Corporate Environmental Responsibility and Cost of Equity Capital – A Meta-Analytical Review

Authors: Robert Witte[1], Ewald Aschauer[2], Helmut Pernsteiner[1]

1 Department of Corporate Finance, Johannes Kepler University Linz, Austria | 2 Department of Financial Accounting and Auditing, Vienna University of Economics and Business, Austria

Abstract: This study explores the impact of corporate environmental responsibility (CER) on the cost of equity capital (COEC), within in the context of a significant increase in green equity investments worldwide and an ongoing debate among academics and practitioners regarding a potential equity "greenium". By conducting a meta-analytical review of 1,139 effect sizes from 75 unique studies with both a meta-analysis and a meta-regression analysis, this study aims to systematically integrate and synthesize the findings from the existing empirical literature. The results reveal a statistically significant yet economically weak negative relationship between CER and COEC, indicating that investors recognize – to a limited extent – improvements in environmental practices and disclosure and that this reduces a firm's cost of capital. This association is robust across a variety of robustness tests, including methodological, statistical, and bibliometric aspects. The study also examines the moderating impact of economic, regulatory, and societal pressure points on the CER-COEC link, effectively testing efficacy of these contextual factors. The results reveal that economic conditions as well as the regulatory framework have substantial effects on the importance of corporate sustainability for investors and significantly moderate the CER-COEC link. However, the results on the moderating effect of the socio-cultural background are inconclusive. These findings offer valuable insights for researchers, investors, and policymakers alike.

Keywords: Corporate environmental responsibility, corporate environmental performance, corporate environmental disclosure, cost of equity capital, meta-analysis, meta-regression analysis

Table of content:

1. Introduction

Over the last decade, the global financial markets have witnessed a significant rise in assets under management of sustainable funds, reaching USD 3.4 trillion by the end of 2023 (Morgan Stanley, 2024). This underscores the growing importance of sustainable investing and the increasing integration of sustainability criteria into investment decisions by investors worldwide (FTSE Russell, 2022). Among the key motivations driving this trend is the anticipated outperformance of green assets (PWC, 2022). In light of this development, a burgeoning academic literature has emerged, exploring return differentials between green and brown assets, commonly referred to as “greenium” (e.g., Pastor et al., 2022). While a rich body of empirical studies has already examined the equity greenium, the findings remain inconclusive, with mixed evidence regarding its existence, magnitude, and direction (Eskildsen et al., 2024). However, one emerging perspective from the literature is that external factors – including economic (e.g., Bauer et al., 2022; Bolton and Kacperczyk, 2023; Zhang, 2023), regulatory (e.g., Alessi et al., 2021; Alessi et al., 2023; Giese et al., 2021; Hsu et al., 2023; Engle et al., 2020; Barnett, 2024), and societal (e.g., Bassen et al., 2023; Pastor et al., 2022) – significantly influence these return differentials. In this context, a critical determinant of the equity greenium is the cost of equity capital, which represents the required rate of return for investors. As a benchmark for expected or realized stock performance, it profoundly impacts green stocks' investment appeal, pricing, and returns (Giese et al., 2019), with implications not only for shareholders but thought its capital allocation effect for society at large.

Against this background, this paper examines the relationship between a firm’s “greenness,” or corporate environmental responsibility (CER), and its cost of equity capital (COEC). Additionally, it investigates how external factors – specifically economic, regulatory, and societal conditions – moderate this relationship.

Given the already extensive body of research on the CER-COEC relationship, this study employs meta-analytical tools to quantitatively review the literature. These tools represent rigorous statistical techniques designed to systematically integrate and synthesize empirical results from diverse studies addressing similar research questions (Borenstein et al., 2009; Rosenthal, 1991; Wolf, 1986). This study is based on a sample of 1,139 effect sizes derived from 75 unique empirical studies. Notably, these primary studies span different time periods and countries, encompassing diverse economic, regulatory, and socio-cultural contexts; this variability in the underlying sample enables a range of analyses – some of which have not yet been conducted in the original studies themselves. Based on this, the study employs a meta-analysis to (i) evaluate the overall relationship between CER and COEC; (ii) assess the influence of external moderating factors including economic, regulatory, and societal environment; and (iii) examine the presence of publication biases, subsequently implementing statistical methods to quantify and adjust for any respective distortions. Moreover, this study utilizes a meta-regression analysis to further examine the link between CER and COEC partial to the identified moderating factors and tests the joint effects of these moderators when they operate simultaneously. This approach facilitates a comprehensive understanding of the interdependencies and interactions among these moderators, thereby enriching insight into the complex dynamics of the CER-COEC relationship. Through this two-fold approach, the study strives to enhance the reliability and generalizability of previous findings and illuminate the impact of external factors, thereby providing a more definitive answer regarding the impact of CER on COEC.

The main results are as follows. First, a statistically significant but economically weak correlation between CER and COEC is confirmed. This suggests that improvements in CER may lead to reductions in COEC, indicating that investors do indeed consider corporate sustainability in their investment decisions, albeit to a limited extent. The robustness of this association was confirmed through a variety of tests encompassing methodological, statistical, and bibliometric aspects. Second, several external factors moderate the CER-COEC association. The regulatory framework significantly influences the degree to which investors prioritize corporate sustainability. Stricter environmental regulations, such as mandatory disclosure requirements, carbon emission taxes, and trading schemes, heighten investor attention to corporate sustainability. Nonetheless, the impact of CER on COEC remains economically weak, regardless of the regulatory context. Similarly, economic conditions critically moderate the relevance of corporate

sustainability for investors. During periods of economic uncertainty, such as a financial crisis 2008/09, investors put less emphasis on corporate sustainability and presumably prioritize tangible financial metrics. Conversely, investors in developing countries place greater importance on corporate sustainability than those in developed nations. Despite these variations, the effect of CER on COEC consistently appears to be small by conventional standards, independent of the economic conditions. In addition, socio-cultural factors may also have a potential moderating influence on the importance of corporate sustainability for investors, yet this remains inconclusive. The analysis did not consistently reveal significant differences in the impact of CER on COEC between cultures with long-term versus short-term orientations, suggesting that societal pressures do not substantially alter investors' investment strategies. Third, existing literature is marked by a small yet statistically significant publication bias. However, the bias does not distort the overall association between CER and COEC as additional tests show that there is, in fact, a genuine effect of CER on COEC beyond publication bias and that the adjusted and the unadjusted effect sizes are almost identical.

The study presents significant practical implications. On the one hand, it investigates the extent to which investors integrate sustainability considerations into their investment decisions, thereby exerting environmental stewardship crucial for compelling companies towards effectively mitigating climate change and other environmental risks. On the other hand, it examines the efficacy of various external pressure points, including social, regulatory, and economic factors, in influencing investors to prioritize and incorporate sustainability criteria into investment choices.

This study also contributes to the existing research in various ways. By consolidating disparate literature, it brings clarity to previously inconclusive findings. Although there are other reviews, they have analyzed the literature only qualitatively and have been limited in scope, depth, and specificity[1] (e.g., Gillan et al., 2021; Benlemlih, 2017; Jiminez and Grimam 2020; Gianfrate et al., 2020); or have examined the effect of disclosure on cost of capital generally, without specifically addressing environmental aspects (e.g., Schreder, 2018; Souissi and Khlif, 2012). In contrast, this study centers on the CER-COEC relationship, offering a quantitative assessment and scrutinizing potential moderators and publication biases across a comprehensive corpus of literature. This rigorous approach facilitates more precise and reliable insights. Furthermore, it lays a foundation for future empirical investigations not only by pinpointing gaps but also by highlighting specific study characteristics influencing empirical outcomes, thus encouraging further exploration into underlying variables affecting the CER-COEC relationship.

The remainder of this study is organized as follows. Section 2 provides a review of the existing literature, detailing theoretical frameworks and empirical findings relevant to the CER-COEC relationship, as well as identifying potential moderating variables and formulating the respective hypotheses. Section 3 outlines the methodologies employed, describing the processes of data collection, data preparation, and the specific meta-analysis and meta-regression techniques. Section 4 details the findings from the meta-analysis and subsequent meta-regression analyses and provides a discussion of the implications of these findings. Finally, Section 5 concludes the study.

[1] Most of the previous reviews did not focus on environmental aspects but took a broader perspective and used constructs such as Corporate Social Responsibility (CSR) or Environment-Social-Governance (ESG)

2. Literature Review and Hypotheses

2.1. The relationship between CER and COEC

The literature presents three main hypotheses for the link between CER and COEC. First, the investor preference hypothesis suggests that investors favoring shares of sustainable firms adjust their required financial returns. This adjustment is attributed to the non-financial utility derived from holding these shares, coupled with enhanced diversification and risk-sharing opportunities as the investor base for such assets expands. Several theoretical models substantiate these dynamics (Heinkel et al., 2001; Baker et al., 2018; Pedersen et al., 2021; Pástor et al., 2021). These dynamics point to a negative link between CER and COEC. Second, the risk mitigation hypothesis suggests that sustainable firms exhibit a lower risk profile as they are less exposed to environmentally related compliance and non-compliance costs, and thus these firms warrant lower required returns from investors. These risks encompass regulatory, legal, and market factors. For example, enhanced environmental performance decreases the likelihood and impact of such adverse events (El Ghoul et al., 2018) and serves as an insurance-like strategy against both current and known as well as future and unknown risks (Sharfmann and Fernando, 2008). This becomes increasingly important as both financial and non-financial stakeholders grow more environmentally aware. Empirical research confirms the risk-mitigating benefits of strong environmental performance (e.g., Ilhan et al., 2021; Hoepner et al., 2019; Kim et al., 2014; Oikonomou et al., 2012; Albuquerque et al., 2019; Salama et al., 2011; Sassen et al., 2016; Becchetti et al., 2015; Jo and Na; 2012). These considerations also suggest a negative association between CER and COEC. Third, the over-investment hypothesis conversely states that investors require an additional return premium for environmentally friendly firms as investments in corporate sustainability may be perceived as (i) costly, because they divert a firm's scarce financial and non-financial resources from other more shareholder-value-adding activities (Friedmann, 1970); (ii) risky, as they tie up financial resources, temporarily constraining the entrepreneurial scope of action for a firm and thus potentially exacerbating the uncertainty and volatility of its future earnings (Utz, 2017); and (iii) hazardous, as they entail agency costs since managers may be incentivized to over-prioritize CER investment and possibly under-prioritize other, more shareholder-value-adding activities for their own private benefit (Barnea and Rubin, 2010; Cespa and Cestone, 2007). Contrary to the other hypotheses presented, this suggests a positive link between a CER and its COEC. Given these diverging theoretical perspectives, the question of whether a firm's greenness positively or negatively affects its COEC is fundamentally empirical. Indeed, most of the empirical evidence suggests that sustainability reduces COEC, thereby supporting the investor preference and risk-mitigation hypotheses (e.g., Sharfman and Fernando, 2008; Chava, 2014; El Ghoul et al., 2018; Ng and Rezaee, 2015; Gupta, 2018; Kim et al., 2015; Gerged et al., 2020).

Apart from that, the literature suggests various other mechanisms through which corporate sustainability can mitigate non-diversifiable risk and subsequently reduce COEC. First, environmental disclosure reduces information asymmetry between investors and managers as well as informed and non-informed investors by making information publicly available and disseminating information uniformly to all investors. This diminishes the advantage of private information held by management (Huang and Zhang, 2012, Bhushan 1989, Lang and Lundholm, 1996) or insider investors (Easley and O'Hara, 2004, Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994), thereby lowering risk for investors who lack such insights. Second, environmental disclosure reduces information or estimation risk by providing investors with more comprehensive data, allowing investors to estimate firms' future earnings and dividends more accurately. This enables investors to make more informed and presumably more reliable projections of their expected returns, boosting investors' confidence in their models (Barry and Brown, 1985; Handa and Linn, 1993; Coles et al., 1995). Third, environmental disclosure stimulates expanded analyst coverage, improving forecast consensus and accuracy, thereby facilitating more informed investment decisions for investors and thus again facilitating investor's confidence in their return calculation and investment decision (Healy et al., 1999; Francis et al., 1997; Lang and Lundholm, 1996; Muslu et al., 2019). In sum, the augmented quantity and quality of available information enhance firms' visibility and investors'

awareness, thereby expanding the investor base and thus potential diversification and risk-sharing opportunities. Consequently, investors can reduce the risk premium and their required return, thus lowering the COEC (Merton, 1987). Furthermore, enhanced environmental disclosure not only increases investors' awareness of the firms' stock but also boosts their willingness to trade due to improved information access and reduced information risks and information asymmetry. This increased trading activity in turn mitigates liquidity risk and lowers transaction costs, further reducing the risk premium and the COEC (Amihud and Mendelson, 1986; Diamond and Verrecchia, 1991; Kim and Verrecchia, 1994; Welker, 1995; Healy et al., 1999; Leuz and Verrecchia, 2000). Additionally, as environmental disclosure mitigates investors' exposure to information asymmetry, information risk, diversification risk, and liquidity risk, investors perceive lower systematic risk, leading to a decrease in the COEC (Barry and Brown, 1985, 1986; Hughes et al., 2007; Jorgensen and Kirschenheiter, 2003; Lambert et al., 2007). All these mechanisms suggest an inverse relationship between CER and COEC. However, the empirical evidence is mixed, with some studies confirming the negative link between corporate sustainability and COEC (e.g., Reverte, 2012; Bachoo et al., 2013; He et al., 2013; Fonseka et al., 2019; Dhaliwal et al., 2014), while others have identified no significant effect (e.g., Clarkson et al., 2013; Dhaliwal et al., 2011; Lemma et al., 2019; Plumlee et al., 2015).

Given both the presented theoretical considerations as well as the empirical evidence, it can be assumed that there is, in fact, an association between CER and COEC.

Against this background, the following hypothesis was formulated:

H1: There is a negative relationship between CER and COEC.

However, the relationship might be more complex as contextual factors may influence the effect of CER on COEC. In this regard, empirical studies have produced varying results depending on the economic conditions and development of the country studied (e.g., El Ghoul et al., 2018; Wang et al., 2013; Feng et al., 2015; Breuer et al., 2018), the culture of the investors studied (e.g., Gray et al., 2013; Dhaliwal et al., 2014; Matthiesen and Salzmann, 2017), the industrial setting of the firms studied (e.g., Kim et al., 2015; Trinks et al., 2017a; Park and Noh, 2018), or the regulatory setting of the firms studied (e.g., Gerged et al., 2021). This suggests that the CER-COEC link is moderated by various factors, particularly the specific external conditions. This view is underpinned by institutional theory, which posits that the motivations and actions of both individuals and organizations are profoundly shaped by their institutional environments, including the prevailing rules, norms, and routines that prescribe acceptable behavior in various situations (Matten and Moon, 2008; Meyer and Rowan, 1977; DiMaggio and Powell, 1983). This external context impacts individuals, such as customers, investors, and managers, who are influenced by their cultural and social backgrounds when they interact with corporations. In response, firms strive to align with these prevailing institutional expectations to maintain compliance and legitimacy (Scott, 2008). Moreover, these interactions are conditional on the surrounding economic conditions as well as legal and regulatory settings, which might change over time. Consequently, this interplay of diverse institutional and external factors results in distinct variations in customer attitudes, investor perceptions, and firm behaviors concerning CER (Jamali and Mirshak, 2007; Moon and Shen, 2010), ultimately influencing its effect on COEC.

In light of this, we continue by exploring these external moderating factors, focusing on economic, regulatory and social conditions.

2.2. The moderating effect of economic conditions

We start with the economic environment and how it may affect the CER-COEC link.

This environment encompasses a spectrum of factors including infrastructure, labor markets, regulatory frameworks, economic policies, governmental efficiency and stability, and financial systems and capital markets. These elements collectively shape the overarching economic and business framework of a country. Consequently, they exert significant impacts on firms, affecting their access to human capital, financial resources, and technological advancements, effectively shaping growth prospects and profit potentials. Simultaneously, these external determinants affect investors by impacting their access to capital markets, the availability of pertinent firm information, legal protections safeguarding investments, and the predictability of economic and legal landscapes. As such, differences in economic environment and development might modulate investors' attitudes and firms' actions pertaining to corporate sustainability, especially relative to other financial factors (Jamali and Mirshak, 2007; Moon and Shen, 2010). These differences are particularly pronounced between developed and developing countries. Jamali and Karam (2018) argue that CSR-related research in developing countries constitutes a distinctive field of study that is different from developing countries due to these countries' specific characteristics in terms of institutional and macroeconomic antecedents, the salience of multiple actors involved in formal and informal governance, the specific forms of CSR expressions, and the varied scope of developmental and detrimental CSR consequences.

Empirical studies investigating the link between corporate sustainability and COEC for varying economic conditions have provided mixed results. Bui et al. (2019) found that GHG emission is positively associated with COEC in developed countries but not in developing countries. On the contrary, Gupta (2018) determined that the effect of environmental performance on COEC is stronger in countries with a lower level of government effectiveness, regulatory quality, rule of law, and voice and accountability. Similarly, Breuer et al. (2018) identified a negative association between ESG performance and COEC in countries with weak investor protection laws but a positive association in countries with a strong investor protection law. However, El Ghoul et al. (2018) observed a significant association between external environmental costs and COEC for both developed as well as developing countries. Furthermore, they consistently found a positive relationship for common law and civil law countries as well as for Europe, North America, and the Asia-Pacific region. In contrast, Feng et al. (2015) concluded that CSR activities reduce COEC for firms in North America and Europe, but it increases COEC for firms in Asia. In line with this, Wang et al. (2013) highlighted a negative effect on COEC when implementing effective CSR strategies for firms in North America and Europe but the inverse effect for firms in Asia. Li et al. (2019) determined that the correlation between carbon information disclosure, non-financial carbon information disclosure, financial carbon information disclosure, and COEC is stronger in regions in China with a higher level of marketization, meaning the level of economic development, legal system, and public awareness of environmental protection.

Against this background, the following hypothesis was formulated:

H2: The relationship between CER and COEC is moderated by economic development.

Moreover, economic conditions might change suddenly as exogenous shocks, such as national or international financial crises, hit countries, with severe consequences for firms and potentially investors as well. However, there are two conflicting perspectives on how such crises might affect the association between CER and COEC. From a resource-based view, social capital, such as reputation and trust, represents a strategic resource that provides firms with a competitive advantage (Barney, 1991; Russo and Fouts, 1997). Firms build social capital by engaging in ethical behaviors such as CER, thereby enhancing their standing with socially and environmentally conscious stakeholders (Lins et al., 2017). During economic crises, when trust is generally low (Zingales, 2011), a firm's reputation becomes even more crucial as financial stakeholders may offer capital at a discount to reputable firms, while non-financial stakeholders such as employees, customers, and suppliers may reciprocally support these businesses in acknowledgment of their previous social contributions (Guiso et al., 2004). Hence, social capital can increase a firm's financial resilience during a crisis and thus functions as an insurance-like protection against systematic risks (Lins et al., 2017; Kim et al., 2014; Boubaker et al., 2020; Godfrey et al., 2009). Resource-based theory therefore suggests that CER reduces COEC and that this effect is even more pronounced during a period of financial and economic turmoil. Conversely, from a neoclassical view, CER investments represent a trade-off (Jensen, 2001) between the conflicting objectives of maximizing shareholder value (Friedman, 1970) versus stakeholder value (Freeman, 1984). This overinvestment risk becomes even more exacerbated during an economic crisis in which financing costs for CER investments are higher (Hoffmann et al., 2013; Amiraslani et al., 2017; Ivashina and Scharfstein, 2010; Kahle and Stulz, 2013; Buchanan et al., 2018) and thus potentially exceed any long-term benefits. Thus, neoclassical theory proposes that CER increases COEC and that this effect is more pronounced during a financial or economic crisis. Although these theoretical considerations are inconclusive regarding whether corporate sustainability has positive or negative financial implications (Marsat et al., 2021), they establish that any impact will vary for normal versus crisis periods.

Several empirical studies have investigated the effect of financial crises on the association between corporate sustainability and COEC, with their results largely indicating a moderating influence. El Ghoul et al. (2018) examined the effect of corporate environmental responsibility on COEC and revealed a significant relationship before and after but not during the global financial crisis. Nguyen et al. (2020b) analyzed the impact of carbon risk on COEC and discovered that high-emitting firms experienced a significant decrease in COEC relative to their low-emitting counterparts during the global financial crisis. Husser and Paulet (2021) considered the relationship between non-financial disclosure and COEC and found a consistent negative link for environmental disclosure in the pre-crisis and post-crisis period but an inversion of the link for the aggregated ESG disclosure. Xu et al. (2015) examined the impact of CSR practices on the COEC and revealed that the negative association proved to be more significant during recessions.

Against this background, the following hypothesis was formulated:

H3: The relationship between CER and COEC is moderated by economic crises.

2.3. The moderating effect of regulatory settings

Next, we turn towards the regulatory framework and its impact on the CER-COEC relationship, focusing on national regulations for corporate environmental disclosure and performance.

Disclosure regulations, such as mandatory reporting requirements, have various effects. Initially, they lead to an increase in the quantity and quality of disclosed information (Gulenko, 2018) as well as to an improvement in analyst coverage, accuracy, and consensus on earnings (Krueger et al., 2021; Cormier et al., 2015; Aerts et al., 2008). As a result, the information available to investors might become more informative and less ambiguous, which in turn reduces uncertainty and information risk as well as information asymmetry (Souissi and Khlif, 2012; Schreder, 2018). Furthermore, mandatory regulations increase the comparability and reliability of environmental information by stipulating formal and uniform reporting rules (Galama and Scholtens, 2021; Gerged et al., 2021; Busch and Lewandowski, 2018; Dhaliwal et al., 2014) and thus further increase the informativeness of environmental disclosure for investors. With enhanced access to more comprehensive and accurate information regarding a firm's sustainability, investors are better equipped and potentially more inclined to incorporate this data into their investment decisions. This aligns with targeted disclosure theory, which posits that mandatory disclosure standards not only heighten shareholder awareness and appreciation of environmental information – prompting actions such as investing in sustainable firms – but also induce firms to react to the change in shareholders' behavior by enhancing their own sustainability practices (Gerged et al., 2021). As a result, the CER-COEC link might strengthened in the presence of reporting mandates. However, mandatory requirements might also mitigate self-selection bias (Al-Tuwaijri et al., 2004; Clarkson et al., 2011) as companies are required to disclose the respective information and cannot opt either not to disclose any information or to disclose only favorable information (Galama and Scholtens, 2021). Consequently, companies will not be able to stand out by voluntarily publishing selected environmental information, which in turn might diminish any signaling effect for investors (Souissi and Khlif, 2012) and eventually attenuate the effect of CER on COEC.

Various empirical studies have investigated the relationship between corporate sustainability and COEC in different disclosure environments, and most have confirmed its moderating effect. For example, some studies have analyzed the impact of the introduction of reporting regulations as a quasi-national experiment. Yao and Liang (2019) examined the impact of a newly implemented regulation in China mandating the disclosure of environmental information; they discovered that the effect of disclosure on COEC for manufacturing firms became significant only after the regulation's introduction. Similarly, Fonseka et al. (2019) examined the effect for firms from the energy sector and found that the relationship changed significantly after implementation of the mandatory disclosure scheme. Furthermore, Gerged et al. (2021) examined the impact of disclosing greenhouse gas emission data on COEC in the United Kingdom and found a moderating effect of the national enactment of a carbon disclosure regulation. Other studies have compared the regulatory conditions of different countries using meta-analytic tools. Souissi and Khlif (2012) meta-analyzed studies on the relationship between financial and non-financial information disclosure and COEC and identified a stronger and more reliable link for studies in countries with a low disclosure environment. Similarly, Schreder (2018) concluded that the effect of the quantity of disclosed information on COEC is stronger in studies from less regulated and less transparent countries.

Against this background, the following hypothesis was formulated:

H4: The relationship between CER and COEC is moderated by disclosure regulations.

Performance regulations – which include a variety of measures such as carbon emission taxes, carbon emission trading schemes, water pollution controls, waste management standards, and land use protections – entail significant financial implications for firms. These regulations lead to increased compliance costs related to abatement, management, and monitoring activities, as well as non-compliance costs, which can manifest as penalties, reputation damage, reduced customer loyalty, and diminished support from environmentally conscious stakeholders (He et al., 2013; Reverte, 2009). Consequently, firms with poor environmental performance face higher environment-related risks. Conversely, companies demonstrating strong environmental performance and compliance often find themselves positioned for unique growth opportunities and more resilient profitability levels. The stringency of national environmental regulations therefore plays a pivotal role in shaping investor perceptions of CER when making investment decisions and thus also influences the CER-COEC link.

However, there are only a limited number of empirical studies evaluating the moderating effect of environmental regulations directly. Wang et al. (2022) demonstrated that pressure from environmental regulations amplifies the negative effect of air pollution on cost of debt due to increased violation risks. Furthermore, Ni et al. (2022) observed that the introduction of carbon emission trading system pilots in China led to an increase in cost of debt and that this effect was even more pronounced for firms exhibiting higher dependency on external financing and facing increased external pressure. Additionally, other studies have examined the impact of environmental regulations indirectly by comparing firms from environmentally sensitive industries with their counterparts because such industries often exhibit specific and strict environmental regulations. These studies for the most part confirm the regulations' moderating effect (e.g., Kim et al., 2015; Trinks et al., 2017a; Matsumura et al., 2010; Park and Noh, 2018; Yao and Liang, 2019; Matsumura et al., 2020; Reverte, 2012; Bachoo et al., 2013).

Against this background, the following hypothesis was formulated:

H5: The relationship between CER and COEC is moderated by performance regulations.

2.4. The moderating effect of socio-cultural background

Next, we analyze the impact of social pressure on the CER-COEC relationship.

Here, we focus on the socio-cultural context given that attitudes towards corporate sustainability are significantly grounded in societal culture (Husted, 2005). Culture is a complex concept and has been defined in various ways. Hofstede (2001) defines culture as a collective programming of the mind that distinguishes the members of one group or category of people from another. Similarly, House et al. (2004) views culture as a shared understanding and argues that it influences the actions of members of a society. In the same vein, Adler (1997) states that culture influences people's values, attitudes, and behavior, while Sousa and Bradley (2008) describe culture as societal characteristics that affect norms, values, and institutions. In a business context, culture affects the environmental practices of corporations (Cai et al., 2016), the environmental regulations for these practices set by governments, beliefs about the role and responsibilities of businesses, and societal perceptions of acceptable or inacceptable business practices in general and by investors in particular (Park et al., 2007).

Hofstede's cultural dimensions (Hofstede 1980; Hofstede et al. 2010) are the most widely used framework to measure culture in finance, accounting, and management research (Vena et al., 2020; van der Laan Smith et al., 2010; del Mar Miras-Rodríguez et al., 2015; Smith, 2006). One of these dimensions, namely long/short-term orientation (LSTO), pertains to cultural differences in terms of time orientation and is the most relevant component of culture shaping society's attitude toward corporate sustainability. According to Hofstede (2001), a society with a long-term orientation emphasizes virtues targeted towards future rewards, such as perseverance and thrift. Thus, in long-term oriented societies, individuals focus on future rewards instead of or partly at the expense of present or short-term gains (Venaik et al., 2013). This inclination towards future orientation is associated with higher levels of adaptability (Van Everdingen and Waarts, 2003; Gòis et al., 2018; Hofstede et al., 2010) and higher levels of innovation (Jones and Davis, 2000; Rujirawanich et al., 2011; Rossberger, 2014), as these cultures are more receptive to change (Vena et al., 2020). Thus, in long-term oriented cultures, businesses prioritize future profits and do not focus on short-term results. Long-term oriented business can therefore be characterized by long-term and future-oriented decision-making horizons (Trotman and Bradley, 1981), pronounced stakeholder management (Freeman and McVea, 2002), and a social perspective (Bradley et al., 1999). Corporations from such cultural backgrounds have a strong intrinsic and extrinsic rationale to improve their environmental footprint and reporting. Furthermore, investors from such cultural backgrounds tend to be more appreciative of a firm's sustainability and more willing to accept the necessary costs and risks of the respective environmental investments while simultaneously being more demanding in terms of environmentally relevant information. Hence, the effect of CER on COEC might be amplified in long-term orientated societies.

Previous research has also examined the nexus between culture, corporate sustainability, and cost of capital. Vena et al. (2020) revealed a negative relationship between a firm's cost of capital and adoption of an integrated reporting scheme; this relationship is stronger for firms from countries which are low on power distance, high on collectivism, and high on masculinity. However, other cultural dimensions such as uncertainty avoidance, long-term orientation, and indulgence did not seem to moderate the relationship. Matthiesen and Salzmann (2017) identified a negative link between a firm's COEC and its CSR performance and demonstrated that the link is stronger in cultures which are low in assertiveness, high in humane orientation, and high in institutional collectivism. Dhaliwal et al. (2014) found a negative link between a firm's COEC and its CSR disclosure and determined that the link is more pronounced in stakeholder-oriented countries which are characterized by a high level of public awareness and management attention to sustainability issues. Lastly, Gray et al. (2013) observed that firms from more individualistic and less uncertainty-avoiding cultures tend to exhibit higher COEC, which is consistent with the tendency toward greater risk-taking orientation in these societies.

Against this background, the following hypothesis was formulated:

H6: The relationship between CER and COEC is moderated by socio-cultural background.

2.5. Research framework

Figure 1 illustrates the research framework of this study. This framework incorporates (i) the explanatory variable, namely CER; (ii) the dependent variable, namely COEC; and (iii) a series of moderating variables represented by external factors including economic, regulatory, and socio-cultural aspects.

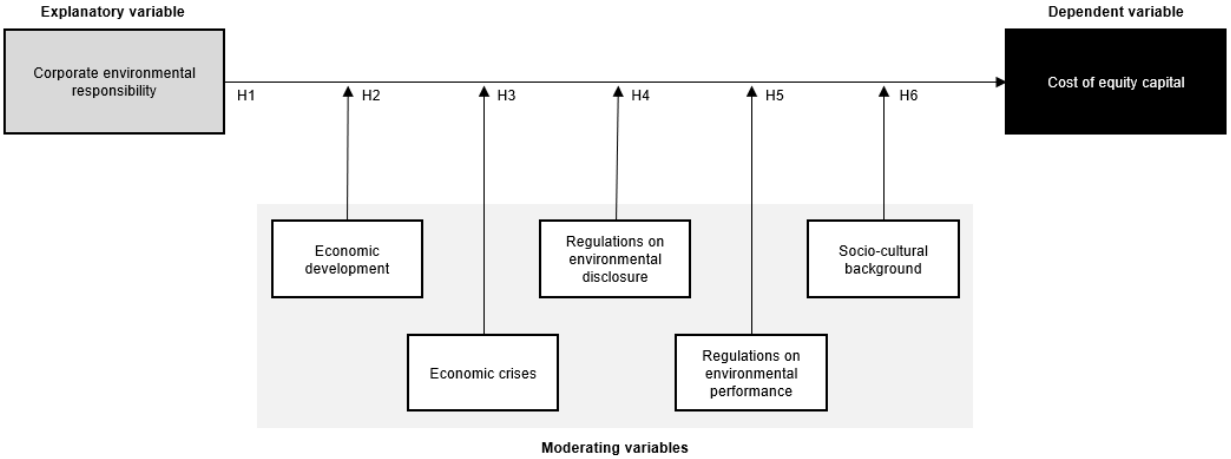

Figure 1: Research framework and hypotheses

3. Methodology

3.1. Data collection and preparation

In this study, CER is comprehensively defined to include both a firm's environmental performance and its environmental disclosure, recognizing their interconnected nature (Doan and Sassen, 2020). In particular, environmental disclosure can serve as a strategic tool to shape investor perceptions of a firm's environmental performance, ultimately influencing stock prices and returns. Similarly, COEC is defined to encompass firm-level metrics that are either derived from realized or expected returns, as both approaches are deemed to provide a valid basis for the risk-adjusted cost of capital. Lastly, this study examines the moderating effects of external factors, including economic conditions (e.g., national economic development and economic shocks such as the 2008/09 financial crisis), regulatory frameworks (e.g., carbon taxes, emissions trading schemes, and voluntary or mandatory disclosure requirements), and societal influences (e.g., national cultural orientations toward long-term versus short-term priorities).

To establish a comprehensive and representative data base, a multiple-step literature search was conducted, including screening literature reviews;[2] exploring key academic databases[3] with specific keywords; analyzing top-tier journals in finance, accounting and sustainability; and using forward and backward citation tracking.

Subsequently, the identified papers were selected for inclusion based on the following criteria. First, papers must examine the COEC-CER quantitatively and report the relevant effect size estimates or sufficient data to allow the calculation of effect size using common conversion methods (Borenstein et al., 2009; Hunter and Schmidt, 2004; Lipsey and Wilson, 2001). Second, papers must estimate COEC based on realized or expected returns on equity for individual firms; those focusing on cost of debt or the weighted average cost of capital or those using portfolio approaches were excluded. Third, papers must focus specifically on environmental aspects[4]; those applying multi-dimensional composite constructs like CSR or ESG were excluded.[5] Fourth, published studies such as peer-reviewed papers as well as unpublished studies such as working papers, conference papers, research papers, and dissertations were included.

Based on this approach, 75 studies were selected.[6]

The effect size is represented by the correlation coefficient r between CER and COEC, allowing for meaningful comparisons across studies (Rosenthal, 1991) and thus testing of Hypothesis 1. Both bivariate and partial correlation coefficients were considered to maximize the sample, enhance the variability of the database, and thus increase the explanatory power of the analysis (Chaikumburg et al., 2016). Furthermore, all reported effect size estimates from each study were collected. This approach features several advantages compared to using one single estimate per

[2] Including Alshehhi et al., 2018; Benlemlih, 2017; Brouwers et al., 2014; Busch and Lewandowski, 2018; Carvalho and Murcia, 2016; Clark et al., 2015; Clark and Viehs, 2014; Friede et al., 2015; Gianfrate et al., 2015; Gillan et al., 2021; Jiminez and Grima, 2020; Kannenberg and Schreck, 2019; Malik, 2015; Velte, 2021; Velte et al., 2020

[3] Including ScienceDirect, Emerald, Business Source Premier, EconLit, SpringerLink, Wiley, JSTOR, Web of Science as well as BASE, SSRN and Google Scholar

[4] As there is no uniform framework for measuring CER (Doan and Sassen, 2020), a wide variety of different CER concepts that are applied in the underlying literature was considered in the meta-analysis, in line with relevant previous reviews (e.g. Dixon-Fowler et al., 2013; Orlitzky, 2001; Orlitzky et al., 2003; Endrikat et al., 2014; Endrikat et al., 2020; Hang et al., 2019; Erauskin-Tolosa et al., 2020). This approach not only acknowledges and reflects the inherent multidimensionality of environmental aspects but also expands the analytical breadth of this study, facilitating a nuanced investigation of this complex domain. Along these lines, the meta-analytic review includes measurements for both environmental performance as well as environmental disclosure. Environmental performance, as defined by the Global Reporting Initiative, refers to "a measure of an organization's impact on living and non-living natural systems, including land, air, water, and ecosystems". Conversely, environmental disclosure, according to the Global Reporting Initiative, pertains to "the actions of measuring, disclosing, and being accountable to stakeholders for a firm's environmental impacts". The existing literature suggesting a correlation between environmental performance and disclosure, although the relationship is assumed to be weak, and the findings remain in part mixed and inconclusive (Doan and Sassen, 2020). Against this background, we conducted a robustness check on the effect of this methodological artefact showing that there is no significant difference between the effect of environmental performance and disclosure on COEC.

[5] Previous studies (e.g. Lu and Taylor, 2016; El Ghoul et al., 2011; Breuer et al., 2018) show that there are significant differences between the effect sizes for the different aspects of these composite concepts (i.e. environmental, social and governance)

[6] The respective studies are included in the reference list and marked with an asterisk (*).

study (Cheung and Chan, 2004; Hedges and Olkin, 1985; Hunter and Schmidt, 2004). Along these lines, this approach has been shown to outperform alternative procedures (Bijmolt and Pieters, 2001) and can be regarded as the current standard for meta-analytical reviews (Hang et al., 2019; Feld et al., 2013; Fidrmuc and Lind, 2020).

Capitalizing on the variability in the dataset, the reported effect sizes were further coded[7] to test the remaining hypotheses regarding the moderating factors. Countries were classified as developed or developing based on the United Nation's (2020) scheme to assess economic development (H2). The influence of economic crises (H3) was explored by differentiating between studies that cover the 2008/09 global financial crisis and those that do not. Furthermore, countries were categorized by whether environmental disclosure is mandatory or voluntary (per Krueger et al., 2021) to explore disclosure regulations (H4) as well as by whether there are carbon tax or trade regulations based on data provided by the Global Change Data Lab (2023) to investigate performance regulations (H5). Furthermore, societies[8] were delineated by short-term versus long-term orientation based on Hofstede's (2001) national culture score,[9] representing a proxy for public awareness of CSR issues and thus social pressure to evaluate the socio-cultural background (H6). Additionally, selected methodological artefacts were coded by differentiating effect sizes between bivariate correlations and partial correlations, estimates for COEC between calculations based on realized and expected returns, measurements for CER between metrics for environmental performance and disclosure, and econometric models based on the inclusion of controls for environmental performance and disclosure.

Table 1 summarizes the variables included in this meta-analysis and the applied coding scheme.

Finally, outliers were eliminated from the dataset to ensure that the observed variance of the underlying sample was not artificially inflated, which could potentially lead to a distorted overall mean and erroneous conclusions (Hunter and Schmidt, 2004). For this purpose, Huffcutt and Arthur's (1995) sample-adjusted meta-analytic deviancy (SAMD) statistic was applied.[10]

First, the sample distribution variance Var_i for a particular study i and the sampling error variance in the mean coefficient $Var_{\bar{r}}$ were calculated as

$$Var_i = \frac{\left(1-\bar{r}^2_{[w/o\ study\ i]}\right)^2}{N-1};\ Var_{\bar{r}} = \frac{\left(1-\bar{r}^2_{[w/o\ study\ i]}\right)^2}{N-K}, \quad (1)$$

Where N is the total sample size for all studies, and K is the number of studies included in the analysis.

Second, the SAMD for study i was calculated as

$$SAMD_i = \frac{r_{[study\ i]} - \bar{r}_{[w/o\ study\ i]}}{\sqrt{Var_i - VAR_{\bar{r}}}}; \quad (2)$$

where $r_{[study\ i]}$ is the correlation coefficient of study i, and $\bar{r}_{[w/o\ study\ i]}$ is the mean correlation coefficient of the studies included in the meta-analysis without the study i.

Based on this approach, 1,139 effect size estimates were collected.

[7] Initially, all papers were coded by the author. Subsequently, two independent postgraduate students coded 10 randomly selected papers each, totalling 20 papers (representing approximately one quarter of the total sample) in order to assess the validity of the coded information and to ensure the reliability of the meta-analytical results (Stanley et al., 2013; Endrikat et al., 2020; Tashman et al., 2021). The coding results were compared, any discrepancies were discussed among the coders and any inconsistencies were eventually reconciled and resolved.

[8] Hofstede's national culture score is an absolute value ranging from 0 to 100 for each country; for purposes of this meta-analysis, we operationalized Hofstede's national culture score by coding each country as low on a given dimension (i.e., short-term oriented or collectivistic) if the value is below 50 and high on a given dimension (i.e., long-term oriented or individualistic) if the value is above 50.

[9] Effect sizes based on samples comprising countries from both high and low classified countries were coded as mixed and not considered for this specific analysis.

[10] For the SAMD a cut-off value of 3 was applied, following Arthur et al (2001).

Table 1: Overview of variables applied in the meta-analytical review

Variable	Abbreviation	Definition	Hypothesis
Corporate environmental responsibility	CER	- Pertains to a firm's environmental responsibility (including performance and disclosure) and its effect on cost of equity capital - Measured as the correlation coefficient	H1
Moderator variables			
Economic development	ECON	- Pertains to the level of the countries' economic development, categorizing countries as developed vs developing based on United Nations (2020) - Binary dummy variable with 1 = developed and 0 = developing	H2
Economic crises	CRISIS	- Pertains to the studies' sample period; distinguishing between studies that include the global financial crisis 2008/09 vs studies that do not - Binary dummy variable with 1 = including the global financial crisis and 0 = excluding the global financial crisis	H3
Disclosure regulations	REG_DISC	- Pertains to the countries' disclosure regulations, categorizing countries with mandatory vs voluntary requirements based on Krueger et al (2021) - Binary dummy variable with 1 = mandatory disclosure and 0 = voluntary disclosure	H4
Performance regulations	REG_PERF	- Pertains to the countries' performance regulations, categorizing countries with vs without carbon tax or trade schmes based on Global Change Data Lab (2023) - Binary dummy variable with 1 = with regulations and 0 = without regulations	H5
Socio-cultural background	CULTURE	- Pertains to the countries' socio-cultural background, categorizing countries as long-term oriented vs short-term oriented based on Hofstede (2001) - Binary dummy variable with 1 = long-term oriented and 0 = short-term oriented	H6
Methodological artefacts			
Effect size statistic	ES	- Pertains to the statistical basis of the effect size, distinguishing between effect sizes based on bivariate correlations vs partial correlations - Binary dummy variable with 1 = bivariate correlation and 0 = partial correlation	-
Cost of equity estimate	COE	- Pertains to the methodology of the cost of equity estimate, distinguishing between estimates based on realized returns vs expected returns - Binary dummy variable with 1 = realized (historical) returns and 0 = expected (implied) returns	-
Environmental measurement	ENV	- Pertains to the measurement of CER, distinguishing between measurements of a firm's environmental performance or disclosure - Binary dummy variable with 1 = measuring performance, 0 = measuring disclosure	-
Controlling for performance/disclosure	CONTROL	- Pertains to the studies' econometrically model, distinguishing between studies that control for environmental performance/disclosure vs studies that do not - Binary dummy variable with 1 = including controls for performance/disclosure and 0 = excluding controls for performance/disclosure	-

Note: This table presents the variables used in the meta-analysis and the meta-regression analysis; the moderators represent the applied moderating variables, the methodological artefacts the applied control variables; CER represents the variable under review.

3.2. Meta-analysis procedure

For the meta-analysis, we applied the approach proposed by Hedges and Olkin (1985).

First, the correlation coefficients were transformed into Fisher's z to adjust for a potential bias or skewness in the underlying effect size estimates assuming a normal distribution (Lipsey and Wilson, 2001):

$$z_i = \frac{1}{2} ln\left(\frac{1+r_i}{1-r_i}\right) \text{ and } SE(z_i) = \frac{1}{\sqrt{(n_i-3}} \quad (3)$$

where r_i is the coded effect size, z_i is the z-transformed effect size, n_i is the number of firms related to the respective effect size, and $SE(z_i)$ is the corresponding standard error.

Second, the weighted mean Fisher's z was calculated by

$$\overline{z_\iota} = \frac{\sum_{i=1}^{K} w_i z_i}{\sum_{i=1}^{K} w_i} \text{ and } w_i = \frac{1}{v_i+\tau^2} \quad (4)$$

where w_i is the weight related to the respective effect size, v_i is the variance of the observed effect size (i.e., the within-study variance), τ^2 is the estimate of the variance of true effect size (i.e., the between-study variance), and K is the total number of included effect sizes.

Third, confidence and prediction intervals at the 95% level were calculated by

$$CI = [\overline{z_\iota} - 1.96SE(\overline{z_\iota}); \overline{z_\iota} + 1.96SE(\overline{z_\iota})] \quad (5)$$

$$PI = \left[\overline{z_\iota} - 1.96\sqrt{\tau^2}; \overline{z_\iota} + 1.96\sqrt{\tau^2}\right] \quad (6)$$

Confidence intervals that do not include zero indicate that the respective effect size is statistically significant (Lipsey and Wilson, 2001). Prediction intervals that are comparably large or that include zero indicate heterogeneity and moderating influences (Hunter and Schmidt, 2004).

Fourth, the results expressed in Fisher's Z values were converted back to correlation coefficients to allow for meaningful interpretations by

$$\bar{r} = \frac{e^{2\bar{z}}-1}{e^{2\bar{z}}+1} \quad (7)$$

The correlations were then tested for their statistical significance using the z-statistic and considering conventional confidence levels of 1%, 5%, and 10%. Furthermore, correlations were assessed in terms of their practical and economic importance using thresholds proposed by Doucouliagos (2011), setting the lower thresholds at 0.070 for weak, 0.173 for moderate, and 0.327 for strong associations.

To assess the homogeneity of the results, Cochran's Q and Higgins' I^2 were considered, as described by Borenstein et al. (2009), as calculated by

$$Q = \sum_{i=1}^{K} w_i(z_r - \overline{z_r}) \quad (8)$$

$$I^2 = \frac{Q-(K-1)}{Q} \quad (9)$$

If Q is statistically significant and I^2 reports a significant amount of variance in the true effect size, then the hypothesis of homogeneity is rejected, indicating the presence of moderator effects (Lipsey and Wilson, 2001; Borenstein et al., 2009). Following Higgins et al.'s (2003) guidelines, magnitudes of 25%, 50%, and 75% for I^2 might be considered low, moderate, and high, respectively.

For the analysis, a random-effects model was applied that considered differences between the included studies in terms of measurement of the variables, regional scope and time period of the underlying samples, and other study design characteristics.[11]

In addition, the presence of publication bias, or the phenomenon whereby certain empirical results are systematically overrepresented in published literature (Rosenthal, 1979) and thus potentially distort the overall assessment, was assessed using the FAT-PET-PEESE technique (Stanley, 2008; Stanley and Doucouliagos, 2012).

For this purpose, a regression analysis was performed to statistically examine the connection between the effect size and its precision using the model proposed by Egger et al. (1997):

$$r_i = \beta_0 + \beta_1 SE(r_i) + \epsilon_i \tag{10}$$

The model incorporates the funnel-asymmetry test (FAT) and the precision-effect test (PET). The FAT examines the regression coefficient β1, signaling an overrepresentation of effect size estimates with a higher precision and hinting at a potential publication bias when statistically significant. The severity of the bias was assessed based on the coefficient's statistical significance and its magnitude, following Doucouliagos and Stanley (2013).[12] The PET evaluates intercept β0, confirming genuine effects beyond a potential bias when statistically significant. For the analysis, we applied weighted least squared estimators based on inverse variance weights (Borenstein et al., 2009).

Based on this, we calculated the precision-effect estimate with standard error (PEESE), which provides a more effective estimate of the actual empirical effect beyond selection distortions when publication bias is detected and a genuine effect can be assumed (Stanley and Doucouliagos, 2012):

$$r_i = \beta_0 + \beta_1 SE^2(r_i) + \epsilon_i \tag{11}$$

Finally, several robustness tests were performed, including using (i) a fixed-effects model, (ii) one effect size estimate per study, (iii) the number of firms as the sample size, (iv) alternative approaches regarding the exclusion of outliers, (iv) journal quality as a differentiator and (v) analyzing changes over time.

[11] In general, there are two different model specifications applicable for meta-analysis: Under the fixed-effect model, it is assumed that the samples of the included studies are drawn from the same population and thus share a common true effect size. Therefore, the observed variation in the effect size estimates from the different samples is attributable only to random sampling error. Thus, when aggregating observed effect size estimates from the different samples and calculating the weighted mean, the weights are based on the inverse variance of the respective studies, assigning higher weights to larger studies with presumably more precise estimates (Borenstein et al., 2009). Under the random-effects model, the assumption is that the observed samples come from different populations and that the respective effect sizes are heterogeneous. Therefore, the differences in the observed effect size estimates are not only due to random sampling error but also due to the heterogeneity of the true effect sizes. Accordingly, the weights are calculated based on the inverse variance of the individual study as well as the between-study variance and thus are more evenly distributed between small and large studies (Borenstein et al., 2009). For this meta-analysis a random-effects model was applied, considering, among others, the differences between the included studies in terms of the measurement of the variables, the regional scope and time period of the underlying samples and other study design characteristics. This approach is line with previous meta-analytical reviews analyzing environmental performance, environmental innovation or environmental management (e.g. Dixon-Fowler et al., 2013; Endrikat et al., 2014; Erauskin-Tolosa et al., 2020; Fang and Zhang, 2018; Govindan et al., 2020; Hang et al., 2019; Hizarci-Payne et al., 2021; Liao and Liu, 2021; Tashman et al., 2021; Zubeltzu-Jaka et al., 2018; Bush and Lewandowski, 2018)

[12] Accordingly, the bias is considered little to modest if the regression coefficient is statistically insignificant or less than 1, substantial if the regression coefficient is both statistically significant and falls between 1 and 2 and severe if the regression coefficient is statistically significant and exceeds 2.

3.3. Meta-regression procedure

For the meta-regression, we followed the procedures described in Stanley and Doucouliagos (2012) and considered the guidelines outlined in Stanley et al. (2013).

To that end, a linear regression model was applied with the effect size estimates as the dependent variable, the identified moderator effects as explanatory variables, the selected methodological artefacts as control variables, and the precision of the effect size as an additional control variable correcting for any potential publication bias.

$$r_i = \beta_0 + \beta_1 SE(r_i) + \sum_{j=1}^{J} \gamma_j M_{ij} + \sum_{k=1}^{K} \delta_k A_{ik} + \epsilon_i \quad (12)$$

where M_{ij} denotes the set of j moderators and A_{ik} denotes the set of k methodological artefacts.

Considering potential heteroscedasticity of the error terms (Stanley and Doucouliagos, 2012), we applied weighted least squared estimators based on inverse variance weights. Furthermore, given the assumed heterogeneity of the included studies, we used a random-effects model (Borenstein et al., 2009).

4. Results and discussion

4.1. Meta-analysis results

Table 2 presents the meta-analysis results for the overall association between CER and COEC and its potential external moderating factors. The analysis identifies a statistically significant, albeit economically weak, negative correlation ($r = -0.041$; $p < 0.01$), thereby supporting Hypothesis H1. This suggests that enhanced CER may reduce a firm's COEC only to a limited extent from a practical perspective.[13] Regarding environmental performance, this aligns with investor preference theory, which posits that investors may favor shares of environmentally sustainable firms, deriving non-financial benefits that in turn influence their required returns, as well as the risk mitigation theory, which argues that such firms are less exposed to environmental risks, thereby attracting lower risk premiums and, consequently, reducing COEC. These results echo various prior empirical studies (e.g., El Ghoul et al., 2011; Breuer et al., 2018; Gupta, 2018; Kim et al., 2015). Regarding environmental disclosure, this is in line with various theories, proposing that increased disclosure of information on environmental aspects might mitigate investors' exposure to information asymmetry, information risk, diversification risk, and liquidity risk, eventually decreasing the perceived systematic risk and thus the COEC. These results are supported by a broad spectrum of studies focusing on both financial disclosure (e.g., Botosan, 1997; Botosan and Plumlee, 2002; Hail and Leuz, 2006; Francis et al., 2008; Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; Easley and O'Hara, 2004; Lambert et al., 2007; Hughes et al., 2007) and non-financial disclosures, particularly those pertaining to sustainability (e.g., Reverte, 2012; He et al., 2013; Fonseka et al., 2019; Dhaliwal et al., 2014).

These findings remain consistent across a series of robustness checks (not tabulated). Initially, we employed a fixed-effects model as opposed to a random-effects model to address the assumption that the observed effect size estimates derive from a homogeneous population, reflecting a common true effect size. This robustness test confirmed a similar significant negative association ($r = -0.038$; $p < 0.01$). Subsequently, to mitigate potential confounding due to interdependencies among multiple outcomes within studies, we reanalyzed the data using only one effect size estimate per study, the mean of all reported estimates. Here again we observed a comparable significant negative association ($r = -0.039$; $p < 0.01$). Also, we adjusted the analysis by using the number of firms as a proxy for each effect size's sample size rather than the number of firm-years to address potential biases from large but temporally short samples. This adjustment also supported a consistent negative association ($r = -0.046$; $p < 0.01$). In handling outliers, various methodologies were tested, including not eliminating outliers ($r = -0.042$; $p < 0.01$), applying cut-off values of 2 ($r = -0.043$; $p < 0.01$) and 4 ($r = -0.038$; $p < 0.01$) for the SAMD analysis, and using an exclusion criterion based on an interval of plus/minus 3 standard deviations from the mean ($r = -0.038$; $p < 0.01$). All of these indicated similarly significant negative correlations. Furthermore, a one-study-removed analysis was conducted, yielding similarly significant negative associations (high: $r = -0.040$; $p < 0.01$; low: $r = -0.038$; $p < 0.01$). Additionally, we analyzed whether the effect changed over time, but observed no significant differences for studies with a mean-sample period pre 2008 ($r = -0,041$; $p < 0.01$) and post-2008 ($r = -0,042$; $p < 0.01$).[14] Lastly, the analysis of journal quality showed also revealed similarly significant associations for studies from journals of both higher ($r = -0,037$; $p < 0.01$) and lower ($r = -0,043$; $p < 0.01$) quality. Given the minimal variation in results across these robustness tests, we conclude that the findings of the main analysis are robust and not overly sensitive to various model specifications or outlier exclusions, thereby enhancing the reliability of our results.

[13] Potential endogeneity issues, which may arise from measurement errors, omitted variables, or reverse causality, could be a concern in the underlying primary studies. However, it is not entirely clear to what extent these issues affect the findings. Notably, studies that address these concerns, such as He et al. (2013), El Ghoul et al. (2018), and Yao and Liang (2019), report robust results consistent with the main findings of this meta-analysis.

[14] The year 2008 was selected as a demarcation point to create equally sized sub-samples, based on the distribution of underlying effect sizes and their corresponding mean-sample years. Notably, similar results were obtained when using 2007 or 2009 as the demarcation year. Furthermore, a year-by-year analysis did not demonstrate a consistent trend in the CER-COEC association. Finally, a meta-regression analysis indicated no significant impact of the mean-sample year on the CER-COEC association.

However, the analysis also reveals a significant heterogeneity in the relationship ($Q = 2.282{,}595$; $p < 0.01$, $I^2 = 50.144$), supporting the application of a random-effects model and suggesting the presence of moderating factors. Against this background, we conducted a sub-sample analysis to systematically explore potential moderating effects, focusing on the presented external influencing factors.

To begin, we assessed the moderating impact of economic development. The analysis indicates a significant negative correlation in both developed ($r = -0.036$; $p < 0.01$) and developing countries ($r = -0.062$; $p < 0.01$), with a statistically significant difference between these sub-samples ($Q = 44.462$; $p < 0.01$), thereby supporting Hypothesis H2. Consequently, the impact of CER on reducing the COEC is substantially more pronounced in developing countries than in developed countries.[15] This generally coincides with the predictions of institutional theory, which suggest that variations in institutional frameworks might influence customer attitudes, investor perceptions, and firm activities regarding corporate sustainability, thereby also affecting the impact of CER on COEC. Furthermore, the results generally align with previous research identifying significant disparities in the effects of corporate sustainability on COEC across different economies characterized by variations in development levels, investor protection laws, stock market efficiencies, governmental efficiencies, environmental regulations, and public awareness of environmental issues (e.g., Bui et al., 2019; Gupta, 2018; Breuer et al., 2018). However, these findings are contrary to the conventional intuition that investors would place more emphasis on corporate sustainability in more economically and financially stable surroundings as environmental aspects represent secondary concerns to pure financial returns. On this note, the disparity between the effects in developed and developing countries may be ascribed to various factors. First, developing countries typically exhibit weaker investor protection laws and lower levels of financial transparency, which heighten investors' susceptibility to information asymmetry and information risk. Enhancements in the scope and quality of environmental disclosure are therefore likely to be particularly valuable in these contexts as they serve to alleviate such risks by providing essential information that might otherwise remain inaccessible. This perspective aligns with Schreder (2018) and Souissi and Khlif (2012), who highlighted the critical moderating influence of the disclosure environment. Second, capital markets in developing countries are generally less mature and efficient, which amplifies liquidity risks for investors. In these markets, the disclosure of financial and non-financial information can significantly affect investor behavior, enhancing investors' willingness to trade stocks and thereby reducing the overall associated liquidity risks. This effect is supported by El Ghoul et al. (2017), who emphasized the moderating impact of market efficiency. Third, the regulatory and legal landscape, particularly in terms of environmental standards, is characterized by relative volatility and unpredictability. This uncertainty exposes investors in companies with poor environmental practices to heightened risks, particularly as more stringent environmental regulations could lead to significant financial penalties for these firms. However, note that the effect of CER on COEC is still economically weak in both developed and developing countries.

Next, we tested the moderating effect of financial crises. The shows a significant negative correlation for samples that include the period of the global financial crisis of 2008/09 ($r = -0.040$; $p < 0.01$) and those that do not ($r = -0.046$; $p < 0.01$), with a statistically significant difference between these sub-samples ($Q = 4.547$; $p < 0.05$), thereby supporting Hypothesis H3. Thus, the impact of CER on COEC is more pronounced in stable economic conditions rather than in times of financial and economic turmoil. However, even in such stable times, the effect remains economically weak. These results challenge the resource-based view, which posits that investments in environmental practices and reporting can strengthen financial resilience by building social capital that functions as an insurance-like protection during economic crises and thus presumably amplifying CER's impact on COEC in tumultuous times. Instead, the findings support the neoclassical view, which argues that investments in sustainability constitute a trade-off between shareholder and stakeholder value maximization by carrying risks of overinvesting. As the overinvestment risk

[15] As an additional robustness check, we applied the Financial Development Index published by the International Monetary Fund as a classification scheme regarding a countries' economic development level. This analysis yielded similar results, confirming our initial observations.

becomes particularly acute during periods of macroeconomic instability, investors will prioritize immediate financial returns over broader, long-term societal benefits. As a result, the perceived value of investments in environmental practices and disclosure is likely to decrease during times of economic and financial crises. This interpretation is corroborated by various empirical studies (e.g., El Ghoul et al., 2018, Nguyen et al., 2020b, Husser and Paulet, 2021).

Moving on, we examined the moderating effect of disclosure regulations. The analysis revealed a significant negative correlation for countries with mandatory ($r = -0.048$; $p < 0.01$) as well as voluntary disclosure ($r = -0.038$; $p < 0.01$), with a statistically significant difference between these sub-samples ($Q = 10.326$; $p < 0.01$), thereby supporting Hypothesis H4. Thus, the effect of CER on COEC is more pronounced in jurisdictions with mandatory disclosure requirements. This can be explained by the fact that mandatory reporting requirements enhance the quantity and quality as well as the reliability and comparability of disclosed information (Gulenko, 2018; Galama and Scholtens, 2021; Gerged et al., 2021; Busch and Lewandowski, 2018; Dhaliwal et al., 2014). Because of this, investors are more likely to incorporate this information into their investment decisions, thereby becoming more sensitive to a firm's sustainability. This sensitivity eventually magnifies the impact of CER on COEC. This view aligns with targeted disclosure theory, which posits that mandatory disclosure not only improves firms' environmental disclosure but also their environmental practices, potentially explaining variations in the influence of corporate sustainability based on national disclosure regulations. Our findings corroborate these theoretical and conceptual considerations and align with prior empirical research on the impact of environmental disclosure on the COEC (e.g., Yao and Liang, 2019; Fonseka et al., 2019; Gerged et al., 2021). However, it is noteworthy that the empirical evidence concerning the impact of environmental performance on financial performance did not consistently demonstrate a moderating effect for disclosure regulations (e.g., Busch and Lewandowski, 2018; Galama and Scholtens, 2021). This juxtaposition suggests that the pronounced effect of corporate sustainability on COEC in jurisdictions with mandatory disclosures is primarily due to enhanced environmental reporting and shifts in investor perception and required risk premiums rather than direct improvements in the financial performance of the firms themselves. Furthermore, it is important to note that the effect of CER on COEC is still economically weak, independent of any environmental disclosure regulations.

Similarly, we analyzed the moderating effect of performance regulations. Our analysis shows a significant negative correlation for countries with carbon tax or trading schemes ($r = -0.046$; $p < 0.01$) as well as for countries without such regulations ($r = -0.040$; $p < 0.01$), with a relatively small difference between these sub-samples ($Q = 3.298$; $p < 0.10$), thereby supporting Hypothesis H5. This indicates that the association between CER and COEC is stronger for countries with stricter environmental regulations, although to a lesser degree of statistical confidence. As these regulations may impact firms' bottom line, the stringency of these regulations increases the importance of corporate sustainability for investors depending on their ecological footprint and the resulting regulatory compliance. This effect of regulatory stringency on cost of equity matches evidence presented in the literature for cost of debt (Wang et al., 2022; Ni et al., 2022). However, even in countries that implemented regulations such as carbon emission taxes and carbon trade systems, the effect of CER on COEC remains relatively weak.

Subsequently, we evaluated the moderating effect of culture. Our analysis indicates significant but basically identical negative correlations for long-term ($r = -0.041$; $p < 0.01$) and short-term oriented cultures ($r = -0.041$; $p < 0.01$), rendering the differential statistically trivial ($Q = 0.018$; $p > 0.1$) and thereby rejecting Hypothesis H6. These findings indicate that the effect of CER on COEC is not moderated by socio-cultural background, and thus social pressure does not exert a significant influence on investors' decisions;[16] this contrasts with conventional expectations, which typically forecast a stronger impact of CER on COEC in long-term oriented cultures because investors in these settings are pressured by their societal background to focus more on future than immediate rewards. Because of this, they value a firm's sustainability initiatives more highly and are more receptive to bearing the associated costs and risks of eco-

[16] As an additional robustness check, we applied a proxy measuring the country-level public awareness of CSR issues proposed by Dhaliwal et al. (2014) as a classification scheme regarding the socio-cultural background. This analysis yielded similar results, confirming our initial observations.

investments as well as to demanding more comprehensive environmental disclosure as they weigh these elements more heavily when making investment decisions (e.g., Van der Laan Smith et al., 2010; Tsai et al., 2020).

Lastly, we also examined whether certain methodological artefacts exert a significant influence on the relationship observed between CER and COEC. The results support that the metric used to measure COEC (i.e., whether it is based on realized or expected returns; $Q = 8.180$; $p < 0.01$) as well as the design of the applied econometrical model (i.e., whether it controls for environmental performance or disclosure; $Q = 31.041$; $p < 0.01$) both affect the resulting CER-COEC link. Conversely, the effect size statistic (i.e., whether it is based on a bivariate or partial correlation coefficient; $Q = 1.983$; $p > 0.1$) as well as the applied concept for measuring CER (i.e., whether it is focused on environmental performance or disclosure; $Q = 0{,}114$; $p > 0.1$) do not exert a substantial impact.

In sum, we conclude that there is a statistically significant relationship between CER and COEC and that this relationship is significantly moderated by various external factors including economic, regulatory, and socio-cultural conditions. However, the association between CER and COEC appears to be small by conventional standards. This is true not only for the overall effect but also for the tested sub-samples considering multiple variations in external factors.

Table 2: Results of the meta-analysis

	Sample		Effect size and 95% CI/PI					Test of null		Test for Heterogeneity				
	N	k	r	CI Lower	CI Upper	PI Lower	PI Upper	Z-statistic	p-value	Q	Q_B	p-value	I^2	Tau^2
Overall	75	1.139	-0,041 ***	-0,043	-0,039	-0,083	0,000	-38,610	0,000	2.282,595 ***		0,000	50,144	0,000
Moderator variables														
Economic development											44,462 ***	0,000		
Developed countries	37	637	-0,036 ***	-0,039	-0,033	-0,087	0,015	-22,632	0,000	1.339,871 ***		0,000	52,533	0,001
Developing countries	35	190	-0,062 ***	-0,068	-0,055	-0,112	-0,010	-17,779	0,000	444,183 ***		0,000	57,450	0,001
Economic crises											4,547 **	0,033		
Including GFC 08/09	38	739	-0,040 ***	-0,042	-0,038	-0,081	0,001	-33,321	0,000	1.349,202 ***		0,000	45,301	0,000
Excluding GFC 08/09	43	400	-0,046 ***	-0,050	-0,041	-0,087	-0,004	-19,756	0,000	920,935 ***		0,000	56,674	0,000
Disclosure regulations											10,326 ***	0,001		
Mandatory disclosure	37	324	-0,048 ***	-0,053	-0,044	-0,101	0,005	-20,432	0,000	692,230 ***		0,000	53,339	0,001
Voluntary disclosure	29	433	-0,038 ***	-0,042	-0,034	-0,091	0,015	-17,872	0,000	944,584 ***		0,000	54,266	0,001
Performance regulations											3,298 *	0,069		
Existing cabon tax or trading schemes	21	249	-0,046 ***	-0,052	-0,041	-0,100	0,007	-17,726	0,000	581,220 ***		0,000	57,331	0,001
No such regulations	40	509	-0,040 ***	-0,044	-0,036	-0,094	0,013	-20,147	0,000	1.078,014 ***		0,000	52,876	0,001
Socio-cultural background											0,018	0,894		
Long-term oriented	36	339	-0,041 ***	-0,045	-0,037	-0,093	0,011	-19,274	0,000	663,709 ***		0,000	49,074	0,001
Short-term oriented	29	482	-0,041 ***	-0,045	-0,037	-0,093	0,011	-19,842	0,000	1.113,416 ***		0,000	56,800	0,001
Methodological artefacts														
Effect size statistic											1,983	0,159		
Bivariate correlation	47	209	-0,037 ***	-0,043	-0,032	-0,079	0,005	-12,744	0,000	438,599 ***		0,000	52,576	0,000
Partial correlation	66	930	-0,042 ***	-0,044	-0,040	-0,083	0,000	-36,445	0,000	1.843,160 ***		0,000	49,597	0,000
Cost of equity measurement											8,180 ***	0,004		
Realized returns	47	173	-0,034 ***	-0,039	-0,029	-0,075	0,008	-12,349	0,000	316,822 ***		0,000	45,711	0,000
Expected returns	55	966	-0,042 ***	-0,045	-0,040	-0,083	-0,001	-36,865	0,000	1.938,912 ***		0,000	50,230	0,000
Environmental measurement											0,114	0,736		
Disclosure	43	484	-0,041 ***	-0,044	-0,037	-0,082	0,001	-23,385	0,000	1.024,761 ***		0,000	52,867	0,000
Performance	55	655	-0,041 ***	-0,044	-0,039	-0,083	0,000	-30,747	0,000	1.252,065 ***		0,000	47,766	0,000
Controll for performance/disclosure											31,041 ***	0,000		
Including control	13	249	-0,046 ***	-0,052	-0,041	-0,100	0,007	-17,726	0,000	581,220 ***		0,000	57,331	0,001
Excluding control	74	509	-0,040 ***	-0,044	-0,036	-0,094	0,013	-20,147	0,000	1.078,014 ***		0,000	52,876	0,001

Note: N = number of studies; k = number of effect sizes; r = mean effect size; CI = confidence interval (lower and upper bound); PI = prediction interval (lower and upper bound); Q = Q statistic; Q_B = between-group Q statistic

* p < 0.10; ** p < 0.05; *** p < 0.01

Next, we tested for a potential publication bias.

Table 3 presents the FAT-PET-PEESE results to analytically assess potential publication biases. The model was applied not only to the overall sample but also to all tested sub-samples to ensure a comprehensive assessment.

For the overall sample, the FAT reveals that the tested regression coefficient is statistically significant (ß1 = -0.110; $p < 0.01$), suggesting a dependency of effect size estimates on their corresponding precision and thus indicating a publication bias. However, the magnitude of this publication bias is considered small given the statistical significance and the value of the regression coefficient. Moreover, the PET indicates a statistically significant intercept (ß0 = -0.037; $p < 0.01$), which confirms a true effect beyond the identified publication bias. Complementing this, the PEESE results demonstrate an adjusted mean effect size ($r = -0.040$; $p < 0.01$) that is almost identical with the unadjusted mean effect size ($r = -0.041$; $p < 0.01$), suggesting only minimal distortion from publication selection. Therefore, the general conclusion that there is a significant negative association between CER and COEC remains valid, irrespective of potential distortions form publication bias.

For the sub-samples, the FAT also identifies various publication biases, though these are similarly small. Moreover, the PET affirms a genuine effect size across all sub-samples, beyond the identified biases. The PEESE results indicate minimal differences between the adjusted and unadjusted effect sizes in most sub-samples.

Table 3: Results of the FAT-PET-PEESE analysis

	Sample		Effect size	Test for Publication Bias		
	N	K	r	FAT coefficient	PET intercept	PEESE intercept
Overall	75	1.139	-0,041 ***	-0,110 ***	-0,037 ***	-0,040 ***
Moderator variables						
Economic development						
Developed countries	37	637	-0,036 ***	0,016	-0,036 ***	-0,036 ***
Developing countries	35	190	-0,062 ***	-0,332 **	-0,051 ***	-0,061 ***
Economic crises						
Including GFC 08/09	38	739	-0,040 ***	-0,131 ***	-0,035 ***	-0,038 ***
Excluding GFC 08/09	43	400	-0,046 ***	0,191	-0,055 ***	-0,050 ***
Disclosure regulations						
Mandatory disclosure	37	324	-0,048 ***	-0,442 ***	-0,034 ***	-0,040 ***
Voluntary disclosure	29	433	-0,038 ***	-0,004	-0,038 ***	-0,038 ***
Performance regulations						
Existing cabon tax or trading schemes	21	249	-0,046 ***	-0,351 ***	-0,035 ***	-0,041 ***
No such regulations	40	509	-0,040 ***	-0,197 *	-0,034 ***	-0,036 ***
Socio-cultural background						
Long-term oriented	36	339	-0,041 ***	-0,061	-0,035 ***	-0,037 ***
Short-term oriented	29	482	-0,041 ***	-0,031	-0,040 ***	-0,040 ***
Methodological artefacts						
Effect size statistic						
Bivariate correlation	47	209	-0,037 ***	-0,063	-0,035 ***	-0,037 ***
Partial correlation	66	930	-0,042 ***	-0,110 ***	-0,037 ***	-0,040 ***
Cost of equity measurement						
Realized returns	47	173	-0,034 ***	-0,348 ***	-0,026 ***	-0,030 ***
Expected returns	55	966	-0,042 ***	-0,065 *	-0,040 ***	-0,042 ***
Environmental measurement						
Disclosure	43	484	-0,041 ***	-0,357 ***	-0,030 ***	-0,035 ***
Performance	55	655	-0,041 ***	-0,058	-0,038 ***	-0,040 ***
Controll for performance/disclosure						
Including control	74	509	-0,040 ***	-0,104 ***	-0,039 ***	-0,042 ***
Excluding control	13	249	-0,046 ***	-0,110	-0,025 ***	-0,025 ***

Note: N = number of studies; k = number of effect sizes; r = mean effect size; FAT = funnel asymmetry test (regression coefficient β_1 in Equation 10); PET = precision-effect test (regression intercept β_0 Equation 10); PEESE = precision-effect estimate with standard error (regression intercept β_0 in Equation 11); * p < 0.10; ** p < 0.05; *** p < 0.01

4.2. Meta-regression results

Table 4 presents the meta-regression results for the modulated association between CER and COEC, partial to the identified moderating factors and methodological artefacts.

Model 1 incorporates just one intercept to depict the unadjusted direct relationship between CER and COEC, free from moderating impacts, paralleling the results from the meta-analysis. Model 2 introduces the standard error of the effect sizes to mitigate distortions from publication bias, thereby refining the relationship in alignment with the FAT-PET results. Model 3 added the control variables to account for potential effects from methodological artefacts, including statistical basis for the effect sizes differentiated by bivariate and partial correlations (ES); the methodology to estimate COEC using realized versus expected returns (COE); measurement criteria for CER focusing on environmental performance versus disclosure (ENV); and the econometric model considering controls for environmental performance and control (CONTROL). Interestingly, the inclusion of these control variables improved the model's explanatory power, particularly the proportion of the total variance in the true effect size that is explained by the model ($R^2 = 0.19$).

Following this, Models 4 to 8 systematically incorporate the moderating variables, with each addition aimed at assessing their individual effects on the CER-COEC relationship partial to the methodological controls and the publication bias adjustments already included. This sequential integration allowed for a detailed examination of the unique impact of each moderator and its contribution to the variance observed in the CER-COEC relationship.

Lastly, Model 9 integrates all moderating variables simultaneously, facilitating a comprehensive analysis. This fully integrated model scrutinizes each moderator's individual influence while controlling for the effects of all others, thus assessing their partial impacts. It also explores the collective and interactive contributions of these moderators to the CER-COEC relationship. Additionally, this model evaluates overall explanatory power, quantifying how well these combined moderators account for the observed variations in the link between CER and the COEC.

The meta-regression analysis consistently yields a statistically significant yet economically weak relationship between CER and COEC, represented by the respective intercept, across all tested Models 1 to 9, thereby reinforcing Hypothesis 1. Moreover, Model 9 confirms that all moderators are individually and simultaneously statistically significant and thus separately and jointly influence the CER-COEC link ($Q = 134.460$; $p < 0.01$). It also demonstrates robust explanatory power ($R^2 = 0.34$), accounting for a significant proportion of the variance in the true effect size (Stanley and Doucouliagos, 2012). The external factors pertaining to both the economic conditions (ECON and CRISIS) and the regulatory frameworks (REGULATION_DISC and REGULATION_PERF) consistently exhibit a statistically significant moderating effect, partial to the included methodological artefacts as well as all other moderators. This matches the meta-analysis results and further corroborates Hypotheses 2, 3, 4 and 5. The influence of socio-cultural background (CULTURE), however, presents a more nuanced picture as it appears statistically significant only in conjunction with the other factors, highlighting the complex interactions between various external conditions. Although this pattern aligns with the theoretical notion that the effect of CER on COEC is magnified in long-term oriented societies and thus tentatively supports Hypothesis 6, it lacks conclusive evidence and thus does not definitively establish the moderating role of culture in the CER-COEC link.

Table 4: Results of the meta-regression

	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)	Model (7)	Model (8)	Model (9)
Intercept	-0,041 ***	-0,037 ***	-0,044 ***	-0,053 ***	-0,052 ***	-0,040 ***	-0,042 ***	-0,045 ***	-0,055 ***
	(0,001)	(0,002)	(0,002)	(0,003)	(0,003)	(0,002)	(0,002)	(0,002)	(0,004)
SE(Zr)		-0,110 ***	-0,084 **	-0,080 **	-0,063 *	-0,089 **	-0,089 **	-0,092 ***	-0,066 *
		(0,035)	(0,035)	(0,035)	(0,036)	(0,035)	(0,036)	(0,036)	(0,035)
Moderator variables									
ECON				0,013 ***					0,015 ***
				(0,002)					(0,002)
CRISIS					0,009 ***				0,008 ***
					(0,003)				(0,003)
REGULATION_DISC						-0,008 ***			-0,012 ***
						(0,002)			(0,003)
REGULATION_PERF							-0,004 *		-0,007 *
							(0,003)		(0,004)
CULTURE								0,003	-0,001
								(0,002)	(0,002)
Methodological artefacts									
ES			0,004	0,001	0,006 *	0,006 *	0,005	0,004	0,005
			(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)
COE			0,010 ***	0,014 ***	0,010 ***	0,009 ***	0,009 ***	0,010 ***	0,014 ***
			(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)
ENV			0,002	0,007 ***	0,001	-0,001	0,001	0,003	0,001
			(0,002)	(0,002)	(0,002)	(0,002)	(0,002)	(0,002)	(0,002)
CONTROLL			0,017 ***	0,013 ***	0,018 ***	0,015 ***	0,016 ***	0,016 ***	0,012 ***
			(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)	(0,003)
Observations	1.139	1.139	1.139	1.139	1.139	1.139	1.139	1.139	1.139
Q(model)	0,000	9,700 ***	61,060 ***	96,590 ***	75,630 ***	72,350 ***	63,920 ***	63,580 ***	134,460 ***
R2	0,00	0,06	0,19	0,27	0,22	0,21	0,19	0,22	0,34

Note: The dependent variable is represented by the correlation between CER and COEC; ECON pertains to the level of the countries' economic development, categorizing countries as developed (coded 1) vs developing (coded 0); CRISIS pertains to the studies' sample period, distinguishing between studies that include the global financial crisis of 2008/09 (coded 1) vs studies that do not (coded 0); REGULATION_DISC pertains to the countries' disclosure regulations, categorizing countries with mandatory disclosure (coded 1) vs voluntary disclosure (coded 0); REGULATION_PERF pertains to the countries' performance regulations, categorizing countries with existing carbon tax or trade schemes (coded 1) vs those without such regulations (coded 0); CULTURE pertains to the countries' socio-cultural background, categorizing countries as long-term-oriented (coded 1) vs short-term-oriented (coded 0); ES pertains to the statistical basis of the effect size, distinguishing between effect sizes based on bivariate correlations (coded 1) vs partial correlations (coded 0); COE pertains to the methodology of the cost of equity estimate, distinguishing between estimates based on realized returns (coded 1) vs expected returns (coded 0); ENV pertains to the measurement of CER, distinguishing between measurements of a firm's environmental performance (coded 1) or disclosure (coded 0); CONTROL pertains to the studies' econometrically model, distinguishing between studies that control for environmental performance/disclosure (coded 1) vs studies that do not (coded as 0); the analysis is based on Equation 12; standard errors are presented in parentheses; * p < 0.10; ** p < 0.05; *** p < 0.01.

5. Conclusion

This study represents a meta-analytical review of the existing literature on the CER-COEC link. The findings confirm a statistically significant but economically weak correlation between CER and COEC, suggesting that while investors consider corporate sustainability in their decisions, its impact on COEC is limited. This association holds robust across various methodological and statistical tests. Furthermore, the findings show that external factors significantly moderate the CER-COEC relationship. Stricter environmental regulations, such as mandatory disclosures and carbon taxes, heighten investor attention to sustainability, though the economic significance remains weak. Economic conditions also play a critical role, with investors prioritizing financial metrics over sustainability during financial crises, while those in developing countries place greater emphasis on CER than their counterparts in developed nations. Socio-cultural factors, such as long-term versus short-term orientations, show no consistent moderating effect, indicating minimal influence on investment strategies.

The study features several limitations to note, many of which are characteristic of meta-analytical reviews, particularly considering the domain and scope of this review. First, a few primary studies had to be excluded as they examined the impact of CER on a portfolio level or assumed a broader perspective and analyzed the effect of CSR or ESG. However, the underlying sample may still be sufficient to derive reliable and representative conclusions. Second, the included primary studies employ a diverse array of methodologies to assess CER.[17] These methodologies include performance metrics ranging from public environmental ratings and proprietary scores to emissions data and governance features such as environmental committees, as well as disclosure metrics varying from standalone environmental reports to public or proprietary disclosure scores. However, despite this methodological heterogeneity, each method uniquely captures specific environmental facets of corporate actions, justifying their collective analysis in this meta-study and reflecting the multi-faceted nature of CER. Third, the identification and selection of the moderating factors tested in this study was based on and constrained by the available evidence and data within the existing literature. As a result, several potential moderators on the firm, industry, and country levels could not be examined. While this constrained scope may appear to be a limitation, it highlights the gaps in the existing literature and in turn delineates areas for future research to explore.

Regardless of these limitations, the study carries significant practical implications, particularly for policymakers. The findings indicate that social pressure alone may not be sufficient to steer investors toward green investments, underscoring the vital role of government agencies in setting laws and regulations that encourage sustainable corporate behavior. Nonetheless, while measures such as mandatory disclosure requirements and carbon taxes appear to heighten investor attention to environmental performance, their overall effect on capital allocation remains modest. This suggests a need for even stronger or more comprehensive policy frameworks to meaningfully shift investor behavior and direct capital toward climate-friendly initiatives. By tightening existing disclosure requirements, raising carbon taxes, or introducing new market-based mechanisms, policymakers can create more robust incentives for firms and investors alike to prioritize sustainability. Ultimately, such measures can help reorient capital flows to better address climate risks, foster corporate innovation in environmental responsibility, and contribute to the achievement of broader sustainability goals.

Apart from that, the study makes important contributions to the literature. To begin with, the study contributes to the debate on the equity greenium. On the one hand, it provides further evidence of a negative relationship between corporate sustainability and the cost of equity capital, indicating a negative greenium – i.e., lower expected returns on green compared to brown assets – albeit small in magnitude. On the other hand, it reinforces the crucial role of external factors, notably the economic context and regulatory landscape, in moderating this effect.

[17] This is also in line with previous meta-analytical reviews (e.g., Dixon-Fowler et al., 2013; Orlitzky, 2001; Orlitzky et al., 2003; Endrikat et al., 2014; Endrikat et al., 2020; Hang et al., 2019).

Apart from this, the study provides valuable insights for researchers by offering a benchmark and guideline for future research. As the study aggregates and synthesizes existing empirical evidence and thereby sheds light on the overall relationship between CER and COEC, researchers can use the study's results as a benchmark for their own findings, viewing these conclusions as a tentative and temporary consensus. Additionally, as the study highlights specific study characteristics that moderate the CER-COEC link, it can serve as a crucial guide for researchers to structure the framework of future investigations, including the sample and the econometric model. For example, when employing a global sample, researcher should account for variations in economic conditions, the regulatory framework, and potentially cultural factors, all of which may affect the CER-COEC link. Additionally, in longitudinal studies, researchers should recognize that the impact of CER on COEC changes over time, although only slightly. The econometric design, and particularly the controls for performance and disclosure, also significantly shapes the observed relationship.

Finally, the study opens avenues for future research. One potential area involves exploring the effect of ownership structure on the CER-COEC relationship. Different shareholder types, such as individual, institutional, family, government, or insider shareholders, may prioritize financial versus non-financial returns differently, influencing their required returns in relation to CER and thus modulating the CER-COEC relationship, as indicated by findings from, among others, Khlif et al. (2015), Xu et al. (2015), and Ould Daoud Ellili (2020). Furthermore, researchers might explore whether the relationship between CER and COEC is indeed linear or, as suggested by Gerged et al. (2021), more nuanced. For example, the relationship may be U-shaped given that improvements in CER require substantial investments and thus potentially entail non-trivial risks. Lastly, we encourage researchers to pursue further meta-analyses to elucidate the interconnections between corporate sustainability and its financial implications within capital markets. More specifically, a detailed meta-analysis examining the relationship between CER and the cost of debt capital would illuminate the complexities linking corporate sustainability practices with financial strategies from debt capital providers. Additionally, exploring the associations between corporate governance and the cost of capital, including both equity and debt, through meta-analytical approaches could significantly advance our understanding of the broader scope of corporate responsibility.

References

Adler, N. (1997). International dimensions of organizational behavior. International Thompson Publishing.

Aerts, W, Cormier, D., & Magnan, M. (2008). Corporate environmental disclosure, financial markets and the media: An international perspective. Ecological Economics 64 (3), 643–659.

*Albarrak, M. S., Elnahass, M., & Salama, A. (2019). The effect of carbon dissemination on cost of equity. Business Strategy and the Environment 28 (6), 1179–1198.

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate Social Responsibility and Firm Risk: Theory and Empirical Evidence. Management Science 65 (10), 4451–4469.

Alessi, L., Ossola, E., & Panzica, R. (2021). What greenium matters in the stock market? The role of greenhouse gas emissions and environmental disclosures. Journal of Financial Stability, 54, 100869.

Alessi, L., Ossola, E., & Panzica, R. (2023). When do investors go green? Evidence from a time-varying asset-pricing model. International review of financial analysis, 90, 102898.

Alshehhi, A., Nobanee, H., & Khare, N. (2018). The Impact of Sustainability Practices on Corporate Financial Performance: Literature Trends and Future Research Potential. Sustainability 10 (2), 494.

*Alviani, L., & Sholihin, M. (2015). Does Eco-Efficency Reduce the Cost of Equity Capital? Empirical Evidence from Indonesia. Journal of Indonesian Economy and Business 30 (2), 173–182.

Al-Tuwaijri, S. A., Christensen, T. E., & Hughes, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: A simultaneous equations approach. Accounting, Organizations and Society, 29(5), 447–471.

Amiraslani, H., Lins, K. V., Servaes, H., & Tamayo, A. N.E. (2017): A Matter of Trust? The Bond Market Benefits of Corporate Social Capital During the Financial Crisis.

Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. Journal of financial Economics, 17(2), 223-249.

*Anifowose, M., Abang, S., & Zakari, M. A. (2020). Integrated capitals reporting and companies' sustainable value: evidence from the Asian continent. Asian Review of Accounting 28 (4), 567–589.

Arthur, W., Winston, B., & Huffcutt, A. I. (2001). Conducting Meta-Analysis Using SAS. New York: Psychology Press.

*Atasel, O. Y., Güneysu, Y., & Ünal, H. (2020). Impact of Environmental Information Disclosure on Cost of Equity and Financial Performance in an Emerging Market: Evidence from Turkey. Ekonomika 99 (2), 76–91.

*Bachoo, K., Tan, R., & Wilson, M. (2013). Firm Value and the Quality of Sustainability Reporting in Australia. Australian Accounting Review 23 (1), 67–87.

Baker, M., Bergstresser, D., Serafeim, G., & Wurgler, J. (2018). Financing the response to climate change: The pricing and ownership of US green bonds (No. w25194). National Bureau of Economic Research.

Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. Journal of business ethics, 97, 71-86.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of management, 17(1), 99-120.

*Bassen, A., Meyer, K., & Schlange, J. (2006). The Influence of Corporate Responsibility on the Cost of Capital.

Becchetti, L., Ciciretti, R., & Hasan, I. (2015). Corporate social responsibility, stakeholder risk, and idiosyncratic volatility. Journal of Corporate Finance, 35, 297-309.

Benlemlih, M. (2017). Corporate social responsibility and firm financing decisions: A literature review. Journal of Multinational Financial Management 42-43 (3), 1–10.

*Berkman, H., Jona, J., & Soderstrom, N. S. (2019). Firm-Specific Climate Risk and Market Valuation.

Barry, C. B., & Brown, S. J. (1985). Differential information and security market equilibrium. Journal of financial and quantitative analysis, 20(4), 407-422.

Barry, C. B., & Brown, S. J. (1986). Limited information as a source of risk. The Journal of Portfolio Management, 12(2), 66-72.

Bassen, A., Shu, H., & Tan, W. (2023). Green revenues and stock returns: Cross-market evidence. Finance Research Letters, 52, 103550.

Bauer, M. D., Huber, D., Rudebusch, G. D., & Wilms, O. (2022). Where is the carbon premium? Global performance of green and brown stocks. Journal of Climate Finance, 1, 100006.

Bhushan, R. (1989). Collection of information about publicly traded firms: Theory and evidence. Journal of Accounting and Economics, 11(2-3), 183-206.

Barnett, M. (2023). Climate change and uncertainty: An asset pricing perspective. Management Science, 69(12), 7562-7584.

Bijmolt, T. H. A., & Pieters, R. G. M. (2001). Meta-Analysis in Marketing when Studies Contain Multiple Measurements. Marketing Letters 12 (2), 157–169.

*Bonetti, P., Cho, C. H., & Michelon, G. (2015). Environmental Disclosure and the Cost of Capital: Evidence from the Fukushima Nuclear Disaster.

Bolton, P., & Kacperczyk, M. (2023). Global pricing of carbon-transition risk. The Journal of Finance, 78(6), 3677-3754.

*Bose, S. (2014). Capital market impact of the disclosure, assurance and management of greenhouse gas (GHG) emissions: an international study. Dissertation. University of New South Wales. Australian School of Business.

Borenstein, M., Hedges, L. V., Higgins, J. P. T., & Rothstein, H. R. (2009). Introduction to meta-analysis. John Wiley & Sons.

Boubaker, S., Cellier, A., Manita, R., & Saeed, A. (2020). Does corporate social responsibility reduce financial distress risk? Economic Modelling 91, 835–851.

Boubakri, N., El Ghoul, S., Guedhami, O., & Wang, H. (2021). Corporate social responsibility in emerging market economies: Determinants, consequences, and future research directions. Emerging Markets Review 46, 100758.

*Boubakri, N., Guedhami, O., Kwok, C., & Wang, H. (2019). Is privatization a socially responsible reform? Journal of Corporate Finance 56, 129–151.

Botosan, C. A. (1997). Disclosure level and the cost of equity capital. Accounting review, 323-349.

Botosan, C. A., & Plumlee, M. A. (2002). A re-examination of disclosure level and the expected cost of equity capital. Journal of accounting research, 40(1), 21-40.

*Brahmana, R. K., You, H. W., & Razali, W. M. (2016). Climate change mitigation and the cost of equity: evidence from Malaysia. International Journal of Green Economics 10 (3/4), 327–337.

Bradley, M., Schipani, C. A., Sundaram, A. K., & Walsh, J. P. (1999). The purposes and accountability of the corporation in contemporary society: corporate governance at a crossroads. Law and Contemporary Problems, 62 (3), 9-86.

*Breuer, W., Müller, T., Rosenbach, D. & Salzmann, A. (2018). Corporate social responsibility, investor protection, and cost of equity: A cross-country comparison. Journal of Banking & Finance 96 (3), 34–55.

Brouwers, R., Schoubben, F., van Hulle, C., & van Uytbergen, S. (2014). The link between corporate environmental performance and corporate value: A literature review. Review of Business and Economic Literature 58 (4), 343–374.

*Bui, B., Moses, O., & Houqe, M. N. (2019). Carbon disclosure, emission intensity and cost of equity capital: multi-country evidence. Accounting & Finance 60 (1), 47–71.

Busch, T., & Lewandowski, S. (2018). Corporate Carbon and Financial Performance: A Meta-analysis. Journal of Industrial Ecology 22 (4), 745–759.

Buchanan, B., Cao, C. X., & Chen, C. (2018). Corporate social responsibility, firm value, and influential institutional ownership. Journal of Corporate Finance, 52, 73-95.

Cai, Y., Pan, C. H., & Statman, M. (2016). Why do countries matter so much in corporate social performance? Journal of Corporate Finance 41, 591–609.

Carvalho, N., & Murcia, F. D. R. (2016). The Relationship Between Integrated Reporting and Cost of Capital. Chiara, M (Ed.). Integrated Reporting: Palgrave Macmillan, London, 253–268.

Cespa, G., & Cestone, G. (2007). Corporate social responsibility and managerial entrenchment. Journal of Economics & Management Strategy, 16(3), 741-771.

*Chalwati, A. (2018). The level of greenwashing and cost of equity capital. Dissertation. The Hong Kong Polytechnic University. School of Accounting and Finance.

*Chava, S. (2014). Environmental Externalities and Cost of Capital. Management Science 60 (9), 2223–2247.

Chaikumbung, M., Doucouliagos, H., & Scarborough, H. (2016). The economic value of wetlands in developing countries: A meta-regression analysis. Ecological Economics, 124, 164-174.

*Chen, Y. (2017). The informational role of corporate carbon performance in the stock market. Dissertation. The University of Adelaide. Business School.

*Chen, R. C. Y., Lee, C. H., & Hung, S. W. (2020). The relationship between ex-ante cost of equity capital and corporate social responsibility in introductory and maturity period. Corporate Social Responsibility and Environmental Management 27 (2), 1089–1107.

*Chen, L. H., & Silva-Gao, L (2011). The Pricing of Climate Risk.

Cheung, S. F., & Chan, D. K. S. (2004). Dependent Effect Sizes in Meta-Analysis: Incorporating the Degree of Interdependence. Journal of Applied Psychology 89 (5), 780–791.

Christensen, D. M., Serafeim, G., & Sikochi, A. (2022). Why is Corporate Virtue in the Eye of The Beholder? The Case of ESG Ratings. The Accounting Review 97 (1), 147–175.

Clark, G. L., Feiner, A., & Viehs, M. (2015). From the Stockholder to the Stakeholder: How Sustainability Can Drive Financial Outperformance.

Clark, G. L., & Viehs, M. (2014). The Implications of Corporate Social Responsibility for Investors: An Overview and Evaluation of the Existing CSR Literature.

Clarkson, P. M., Overell, M. B., & Chapple, L. (2011). Environmental reporting and its relation to corporate environmental performance. Abacus, 47(1), 27–60.

*Clarkson, P. M., Fang, Y. H., & Li, Y. (2010). The relevance of environmental disclosure for investors and other stakeholder groups: which audience are firms speaking to?

*Clarkson, P. M., Fang, X., Li, Y., & Richardson, G. (2013). The relevance of environmental disclosures: Are such disclosures incrementally informative? Journal of Accounting and Public Policy 32 (5), 410–431.

Coles, J. L., Loewenstein, U., & Suay, J. (1995). On equilibrium pricing under parameter uncertainty. Journal of Financial and Quantitative analysis, 30(3), 347-364.

*Connors, E., & Johnston, H. H. (2013). Voluntary Environmental Disclosures in 10-Ks and Environmental Reports: Determinants and Relationship to Firm Risk Premium.

*Connors, E., & Silva-Gao, L. (2008). The impact of environmental risk on the cost of equity capital: evidence from the toxic release inventory.

*Cormier, D., Lapointe-Antunes, P., & Magnan, M. (2015). Does corporate governance enhance the appreciation of mandatory environmental disclosure by financial markets? Journal of Management & Governance 19 (4), 897–925.

*Cormier, D., Ledoux, M. J., & Magnan, M. (2011). The informational contribution of social and environmental disclosures for investors. Management Decision 49 (8), 1276–1304.

*Darmawan, A., & Laura, S. (2019). Does Eco-Efficiency Reduce the Cost of Equity Capital? International Conference on Applied Economics and Social Science.

Daugaard, D., & Ding, A. (2022). Global Drivers for ESG Performance: The Body of Knowledge. Sustainability 14 (4), 2322.

Deloitte (2022). Ingraining sustainability in the next era of ESG investing. New opportunities are emerging for investment managers to adapt as investors preferences evolve. With assistance of A. Khan, H. Bachman, D. Poddar, A. K. Saha.

Del Mar Miras-Rodríguez, M., Carrasco-Gallego, A., & Escobar-Pérez, B. (2015): Are Socially Responsible Behaviors Paid Off Equally? A Cross-cultural Analysis. Corporate Social Responsibility and Environmental Management 22 (4), 237–256.

*Déjean, F., & Martinez, I. (2009). Environmental Disclosure and the Cost of Equity: The French Case. Accounting in Europe 6 (1), 57–80.

Dhaliwal, D., Li, O. Z., Tsang, A., & Yang, Y. G. (2014). Corporate social responsibility disclosure and the cost of equity capital: The roles of stakeholder orientation and financial transparency. Journal of Accounting and Public Policy 33 (4), 328–355.

Dhaliwal, D., Li, O. Z., Tsang, A., & Yang, Y. G. (2011). Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. The Accounting Review 86 (1), 59–100.

Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, liquidity, and the cost of capital. The journal of Finance, 46(4), 1325-1359.

DiMaggio, P. J., & Powell, W. W. (1983). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. American Sociological Review 48 (2), 147.

Dixon-Fowler, H. R., Slater, D. J., Johnson, J. L., Ellstrand, A. E., & Romi, A. M. (2013). Beyond “Does it Pay to be Green?” A Meta-Analysis of Moderators of the CEP–CFP Relationship. Journal of Business Ethics 112 (2), 353–366.

Doan, M. H., & Sassen, R. (2020). The relationship between environmental performance and environmental disclosure: A meta-analysis. Journal of Industrial Ecology 24 (5), 1140–1157.

Doucouliagos, C. (2011). How large is large? Preliminary and relative guidelines for interpreting partial correlations in economics.

Doucouliagos, C., & Stanley, T. D. (2013). Are all economic facts greatly exaggerated? Theory competition and selectivity. Journal of Economic Surveys, 27(2), 316-339.

Easley, D., & O'Hara, M. (2004). Information and the cost of capital. The journal of finance, 59(4), 1553-1583.

Egger, M., Davey S. G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple graphical test. British Medical Journal 316, 629–634.

Ehlers, T., Elsenhuber, U., Jegarasasingam, A., & Jondeau, E. (2022). Deconstructing ESG scores: How to invest with your own criteria. BIS Working Papers No 1008.

*El Ghoul, S., Guedhami, O., Kwok, C., & Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? Journal of Banking & Finance 35 (9), 2388–2406.

El Ghoul, S., Guedhami, O., & Kim, Y. (2017). Country-level institutions, firm value, and the role of corporate social responsibility initiatives. Journal of International Business Studies 48 (3), 360–385.

*El Ghoul, S., Guedhami, O., Kim, H., & Park, K. (2018). Corporate Environmental Responsibility and the Cost of Capital: International Evidence. Journal of Business Ethics 149 (2), 335–361.

*Eichholtz, P, Barron, P, & Yönder, E. (2018). Sustainable REITs: REIT environmental performance and the cost of equity. In Parker, D. (Ed.). The Routledge REITs research handbook. Abingdon, Oxon, New York, NY: Routledge is an imprint of the Taylor & Francis Group an Informa Business, 77–94.

Endrikat, J., Guenther, E., & Hoppe, H. (2014). Making sense of conflicting empirical findings: A meta-analytic review of the relationship between corporate environmental and financial performance. European Management Journal 32 (5), 735–751.

Endrikat, J., Villiers, C., Guenther, T. W., & Guenther, E. M. (2020). Board Characteristics and Corporate Social Responsibility: A Meta-Analytic Investigation. Business & Society 118 (2), 1-37.

Engle, R. F., Giglio, S., Kelly, B., Lee, H., & Stroebel, J. (2020). Hedging climate change news. The Review of Financial Studies, 33(3), 1184-1216.

Erauskin-Tolosa, A., Zubeltzu-Jaka, E., Heras-Saizarbitoria, I., & Boiral, O. (2020). ISO 14001, EMAS and environmental performance: A meta-analysis. Business Strategy and the Environment 29 (3), 1145–1159.

*Eriandani, R., Narsa, I. M., & Irwanto, A. (2019). Environmental Risk Disclosure and Cost of Equity. Polish Journal of Management Studies 19 (2), 124–131.

Eskildsen, M., Ibert, M., Jensen, T. I., & Pedersen, L. H. (2024). In search of the true greenium.

*Fahad, P., & Busru, S. A. (2021). CSR disclosure and firm performance: evidence from an emerging market. Corporate Governance: The International Journal of Business in Society 21 (4), 553–568.

Fang, C., & Zhang, J. (2018). Performance of green supply chain management: A systematic review and meta-analysis. Journal of Cleaner Production 183 (1), 1064–1081.

*Felisha, F., & Rossieta, H. (2017). Is Environmental Performance Valued by Investors? The Case of Indonesian Listed Companies. International Accounting Conference.

Feld, L. P., Heckemeyer, J. H., & Overesch, M. (2013). Capital structure choice and company taxation: A meta-study. Journal of Banking & Finance, 37(8), 2850-2866.

*Feng, Z. Y., Wang, M. L., & Huang, H. W. (2014). Research Note: Corporate Social Responsibility and Equity Financing in the Global Tourism Industry. Tourism Economics 20 (4), 869–883.

*Feng, Z. Y., Wang, M. L., & Huang, H. W. (2015). Equity Financing and Social Responsibility: Further International Evidence. The International Journal of Accounting 50 (3), 247–280.

*Fernandes, S. M. (2013). The Influence of Environmental Disclosure on Capital Structure of Brazilian Companies listed on the BM&FBovespa. Sociedade, Contabilidade e Gestão 7 (2), 41–54.

*Fonseka, M., Rajapakse, T., & Tian, G. L. (2019). The Effects of Environmental Information Disclosure and Energy Types on the Cost of Equity: Evidence from the Energy Industry in China. Abacus 55 (2), 362–410.

Francis, J., Hanna, J. D., & Philbrick, D. R. (1997). Management communications with securities analysts. Journal of Accounting and Economics, 24(3), 363-394.

Francis, J., Nanda, D., & Olsson, P. (2008). Voluntary disclosure, earnings quality, and cost of capital. Journal of Accounting Research, 46, 53–99.

Frost, J. (2024). Regression analysis: An intuitive guide for using and interpreting linear models. Statistics By Jim Publishing.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. Journal of Sustainable Finance & Investment 5 (4), 210–233.

Fidrmuc, J., & Lind, R. (2020). Macroeconomic impact of Basel III: Evidence from a meta-analysis. Journal of Banking & Finance, 112, 105359.

Friedman, M. (1970). The social responsibility of business is to increase its profits. New York Times Magazine, 13(32–33), 122–124.

Freeman, R. E. (1984). Strategic Management: A Stakeholder Approach. Pitman.

Freeman, R. E., & McVea, J. (2002). A stakeholder approach to strategic management. Working Paper No. 01-02

FTSE Russell (2022). Sustainable Investment: 2021 global survey findings from asset owners. London Stock Exchange Group plc.

Galama, J. T., & Scholtens, B. (2021). A meta-analysis of the relationship between companies' greenhouse gas emissions and financial performance. Environmental Research Letters 16 (4), 43006.

*Garzón-Jiménez, R., & Zorio-Grima, A. (2021). Effects of Carbon Emissions, Environmental Disclosures and CSR Assurance on Cost of Equity in Emerging Markets. Sustainability 13 (2), 696.

*Gerged, A. M., Matthews, L., & Elheddad, M. (2021). Mandatory disclosure, greenhouse gas emissions and the cost of equity capital: UK evidence of a U-shaped relationship. Business Strategy and the Environment 30 (2), 908–930.

Gianfrate, G., Schoenmaker, D., & Wasama, S. (2015). Cost of capital and sustainability: a literature review. Rotterdam School of Management.

Giese, G., Lee, L. E., Melas, D., Nagy, Z., & Nishikawa, L. (2019). Foundations of ESG investing: How ESG affects equity valuation, risk, and performance. Journal of portfolio management, 45(5), 69-83.

Giese, G., Nagy, Z., & Rauis, B. (2021). Foundations of climate investing: How equity markets have priced climate-transition risks. Journal of Portfolio Management, 47(9), 35-53.

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. Journal of Corporate Finance 66, 101889.

Global Change Data Lab (2023). https://ourworldindata.org/carbon-pricing

P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. Strategic management journal, 30(4), 425-445.

Govindan, K, Rajeev, A., Padhi, S. S., & Pati, R. K. (2020). Supply chain sustainability and performance of firms: A meta-analysis of the literature. Transportation Research Part E: Logistics and Transportation Review 137 (5), 101923.

Governance & Accountability Institute (2021). Sustainability Reporting in Focus.

Gòis, A. D., de Lima, G. A. S. F., de Sousa, N. A., & Malacrida, M. J. C. (2018): The effect of national culture on the relationship between IFRS adoption and the cost of equity capital. Journal of International Accounting Research, 17 (3), 69–85.

*Gregory, A., Tharyan, R., & Whittaker, J. (2013). Corporate social responsibility and firm value: disaggregating the effects on cash flow, risk and growth.

Gray, S. J., Kang, T., Yoo, & Y. K. (2013): National Culture and International Differences in the Cost of Equity Capital. Management International Review 53, (6), 899–916.

Gulenko, M. (2018). Mandatory CSR reporting - literature review and future developments in Germany. Sustainability Management Forum 26 (1-4), 3–17.

Guiso, L., Sapienza, P., & Zingales, L. (2004). The role of social capital in financial development. American economic review, 94(3), 526-556.

*Gupta, K. (2018). Environmental Sustainability and Implied Cost of Equity: International Evidence. Journal of Business Ethics 147 (2), 343–365.

Hail, L., & Leuz, C. (2006). International differences in cost of equity: Do legal institutions and securities regulation matter? Journal of Accounting Research 44: 485–531.

Handa, P., & Linn, S. C. (1993). Arbitrage pricing with estimation risk. Journal of Financial and Quantitative analysis, 28(1), 81-100.

Hang, M., Geyer-Klingeberg, J., & Rathgeber, A. W. (2019). It is merely a matter of time: A meta-analysis of the causality between environmental performance and financial performance. Business Strategy and the Environment 28 (2), 257–273.

*He, D. L. (2017). Carbon Disclosure and the Cost of Capital. Annual International Conference on Management, Economics and Social Development.

*He, Y., Tang, Q., & Wang, K. (2013). Carbon disclosure, carbon performance, and cost of capital. China Journal of Accounting Studies 1 (3-4), 190–220.

Healy, P. M., Hutton, A. P., & Palepu, K. G. (1999). Stock performance and intermediation changes surrounding sustained increases in disclosure. Contemporary accounting research, 16(3), 485-520.

Hedges, L. V., & Olkin, I. (1985). Statistical Method for Meta-Analysis. Orlando, United States of America: Academic Press.

Heinkel, R., Kraus, A., & Zechner, J. (2001). The effect of green investment on corporate behavior. Journal of financial and quantitative analysis, 36(4), 431-449.

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. Bmj, 327(7414), 557-560.

Hizarci-Payne, A. K., Ipek, I., & Kurt Gümüş, G. (2021). How environmental innovation influences firm performance: A meta-analytic review. Business Strategy and the Environment, 30(2), 1174-1190.

Hoepner, A. G., Oikonomou, I., Sautner, Z., Starks, L. T., & Zhou, X. (2018). ESG shareholder engagement and downside risk.

Hofstede, G. (2001): Culture's Consequences: Comparing Values, Behaviors, Institutions, and Organizations Across Nations (2nd ed.). Thousand Oaks, CA: Sage Publications

Hofstede, G., Hofstede, G., & Minkov, M. (2010): Cultures and organizations: Software of the mind (3rd ed.). New York, NY: McGraw-Hill Education

Hoffmann, A. O. I., Post, T., & Pennings, J. M. E. (2013): Individual investor perceptions and behavior during the financial crisis. Journal of Banking & Finance 37 (1), 60–74.

House, R. J., Hanges, P. J., Javidan, M., Dorfman, P. W., & Gupta, V. (2004). Culture, Leadership, and Organizations: The GLOBE Study of 62 Societies. Thousand Oaks: Sage Publications, Inc.

*Hsieh, H. C., Claresta, V., & Bui, T. (2020). Green Building, Cost of Equity Capital and Corporate Governance: Evidence from US Real Estate Investment Trusts. Sustainability 12 (9), 3680.

Hsu, P. H., Li, K., & Tsou, C. Y. (2023). The pollution premium. The Journal of Finance, 78(3), 1343-1392.

Huang, P., & Zhang, Y. (2012). Does enhanced disclosure really reduce agency costs? Evidence from the diversion of corporate resources. The Accounting Review, 87(1), 199-229.

Huffcutt, A. I., & Arthur, W. (1995). Development of a new outlier statistic for meta-analytic data. Journal of Applied Psychology 80 (2), 327–334.

Hughes, J. S., Liu, J., & Liu, J. (2007). Information asymmetry, diversification, and cost of capital. The accounting review, 82(3), 705-729.

Hunter, J. E., & Schmidt, F. L. (2004). Methods of meta-analysis. Correcting error and bias in research findings. Thousand Oaks, California, United States of America: Sage Publications.

*Husser, J., & Paulet, E. (2021). Impact of Non-financial Disclosure Scores on the Cost of Equity Capital: Evidence from European Data in the Light of the Subprime Crisis. In Tunca, K. Ç. (Ed.). Ethics and Sustainability in Accounting and Finance, Volume II: Springer, Singapore, 63–84.

Husted, B. W. (2005): Culture and ecology: a cross-national study of the determinants of environmental sustainability. Management International Review 45 (3), 349-371.

Ilhan, E., Sautner, Z., & Vilkov, G. (2021). Carbon tail risk. The Review of Financial Studies, 34(3), 1540-1571.

Ivashina, V., & Scharfstein, D. (2010). Bank lending during the financial crisis of 2008. Journal of Financial economics, 97(3), 319-338.

Jamali, D., & Karam, C. (2018). Corporate Social Responsibility in Developing Countries as an Emerging Field of Study. International Journal of Management Reviews 20 (1), 32–61.

Jamali, D., & Mirshak, R. (2007). Corporate Social Responsibility (CSR). Theory and Practice in a Developing Country Context. Journal of Business Ethics 72 (3), 243–262.

Jensen, M. (2001). Value maximisation, stakeholder theory, and the corporate objective function. European financial management, 7(3), 297-317.

Jiminez, R. G., & Grima, A. Z. (2020). Corporate Social Responsibility and Cost of Equity: Literature Review and Suggestions for Future Research. Journal of Business, Accounting and Finance Perspectives 2 (2), 15.

Jo, H, & Na, H. (2012). Does CSR Reduce Firm Risk? Evidence from Controversial Industry Sectors. Journal of Business Ethics 110 (4), 441–456.

Jones, G. K., & Davis, H. J. (2000). National culture and innovation: Implications for locating global R& D operations. Management International Review, 40 (1), 11–39.

*Jones, S., & Frost, G. (2017). Sustainability Information and the Cost of Capital: An Australian, United Kingdom and Hong Kong Listed Company Study. CPA Australia Limited and The University of Sydney.

Jorgensen, B. N., & Kirschenheiter, M. T. (2003). Discretionary risk disclosures. The Accounting Review, 78(2), 449-469.

Kahle, K. M., & Stulz, R. M. (2013). Access to capital, investment, and the financial crisis. Journal of Financial economics, 110(2), 280-299.

Kannenberg, L., & Schreck, P. (2019). Integrated reporting: boon or bane? A review of empirical research on its determinants and implications. Journal of Business Economics 89 (5), 515–567.

Khlif, H., Samaha, K., & Azzam, I. (2015). Disclosure, ownership structure, earnings announcement lag and cost of equity capital in emerging markets: The case of the Egyptian stock exchange. Journal of Applied Accounting Research, 16(1), 28-57.

Kim, O., & Verrecchia, R. E. (1994). Market liquidity and volume around earnings announcements. Journal of accounting and economics, 17(1-2), 41-67.

Kim, Y., Li, H., & Li, S. (2014). Corporate social responsibility and stock price crash risk. Journal of Banking & Finance 43, 1–13.

*Kim, Y. B., An, H. T., & Kim, J. D. (2015). The effect of carbon risk on the cost of equity capital. Journal of Cleaner Production 93 (3/4), 279–287.

Krueger, P., Sautner, Z., Tang, D. Y., & Zhong, R. (2021). The Effects of Mandatory ESG Disclosure Around the World. Research Paper Series N21-44. Swiss Finance Institute.

*Kumar, P., & Firoz, M. (2017). The Impact of Voluntary Environmental Disclosure on Cost of Equity Capital - Evidence from Indian Firms. Journal of Contemporary Management 11 (1), 1–26.

Lambert, R., Leuz, C., & Verrecchia, R. E. (2007). Accounting information, disclosure, and the cost of capital. Journal of accounting research, 45(2), 385-420.

Lang, M. H., & Lundholm, R. J. (1996). Corporate disclosure policy and analyst behavior. Accounting review, 467-492.

*Latupeirissa, G., & Adhariani, D. (2020). External and internal economic impacts of eco-innovation and the role of political connections: A sustainability narrative from an emerging market. Journal of Cleaner Production 258 (1), 120579.

*Le, Q. X., Nguyen, T. N., & van Le, T. H. (2019). The impact of corporate social responsibility on the cost of equity: an analysis of Vietnamese listed companies. Investment Management and Financial Innovations 16 (3), 87–96.

*Lemma, T. T., Feedman, M., Mlilo, M., & Park, J. D. (2019). Corporate carbon risk, voluntary disclosure, and cost of capital: South African evidence. Business Strategy and the Environment 28 (1), 111–126.

Leuz, C., & Verrecchia, R. E. (2000). The economic consequences of increased disclosure. Journal of accounting research, 91-124.

*Li, L., Liu, Q., Tang, D., & Xiong, J. (2017). Media reporting, carbon information disclosure, and the cost of equity financing: evidence from China. Environmental science and pollution research international 24 (10), 9447–9459.

*Li, L., Liu, Q., Wang, J., & Hong, X. (2019). Carbon Information Disclosure, Marketization, and Cost of Equity Financing. International journal of environmental research and public health 16 (1), x-x.

*Li, L., Yang, Y., & Tang, D. (2015). Carbon information disclosure of enterprises and their value creation through market liquidity and cost of equity capital. Journal of Industrial Engineering and Management 8 (1), 137–151.

*Li, Y., & Zhang, S. (2019). Relationship between Environmental Information Disclosure and Cost of Equity of Listed Companies in China's Marine Industry. Journal of Coastal Research 98 (1), 42.

*Li, Y., Eddie, I., & Liu, J. (2014). Carbon emissions and the cost of capital: Australian evidence. Review of Accounting and Finance 13 (4), 400–420.

*Li, Y., Liu, M., & Shou, S. (2018). Empirical Research on Environmental Information Disclosure and Equity Capital Cost of Chinese Chemical Enterprises. Chemical Engineering Transactions 67, 433–438.

Liao, Z., & Liu, Y. (2021). What drives environmental innovation? A meta-analysis. Business Strategy and the Environment 30 (4), 1852–1864.

Lins, K. V., Servaes, H., & Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. the Journal of Finance, 72(4), 1785-1824.

Lipsey, M. W., & Wilson, D. B. (2001). Practical meta-analysis. Thousand Oaks, California, United States of America: Sage Publications.

Lu, W., & Taylor, M. E. (2016). Which factors moderate the relationship between sustainability performance and financial performance? A meta-analysis study. Journal of International Accounting Research, 15(1), 1-15.

*Lyu, M., Xu, G., & Shen, Y. (2020). Corporate Environmental Disclosures and the Cost of Equity Capital: Evidence from the High-Polluting Chinese Listed Firms. International Journal of Management Sciences and Business Research 9 (2), 67–78.

Malik, M. (2015). Value-Enhancing Capabilities of CSR: A Brief Review of Contemporary Literature. Journal of Business Ethics 127 (2), 419–438.

Marsat, S., Pijourlet, G., & Ullah, M. (2021). Is there a trade-off between environmental performance and financial resilience? International evidence from the subprime crisis. Accounting & Finance 61 (3), 4061–4084.

*Matsumura, E. M., Prakash, R., & Vera-Munoz, S. C. (2020). Climate Risk Materiality and Firm Risk.

*Matsumura, E. M., Prakash, R., & Vera-Muñoz, S. C. (2010). Carbon Emissions and Firm Value.

Matten, D., & Moon, J. (2008). “Implicit” and “Explicit” CSR: A Conceptual Framework for a Comparative Understanding of Corporate Social Responsibility. Academy of Management Review 33 (2), 404–424.

Matthiesen, M. L., & Salzmann, A. J. (2017): Corporate social responsibility and firms’ cost of equity: how does culture matter? Cross Cultural & Strategic Management 24 (1), 105–124.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. Journal of Finance, 42, 483–510

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. American journal of sociology, 83(2), 340-363.

*Mohamed, T., & Faouzi, J. (2014). Does corporate environmental disclosure affect the cost of capital? Evidence from Tunisian companies. Global Journal of Management and Business Research: D Accounting and Auditing 14 (1), 1–9.

Moon, J., & Shen, X. (2010). CSR in China Research: Salience, Focus and Nature. Journal of Business Ethics 94 (4), 613–629.

Morgan Stanley Institute for Sustainable Investing. (2024). Sustainable reality: Sustainable funds show continued outperformance and positive flows in 2023 despite a slower second half. Retrieved from https://www.morganstanley.com/what-we-do/institute-for-sustainable-investing

Muslu, V., Mutlu, S., Radhakrishnan, S., & Tsang, A. (2019). Corporate Social Responsibility Report Narratives and Analyst Forecast Accuracy. Journal of Business Ethics 154 (4), 1119–1142.

*Najah, M. M. S. (2012). Carbon risk management, carbon disclosure and stock market effects: An international perspective. Dissertation. University of Southern Queensland. School of Accounting, Economics and Finance; Faculty of Business and Law.

Nelson, J. P., & Kennedy, P. E. (2009). The use (and abuse) of meta-analysis in environmental and natural resource economics: an assessment. Environmental and resource economics, 42, 345-377.

Ni, X., Jin, Q., & Huang, K. (2022). Environmental regulation and the cost of debt: Evidence from the carbon emission trading system pilot in China. Finance Research Letters, 49, 103134.

*Ng, A. C., & Rezaee, Z. (2012). Sustainability Disclosures and Cost of Capital.

*Ng, A. C., & Rezaee, Z. (2015). Business sustainability performance and cost of equity capital. Journal of Corporate Finance 34 (2), 128–149.

*Nguyen, H. A., Nguyen, L. S., & Ha, H. H. (2020a). Environmental accounting practices and cost of capital of enterprises in Vietnam. Cogent Economics & Finance 8 (1), 1790964.

*Nguyen, J. H., Truong, C., & Zhang, B. (2020b). The Price of Carbon Risk: Evidence from the Kyoto Protocol Ratification.

OECD (2022). Measuring environmental policy stringency in OECD countries: An update of the OECD composite EPS indicator. With assistance of T. Kruse, A. Dechezleprêtre, R. Saffar, L. Robert.

Oikonomou, I., Brooks, C., & Pavelin, S. (2012). The impact of corporate social performance on financial risk and utility: A longitudinal analysis. Financial Management, 41(2), 483-515.

*Ok, Y., & Kim, J. (2019). Which Corporate Social Responsibility Performance Affects the Cost of Equity? Evidence from Korea. Sustainability 11 (10), 2947.

Orlitzky, M. (2001). Does Firm Size Cofound the Relationship Between Corporate Social Performance and Firm Financial Performance? Journal of Business Ethics 33 (2), 167–180.

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate Social and Financial Performance: A Meta-Analysis. Organization Studies 24 (3), 403–411.

*Ould Daoud Ellili, N. (2020). Environmental, Social, and Governance Disclosure, Ownership Structure and Cost of Capital: Evidence from the UAE. Sustainability 12 (18), 7706.

Park, J. H., & Noh, J. H. (2018). Relationship between Climate Change Risk and Cost of Capital. Global Business Finance Review 23 (2), 66–81.

Pástor, Ľ., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. Journal of Financial Economics, 142(2), 550-571.

Pástor, Ľ., Stambaugh, R. F., & Taylor, L. A. (2022). Dissecting green returns. Journal of financial economics, 146(2), 403-424.

Pedersen, L. H., Fitzgibbons, S., & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. Journal of Financial Economics, 142(2), 572-597.

*Plumlee, M., Brown, D., Hayes, R. M., & Marshall, R. S. (2015). Voluntary environmental disclosure quality and firm value: Further evidence. Journal of Accounting and Public Policy 34 (4), 336–361.

Principles for Responsible Investment (2022). PRIs Regulation database. Available online at https://www.unpri.org/policy/regulation-database.

PWC (2022). The growth opportunity of the century. Are you ready for the ESG change? Sustainable Finance Series.

Reverte, C. (2009). Determinants of Corporate Social Responsibility Disclosure Ratings by Spanish Listed Firms. Journal of Business Ethics 88 (2), 351–366.

Reverte, C. (2012). The Impact of Better Corporate Social Responsibility Disclosure on the Cost of Equity Capital. Corporate Social Responsibility and Environmental Management 19 (5), 253–272.

Rosenthal, R. (1979). The file drawer problem and tolerance for null results. Psychological Bulletin 86 (3), 638–641.

Rosenthal, R. (1991). Meta-analytic Procedures for Social Research. Newbury Park, California, United States of America: Sage Publications.

Rossberger, R. (2014). National personality profiles and innovation: The role of cultural practices. Creativity and Innovation Management, 23(3), 331–348.

Rujirawanich, P., Addison, R., & Smallman, C. (2011). The effects of cultural factors on innovation in a Thai SME. Management Research Review, 34 (12), 1264–1279.

Russo, M. V., & Fouts, P. A. (1997). A Resource-Based Perspective on Corporate Environmental Performance and Profitability. Academy of Management Journal 40 (3), 534–559.

Salama, A., Anderson, K., & Toms, J. S. (2011). Does community and environmental responsibility affect firm risk? Evidence from UK panel data 1994–2006. Business ethics: a European review, 20(2), 192-204.

Sassen, R., Hinze, A. K., & Hardeck, I. (2016). Impact of ESG factors on firm risk in Europe. Journal of business economics, 86, 867-904.

Scott, W. R. (2008). Institutions and Organizations. Ideas, Interests, and Identities: Sage Publications.

Schreder, M. (2018). Idiosyncratic information and the cost of equity capital: A meta-analytic review of the literature. Journal of Accounting Literature 41 (5), 142–172.

*Shad, M. K., Lai, F. W., Shamim, A., & McShane, M. (2020). The efficacy of sustainability reporting towards cost of debt and equity reduction. Environmental science and pollution research international 27 (18), 22511–22522.

*Sharfman, M. P., & Fernando, C. S. (2008). Environmental risk management and the cost of capital. Strategic Management Journal 29 (6), 569–592.

Smith, P. (2006): When elephants fight, the grass gets trampled: the GLOBE and Hofstede projects. Journal of International Business Studies, 37 (6), 915-921.

Souissi, M, & Khlif, H. (2012). Meta-analytic review of disclosure level and cost of equity capital. International Journal of Accounting & Information Management 20 (1), 49–62.

Sousa, C. M. P., & Bradley, F. (2008): Cultural Distance and Psychic Distance: Refinements in Conceptualisation and Measurement. Journal of Marketing Management, 24(5-6), 467-488.

Stanley, T. D. (2008). Meta-Regression Methods for Detecting and Estimating Empirical Effects in the Presence of Publication Selection. In Oxford Bulletin of Economics and Statistics 70 (1), 103-127.

Stanley, T. D., & Doucouliagos, H. (2012). Meta-Regression Analysis in Economics and Business. Abingdon, Oxon, United Kingdom: Routledge.

Stanley, T. D., Doucouliagos, H., Giles, M., Heckemeyer, J., Johnston, R., Laroche, P., Nelson, J. P., Paldam, M., Poot, J., Pugh, G., Rosenberger, R. S., & Rost, K. (2013). Meta-Analysis of economics research reporting guidelines. Journal of Economic Surveys 27 (2), 390–394.

Tashman, P., Flankova, S., van Essen, M., & Marano, V. (2021). Why Do Firms Participate in Voluntary Environmental Programs? A Meta-Analysis of the Role of Institutions, Resources, and Program Stringency. Organization & Environment.

*Trinks, A., Ibikunle, G., Mulder, M., & Scholtens, B. (2017a). Carbon Intensity and the Cost of Equity Capital.

*Trinks, A., Ibikunle, G., Mulder, M., & Scholtens, B. (2017b). Greenhouse gas emissions intensity and the cost of capital.

Trotman, K. T., & Bradley, G.W. (1981). Associations between social responsibility disclosure and characteristics of companies. Accounting, Organizations and Society, 6 (4), 355-62.

Tsai, K. H., Huang, C. T., & Chen, Z. H. (2020). Understanding variation in the relationship between environmental management practices and firm performance across studies: A meta-analytic review. Business Strategy and the Environment 29 (2), 547–565.

United Nations Environment Programme (2019). Environmental Rule of Law. First Global Report. With assistance of S. Kumar, E. Ugirashebuja, L. Carnwath, T. Tamminen, D. Boyd.

United Nations (2020). World economic situation prospects. https://www.un.org/development/desa/dpad/wp-content/uploads/sites/45/WESP2020_Annex.pdf

Utz, S. (2017). Over-investment or risk mitigation? Corporate social responsibility in Asia-Pacific, Europe, Japan, and the United States. Review of Financial Economics.

Van Everdingen, Y. M., & Waarts, E. (2003): The effect of national culture on the adoption of innovations. Marketing Letters 14 (3), 217-232.

Van der Laan Smith, J., Adhikari, A., Tondkar, R. H., & Andrews, R. L. (2010): The impact of corporate social disclosure on investment behavior: A cross-national study. Journal of Accounting and Public Policy 29 (2), 177–192.

Velte, P. (2021). Meta-analyses on Corporate Social Responsibility (CSR). a literature review. Management Review Quarterly 32 (3), 836.

Velte, P., Stawinoga, M., & Lueg, R. (2020). Carbon performance and disclosure: A systematic review of governance-related determinants and financial consequences. Journal of Cleaner Production 254, 120063.

Vena, L., Sciascia, S., & Cortesi, A. (2020): Integrated reporting and cost of capital: The moderating role of cultural dimensions. Journal of International Financial Management & Accounting 31 (2), 191–214.

Venaik, S., Zhu, Y., & Brewer, P. (2013). Looking into the future: Hofstede long term orientation versus GLOBE future orientation. Cross Cultural Management: An International Journal 20 (3), 361–385.

*Virtania, L. O., & Siregar, S. V. (2017). The Effect of Environmental Disclosure on Cost of Equity. International Conference on Business and Management Research.

Wang, M.-L., Feng, Z.-Y., & Huang, H.-W. (2013). Corporate social responsibility and cost of equity capital: a global perspective.

*Wang, Y., Delgado, M. S., & Xu, J. (2016). Long-term financial incentive of environmental responsibility - socially responsible investing and cost of equity capital. Agricultural & Applied Economics Association Annual Meeting.

Wang, A., Zhang, M., & Zhou, S. (2022). Air pollution, environmental violation risk, and the cost of debt: Evidence from China. International Journal of Environmental Research and Public Health, 19(6), 3584.

Welker, M. (1995). Disclosure policy, information asymmetry, and liquidity in equity markets. Contemporary accounting research, 11(2), 801-827.

Wolf, F. M. (1986). Meta-Analysis: Quantitative Methods for Research Synthesis. Thousand Oaks, California, United States of America: Sage Publications.

Xu, S., Liu, D., & Huang, J. (2015). Corporate social responsibility, the cost of equity capital and ownership structure: An analysis of Chinese listed firms. Australian Journal of Management, 40(2), 245-276.

*Yao, S.; Liang, H. (2019). Analyst Following, Environmental Disclosure and Cost of Equity: Research Based on Industry Classification. Sustainability 11 (2), 300.

Zhang, S. (2024). Carbon returns across the globe. The Journal of Finance.

Zingales, L. (2011). The role of trust in the 2008 financial crisis. The Review of Austrian Economics 24 (3), 235–249.

Zubeltzu-Jaka, E., Erauskin-Tolosa, A., & Heras-Saizarbitoria, I. (2018). Shedding light on the determinants of eco-innovation: A meta-analytic study. Business Strategy and the Environment 27 (7), 1093–1103.