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Do female directors and their foreign experience complement or substitute for CSR performance? Evidence from the cost of debt financing

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Abstract

Purpose – This study aims to investigate the association between corporate social responsibility (CSR) performance and the cost of debt financing (CODF) in Malaysia. It further explores whether the potential impact of CSR performance on debt pricing is moderated by the females' representation on board and female directors' foreign experience.

Design/methodology/approach – The authors use a sample of 845 firm-year observations from 2017 to 2021 and apply various regression techniques, including the pooled ordinary least squares (POLS), the Heckman two-stage self-selection model, propensity score matching (PSM) and quantile regression, to test the study's hypotheses.

Findings – The results show that socially responsible firms incur lower costs of debt. Similarly, female directors and female directors with foreign exposure are negatively associated with CODF. However, their impact becomes positive when these two variables are interacted with CSR performance. The study findings are robust across alternative measures of board gender diversity, different model specifications and approaches addressing the endogeneity problem. In additional analyses, we find that the positive implication of CSR on CODF is more pronounced for firms with higher CSR performance and less financial constraint. Nevertheless, the results reveal that only firms with lower CSR performance but a high proportion of female directors and female directors with foreign experience exhibit lower CODF. This underscores the likelihood that female directors and their foreign exposure may substitute CSR practices in mitigating the cost of debt.

Originality/value – Existing literature generally emphasises the importance of CSR performance to corporate financing decisions, often neglecting the role of female directors and their attributes in financial institutions' creditworthiness evaluation. This study is among the first to address this gap by examining the moderating effect of female directors and their characteristics on CSR–CODF relationship within an emerging economy context. The findings contribute to the literature on CSR and board gender diversity, indicating that CSR performance and board gender diversity function more as substitutes than complements. Despite the unexpected consequences of interacting with female directors and their foreign experience with CSR, the study affirms the significance of CSR practices and board gender diversity in shaping borrowers' financial decisions.

Keywords CSR performance, Debt pricing, Board gender diversity, Female directors' overseas experience

Paper type Research paper

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1. Introduction

In the finance literature, there is a growing interest in the impact of corporate social responsibility (CSR) on corporate financing policies. The discussion is centred on the financial management model proposed by Girerd-Potin *et al.* (2011), which demonstrates that the choice and cost of financing are functions of a company's social rating. A company's commitment to addressing environmental and social challenges can signal its quality in terms of ethical practices, environmental risk management, resource utilisation and creditworthiness. These factors enhance a company's reputational capital, reduce default and systematic risk, and lead investors to demand a lower risk premium, consequently lowering the weighted average cost of capital (WACC).

Since the introduction of Girerd-Potin *et al.*'s (2011) financial management model, several empirical studies have examined the effect of CSR on financing costs, including the cost of capital (Fandella *et al.*, 2023; Shad *et al.*, 2020), specifically the cost of equity (El Ghoul *et al.*, 2011; Benlemlih, 2017; Chen and Zhang, 2021; Dhaliwal *et al.*, 2011; Gupta and Aggarwal, 2024), and the cost of debt (Ali *et al.*, 2023; Bacha *et al.*, 2021; Bae *et al.*, 2018; Eliwa *et al.*, 2021; Ge and Liu, 2015; Gigante and Manglaviti, 2022; Gracia and Siregar, 2021; Hamrouni *et al.*, 2020; Huang *et al.*, 2017; La Rosa *et al.*, 2018; Li *et al.*, 2024; Ye and Zhang, 2011), among others.

Despite the extensive research, the empirical findings on the nexus between CSR and the cost of debt remain inconsistent, with studies reporting positive, negative, mixed or inconclusive results. Girerd-Potin *et al.* (2011) argue that, unlike the equity market, the debt market does not perceive CSR scores as a value enhancing or risk mitigating strategy. Consequently, the cost of debt financing for firms with high CSR scores is identical to that for firms with low CSR scores. These contradictory findings suggest that how a firm's decision to engage in CSR activities influences debt pricing remains an open question. Accordingly, we re-examine the association between CSR performance and the cost of debt financing (CODF) in Malaysia, where CSR practices are still evolving (Al-Dhamari *et al.*, 2022a), and where the governance structure and institutional environment differ from those in developed economies (Katmon *et al.*, 2019).

The mixed evidence on the association between CSR and the cost of debt also suggest that additional factors may influence this relationship. Prior studies have highlighted the importance of female directors and their foreign experience as drivers of CSR initiatives and CODF (Kamil and Appiah, 2022; Khan *et al.*, 2023; Romano *et al.*, 2024; Zhang *et al.*, 2018). However, to the best of our knowledge, these studies have overlooked the moderating impact of these two factors on CSR-CODF relationship. Hence, this study endeavours to fill this gap by investigating the interaction effect of female directors and their foreign experience on the association between CSR and CODF.

Competing arguments exist regarding the association between CSR and the cost of debt. Based on the agency theory, CSR can be viewed as a source of agency problems, as managers may overinvest in CSR activities for self-serving interests (Preston and O'bannon, 1997). Such egocentric action can erode a firm's competitive advantage and adversely affect firm value, thereby increasing the cost of debt. However, according to stakeholder theory, involvement in CSR initiatives can boost employee morale and eventually lead to production efficiency, which in turn, positively impact on a company's future cash flow, value, access to finance, and cost of capital (Ali *et al.*, 2023; Cheng *et al.*, 2014; Dhaliwal *et al.*, 2011; El Ghoul *et al.*, 2011; Mariani *et al.*, 2021). Furthermore, CSR can also be used as a marketing tool by firms to signal their success and superiority, enabling better negotiation of debt contracts (Abu Bakar and Ameer, 2011; Dhoraisingam Samuel *et al.*, 2022). Based on this perspective, our study assumes that CSR mitigates the cost of debt.

Indeed, CSR initiatives and debt capital decisions are outcomes of strategic board decisions (Rao and Tilt, 2016), and decision making at the board level should align with the general interest of the firms' stakeholders (Pucheta-Martínez *et al.*, 2023). Therefore, strategic decisions are likely influenced by the composition and characteristics of the company's board of directors, particularly in terms of gender and directors' foreign experience (Dobija *et al.*, 2023).

Notably, prior literature has identified female directors as important stakeholder in a company who directly act as signal of responsible business practices because their presence on the board helps firms commit to CSR initiatives (Javeed *et al.*, 2022; Kahloul *et al.*, 2022; Nekhili *et al.*, 2017). The improvement in CSR initiatives, coupled with female directors' foreign exposure, may provide an important signal of enhanced company reputation (Bear *et al.*, 2010), which in turn, reduce credit and systematic risk (Khan *et al.*, 2023). Consequently, the adoption of CSR initiatives, alongside female directors and their foreign exposure, is expected to enhance the company's reputation in the debt market, thereby strengthening the negative relationship between CSR and CODF.

However, since female directors and their foreign experience may be associated with better corporate governance practices, such as serving as effective monitors and advisors as well as exposed to overseas network, board decisions are likely to be thoroughly scrutinised. CSR can also serve as a monitoring tool in the lending evaluation process (Li *et al.*, 2024). Moreover, debt capital, as an external source of finance, is considered a monitoring mechanism to ensure managers avoid wasting corporate resources (Jensen, 1986; Pucheta-Martínez *et al.*, 2023), thereby reducing discretionary actions concerning cash flow. Thus, the increased monitoring from the board of directors (BODs) due to the presence of female directors and their foreign experience may positively influence debt capital decisions (Khan *et al.*, 2023; Nisiyama and Nakamura, 2018), and potentially lead to an increase in CODF (Berger *et al.*, 1997).

Malaysia is used as a prime focus because debt financing through bank loans is one of the traditional sources of financing (Guizani and Abdalkrim, 2023) and is cheaper compared to equity financing (Shad *et al.*, 2020). Debt financing plays a critical role in a company's external funding, operational decisions, and growth. Thus, a company's access to low-cost debt financing is crucial for its survival (Ye and Zhang, 2011). The corporate debt to gross domestic product (GDP) over the period of 2016–2022 ranged between 99.1 and 109.7% (The Edge Malaysia, 2023).

The non-financial corporate sector in Malaysia is also highly leveraged, raising concerns about its ability to service debts (The Edge Malaysia, 2023). Concerns have also been raised regarding corporate responsibility. For instance, in March 2019, the dumping of a mixture toxic chemicals into the Kim Kim River in the state of Johor led to the hospitalisation of up to 3,000 individuals, raising serious concerns about firms' commitment to environment protection and adherence to regulations. Similarly, several Malaysian firms such as Top Glove, FGV Holdings Berhad, and Sime Darby Plantation Berhad, faced suspension by the United States Customs and Border Protection (CBP) over widespread allegations of forced labour in their production. These incidents highlight the critical question of whether Malaysian firms fully understand the benefits of behaving responsibly.

Nevertheless, Malaysia is one of the few Asian countries where the government has undertaken initiatives to encourage engagement in CSR practices. For instance, to promote CSR programmes among firms and within the communities where they operate, the government has launched several initiatives and provided incentives. This includes the Prime Minister's CSR Awards, introduced by the Ministry of Women, Family, and Community in 2007, the FTSE4Good Bursa Malaysia Index launched in 2014 to facilitate environment, social, and governance (ESG) focused investments, and the sustainability reporting framework launched in 2015 and amended in 2018. Both frameworks require firms to disclose sustainability statements in their annual reports and incorporate ESG issues related to their respective businesses. Firms are also expected to provide more detailed and extensive reporting on material economic, environmental, and social (EES) risks and opportunities.

In addition to the initiatives of the government in promoting CSR, the government has encouraged firms listed on Bursa Malaysia to have 30% female directors (Guizani and Abdalkrim, 2023). Another reason Malaysia serves as an excellent case study is that Malaysian students, many of whom go on to become managers or board members, are known for their eagerness to study abroad. This allows them to immerse themselves in foreign cultures, network with global peers, and gain experience at some of the world's top universities (The Edge Malaysia, 2023).

Our study contributes to the literature in several ways. First, previous research on the cost of debt has predominantly focused on data from Western countries or China data, with only a few studies examining Malaysian firms. For instance, Shad *et al.*'s (2020) study analysed a sample of 41 Malaysian firms but focused solely on the oil and gas industry. Similarly, Gracia and Siregar's (2021) study, which examined the Association of Southeast Asian Nations (ASEAN) firms, yielded mixed results. Compared to these studies, our research employs a comprehensive sample of firms across all industries in the Malaysian capital market, providing robust evidence that socially responsible firms benefit from lower costs of debt financing.

Second, most existing studies have relied on the conditional mean regression technique (e.g. generalised least squares (GLS) random effects regression), without utilising the median regression technique. The median regression technique, or quantile regression, allows researchers to examine the full distribution of the dependent variable (CODF) and accounts for values beyond the confidence interval (Bruna *et al.*, 2021; Oware and Mallikarjunappa, 2021; Minh *et al.*, 2022). This approach ensures that the lower and upper quantiles of CODF, often overlooked by conditional mean regression technique focused on central distribution tendency, are captured in our research. Third, while prior studies have analysed the impact of CSR performance on cost of debt, to the best of our knowledge, no study has examined the moderating effect of board gender diversity on CSR-CODF relationship. We contribute to the literature by providing empirical evidence the economic benefit of CSR in reducing the cost of debt is weakened for firms with female directors on the board. Fourth, this study extends gender diversity research stream by highlighting the importance of female directors' characteristics in debt pricing. Our findings reveal that CSR firms incur higher cost of debt, particularly when they have female directors with foreign experience on their boards. Fifth, we supplement the literature on CSR by investigating its differential effects on CODF for firms with varying CSR performance and financial condition. Our results indicate that the positive implications of CSR for reducing CODF are more pronounced for less financially constrained firms and those with higher CSR performance. Additional analyses show that women's board representation and their international experience can substitute the role of CSR in explaining CODF. Finally, from a policymaker's perspective, our findings support the Malaysian government's initiatives to induce firms to engage more in CSR activities and to include qualified females in the boardroom.

2. Literature review and hypothesis development

2.1 CSR performance and the cost of debt financing

An important channel through which the cost of external financing (e.g. debt financing) arises is the interest expenses on bank loan contracts and bond yield spreads. The financing cost is often referred to as the cost of a bank loan, the cost of a bond, and in general the cost of debt financing (CODF). The CODF is a key determinant of a company's performance and a price term applied in corporate finance to address borrowers' (firms') business and financial risk (Dalwai *et al.*, 2023; Modigliani and Miller, 1958). Therefore, to reduce borrowers' risk profile and uncertainty about a company's prospects, stakeholder's theory (Donaldson and Preston, 1995; Hill and Jones, 1992; Jones, 1995) has identified CSR performance as a symbolic and risk mitigation strategy (Eliwa *et al.*, 2021; Hamrouni *et al.*, 2020).

As a symbolic strategy, CSR performance provides a clue about the company strategies executed to improve the environment, community, employee welfare, governance, and products. This reflects firms' ability to generate long-term value orientation and create better stakeholder engagement (Apergis *et al.*, 2022; Jizi, 2017; Samet *et al.*, 2022). In building stakeholders' engagement, CSR provides opportunities for firms to have better access to finance, increase performance and value, and reduces financial risk, which may in turn lower the cost of financing through reduced risk premiums from credit institutions (Attig *et al.*, 2013; Cheng *et al.*, 2014; Fandella *et al.*, 2023).

In addition, CSR performance can increase a company's reputational and moral capital by improving the corporate image regarding customers and consumers (Cornell and Shapiro, 1987; Chouaibi *et al.*, 2024). However, if firms fail to engage in stakeholder enhancement strategies, society may view them negatively and access to resources may be limited, thereby resulting in higher CODF (Eliwa *et al.*, 2021). Therefore, by taking into account firms' CSR performance in the credit evaluation process, creditors can demonstrate greater interest in minimising default risk (Merton, 1974; Kordsachia, 2021).

CSR performance also offers incremental information beyond credit rating, such as signalling a company's prospects and creditworthiness to the financial market, especially to debt holders. In fact, credit rating agencies use firms' CSR performance to evaluate their creditworthiness (Ftiti *et al.*, 2022; Hamrouni *et al.*, 2020). According to Asimakopoulos *et al.* (2023), when firms are socially responsible, they tend to have lower optimal market and book leverage ratios and redistribute their financing sources from public debt (bond issuance) to private debt (bank loans). Hence, firms with high CSR performance tend to pay less on loan spreads than those with low CSR performance.

As a risk mitigation strategy, CSR performance captures the full spectrum of related risks (e.g. default and reputational) and helps to mitigate market share losses. For instance, it offers information on firms' long-term development initiatives and social behaviours that are valuable in building long-term connections with various stakeholders (financial, societal, and business). This impacts firms' ability to outperform their rivals or preserve their competitive advantage (Hillman and Keim, 2001; Porter and Kramer, 2006). Thus, CSR performance can serve as an insurance premium for the protection of stakeholders to mitigate risks like default risk (Godfrey, 2005; Singh, 2024) and reduce the cost of high leverage that arises because of conflicts between relevant stakeholders like customers and competitors (Bae *et al.*, 2018).

Other reasons why firms undertake CSR, as mentioned by Lys *et al.* (2015), are: (1) anticipation of stronger future financial performance; (2) societal benefit; and (3) to generate positive economic returns. These three reasons are referred to as charity, investment, and signalling purposes. Therefore, it can be argued that firms can build their identity and reputation within society through their CSR performance (Bear *et al.*, 2010; Brammer and Millington, 2005; Grover *et al.*, 2019).

From the standpoint of corporate reputational theory, a strand of literature (e.g. Cornell and Shapiro, 1987; Datta *et al.*, 1999; Diamond, 1989; La Rosa *et al.*, 2018) has also argued that CSR performance is a potent tool for building positive corporate reputations in the capital markets because it relates to trustworthiness, integrity, and non-opportunism. Hence, through its CSR activities, a company can gather solid credit records. Consequently, this can enhance firms' reputation, leading to reduced default and financial risk and, as a result, lower interest rates.

All these suggest that if market participants or financial institutions view a firm's CSR performance as a risk reduction strategy, a signal, or a means to improve the firm's reputation, they are more likely to integrate it into their credit decisions and offer better conditions on credit facilities granted to firms. This will reduce default risk and, in turn, the CODF (Eliwa *et al.*, 2021; Magnanelli and Izzo, 2017). Girerd-Potin *et al.* (2011), for instance, demonstrated that firms with better social scores typically have lower risk of bankruptcy and CODF. These firms are also more appealing to creditors in terms of leverage allowance and have a high debt rating (La Rosa *et al.*, 2018).

Since the debt market may apply CSR performance to evaluate a firm's creditworthiness, several studies have demonstrated that it significantly affects corporate financing decisions. However, the majority of these studies are deeply rooted in China, Europe, and the U.S., with little emphasis on other emerging markets like Malaysia. In addition, prior studies results do not unanimously document a negative association between CSR and CODF. For instance, the

Girerd-Potin *et al.* (2011) study of firms from European countries showed that CSR performance has no effect on CODF, which means that banks do not consider a firm's CSR performance when negotiating interest rates on loans or credit facilities.

According to empirical evidence provided by Gigante and Manglaviti (2022) for European firms, firms with ESG performance above average show a positive effect on CODF, while for those with ESG performance below average, a negative effect is reported. In the case of Magnanelli and Izzo (2017), CSR performance is positively linked to CODF for firms included in the Dow Jones Sustainability Indexes database. The authors ascribed the results to the fact that financial institutions consider a firm's CSR performance as a wasteful allocation of resources rather than a risk reduction strategy. Similarly, for a sample of firms from Brazil, Russia, India, China, and South Africa (BRICs), Fandella *et al.* (2023) found that CSR performance is positively associated with CODF. However, the results turned out to be negative when the authors excluded Chinese firms from the sample.

Contrary to the mixed findings reported by the aforementioned studies, La Rosa *et al.* (2018) reported a negative impact of CSR performance on CODF for a sample of European firms. Additionally, for a sample of French and Italian firms, Bacha *et al.* (2021) and Hamrouni *et al.* (2020) observed a negative association between CSR scores and CODF. Other studies that used a sample of European firms revealed that ESG practices (ESG disclosure and/or ESG performance) have a negative impact on CODF (Eliwa *et al.*, 2021; Houqe *et al.*, 2020; Kordsachia, 2021).

Arora and Sharma's (2022) study that used a sample of firms listed on the NIFTY 500 showed that Indian firms with higher ESG scores are associated with lower CODF. A similar negative association was found by Bhuiyan and Nguyen (2020) for a sample of Australian firms and Chang *et al.* (2014) for a sample of Taiwan firms. These studies showed that firms with better CSR performance enjoyed lower interest rates and smaller bank loan spreads.

In the case of the U.S. market, Hsu and Chen (2015) found that U.S. firms with high CSR performance have lower credit risk and a higher credit rating. Attig *et al.* (2013) observed that CSR strengths positively influence credit ratings, which implies that credit rating agencies like Standard & Poor (S&P) allocate higher ratings to firms with good social performance because such firms are assumed to use the internal resources efficiently and tend to have good performance (Chung *et al.*, 2024). The consequential effect is that such firms would be able to access external financing at a lower cost. Using data from U.S. firms, Ge and Liu (2015) and Apergis *et al.* (2022) reported that firms with better CSR performance are associated with higher credit ratings and lower CODF. Another study by Goss and Roberts (2011) provides evidence that U.S. firms with fewer CSR concerns (high CSR scores) pay less to banks on the cost of loans obtained as compared to firms with more CSR concerns (low CSR scores).

CSR rating and CODF have been found to have U-shaped and an inverse U-shape relationship in a number of studies that also used a sample of Chinese firms (Huang *et al.*, 2017; Li *et al.*, 2024; Luo *et al.*, 2019; Xu *et al.*, 2021; Ye and Zhang, 2011). For instance, according to Ye and Zhang (2011), CSR performance reduces the CODF when performance is below the optimal level but increases the CODF when performance is beyond the optimal level. Contrary to Ye and Zhang's (2011) findings, Li *et al.* (2024) and Huang *et al.* (2017) found a positive association when CSR scores are lower than the threshold, but the association becomes negative when CSR is greater than the threshold. Their conclusion suggests that underinvesting in CSR has a value-destroying effect. As such, CSR can serve as a monitoring mechanism in loan evaluations.

A strand of literature has also used a sample of firms in the ASEAN environment (in Indonesia, Malaysia, the Philippines, Singapore, and Thailand). However, the results remain controversial. For example, Gracia and Siregar (2021) reported mixed results on the impact of sustainability practices (disclosure and performance) on CODF for a combined sample of firms in the ASEAN region. The results showed that debtholders incorporate sustainability disclosure in their credit evaluation; however, no significant influence was found for sustainability performance.

Al Rabab'a *et al.* (2023), using a sample of firms from Asia-Pacific countries, found that firms with good carbon performance enjoy lower CODF, especially those in countries with weak governance quality. According to a study by Shad *et al.* (2020) on Malaysian firms in the oil and gas industry, CODF is negatively affected by the overall sustainability reporting scores. The authors concluded that the reduction in CODF showed that a firm's sustainability reporting can act as a risk mitigation strategy in the eyes of investors and speculators. Another study by Dhoraisingam Samuel *et al.* (2022) that used a sample of 104 firms belonging to the Edge Billion Ringgit Club between 2009 and 2015 observed that firms that disclosed more information on their CSR activities were associated with lower CODF.

Based on the empirical review, it remains unclear whether CSR performance has a positive, negative, or no effect in the credit evaluation process. Therefore, this study adds to the literature by investigating the nexus between CSR performance and the CODF using a comprehensive sample of firms listed in the Malaysian capital market. This is based on the idea that CSR performance could be a moral signal to boost a firm's reputational and moral capital, which tends to enhance a firm's reputation, value, performance, creditworthiness, and stakeholder engagement. As a result, a consequential reduction in various types of risk (e.g. default, systematic, and reputation risk) may occur.

Because firms with high CSR performance tend to have a lower risk profile, it is anticipated that banks would provide such firms with better terms on loans or charge lower interest rates. Thus, in the debt market, CSR performance can be used as a risk reduction strategy, a tool to enhance corporate reputation, and symbolic mechanism (Eliwa *et al.*, 2021; Godfrey, 2005; Li *et al.*, 2024). Therefore, this study hypothesises that lower CODF may be the outcome of CSR performance.

H1. CSR performance is negatively associated with cost of debt financing.

2.2 CSR performance, female directors, and the cost of debt financing

According to several theoretical frameworks (e.g. agency, resource dependence, stakeholder, and signalling), BODs is a corporate organ that manages environmental uncertainty and is tasked with the responsibility of developing corporate strategies and allocating resources to foster sustainability. Thus, decisions about CSR and debt financing could be regarded as outcomes of the strategic decisions made by the BODs.

Relying on the importance of BODs in strategic decision-making, arguments from agency and stakeholder theorists suggest that firms can reduce agency costs, foster relationships with creditors, and meet stakeholder needs through an effective and efficient board structure (Ferrell *et al.*, 2016; Ingley and Van Der Walt, 2004; Webb, 2004). Similarly, the resource dependence theory (RDT) states that the BODs can serve as a tool to help firms manage environmental uncertainty (Boyd, 1990) and gain preferential access to resources and legitimacy (Hillman *et al.*, 2009). According to Connelly *et al.* (2011), the signalling theory also views board structure as a signal of a company's internal corporate governance quality and its credibility to the capital market.

Generally, female directors have been recognised as a type of directors who can benefit the company the most because they have a distinct set of traits (e.g. having advanced degrees, being risk averse, and holding multiple directorships, among others) that set them apart from their male counterparts (Hillman *et al.*, 2002). These traits tend to influence corporate behaviours, governance quality, and the linkage between firms and capital suppliers (Hillman *et al.*, 2007). Because women tend to possess the necessary skills and knowledge and engage in transformational, transactional, and laissez-faire leadership roles, female directors, for instance, are viewed as effective leaders (Eagly and Carli, 2003; Paustian-Underdahl *et al.*, 2014; Sergent and Stajkovic, 2020). Compared to male directors, female directors have high ethical standards, are more socially sensitive, generous, and compassionate, which may result in the board paying attention to CSR activities (Areneke *et al.*, 2023; Buertey, 2021; Dobija *et al.*, 2023; Peng *et al.*, 2021).

Experimental economists have specifically demonstrated that females are generally more socially oriented and cooperative than males (e.g. Croson and Gneezy, 2009; Eckel and Grossman, 1998; Nowell and Tinkler, 1994). Several studies in the management and corporate governance literature have observed significant differences between males and females in sustainability behaviour, even though studies that used the general population sample, such as Bolton and Katok (1995) and Eckel and Grossman (2008), found no significant difference between males and females in beneficent behaviour (e.g. charitable giving, donation, and generosity). For instance, a meta-analysis of 87 studies by Byron and Post (2016) showed that the presence of female directors is positively associated with corporate social performance.

Having more females on the executive team increases investment in social sustainability initiatives and sustainable development goals (Apesteguia *et al.*, 2012; Bauer *et al.*, 2021; McGuinness *et al.*, 2017). This indicates that female directors support strong CSR performance and improve corporate sustainability ratings. A positive impact of female directors on environmental and social performance was documented by Peng *et al.* (2021) for a sample of multinational corporations (MNCs) from China, Japan, the U.K. and the U.S. Disli *et al.* (2022) also reported that having female directors in the boardroom enhances the firm's reputation through their social engagement.

Female directors can also enhance CSR legitimacy by ensuring that corporate resources are used efficiently for value maximising societal behaviour that would increase a firm's CSR performance (Dobija *et al.*, 2023; Jizi, 2017; Webb, 2004). For a sample of FTSE 350 firms, other studies have also documented a positive influence of female directors on CSR performance and ethical policies (Bear *et al.*, 2010; Jizi, 2017). In the case of U.S. firms, a gender-diverse board leads to an increase in CSR strengths and a decrease in CSR concerns (Harjoto *et al.*, 2015).

On the contrary, Bruna *et al.* (2021) revealed that the relationship between gender diversity and corporate social performance is non-linear for a sample of S&P 500 Index firms because it changes along the quantiles of the performance distribution. Furthermore, in the context of developing countries, Muttakin *et al.* (2015) found a negative association with CSR for a sample of Bangladeshi firms.

According to ethical studies, female directors and executives are less likely to present inaccurate financial statements, particularly when there is a lack of oversight from key stakeholders (Gupta *et al.*, 2020; Sun and Zhang, 2024). The integrity of the financial reporting process (Bansal, 2024; Ittonen *et al.*, 2010) and a company's propensity to engage in fraud and fraud detection are improved by female corporate leadership (Wang *et al.*, 2022).

Creditors view firms with female directors as less risky and having a lower default risk, which decreases the CODF (Aksoy and Yilmaz, 2023; García and Herrero, 2021). Because females are less overconfident and more sensitive to risky situations than males, females are risk averse and avoid competition (Croson and Gneezy, 2009; Friedl *et al.*, 2020). For instance, Adhikari *et al.* (2019) found that firms with a high proportion of female executives have less operational-related lawsuits because they tend to avoid adopting risky and litigation policies yet value enhancing corporate policies.

Besides the influence of female directors on firms CSR performance, ethical policies, and risky behaviours, female directors are thought to be the most influential board characteristics when decision-making relates to financing decisions. For instance, García and Herrero (2021) discovered that female directors are negatively associated with the CODF and reduce the likelihood of firms experiencing financial distress. The presence of female directors is also found to reduce the CODF and the perceptions of default risk by fund providers for firms listed on Borsa Istanbul (Aksoy and Yilmaz, 2023). A similar negative association was reported by Kordsachia (2021) for a sample of European firms, Mansour *et al.* (2024) for a sample of Jordanian firms, Usman *et al.* (2019) for a sample of A-share listed firms on the Shanghai and Shenzhen stock exchanges, and Tee (2019) for a sample of Malaysian firms.

According to Mansour *et al.* (2024), the economic benefit of female directors is that firms with a greater number of female directors enjoy an average of 0.75% reduction in interest rates incurred by creditors compared to firms with fewer female directors. Usman *et al.* (2019) also documented that firms with at least one female director receive 4% fewer charges from creditors compared to firms without female directors on the board. However, Kamil and Appiah (2022) found a positive effect of female directors on CODF for a sample of Ghanaian firms.

Given that female directors play a unique role in the boardroom, their distinctiveness in terms of risk preferences, social orientation, ethical standards, and the importance placed on them may matter in the debt market, thereby resulting in lower CODF. This is because strategic decisions taken at the board level involving firms with female directors would be in the utmost interest of stakeholders, including CSR. Additionally, having female directors on boards ensure that firm resources are used efficiently, thereby limiting managerial opportunistic behaviour and ensuring that the firm behaves responsibly (Ferrell *et al.*, 2016). This means that the CSR activities engaged by these firms would tend to be align with the interest of the society and environment in which they operate. Hence, CSR performance and female directors can serve as mechanisms to reduce a firm's risk profile and signal its quality, potentially affecting debt pricing (García and Herrero, 2021; Usman *et al.*, 2019).

Based on these presumptions, creditors' perceptions about firms' probability of default may become less significant, consequently resulting in low CODF. For instance, Romano *et al.* (2024) discovered that European firms with more female representation on boards have a strong negative relationship between environmental innovation and CODF. Similarly, Kahloul *et al.* (2022) documented that CSR enhances financial performance through the positive moderating role of female directors.

Altogether, this may suggest that firms' CSR performance and female directors' presence on board send a positive signal to the debt market through female directors' differences compared to male directors in terms of social orientation, effectiveness, risk preference, and ethical sensitivity – all of which can help to gain creditors' confidence. As such, female directors are expected to strengthen the negative relationship between CSR performance and CODF.

Having indicated that female directors can serve as a signalling mechanism of a firm's corporate governance quality and the most important type of directors in the form of benefits attraction to a company, which include channelling information via advice and counsel, legitimacy, preferential access to resources at a low cost, playing an insurance role to reduce the risk profile of firms, supporting sustainable investment initiatives, and avoiding unethical practices – creditors may view firms with female directors on board that also engage in high CSR activities as an avenue for managers to squander the firm's corporate resources for personal gain.

This is because the RDT identifies the presence of female directors in BODs as a means of adding legitimacy and linking the firm to important suppliers who provide capital at a lower cost. Similarly, Liang and Renneboog (2018) observed that policies created by the firms to enhance board diversity can act as alternatives to CSR performance. A firm's CSR performance provides clues about multidimensional behaviour and captures efforts to address various externalities arising during profit maximisation. Likewise, high CSR performance is common in firms that are well managed. Hence, investment in CSR may be a curse and not be viewed as an act of stakeholders' engagement or trustworthiness on the part of the firm to stakeholders but rather as a means for private benefits. Indeed, while gender disparity may not exist in trust behaviour, females tend to reciprocate more of their wealth than males (Croson and Buchan, 1999). In such situations, creditors may demand a higher cost of debt. Liang and Renneboog (2018) also claimed that board diversity policy may serve as an alternative to CSR performance.

A typical scenario is the empirical analysis by Nisiyama and Nakamura (2018), who found that increased board diversity is associated with increased debt because of the effectiveness and advantage of diversity, which improves board monitoring roles. This suggests that there may not be a need for firms with high CSR performance to signal their quality or reduce their risk of default through the inclusion of female directors. In essence, CSR and female directors might perform the same role of signalling a firm's quality or reputation and resource provisioning, thereby substituting one another. Therefore, the assertion of Hillman *et al.* (2007) that directors are representations of organisational dependence may suggest that firms with some form of environmental dependencies tend to appoint female directors because they can link firms to diverse constituencies differently than men. Although Pucheta-Martínez *et al.* (2023) revealed that female directors do not substantially affect the relationship between CSR disclosure and capital structure for an international sample of firms from 48 countries, more investigation is still needed in this regard. Therefore, based on the contrasting arguments and empirical evidence discussed earlier, this study proposes the following hypothesis:

H2. The association between CSR performance and the CODF is moderated by the presence of female directors on boards.

2.3 CSR performance, female directors' foreign experience, and the cost of debt financing

According to RDT, the composition of the BODs plays a crucial role in determining the quality of the board and its ability to acquire resources from suppliers of capital at a lower cost (Hillman *et al.*, 2009). For instance, debates in the boardroom tend to favour stakeholders' interests and lead to effective and efficient monitoring of management when BODs include a mix of directors with foreign experience (Boyd, 1990; Giannetti *et al.*, 2015; Zhang *et al.*, 2018).

The presence of directors with foreign experience adds value to the board and enhances a firm's reputations through directors' international orientation and connections, which can facilitate the chances of firms gaining access to foreign capital and engaging in foreign acquisitions (Giannetti *et al.*, 2015). The foreign experience of directors also serves as an efficient mechanism to transmit knowledge acquired about better governance and management practices from overseas, improving the quality of corporate governance domestically (Dai *et al.*, 2018; Giannetti *et al.*, 2015; Iliev and Roth, 2018).

Improved corporate governance quality can mitigate managerial myopia, thereby helping managers to focus more on the long-term value of their firms and engaging in stockholder-oriented business culture (Dobija *et al.*, 2023; Giannetti *et al.*, 2015). Moreover, CSR, being an important long-term investment and a signal of responsible actions, may improve due to the foreign expertise of directors because such directors are likely to view CSR activities as a moral and standard responsibility of the firm.

In addition, the presence of directors with foreign experience may signal improved corporate governance quality and monitoring to the debt market, potentially decreasing default and systematic risk (Khan *et al.*, 2023). Therefore, directors' foreign experience is likely to positively affect corporate outcomes (Dobija *et al.*, 2023), particularly CSR engagement (Zhang *et al.*, 2018), dividend payout ratios (Tao *et al.*, 2022), stock price informativeness (Ullah *et al.*, 2021), financial reporting quality, and negatively affect the CODF (Khan *et al.*, 2023).

Notably, there have been some studies on the importance of directors' foreign experience in board strategic decisions, such as CSR and financial decisions, but most studies focus on samples of Chinese firms. For example, Giannetti *et al.* (2015) documented that when individuals with foreign experience join a board, the firm's valuation and profitability improve, and the total factor productivity increases. This improvement is accompanied by changes in corporate policies, with a decreased tendency to manage earnings.

Regarding investment decisions, Dai *et al.* (2018) found that directors with foreign experience significantly improve investment efficiency, especially for firms that experience overinvestment. Wen *et al.* (2020) discovered that firms with better CSR performance tend to have directors with foreign experience. Similar positive impacts of directors' foreign experience on CSR engagement and corporate innovation were documented by Zhang *et al.* (2018) and Yuan and Wen (2018), and on environmental information disclosure by Su *et al.* (2023).

In relation to CODF, Khan *et al.* (2023) reported that directors' foreign experience has a negative relationship with CODF. The authors claimed that firms with such directors are more likely to obtain cheaper capital compared to their counterparts without such directors.

Another study by Dobija *et al.* (2023) showed that directors' foreign experience is positively associated with non-financial disclosure of firms listed on the Warsaw Stock Exchange. Additional results revealed that the specific attributes of female directors, such as foreign experience, increase the scope of non-financial disclosure, which indicates that the international orientation of supervisory boards and other characteristics enable firms to move towards sustainable development. In the same vein, Wang *et al.* (2023) and Ji and Abdoune (2023) reported that directors with foreign experience enhance Chinese firms' commitment to green innovation and CSR disclosure.

Similarly, Ullah *et al.* (2022) found that female directors' foreign experience positively impacts firms' environmental and sustainable performance compared to male counterparts with similar experience, based on a sample of Chinese firms. Further results showed that the countries from which the female directors obtained their foreign experience matter. For example, female directors' foreign experience from developed or high CSR countries has a more positive impact on sustainability practices than experience from emerging or low CSR countries. This implies that the unique attributes of female directors (e.g. foreign experience) can play a key role in protecting stakeholders' interests (Hillman *et al.*, 2007; Ullah *et al.*, 2022).

Based on this insight, female directors with foreign experience may act in stakeholders' interests. As such, having a boardroom presence of female directors with foreign experience may signal the board quality to the capital market and the reputational capital of the company. It also suggests that such a board is more aware of social and ethical issues, which may improve creditworthiness. This, in turn, increases board's ability to attract cheaper debt capital and reduces susceptibility to default and systematic risk. For this reason, the presence of female directors with foreign experience may strengthen the negative relationship between CSR and CODF. This outcome may arise due to the unique benefits female directors bring to the boardroom and their lower likelihood of making poor decisions (Hillman *et al.*, 2007). Thus, foreign experience among female directors may enhance board performance (Hillman *et al.*, 2002) and serve as a medium to transmit sustainability practices and safeguard shareholders' interests (Ullah *et al.*, 2022).

However, considering the fact that firms with high CSR scores are often viewed as transparent, less risky, and trustworthy, there may not be a need to rely on female directors or those with foreign experience as a signalling mechanism or a means of linking the firm to suppliers of capital at a lower cost. According to RDT, the presence of females on the board adds legitimacy to the firm, while foreign experience enhances board's advisory, counselling, monitoring, and resource provisioning roles. Consequently, BODs with female directors who have foreign experience may demonstrate the ability to support stakeholders' interests.

In essence, CSR and female directors with foreign experience may perform similar roles, potentially substituting rather than complementing each other. Hence, female directors' foreign experience may influence the relationship between CSR and CODF positively. Given the multi-theoretical arguments on unique resources female directors bring to firms and the advantages of foreign experience, the next non-directional hypothesis is as follows:

H3. Female directors' foreign experience moderates the association between CSR performance and the CODF.

3. Research design

3.1 Sample size and data

The sample is composed of Malaysian-listed firms whose annual CSR ratings have been assessed by the CSRHub database. The initial sample comprises 895 firm-year observations from 2017 to 2021. However, after the exclusion of financial firms due to different regulations and standards in the preparation of financial statements and the removal of firms with missing data for all variables tested in this research, the final sample comprises 845 firm-year observations.

The Bursa Malaysia sectoral classification was used to categorise firms into different sectors. Table 1 Panel A shows the number of firm-year observations by year, while Panel B presents the number of firm-year observations by industry. According to Panel A, the sample size ranges from 123 observations in 2017 to 222 in 2021. Additionally, Panel B indicates that the number of firms operating in each sector varies significantly. For example, a total of 22.49% of firm-year observations belong to the consumer product and services sector, 13.02% in industrial products and services, and 12.07% in property. These three sectors represent the majority of the observations in the sample. However, the telecommunications and media sector and the health care sector have the lowest percentages (4.38 and 4.62%, respectively) compared to other sectors.

In terms of data collection, the study followed previous studies (e.g. Cordeiro *et al.*, 2020; Cruz *et al.*, 2014) and used CSR ratings from the CSRHub database as a proxy for CSR performance. The data on gender diversity, corporate board size, and audit quality were extracted from the sampled firms' annual reports. Other data, such as the cost of debt and financial data, were obtained from the Thomson Reuters DataStream.

3.2 Variables measurements

3.2.1 Dependent variable. The dependent variable is the CODF, which is measured as the ratio of a firm's interest expense to its average short-term and long-term debt (Al-Dhamari *et al.*, 2022b; Bliss and Gul, 2012; Eliwa *et al.*, 2021; Xu *et al.*, 2021). This measure is often considered an effective accounting indicator of CODF and is widely used to explain CSR performance (Orlitzky *et al.*, 2003). Although there are other measures of CODF, such as

Table 1. Sample distribution

Panel A. Number of observations by year

Year	Observations	%	Cumulative
2017	123	14.56	14.56
2018	139	16.45	31.01
2019	139	16.45	47.46
2020	222	26.27	73.73
2021	222	26.27	100
Total	845	100	

Panel B. Number of observations by industry

Industry	Observations	%	Cumulative
Consumer product and services	190	22.49	22.49
Construction	70	8.28	30.77
Health care	39	4.62	35.39
Property	102	12.07	47.46
Telecommunications and media	37	4.38	51.84
Energy	76	8.99	60.83
Utilities	47	5.56	66.39
Transportation and logistics	51	6.03	72.42
Industrial products and services	110	13.02	85.44
Plantation	73	8.64	94.08
Technology	50	5.92	100
Total	845	100	

Note(s): This table reports the sample distribution by year and industry. Panel A shows the sample distribution for the period 2017–2021. The final sample consists of 845 firm-year observations. Panel B reveals the industry distribution of the full sample. This table is prepared by the authors
Source(s): Authors' own creation

credit rating and yield spread, the researchers could not obtain the relevant data. Thus, this study uses the interest rate (RATE) as a measure of CODF. To mitigate the effect of outliers in the regression analysis, the study uses the natural logarithm of RATE as the final measure of CODF (Shailer and Wang, 2015).

3.2.2 Independent variable. As stated earlier in Section 3.1, this study uses CSRHub data on aggregated CSR scores as a proxy for CSR performance (CSRP). CSRHub is a popular platform that provides sustainability ratings for approximately 53,755 firms across 209 countries around the world. The typical method of generating CSR scores on CSRHub involves collecting data from over 905 sources. CSRHub weights each source based on its estimated credibility and value and then converts the data into a rating on a 0 to 100 scale. The overall CSR performance is divided into twelve subdimensions. These subdimensions roll up into four main dimensions: community, employees, environment, and governance. CSRHub combines all the available data on a firm and generates base ratings for the subdimensions. CSRHub then aggregates these ratings further into the four dimensions mentioned above. The total CSR score is based on the information disclosed in the four dimensions. A higher the overall rating indicates better CSR performance, with a maximum possible score of 100.

3.2.3 Moderators. Two important moderating variables are used in this study. The first is female representation on the board of directors, and the second is the foreign experience of female directors. For female directors' representation, two measures are considered: (1) the proportion of female directors to the total number of directors on the board (Female%) (Yarram and Adapa, 2021; Pucheta-Martínez *et al.*, 2023); (2) an indicator variable coded as 1 for firms with at least one female on the BODs and 0 otherwise (Female_Dum). Similarly, the foreign experience of female directors is measured using two proxies. The first proxy is the proportion of female directors with foreign experience (FemFore%), which is calculated as the number of female directors who have worked abroad or received foreign education, divided by the total number of directors on the board. The second proxy is an indicator variable coded as 1 for firms with at least one female director who has worked abroad or received foreign education, and 0 otherwise (FemFore_Dum).

3.2.4 Control variables. The study applied a set of control variables identified by prior studies as determinants of CODF (e.g. Al-Dhamari *et al.*, 2022b; Bliss and Gul, 2012; Dalwai *et al.*, 2023; Eliwa *et al.*, 2021; Shailer and Wang, 2015; Ye *et al.*, 2023). These variables include a company's financial performance, measured as return on assets (ROA), the company's size (SIZE), company's growth (MTB), loss (LOSS), company's age (AGE), leverage (LEV), interest coverage ratio (IntCov), current ratio (CR), cash flow (CF), financial distress (NEGO), board size (BSIZE), and audit quality (BIG4) (see Appendix for further explanations).

SIZE is assumed to be negatively associated with CODF because larger firms are likely to have more resources for external finance at a lower cost than smaller firms (Eliwa *et al.*, 2021; Hasan *et al.*, 2017). ROA and MTB are also expected to have a negative effect on CODF because more profitable firms and firms with higher growth tend to experience lower default risk (Bliss and Gul, 2012; Shailer and Wang, 2015).

Moreover, firms with higher IntCov ratio are more capable of paying their interest obligations (Eliwa *et al.*, 2021), and those with higher CR are more able to meet short-term obligations (Shailer and Wang, 2015). Therefore, a firm's IntCov and CR are expected to correlate negatively with CODF. Similarly, a negative relationship is expected between AGE and CODF because older firms often establish good credit histories, allowing them to obtain loans at lower interest rates (Diamond, 1989).

A positive association is expected between LEV and CODF because highly leveraged firms are likely to experience higher default risk (Eliwa *et al.*, 2021; Shailer and Wang, 2015). Financially distressed firms and firms that frequently experience losses are assumed to be in a worse financial position. As a result, such firms may often obtain loans with higher interest rates (Al-Dhamari *et al.*, 2022b), leading to a positive effect of NEGO and LOSS on CODF.

Firms with high levels of cash flows are generally in a better financial position to meet their financial obligations, thereby experiencing lower CODF. However, according to the free cash flow theory, managers of firms with excess free cash flows may invest in value-destroying projects (Jensen, 1986). Therefore, lenders may perceive firms with excessive free cash flows as riskier and, consequently, charge them a higher CODF. On this note, CF is assumed to influence CODF.

Besides financial variables, this study also uses other corporate governance variables, such as BSIZE and BIG4. Both variables are expected to have negative effects on CODF because board size indicates an effective corporate governance structure within a firm. Similarly, firms whose financial statements are audited by one of the BIG4 audit firms are perceived as more transparent and, hence, may experience lower CODF.

3.3 Empirical models

To achieve the objectives of the study, three regression models are stated. The first regression model focuses on the association between CSRP and CODF:

$$\begin{aligned} \mathrm{LnRATE}_{it} = {} & \beta_1 \mathrm{CSRP}_{it} + \beta_2 \mathrm{IntCov}_{it} + \beta_3 \mathrm{NEGO}_{it} + \beta_4 \mathrm{AGE}_{it} + \beta_5 \mathrm{FSIZE}_{it} + \beta_6 \mathrm{LEV}_{it} \\ & + \beta_7 \mathrm{LOSS}_{it} + \beta_8\, \mathrm{CR}_{it} + \beta_9 \mathrm{ROA}_{it} + \beta_{10} \mathrm{BSIZE}_{it} + \beta_{11} \mathrm{BIG4}_{it} + \beta_{12} \mathrm{MTB}_{it} \\ & + \beta_{13} \mathrm{CF}_{it} + \text{Industry Dummies} + \text{Year Dummies} + \varepsilon_{it} \end{aligned} \tag{1}$$

The definitions of variables are explained in Appendix. Industry and year dummies are included in order to control for industry and year fixed effects.

In order to test the moderating effect of female directors and female directors' foreign experience, Model 1 is modified as follows:

$$\begin{aligned} \mathrm{LnRATE}_{it} = {} & \beta_1 \mathrm{CSRP}_{it} + \beta_2 \mathrm{Female\%} + \beta_3 \mathrm{CSRP} \times \mathrm{Female\%} + \beta_4 \mathrm{IntCov}_{it} + \beta_5 \mathrm{NEGO}_{it} \\ & + \beta_6 \mathrm{AGE}_{it} + \beta_7 \mathrm{FSIZE}_{it} + \beta_8 \mathrm{LEV}_{it} + \beta_9 \mathrm{LOSS}_{it} + \beta_{10} \mathrm{CR}_{it} + \beta_{11} \mathrm{ROA}_{it} \\ & + \beta_{12} \mathrm{BSIZE}_{it} + \beta_{13} \mathrm{BIG4}_{it} + \beta_{14} \mathrm{MTB}_{it} + \beta_{15} \mathrm{CF}_{it} + \text{Industry Dummies} \\ & + \text{Year Dummies} + \varepsilon_{it} \end{aligned} \tag{2}$$

$$\begin{aligned} \mathrm{LnRATE}_{it} = {} & \beta_1 \mathrm{CSRP}_{it} + \beta_2\, \mathrm{FemFore\%} + \beta_3 \mathrm{CSRP} \times \mathrm{FemFore\%} + \beta_4 \mathrm{IntCov}_{it} \\ & + \beta_5 \mathrm{NEGO}_{it} + \beta_6 \mathrm{AGE}_{it} + \beta_7 \mathrm{FSIZE}_{it} + \beta_8 \mathrm{LEV}_{it} + \beta_9 \mathrm{LOSS}_{it} + \beta_{10} \mathrm{CR}_{it} \\ & + \beta_{11} \mathrm{ROA}_{it} + \beta_{12} \mathrm{BSIZE}_{it} + \beta_{13} \mathrm{BIG4}_{it} + \beta_{14} \mathrm{MTB}_{it} + \beta_{15} \mathrm{CF}_{it} \\ & + \text{Industry Dummies} + \text{Year Dummies} + \varepsilon_{it} \end{aligned} \tag{3}$$

Female% is the proportion of females on a corporate board. FemFore% is the proportion of female directors with foreign working or education experience. The variables of interest are the interaction of Female% and FemFore% with the aggregated CSR performance. That is CSRP × Female% and CSRP × FemFore%.

4. Results

4.1 Descriptive statistics

The descriptive statistics for all variables are reported in Table 2. The table shows that the mean CODF charged to Malaysian listed firms is 5.853% and the median is 4.72%, which indicates that CODF is not normally distributed. These figures are roughly close to those reported by Ye *et al*. (2023) in China and Al-Dhamari *et al*. (2022b) in Malaysia. As for CSRP, the mean and median values are 57.653 and 57, respectively. This shows that CSRP has a normal distribution, as both the mean and median are very close. Although Malaysian firms are

Table 2. Descriptive statistics

Variables	*N*	Mean	St. dev	p25	Median	p75
RATE	845	5.853	9.424	3.57	4.72	5.87
RATE (log)	845	1.412	1.272	1.273	1.552	1.770
CSRP	845	57.653	8.829	52	57	62
Female_Dum	845	0.879	0.326	1	1	1
Female_Num	845	1.737	1.200	1	2	2
Female%	845	0.205	0.129	0.125	0.182	0.286
Femfore%	845	0.157	0.124	0.08	0.14	0.25
BSIZE	845	8.312	2.091	7	8	10
BIG4	845	0.710	0.454	0	1	1
CF	845	0.082	0.124	0.017	0.055	0.113
MTB	845	2.930	7.308	0.53	1.05	2.21
IntCov (log)	845	0.996	0.840	0.501	0.825	1.346
NEGO	845	0.012	0.108	0	0	0
AGE_Num	845	32.115	20.069	17	28	45
AGE (log)	845	1.419	0.294	1.230	1.447	1.653
FSIZE	845	9,417,941	2.00e+07	874,086	2,749,763	8,341,527
FSIZE (log)	845	6.433	0.687	5.942	6.394	6.921
LEV	845	25.202	17.692	10.84	23.97	36.96
ROA	845	4.690	11.005	1.01	3.77	7.86
LOSS	845	0.174	0.379	0	0	0
CR	845	4.892	34.099	1.09	1.58	2.67

Note(s): This table presents the descriptive statistics for the regression variables. All variables are defined in Appendix. This table is prepared by the authors
Source(s): Authors' own creation

required to have at least 30% female directors on their boards, only 21% of BODs are female. Additionally, on average, only 16% of female directors have working or education overseas experience.

The ROA has a positive mean value of 4.690, indicating that on average, Malaysian firms are profitable. This is also supported by the mean value of NEGO, which shows that on average, only 1% of the sampled firms have a negative book value of common equity. The mean value of MTB is 2.930, implying that the average market value of Malaysian firms is 2.930 times higher than their book values. The mean values of FSIZE and AGE are 6.433 and 32.115. The mean value of CF is 0.082, while BSIZE has a mean value of 8.312. The figures of these variables seem realistic because they are roughly close to estimates reported by a relevant study conducted in the same context (e.g. Al-Dhamari *et al.*, 2022b).

4.2 Correlation analysis

Table 3 reports the correlations among all variables included in the regression models. According to the results, CSRP, Female%, and FemFore% are negatively correlated with RATE. A negative correlation is also found for IntCov, AGE, FSIZE, ROA, MTB, and BSIZE. The results are in tandem with prior studies (e.g. Eliwa *et al.*, 2021; Bliss and Gul, 2012; Shailer and Wang, 2015; Diamond, 1989). ROA, BSIZE, BIG4, and CF are positively correlated with CSRP, suggesting that profitable firms, those with higher cash flows, and firm with strong governance are more likely to engage in CSR activities. Socially oriented firms are also likely to demand high-quality auditors to improve the credibility of CSR-related information. Further analysis from Table 3 indicates that none of the coefficient values exceed 0.80 (Green, 2008), implying no multicollinearity issues in this study. However, to confirm the absence of multicollinearity problem, we also calculated the variance inflation factors (VIFs) and show their values in Table 3. Higher VIF values indicate greater correlation among

Table 3. Correlation matrix

Variables	VIF	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
RATE		1.000															
CSRP	1.08	−0.135*	1.000														
Female %	2.69	−0.147*	0.028	1.000													
Femfore %	2.73	−0.136*	0.017	0.785*	1.000												
IntCov	1.93	−0.082*	0.044	−0.059	−0.096*	1.000											
NEGO	1.14	0.053	−0.039	0.005	−0.055	0.006	1.000										
AGE	1.09	−0.077*	−0.122*	0.069*	0.053	0.004	−0.090*	1.000									
FSIZE	1.64	−0.118*	−0.071*	0.199*	0.233*	−0.199*	−0.042	0.008	1.000								
LEV	1.91	−0.082*	−0.024	0.094*	0.125*	−0.526*	0.181	−0.109*	0.380*	1.000							
LOSS	1.81	0.066	−0.061	−0.089*	−0.089*	−0.234*	0.094*	0.016	−0.208*	−0.002	1.000						
CR	1.45	0.031	−0.058	−0.135*	−0.159*	0.388*	−0.058	0.057	−0.208*	−0.475*	−0.038	1.000					
ROA	3.36	−0.090*	0.092*	0.169*	0.163*	0.449*	−0.028	0.039	0.016	−0.154*	−0.586*	0.064	1.000				
BSIZE	1.22	−0.119*	0.093*	0.120*	0.142*	0.005	−0.116*	−0.020	0.356*	0.086*	−0.205*	−0.072*	0.129	1.000			
BIG4	1.22	−0.012	0.104*	0.183*	0.139*	0.019	−0.002	0.127	0.287*	0.111*	−0.051	−0.152*	0.067	0.066	1.000		
MTB	2.38	−0.073*	0.123	0.184*	0.172*	0.319*	−0.085*	−0.036	−0.076*	−0.044	−0.221*	−0.111*	0.657*	0.114*	0.134*	1.000	
CF	1.80	−0.013	0.108*	0.116*	0.130*	0.354*	−0.077*	0.009	−0.129*	−0.191*	−0.247*	0.016	0.578*	0.089*	0.126*	0.586*	1.000

Note(s): This table reports the correlations and VIFs for all variables used in the baseline analysis. All variables are defined in Appendix. * indicates significance at the 5% level or better. This table is prepared by the authors
Source(s): Authors' own creation

variables, and VIF values exceeding the threshold of 10 suggest multicollinearity. As reported in the table, all VIFs are less than 10, suggesting that our regression results are not biased because of the multicollinearity problem [1].

4.3 Regressions analysis

To test the study's hypotheses, the pooled ordinary least squares (POLS) regression technique is employed. Before carrying out the regression analysis, variables such as CR, ROA, MTB, and CF are winsorized at the 5 and 95 percentiles to reduce the effect of extreme outliers. The results, presented in Table 4, comprise three columns corresponding to the three models described in Section 3.3. Column 1 provides the findings of Model 1, which tests the association between CSRP and CODF. Column 2 presents the findings of Model 2, which tests the moderating influence of Female% on the association between CSRP and CODF. Column 3 displays the results of Model 3, which explores the moderating influence of FemFore% on the relationship between CSRP and CODF.

The results in Table 4 indicate that CSRP exhibits a negative coefficient and is statistically significant at the 1% level across all three models. This suggests that firms with higher CSR performance enjoy lower costs of debt financing, a finding that is also economically meaningful. For example, the coefficient in Column (1) suggests that a one-unit increase in the CSRP of firms is associated with a reduction in the cost of debt by 1.42% [2]. The results imply that lenders incorporate information concerning the CSR ratings of borrowing firms into their

Table 4. POLS regression analysis of CSR performance: the interaction of the proportion of female directors and the proportion of female directors with foreign experience on the cost of debt

Variables	LnRATE (1)	LnRATE (2)	LnRATE (3)
CSRP	−0.0142*** (−4.04)	−0.0310*** (−4.74)	−0.0263*** (−4.76)
Female %		−5.4215*** (−3.45)	
CSRP*Female %		0.0807*** (2.92)	
Femfore%			−4.8562*** (−3.11)
CSRP*Femfore%			0.0724*** (2.68)
IntCov	−0.1685** (−2.37)	−0.1880*** (−2.67)	−0.1852*** (−2.60)
NEGO	0.5027** (2.03)	0.5298** (2.00)	0.4749* (1.84)
AGE	−0.2962*** (−3.12)	−0.2685*** (−2.87)	−0.2618*** (−2.79)
FSIZE	−0.1331*** (−2.51)	−0.1172** (−2.29)	−0.1160** (−2.24)
LEV	−0.0070*** (−3.34)	−0.0070*** (−3.33)	−0.0068*** (−3.25)
LOSS	−0.072 (−0.78)	−0.0653 (−0.72)	−0.0682 (−0.75)
CR	0.0064 (0.28)	0.0051 (0.22)	0.0034 (0.15)
ROA	−0.0039 (−0.57)	−0.0011 (−0.16)	−0.0014 (−0.21)
BSIZE	−0.0147 (−1.20)	−0.0074 (−0.61)	−0.0086 (−0.71)
BIG4	0.1382** (2.39)	0.1741*** (3.02)	0.1590*** (2.74)
MTB	−0.0068 (−0.41)	−0.0054 (−0.34)	−0.0096 (−0.59)
CF	0.5245 (1.29)	0.5134 (1.27)	0.5794 (1.43)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Constant	3.8098*** (9.10)	4.6994*** (8.96)	4.4012*** (9.35)
Observations	845	845	845
Adj.R^2	0.10	0.13	0.12
F value	4.02***	4.41***	4.25***

Note(s): This table unveils the POLS regression results of CSR performance, its interaction with the proportion of female directors as well as the proportion of female directors with foreign experience on the cost of debt. All variables are defined in Appendix. *t*-statistics with robust standard errors are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors

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lending decisions when evaluating firms' business and information risk. This may also suggest that lenders perceive socially oriented firms as transparent and are likely to experience low default risk, and, thus, lenders tend to charge these firms a lower cost of debt. The empirical evidence documented in this study is consistent with prior studies (e.g. Bacha *et al.*, 2021; Eliwa *et al.*, 2021; Hamrouni *et al.*, 2020; Kordsachia, 2021; La Rosa *et al.*, 2018), which report that higher CSR ratings are associated with lower debt financing costs.

Having documented the impact of CSRP on the cost of debt across all columns, Column 2 shows the results for the nexus between CSR performance and the cost of debt in the context of female directors. Although Female% is negatively associated with CODF, the interaction term (CSRP × Female%), shows a positive sign and is statistically significant at the 1% level. This finding suggests that the presence of female directors on board mitigates the positive implication of CSR initiatives on the cost of debt financing. This evidence is contrary to the notion that female directors strengthen governance system to enhance legitimacy through CSR practices (Muttakin *et al.*, 2022). The evidence also is not in line with prior studies (Mansour *et al.*, 2024; Usman *et al.*, 2019) showing that firms with more female directors experience lower borrowing costs.

Nevertheless, the results may indicate that creditors view firms with female directors engaging in high CSR activities as potentially misusing corporate resources for personal gains. Thus, creditors might perceive CSR not as an act of stakeholders' engagement or trustworthiness but as a means of personal benefits.

Similarly, females have been reported to be risk-averse and conservative (Bansal, 2024; Man and Wong, 2013). Consequently, they may be reluctant to invest in risky projects with positive net present value, which may endanger the operating performance of firms, leading to higher default risk. Female directors might also perceive CSR as a risky investment, particularly if managers exploit CSR practices to enhance their social status or divert stakeholders' attention from misconduct. Female directors can be less enthusiastic about CSR policies if they perceive spending on CSR-related matters as wasteful rather than a profitable investment. All these arguments are in line with Nisiyama and Nakamura (2018)'s findings that showed that increased board diversity is associated to higher cost of debt.

In Column 3, the regression results show how the association between CSRP and the cost of debt is impacted by female directors' foreign experience. According to the results presented in Column 3, FemFore%, which represents the proportion of female directors with foreign working or education experience, is found to be negatively associated with the cost of debt at the 1% level of significance. This finding suggests that female directors with foreign experience signal improved governance and monitoring to the debt market, reducing default and systematic risk (Khan *et al.*, 2023). Female directors with foreign experience increase the scope of non-financial disclosure, which means that the international orientation of supervisory boards and other characteristics enable firms to move towards sustainable development (Dobija *et al.*, 2023).

However, our variable of interest (CSRP × FemFore%) shows that the interacting effect of the proportion of female directors with foreign experience and CSR performance exhibits a positive sign and is statistically significant at the 1% level. This could imply that the expected benefits of CSR practices to reduce the cost of debt are attenuated by the presence of female directors with overseas experience on the board. Although this may imply that CSR and female directors with foreign experience perform the same role and substitute for each other in improving transparency, creating competitive advantages, and enhancing financial stability, it contradicts the notion that female directors with foreign experience can become an important antecedent of the extent of firms' financial success and their successful implementation of social and environmental strategies. Hence, firms that employ CSR as a governance mechanism to signal to lenders and other creditors about their financial position and the credibility of their annual reports are less inclined to include more females with overseas experience in boardrooms [3].

Other variables, such as FSIZE, IntCov, and AGE are negatively associated with LnRATE, indicating that larger, older firms and those with higher interest coverage ratios tend to have lower debt costs. Conversely, NEGO is positively associated with LnRATE, implying that financially distressed firms face higher cost of debt. Unexpectedly, high-leverage firms have lower cost of debt financing, while firms audited by BIG4 auditors incur higher debt costs.

5. Complementary tests

5.1 Alternative measure of female directors and female directors with foreign experience

Based on the analysis presented in Table 4, the measurements used for board gender diversity are the proportion of female directors (Female%) and the proportion of those with foreign experience (FemFore%). However, to examine whether the results presented earlier are sensitive to different measurements of Female% and FemFore%, this study provides alternative proxies in the form of binary numbers (0 and 1), namely Female_Dum and FemFore_Dum. Thereafter, models 1 to 3 are rerun with these new proxies. The results of these models are presented in Table 5. The findings in Table 5, particularly Columns 2 and 3, show that the interacting variables (CSRP × Female_Dum and CSRP × FemFore_Dum) remain qualitatively similar to earlier results presented in Table 4. This suggests that the economic benefits of CSR performance to reduce the cost of debt are attenuated for firms with female directors and firms monitored by female directors with foreign experience. These findings validate the use of Female% and FemFore% in the main analysis.

5.2 Using random effect regression as another model specification

In Table 4, the POLS was used to test the hypotheses; however, this regression technique may result in heterogeneity bias because it assumes that differences among firms may have an influence on the dependent variable and/or predictor (Green, 2008). To address this, the study

Table 5. Alternative measures of female directors and female directors with foreign experience

Variables	LNRATE (1)	LNRATE (2)	LNRATE (3)
CSRP	−0.0142*** (−4.04)	−0.0318*** (−3.27)	−0.0253*** (−3.93)
Female_Dum		−1.097* (−1.90)	
CSRP*Female_Dum		0.0195** (1.93)	
Femfor_Dum			−0.7055* (−1.68)
CSRP*Femfor_Dum			0.0138* (1.91)
IntCov	−0.1685** (−2.37)	−0.1685** (−2.37)	−0.1635** (−2.30)
NEGO	0.5027** (2.03)	0.4921** (1.97)	0.5005** (2.06)
AGE	−0.2962*** (−3.12)	−0.3084*** (−3.25)	−0.3077*** (−3.26)
FSIZE	−0.1331*** (−2.51)	−0.1337*** (−2.53)	−0.1429*** (−2.76)
LEV	−0.0070*** (−3.34)	−0.0068*** (−3.27)	−0.0067*** (−3.24)
LOSS	−0.072 (−0.78)	−0.0734 (−0.79)	−0.0661 (−0.71)
CR	0.0064 (0.28)	0.0068 (0.30)	0.0081 (0.35)
ROA	−0.0039 (−0.57)	−0.0034 (−0.50)	−0.0081 (0.35)
BSIZE	−0.0147 (−1.20)	−0.0143 (−1.14)	−0.0158 (−1.27)
BIG4	0.1382** (2.39)	0.1513*** (2.63)	0.1470*** (2.56)
MTB	−0.0068 (−0.41)	−0.0077 (−0.46)	−0.0088 (−0.53)
CF	0.5245 (1.29)	0.4961 (1.21)	0.4861 (1.19)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Constant	3.8098*** (9.10)	4.8004*** (7.25)	4.4549*** (8.70)
Observations	845	845	845
Adj.R^2	0.10	0.10	0.11
F value	4.02***	3.83***	4.13***

Note(s): This table unveils the POLS regression results of CSR performance, its interaction with the presence of female directors as well as the presence of female directors with foreign experience on the cost of debt. All variables are defined in Appendix. *t*-statistics with robust standard errors are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors

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uses the panel regression technique with the aid of fixed and random effects models as robust regression techniques. The Hausman test was applied to determine whether the random effects model is appropriate, and the results confirmed its suitability [4]. The results from the random model are tabulated in Table 6. The results indicate that firms with higher CSR performance are charged a lower cost of debt. Similarly, the negative association between CSR performance and the cost of debt is positively moderated by female representation on the board and female directors' foreign experience.

5.3 Endogeneity issues

In line with prior empirical literature (e.g. Eliwa *et al.*, 2021; Hamrouni *et al.*, 2020; Kordsachia, 2021; Shailer and Wang, 2015) on CSR and cost of debt, self-selection bias and omitted variables might weaken the inference documented in the regression analysis carried out with the aid of POLS or random effect models. This is because debt financing decisions may only be made by firms that prefer debt as a means to finance their investment projects.

To control for potential self-selection bias, the Heckman two-stage estimation model was employed. In the first stage, the study predicts the likelihood that a company may use debt financing; thus, a probit model in which an indicator variable, CSR_Dum, is considered the dependent variable was regressed with the inclusion of all control variables used in the main analyses as well as industry average CSRP as predictors [5]. The Inverse Mill's Ratio (IMR) was obtained from the first stage and included as an additional predictor in the second stage.

In addition to the Heckman two-stage estimation model, the propensity score matching (PSM) technique was employed to alleviate the probability of omitted variables, which can be

Table 6. Random effect regression of CSR performance, its interaction with proportion of female directors, and proportion of female directors with foreign experience on cost of debt

Variables	LnRATE (1)	LnRATE (2)	LnRATE (3)
CSRP	−0.0150*** (−4.49)	−0.0310*** (−5.15)	−0.0256*** (−4.96)
Female %		−5.0480*** (−3.58)	
CSRP*Female %		0.0784*** (3.21)	
Femfore%			−4.2756*** (−3.03)
CSRP*Femfore%			0.0657*** (2.73)
IntCov	−0.2466*** (−5.02)	−0.2613*** (−5.36)	−0.257*** (−5.26)
NEGO	0.5105* (1.90)	0.5044* (1.89)	0.4922* (1.84)
AGE	−0.2393* (−1.80)	−0.2252* (−1.72)	−0.2175 (−1.65)
FSIZE	−0.1188* (−1.77)	−0.1038 (−1.56)	−0.1039 (−1.54)
LEV	−0.0106*** (−4.18)	−0.0102*** (−4.08)	−0.0101*** (−4.01)
LOSS	−0.1483* (−1.73)	−0.1351 (−1.59)	−0.1402 (−1.64)
CR	0.0030 (0.13)	0.0056 (−1.59)	0.0042 (0.18)
ROA	−0.0050 (−0.77)	−0.0028 (−0.42)	−0.0033 (−0.51)
BSIZE	−0.0094 (−0.55)	−0.0039 (−0.23)	−0.0051 (−0.30)
BIG4	0.0730 (0.87)	0.1035 (1.24)	0.0949 (1.13)
MTB	0.0081 (0.37)	0.0079 (0.37)	0.0061 (0.28)
CF	0.6090 (1.47)	0.5735 (1.39)	0.6470 (1.57)
Year dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Constant	3.8265*** (7.63)	4.6569*** (8.15)	4.3308*** (7.94)
Observations	845	845	845
Overall R^2	0.09	0.12	0.11
Wald χ^2	79.48***	96.64***	91.01

Note(s): This table unveils the random effect regression results of CSR performance, its interaction with the proportion of female directors as well as the proportion of female directors with foreign experience on the cost of debt. All variables are defined in Appendix. *Z* values are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors
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correlated with both the dependent variable and predictors. The logistic regression was conducted using the same variables as in the first stage of the Heckman technique to generate samples comprising firms with higher CSR performance (the treatment sample) and firms with lower CSR performance (the control sample). Subsequently, the nearest neighbourhood technique without replacement and using a calliper of 0.01 was applied to match every observation of the treatment sample with that of the control sample [6]. After this matching procedure, any difference in our dependent variable (i.e. LnRATE) will be attributed to differences in our variables of interest (CSRP, Female%, and FemFore%) rather than being due to other explanatory variables. The results of the second stage using the two techniques (Heckman two-stage and PSM) are reported in Table 7.

Based on the results, financial institutions charge a lower cost of debt to borrowing firms with higher CSR performance. Additional results showed that the negative association between CSR and the cost of debt is positively moderated by female directors and the foreign experience of female directors. These findings suggest that endogeneity concerns do not confound the results of this study [7].

5.4 Quantile regression as an alternative model specification

In an attempt to capture the association between CSR and the cost of debt without ignoring the values above the confidence interval, this study applied the quantile regression (QR) technique. The use of the QR technique enables the study to understand the full distribution of the dependent variable (CODF), which otherwise could not have been observed under the POLS or the random effects regression technique, as these solely focus on mean values of the cost of debt. This approach captures the lower (0.25), median (0.50), and upper quantiles (0.75) of CODF, which are often ignored by conditional mean regression technique that focuses on central tendencies (Bruna *et al.*, 2021; Oware and Mallikarjunappa, 2021; Minh *et al.*, 2022).

The results of this regression technique are presented in Table 8. Based on the results, CSR performance remains negatively and significantly associated with the cost of debt financing across quantiles, except at the upper quantile level (0.75). Other results remain qualitatively similar.

5.5 Heterogeneity tests

Having documented that CSR enables firms to have better access to finance and improve their creditworthiness, one may argue that the effect of CSR on the cost of debt may vary between financial and non-financial constrained firms. This is because financial constraints may make it difficult for firms to access the financial markets (Attig *et al.*, 2013; Fandella *et al.*, 2023) and prevent firms from investing more in CSR activities (Chan *et al.*, 2017). To test this empirically, this study creates sub-sample of financially constrained and unconstrained firms. To identify financially constrained firms, the study applied two measures suggested by Hadlock and Pierce (2010) and Kaplan and Zingales (1997).

These measures are the SA index and interest coverage ratio (see Appendix for definitions). The median values of each of the two proxies of financial constraints help to divide the sample firms into unconstrained and constrained sub-samples. Firms that fall above the median SA index value are considered financially constrained (FC), and vice versa. For the second proxy, firms are assigned to be financially constrained if their interest coverage ratio value falls below the median value, and vice versa. Based on the classification, Model 1 was re-estimated. The results of this estimation are presented in Table 9, Columns 1–4. The results show that the estimated coefficients of CSRP for both unconstrained and constrained are negative and statistically significant at the 1% level, implying that firms with higher CSR performance benefit from a lower cost of debt financing. Importantly, the results of the *F*-test for the differences in coefficients for SA index and interest coverage ratio between unconstrained and constrained sub-samples suggest that the effect is stronger for financially unconstrained firms.

Since the effect of CSR on the cost of debt varies between financial and non-financially constrained firms, the study proceeds further to find out whether the results presented in

Table 7. Endogeneity tests: Heckman two-stage selection model and propensity score matching (PSM) technique

Variables	Heckman two-stage LnRATE (1)	LnRATE (2)	LnRATE (3)	PSM LnRATE (4)	LnRATE (5)	LnRATE (6)
CSRP	−0.0143*** (−4.09)	−0.0309*** (−4.74)	−0.0263*** (−4.80)	−0.0141*** (−3.93)	−0.0290*** (−4.40)	−0.0250*** (−4.51)
Female %		−5.3854*** (−3.43)			−4.5709*** (−2.75)	
CSRP*Female %		0.0802*** (2.91)			0.0685** (2.37)	
Femfore%			−4.8611*** (−3.13)			−4.2458*** (−2.63)
CSRP*Femfore%			0.0727*** (2.70)			0.0627** (2.26)
IntCov	−0.2035*** (−2.47)	−0.2138*** (−2.63)	−0.2171*** (−2.66)	−0.1962*** (−2.65)	−0.2057*** (−2.79)	−0.2038*** (−2.73)
NEGO	0.3270 (1.15)	0.3992 (1.32)	0.3141 (1.06)	0.1924 (0.71)	0.2438 (0.88)	0.1612 (0.58)
AGE	−0.5452** (−2.31)	−0.4535** (−1.95)	−0.4902** (−2.09)	−0.3594*** (−3.59)	−0.3093*** (−3.14	−0.3135*** (−3.18)
FSIZE	−0.4147 (−1.63)	−0.3263 (−1.28)	−0.3743 (−1.47)	−0.0914 (−1.59)	−0.0876 (−1.53)	−0.0809 (−1.41)
LEV	−0.0047* (−1.68)	−0.0052* (−1.87)	−0.0046* (−1.67)	−0.0067*** (−3.19)	−0.0065*** (−3.16)	−0.0063*** (−3.04)
LOSS	−0.0474 (−0.51)	−0.0472 (−0.52)	−0.0460 (−0.50)	−0.0603 (−0.63)	−0.0548 (−0.59)	−0.0499 (−0.54)
CR	−0.0287 (−0.76)	−0.0210 (−0.56)	−0.0288 (−0.77)	0.0020 (0.08)	0.0030 (0.12)	−0.0006 (−0.02)
ROA	0.0154 (0.89)	0.0132 (0.77)	0.0163 (0.94)	0.0052 (0.74)	0.0057 (0.87)	0.0068 (1.03)
BSIZE	0.0297 (0.74)	0.0255 (0.63)	0.0321 (0.80)	−0.0178 (−1.44)	−0.0093 (−0.75)	−0.0106 (−0.87)
BIG4	0.5192 (1.54)	0.4565 (1.36)	0.5081 (1.51)	0.1876*** (2.99)	0.2135*** (3.40)	0.1987*** (3.18)
MTB	−0.0227 (−1.20)	−0.0173 (−0.93)	−0.0243 (−1.30)	−0.0184 (−1.05)	−0.0116 (−0.69)	−0.0189 (−1.11)
CF	0.2605 (0.56)	0.3175 (0.68)	0.3369 (0.72)	0.5322 (1.25)	0.4703 (1.11)	0.5561 (1.32)
IMR	0.8956 (1.15)	0.6648 (0.86)	0.8209 (1.05)			
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.6910*** (5.25)	5.4379*** (5.67)	5.2121*** (5.67)	3.6230*** (8.10)	4.4090*** (7.86)	4.1518*** (8.17)
Observations	845	845	845	817	817	817
Adj.R^2	0.10	0.13	0.12	0.12	0.13	0.14
F value	3.88***	4.27***	4.12***	3.75***	3.68***	3.73***

Note(s): This table unveils Two-stage Heckman (1979) and PSM regression results of CSR performance, its interaction with the proportion of female directors as well as the proportion of female directors with foreign experience on the cost of debt. All variables are defined in Appendix. *t*-statistics with robust standard errors are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors
Source(s): Authors' own creation

Table 8. Quantile regression of CSR performance, the interaction of proportion of female directors, and proportion of female directors with foreign experience on cost of debt

Variables	25% LnRATE (1)	LnRATE (2)	LnRATE (3)	50% LnRATE (4)	LnRATE (5)	LnRATE (6)	75% LnRATE (7)	LnRATE (8)	LnRATE (9)
CSRP	−0.0164*** (−3.26)	−0.0280*** (−2.74)	−0.0270*** (−3.79)	−0.0054*** (−2.46)	−0.0158*** (−3.72)	−0.0104*** (−3.30)	−0.0013 (−0.60)	−0.0085** (−2.27)	−0.0052 (−1.60)
Female %		−5.2246** (−2.05)			−3.7456*** (−3.72)			−1.9433** (−2.32)	
CSRP*Female %		0.0614 (1.40)			0.0580*** (3.30)			0.0369*** (2.54)	
Femfore%			−4.6301** (−2.25)			−2.2751*** (−2.58)			−1.5886* (−1.92)
CSRP*Femfore %			0.0512 (1.46)			0.0347** (2.30)			0.0298** (2.10)
IntCov	−0.2931*** (−5.15)	−0.2969*** (−5.23)	−0.2784*** (−5.50)	−0.1385*** (−4.53)	−0.1695*** (−5.46)	−0.1575*** (−5.65)	−0.0508 (−1.33)	−0.0456 (−1.39)	−0.0466 (−1.40)
NEGO	0.3930 (1.24)	0.0722 (0.23)	0.1666 (0.62)	0.2894* (1.66)	0.6079*** (3.43)	0.3281** (2.08)	0.2296 (1.22)	0.2303 (1.42)	0.2358 (1.39)
AGE	−0.2581* (−1.91)	−0.2988** (−2.22)	−0.3090*** (−2.75)	−0.1321** (−2,01)	−0.1608** (−2.41)	−0.1677*** (−2.82)	−0.2113*** (−2.92)	−0.2094*** (−3.37)	−0.2177*** (−3.40)
FSIZE	−0.1587** (−2.26)	−0.1288* (−1.92)	−0.1088* (−1.86)	−0.1218*** (−3.58)	−0.1133*** (−3.24)	−0.1176*** (−3.77)	−0.0623* (−1.72)	−0.0847*** (−2.74)	−0.0791*** (−2.47)
LEV	−0.0013 (−0.50)	−0.0040 (−1.58)	−0.0039* (−1.79)	−0.0027* (−1.86)	−0.0036** (−2.43)	−0.0027** (−2.02)	−0.0031* (−1.70)	−0.0025 (−1.62)	−0.0029* (−1.83)
LOSS	−0.2621** (−1.98)	−0.1876 (−1.47)	−0.2574** (−2.29)	−0.0163 (−0.25)	−0.0517 (−0.77)	−0.0266 (−0.45)	0.0293 (0.41)	0.0318 (0.52)	0.0216 (0.34)
CR	0.0357 (1.31)	0.0133 (0.48)	0.0335 (1.43)	0.0114 (0.82)	−0.0022 (−0.16)	0.0009 (0.07)	0.0033 (0.22)	0.0033 (0.26)	0.0003 (0.02)
ROA	−0.0115 (−1.27)	−0.0082 (−0.89)	−0.0180*** (−2.52)	−0.0024 (−0.51)	−0.0018 (−0.37)	−0.0016 (−0.38)	0.0002 (0.04)	0.0045 (1.03)	0.0029 (0.62)
BSIZE	−0.0005 (−0.03)	0.0029 (0.16)	0.0069 (0.43)	−0.0021 (−0.22)	−0.0013 (−0.13)	−0.0026 (−0.29)	−0.0197* (−1.76)	−0.0177* (−1.82)	−0.0192* (−1.91)

(*continued*)

Table 8. Continued

Variables	25% LnRATE (1)	LnRATE (2)	LnRATE (3)	50% LnRATE (4)	LnRATE (5)	LnRATE (6)	75% LnRATE (7)	LnRATE (8)	LnRATE (9)
BIG4	0.2461*** (2.73)	0.2730*** (3.04)	0.3141*** (4.10)	0.1343*** (2.98)	0.1569*** (3.40)	0.1307*** (3.21)	0.0633 (1.35)	0.0838** (2.09)	0.0787* (1.88)
MTB	−0.0014 (−0.06)	0.0153 (0.64)	0.0073 (0.37)	−0.0055 (−0.43)	0.0048 (0.36)	0.0006 (0.05)	−0.0186 (−1.40)	−0.0255** (−2.23)	−0.02299** (−1.93)
CF	0.2284 (0.38)	0.1499 (0.26)	0.6174 (1.25)	0.5313* (1.87)	0.3953 (1.36)	0.3865 (1.51)	0.7820*** (2.60)	0.4966** (1.94)	0.5253** (1.95)
Constant	3.5701*** (6.02)	4.4223*** (5.88)	4.0326*** (6.96)	2.8563*** (10.35)	3.5496*** (10.26)	3.2396*** (11.49)	2.7513*** (8.97)	3.2297*** (10.35)	3.0742*** (10.30)
Observations	845	845	845	845	845	845	845	845	845
Pseudo R^2	0.083	0.116	0.109	0.032	0.040	0.034	0.034	0.036	0.035

Note(s): This table unveils the quantile regression results of CSR performance, its interaction with the proportion of female directors as well as the proportion of female directors with foreign experience on the cost of debt at 25, 50, and 75% percentile, respectively. All variables are defined in Appendix. *t*-statistics with robust standard errors are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors
Source(s): Authors' own creation

Table 9. Heterogeneity tests: estimates for financial constraints and firms with different CSR rating

Variables	LnRATE (1)	LnRATE (2)	LnRATE (3)	LnRATE (4)	LnRATE (5)	LnRATE (6)	LnRATE (7)	LnRATE (8)
	SA-index		Interest coverage ratio					
	Unconstrained	Constrained	Unconstrained	Constrained	High- performed CSR firms		Low- performed CSR firms	
CSRP	−0.0177***	−0.0147***	−0.0195***	−0.0113***	−0.0340***	−0.0340***	−0.0072	−0.0092
	(−3.68)	(−3.16)	(−3.64)	(−3.21)	(−5.65)	(−5.67)	(−0.86)	(−1.09)
Female %					−0.0646		−1.2668***	
					(−0.20)		(−4.50)	
Femfore%						−0.2036		−1.0883***
						(−0.67)		(−3.40)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.1884***	3.9696***	4.0861***	3.6843***	4.7122***	4.7061***	3.6962***	3.7107***
	(5.27)	(4.80)	(5.47)	(8.55)	(7.28)	(7.28)	(6.08)	(6.04)
Observations	423	422	423	422	407	407	438	438
Adj.R^2	0.15	0.10	0.18	0.12	0.12	0.12	0.15	0.14
F value	3.26***	2.06***	4.17***	2.67***	3.44***	3.46***	4.46***	4.01***
χ^2 test of difference in coefficients	3.96**		10.52***					

Note(s): This table unveils the POLS regression results of CSR performance on the cost of debt based on financial constraint. The table also shows the results of CSR performance, the proportion of female directors as well as the proportion of female directors with foreign experience on the cost of debt for different levels of CSR ratings. All variables are defined in Appendix. *t*-statistics with robust standard errors are shown in brackets below the coefficients. *, ** and *** indicate significance at the 10, 5 and 1%, respectively. This table is prepared by the authors
Source(s): Authors' own creation

Table 4, which reveal that Female% and FemFore% alleviate CODF but turn positive when interacted with CSRP, could signal that Female% and FemFore% can play a substitute or complementary role in place of CSRP when it comes to debt pricing. To establish this assumption, we classify sample firms into high- and low-performing CSR firms based on the median value of CSRP and re-estimate Equ. 2 and 3 without interaction variables. We thank the anonymous reviewers for their suggestion. The results from the reclassification are displayed in Columns 5–8 of Table 9. According to the results, CSRP exhibits a negative association, but it is only statistically significant for firms with higher CSR performance. Additionally, while Female% and FemFore% are negatively associated with the cost of debt, their significance is confined to companies with lower CSR performance. This suggests that female directors and their foreign experience may substitute CSR in reducing the cost of debt. These findings align with preceding literature suggesting that sustainability performance/disclosure and corporate governance mechanisms may substitute each other in explaining the cost of debt financing (Arora and Dharwadkar, 2011; Huang *et al.*, 2017; Li *et al.*, 2024; Samuel *et al.*, 2022).

6. Conclusion

The cost of debt is a paramount issue in developing countries where the stock markets are not efficient, and thus most firms heavily depend on debt as a channel of external financing. Although the implications of CSR/ESG performance on the cost of debt capital have been extensively tested by numerous studies, very little is known empirically on the role of board gender diversity can play in shaping the impact of CSR performance on lending decisions. Therefore, the objectives of this study are threefold. *First*, drawing insights from social theories (stakeholder and corporate reputational theories), this study investigates whether lenders reward socially oriented firms by lowering their cost of debt financing. *Second*, it tests whether the potential impact of CSR performance on debt pricing is attenuated or amplified by the females' representation on the board. *Third*, in addition to their presence *per se*, this study also explores the moderating role of female directors' attributes (in this study, the foreign experience of female directors) in the association between CSR performance and CODF.

Using a sample of listed firms from the Malaysian capital market, the results suggest that firms with higher CSR performance are charged lower costs of debt. Further analyses show that the positive implication of CSR on CODF is substantial for less financially constrained firms and firms with higher CSR performance. Additional analyses also reveal that it is only in lower-performing CSR firms that Female% and FemFore% mitigate the cost of debt, highlighting the substitutive role female directors and their foreign experience can play in the CSR performance-CODF association. The implications of the results are that managers who implement CSR policies should be aware of the benefits of CSR in reducing CODF. Managers should incorporate CSR policies into their business strategies, recognising that increased spending on CSR practices can contribute to improving firms' reputations through lower risk exposure and better financial conditions. An enhanced corporate reputation reduces the cost of debt capital, resulting in lower CODF for firms with high CSR performance. As such, understanding the association between CSR and CODF can assist managers in making informed decisions concerning resource allocation, prioritising spending on CSR activities that prove to significantly mitigate their firms' risk profiles.

Given that CSR is expected to reduce capital constraints due to transparency regarding CSR performance, creditors should incorporate information on CSR ratings when determining bank loan prices or risk premiums on other debt instruments. Investors can also make informed investment decisions when formulating their portfolios based on CSR performance because this enables firms to send a transparent and visible signal of their non-financial performance to the capital markets. The findings suggest that CSR performance can improve firms' ability to access finance by alleviating business risk. Therefore, policymakers can induce firms to adopt CSR practices and adequately disclose CSR-related information in their financial reporting.

The testing of our proposition on board gender diversity revealed that though female directors and their international exposure substantially mitigate CODF, their impact becomes positive when the two variables interact with CSR performance, suggesting that the cost of debt increases for CSR firms with a higher proportion of female directors and those with female directors possessing foreign exposure. The implication of these results is that both CSR, female directors, and their characteristics (i.e. female directors' international exposure) are substitutes rather than complements. Thus, firms with a high proportion of female directors and those with foreign experience, coupled with high CSR performance, may be viewed by creditors as a costly diversion of corporate resources from alternative investment opportunities, leading to both direct and agency costs. As a result, creditors like banks may raise their risk premium on firms. Overall, the results highlight the importance of considering the interacting effect of other corporate governance variables to have a clear understanding of the role of CSRP on CODF. These findings also question the role of corporate governance and business ethics in shaping corporate financing policy.

Notes

1. We find the correlation between MTB and ROA has the highest coefficient, that is 0.657. The coefficient is lower than 0.80 which was suggested by Green (2008). We also find that the mean VIF related to the variables is 1.83. In addition, we centred all interaction terms to alleviate the potential multicollinearity concern caused by interacting with two variables.
2. Our dependent variable is log transformed. We first exponentiate the coefficient of our main independent variable CSRP (exp −0.0142) which becomes 1.0142. We then use the formula [(1.0142–1)*100%] = 1.42%.
3. A typical illustration is when the sample is partitioned into firms with a higher proportion of female directors (Female%) and firms with a lower proportion based on the sample median of Female%. Based on this partitioning, model 2 was re-estimated. The untabulated results show that CSR performance reduces the cost of debt only for subgroups with a low proportion of female directors. Similar results were obtained when the sample was portioned based on the median of female directors with foreign experience. Collectively, these results support the argument that CSR, proportion of female directors, and foreign experience of female directors can serve as a governance mechanism substitute in mitigating the cost of debt financing.
4. The Hausman test does not reject the null hypothesis, which indicates that the individual effects are not correlated with the regressors (β = 18.43, *P*-value = 0.559). Random effects assume that the differences across entities are correlated to outcome variables but not predictors.
5. CSR_Dum is coded 1, when the aggregated score of CSR performance is higher than the study median value, and 0 otherwise.
6. The *t*-test results reveal no significant differences between the high and low CSR performance sub-samples for most explanatory variables included in step 1. This shows that our treatment and control groups, to some extent, are identical. Therefore, it is crucial to include these control variables in the regression model (second step of PSM) using the matched sample generated by the PSM method as covariates to minimise bias and unobserved factors.
7. We have also tested the likelihood both Female% and FemFore% being endogenous variables using the Heckman two-stage least square method. However, we don't report the results to save a space. The untabulated findings reveal similar results to those in baseline analysis both in sign and significance level. The results can be provided by the authors upon request.

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Appendix

Table A1. Variables definitions

Variable	Definition
LnRATE	Natural log of a firm's interest expense divided by its average short-term and long-term debt
CSRP	Aggregated CSR performance score as taken from CSRHub
Female %	Number of female directors to total number of directors on the board
FemFore %	Number of female directors with foreign exposure (working or education experience) to total number of directors on the board
Female_Dum	An indicator variable coded 1 for firms with at least one female on the board of directors and 0 otherwise
FemFore_Dum	An indicator variable coded 1 for firms monitored by at least one female director with foreign working or education experience and 0 otherwise
BSIZE	Total number of board of directors' members
BIG4	An indicator variable coded 1 for firms audited by one of Big4 auditors and 0 otherwise
FSIZE	Natural log of the book value of total assets
LEV	Total debts of a firm divided by its total assets
LOSS	An indicator variable coded 1 for firms with negative net income at the end of the fiscal year and 0 otherwise
NEGO	An indicator variable coded as 1 if a firm's book value of common equity is negative and 0 otherwise
CR	Current assets divided by current liabilities
IntCov	Natural log of income before interest and tax divided by interest expense
ROA	Net income before extraordinary items divided by average total assets
CF	Cash flow from operations divided by total assets
MTB	A firm's market value to the book value of its assets
AGE	Natural log of number of years since the firm was listed in Bursa Malaysia
SA index	$SA = -0.737*Size + 0.043*Size^2 - 0.040*Age$ Where Size is firm size and Age is firm age

Source(s): Authors' own creation

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