-of-print), DOI: 10.1108/SRJ-09-2021-0388.

Sharma, G.D., Verma, M., Shahbaz, M., Gupta, M. and Chopra, R. (2022) 'Transitioning green finance from theory to practice for renewable energy development', *Renewable Energy*, Vol. 195, pp.554–565, DOI: https://doi.org/10.1016/j.renene.2022.06.041.

Sheikh, F.A., Khoso, I. and Khan, M.S. (2023) 'Analysis of determinants of debt financing: a case study of the cement industry of Pakistan', *Review of Economics and Development Studies*, Vol. 9, No. 1, pp.1–16, DOI: 10.47067/reads.v9i1.474.

Sullivan, R.J. and Spong, K.R. (2007) 'Manager wealth concentration, ownership structure, and risk in commercial banks', *Journal of Financial Intermediation*, Vol. 16, No. 2, pp.229–248, DOI: https://doi.org/10.1016/j.jfi.2006.12.001.

Suyono, S. and Amin, M.N. (2022) 'The influence of capital structure and idiosyncratic risk on company value with industri type as moderating on energy company listed on the Indonesia Stock Exchange for the period 2016-2020', *International Journal of Trends in Accounting*

Research, Vol. 3, No. 2, pp.74–83 [online] https://jurnal.adai.or.id/index.php/ijtar/article/view/396 (accessed 19 March 2023).

Swaminathan, V., Gupta, S., Keller, K.L. and Lehmann, D. (2022) 'Brand actions and financial consequences: a review of key findings and directions for future research', *Journal of the Academy of Marketing Science*, Vol. 50, No. 4, pp.639–664, DOI: 10.1007/s11747-022-00866-7.

Tascón, M.T., Castro, P. and Ferreras, A. (2021) 'How does a firm's life cycle influence the relationship between carbon performance and financial debt?', *Business Strategy and the Environment*, Vol. 30, No. 4, pp.1879–1897, DOI: https://doi.org/10.1002/bse.2722.

Ullah, S., Agyei-Boapeah, H., Kim, J.R. and Nasim, A. (2022) 'Does national culture matter for environmental innovation? A study of emerging economies', *Technological Forecasting and Social Change*, Vol. 181, p.121755, DOI: https://doi.org/10.1016/j.techfore.2022.121755.

Vörösmarty, G. and Dobos, I. (2020) 'Green purchasing frameworks considering firm size: a multicollinearity analysis using variance inflation factor', *Supply Chain Forum: An International Journal*, Vol. 21, No. 4, pp.290–301, DOI: 10.1080/16258312.2020.1776090.

Walsh, E.J. and Ryan, J. (1997) 'Agency and tax explanations of security issuance decisions', *Journal of Business Finance & Accounting*, Vol. 24, No. 7–8, pp.943–961, DOI: https://doi.org/10.1111/1468-5957.00144.

Warmana, G.O., Rahyuda, I.K., Purbawangsa, I.B.A. and Artini, N.L.G.S. (2020) 'Investigating capital structure speed of adjustment (SOA) of Indonesian companies for corporate value', *Global Journal of Flexible Systems Management*, Vol. 21, No. 3, pp.215–231, DOI: 10.1007/s40171-020-00235-9.

Yakubu, I.N., Kapusuzoglu, A. and Ceylan, N.B. (2021) 'Trade-off theory versus pecking order theory: the determinants of capital structure decisions for the Ghanaian listed firms', in Dinçer, H. and Yüksel, S. (Eds.): *Strategic Outlook in Business and Finance Innovation: Multidimensional Policies for Emerging Economies*, pp.111–122, Emerald Publishing Limited, https://doi.org/10.1108/978-1-80043-444-820211011.

Ying, M., Tikuye, G.A. and Shan, H. (2021) 'Impacts of firm performance on corporate social responsibility practices: the mediation role of corporate governance in Ethiopia corporate business', *Sustainability*, Vol. 13, No. 17, DOI: 10.3390/su13179717.

Appendix

Table A1 Suggested proxies of explanatory variables and the determinants of the capital structure

Variables	*Proxies*
Profitability	(EBITDA)/total assets
Tangibility	The sum of fixed assets)/total assets
Non-debt tax shield	depreciation and amortisation/total assets
I.Risk	The monthly idiosyncratic risk value is evaluated by obtaining the residual regression SD and dividing it by the number of trading days in that month.
CR	Content analysis
CS	Debt-to-equity (D/E) ratio
Size	Log of total firm's assets
Growth	Growth %ag change into sales
Liquidity	Total current assets/total current liabilities

Table A2 Pair-wise correlation matrix and VIF between explanatory variables

	Variables	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(7)*	*(9)*	*(10)*	*(11)*	*VIF*
1	CS~e	1.000									
2	Profitabi~y	–0.094	1.000								0.93
		(0.001)									
3	Tangibility	0.215	–0.101	1.000							1.05
		(0.000)	(0.001)								
4	Nondebtsh~d	0.112	0.019	0.039	1.000						1.01
		(0.000)	(0.518)	(0.148)							
5	I.Risk	0.060	–0.140	0.003	0.021	1.000					1.02
		(0.029)	(0.000)	(0.912)	(0.447)						
7	CR~n	–0.011	0.174	–0.048	0.027	–0.061	1.000				1.01
		(0.676)	(0.000)	(0.077)	(0.321)	(0.023)					
9	Liquidity~l	–0.345	0.194	–0.204	0.007	–0.147	0.131	1.000			1.09
		(0.000)	(0.000)	(0.000)	(0.792)	(0.000)	(0.000)				
10	Firmsize~e	–0.002	–0.130	0.089	–0.083	–0.089	0.226	0.047	1.000		1.24
		(0.942)	(0.000)	(0.001)	(0.002)	(0.001)	(0.000)	(0.084)			
11	Growthag~s	–0.007	–0.003	0.126	0.005	–0.089	0.066	0.031	0.282	1.000	1.08
		(0.798)	(0.907)	(0.000)	(0.856)	(0.001)	(0.015)	(0.247)	(0.000)		1.09

Note: Researcher's own computation is based on the financial statements.

Table A3 Cameron and Trivedi's decomposition of IM-test and Breusch-Pagan/Cook-Weisberg for heteroskedasticity

Cameron and Trivedi's decomposition of IM-test				*Breusch-Pagan/Cook-Weisberg test*
Source	chi2	df	p	Ho: Constant variance
				Variables: fitted values of cs
Heteroskedasticity	26.88	14	0.0199	chi2(1) = 90.28
Skewness	4.61	4	0.3297	Prob. > chi2 = 0.0000
Kurtosis	2.26	1	0.1324	
Total	33.76	19	0.0196	

Note: Researcher's own computation based on the financial statement.

Table A4 Effect of IV and DV with considering mediation

	GMM		*GLS*	
	MODEL 1 (capital structure)	*MODEL 2 (capital structure)*	*MODEL 3 (capital structure)*	*MODEL 5 (capital structure)*
CR		1.733845***		0.0698524
		(0.6478851)		(0.0032188)***
Profitability	–0.0897244***		–0.0040216***	
	(0.0284375)		(0.0008551)	
Tangibility	0.0256199***		0.012916***	
	(0.0068236)		(0.0044475)	
Non-debt tax shield	–0.0678557***		0.0046406***	
	(0.0124493)		(0.0004547)	
I.Risk	–1.835256***		–0.0072488***	
	(0.8227797)		(0.001562)	
Size	–0.2415453		0.001434	
	(0.1121985)		(0.9603)	
Growth	0.1930841		0.037406	
	(0.1483934)		(0.6562)	
Liquidity	–0.0234898*		0.098426	
	(0.0828972)		(0.0000)*	
Arellano-Bond test for AR (1)	Z = –3.82			
	Pr > z = 0.000			
Arellano-Bond test for AR (2)	Z = 0.44			
	Pr > z = 0.662			
Sargan test	0.22			
Hansen test	0.21			

Table A5 Effect of IV on MV without considering DV

	GMM	*GLS*
	MODEL 4 (CR)	*MODEL 6 (CR)*
Profitability	0.0013881	0.300421***
	(0.0007039)	(0.0109459)
Tangibility	–0.0014643***	–0.188239***
	(0.0007039)	(0.0066907)
Non-debt tax shield	0.009204***	0.0013313***
	(0.0020323)	(0.0004379)
I.Risk	–0.0007909***	–0.183293***
	(0.0008132)	(0.0031701)
Arellano-Bond test for AR (1)	0.0262	
Arellano-Bond test for AR (2)	0.462	
Sargan test	0.13	
Hansen test	0.16	

Table A6 Significance of mediated path

Direct effect	*Beta*	*Std. error*	*p-value*	*t-value*	*Mediated path*	*Sobel Z*	*Decision*
Profitability → CS	–0.089	0.028	0.000	–3.16	Profitability → CR → CS	66.50	Yes
Tangibility → CS	0.064	0.025	0.000	2.57	Tangibility → CR → CS	8.24	Yes
NDTS → CS	0.281	0.062	0.000	4.51	NDTS → CR → CS	13.39	Yes
I.Risk → CS	–1.83	0.822	0.02	–2.23	I.Risk → CR → CS	21.11	Yes