# **ESG Disclosure and Access to Credit:**

# A Configurational Analysis on European Listed Firms

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# Abstract

This paper depicts the combinations of ESG disclosure that have increased access to credit for European firms listed on the STOXX Europe 600 Index during 2021 and 2022. Using fuzzy-set Qualitative Comparative Analysis (fsQCA), applied to the GRI reporting framework as a standardized ESG disclosure, the study finds that the combinations differ when requiring long-term versus shortterm debt. However, while notable differences emerge in S-pillar disclosure, looking at the E-pillar, disclosure related to climate change always results in a greater access to finance. The implications for firms, banks, and policymakers are then discussed.

**Keywords**: Access to credit; Configurational approach; European listed firms; ESG disclosure; fsQCA; GRI Reporting Framework

### 1. Introduction

At the end of November 2019, The European Parliament declared the existence of a "global emergency": climate change. Policymakers and economic agents have since been called to implement initiatives aimed at slowing down and countering this change (Aibar-Guzmán et al., 2024). Regulatory pressures (and beyond) have also impacted the financial system, invited to adopt the measures needed to mitigate adverse impacts on the environment. Accordingly, in the last years, the bank lending process, and consequently the bank-firm relationship, have been transformed (Ali et al., 2023). Today, when banks assess whether to lend money to a borrower, they must consider more than just financial creditworthiness. According to the "Guidelines on Loan Origination and Monitoring" issued by the European Banking Authority (2020), European banks now also evaluate the borrower's environmental, social, and governance (ESG) profile.

Banks have two alternatives to assess a borrower's ESG profile: first, banks can evaluate a potential borrower's ESG disclosure through its ESG rating. This alternative has the advantage of being fast thanks to the availability of ratings from multiple agencies. However, it suffers from the divergences in rating judgments (Berg et al., 2022; Del Giudice et al., 2024). Thus, whether a bank labels a potential borrower as creditworthy based on its ESG rating depends heavily on the chosen rating provider. Second, banks can directly assess an applicant firm's ESG profile by examining its non-financial disclosure (Tsang et al., 2023). In this case, the challenge is for firms that have to select the most suitable ESG reporting standard among the myriad proposed worldwide<sup>1</sup> (Raimo et al., 2022). Of these, the Global Reporting Initiative (GRI) Standards have been, since their inception, the most widely used (Marimon et al., 2012). For banks, GRI provides a major advantage: GRI standards are consistent across industries and allow an easier comparison between borrowers.

Given this background and the current role of ESG disclosure in the bank-firm relationship, academics have investigated whether empirical evidence supports the idea that enhanced ESG disclosure leads to improved access to credit for firms. However, the findings thus far remain inconclusive. One strand of research suggests that ESG disclosure facilitates access to credit for firms (e.g., Srivastava et al., 2022; Zhang & Lucey, 2022; Adeneye et al., 2023; Asimakopoulos et al., 2023c). Conversely, another body of research argues that ESG disclosure is either negatively associated with access to credit or has no effect (e.g., Lai & Zhang, 2022; Lemma et al., 2022). A third perspective suggests that the relationship between ESG disclosure and access to credit could be non-linear (Li et al., 2024).

This inconclusiveness is because the existing literature primarily relies on variance-based approaches. While these methods are widely used, they have several limitations compared to alternative methods, such as configurational approaches. Variance-based methods do not account for the possibility that the same outcome can result from different combinations of inputs, known as

<sup>&</sup>lt;sup>1</sup> Key standards include the Global Reporting Initiative (GRI) Standards, the United Nations Global Compact (UNGC) – Sustainable Development Goals (SDGs), the Task Force on Climate-related Financial Disclosures (TCFD) – TCFD Recommendation, and the UNGC Guidelines/Framework, among others (EFRAG, 2021).

"conditions" in configurational approaches, a concept referred to as "equifinality" (Fiss, 2007; Ragin, 2008). Additionally, variance-based methods assume that each independent variable contributes additively to the outcome, neglecting potential interaction effects, where the impact of one variable depends on the presence or absence of another—termed "causal complexity". Furthermore, variance-based approaches operate under the assumption that the factors leading to the presence of an outcome are simply the inverse of those leading to its absence. In contrast, configurational approaches posit that the factors leading to the presence of an outcome are not merely the reverse of those leading to its absence, a property known as "asymmetry".

Unlike variance-based approaches, configurational methods incorporate equifinality, causal complexity, and asymmetry. They are increasingly being employed in the literature on ESG and, especially fuzzy-set qualitative comparative analysis (fsQCA), have proven effective in explaining the effects of ESG disclosure on a firm's financial performance (Liu et al., 2022), the antecedents of ESG performance (Huarng & Yu, 2024; Lewellyn & Muller-Kahle, 2024; Nguyen & Nguyen, 2023), and the impact of ESG disclosure on a firm's ESG performance (Santamaria et al., 2021).

Recognizing the strength of this methodological approach, this study applies a fsQCA to shed new light on the relationship between ESG disclosure and access to credit in a macro-scenario where the responsibility to mitigate climate change rests on all economic actors (Cadez et al., 2019). In so doing, it provides an answer to the following research question: *What specific configurations of ESG disclosure lead to an increased access to credit*?

The measure of a firm's ESG disclosure is based on the GRI reporting framework. The access to credit is proxied by increases in leverage, long-term debt, and short-term debt. The fsQCA is carried out on a sample of 112 European firms listed on the STOXX Europe 600 Index. Despite European policymakers leading the transition toward a more sustainable economy through policy interventions in the banking sector (Santamaria et al., 2021), Europe remains an understudied context. A few studies including a subset of European countries (Lemma et al., 2022; Hamrouni et al., 2019; Srivastava et al., 2022; Zhang & Lucey, 2022) exist; while most empirical analyses on the effects of

a firm's ESG disclosure on its access to credit have been conducted outside of Europe, in countries such as Australia (Nguyen et al., 2020), China (Huang et al., 2023; Lai and Zhang, 2022; Li et al., 2024), India (Oware & Mallikarjunappa, 2021), the United States (Asimakopoulos et al., 2023b; 2023c; Do et al., 2023; Harjoto, 2017; Newton et al., 2023; Sheikh, 2019), and Vietnam (Minh et al., 2022).

The fsQCA analysis reveals that the configurations of ESG disclosure conducive to improved access to finance differ based on whether the credit relationship is short-term versus long-term oriented. Firms that secure greater access to credit typically disclose anti-corruption policies. Regarding the E-pillar, disclosures related to climate change are linked to improved access to finance, while the significance of biodiversity impact disclosure varies with the timeframe. The most notable differences occur in the S-pillar, where the relevance of disclosures related to employment practices, labor-management relations, occupational health and safety, training and education, and diversity and non-discrimination policies varies with the duration of the credit relationship.

This paper makes several contributions to the literature on the relationship between a firm's ESG disclosure and its access to credit. First, it focuses on the European context, which remains understudied despite its significant role in policy interventions that encourage the integration of ESG considerations into the credit-granting process. Second, it uses a measure of ESG disclosure that avoids comparability issues, such as those found with ESG ratings, by relying on a widely adopted ESG disclosure standard like the GRI. Third, by relying on fsQCA, this paper shows that the relationship between a firm's ESG disclosure and its access to credit is more complex than previously understood.

### 2. Literature Review

In recent years, researchers have aimed to establish whether ESG disclosure enhances firms' access to credit. However, the empirical evidence collected so far has produced conflicting results.

The prevailing perspective posits that ESG disclosure enhances firms' access to credit. Specifically, ESG disclosure has been found to improve access to both short-term debt (Benlemlih, 2017; Hamrouni et al., 2019; Oware & Mallikarjunappa, 2021; Srivastava et al., 2022; Zhang & Lucey, 2022) and long-term debt (Hamrouni et al., 2019; Huang et al., 2023; Nguyen et al., 2020; Oware & Mallikarjunappa, 2021; Srivastava et al., 2022; Zhang & Lucey, 2022). Additionally, research demonstrates that ESG disclosure, either broadly (Asimakopoulos et al., 2023b), or specifically in relation to social aspects (Adeneye et al., 2023), is linked to increased leverage for firms. The rationale is that through ESG disclosure, firms reduce information asymmetries in the bank-firm relationship. Consequently, banks perceive these firms as less risky due to their transparency regarding ESG, which is increasingly considered in lending decisions.

Another strand of literature suggests, instead, that ESG disclosure is associated with a reduction in firms' financial leverage (Asimakopoulos et al., 2023a), influenced by factors such as cultural differences between countries (Lemma et al., 2022) and market competition (Sheikh, 2019). Among others, Minh et al., 2022 provide evidence of a negative relationship between ESG disclosure and firm leverage for firms with larger debt ratios, but no significant correlation for firms with lower debt ratios. This could be driven by the willingness of avoiding the underinvestment problem (Asimakopoulos et al., 2023a). The underinvestment problem occurs when highly leveraged firms forgo profitable investments because the returns primarily benefit creditors rather than shareholders. To prevent this and avoid conflicts between debtholders and shareholders, firms may opt to reduce their leverage, confident that ESG disclosure will also appeal to equity investors, who are increasingly concerned with funding responsible firms (Lai & Zhang, 2022).

Adding further complexity are studies that, though a minority, report a U-shaped relationship between a firm's ESG disclosure and its debt structure (Li et al., 2024).

The results are controversial because the existing literature predominantly employs variancebased approaches which fail to incorporate equifinality, causal complexity, and asymmetry. This study seeks to overcome this limitation by providing an application of fsQCA as configurational methods to contribute to the debate on ESG disclosure and access to credit.

### 3. Methodology

#### 3.1 Sample selection

This paper examines a sample of European firms listed on the STOXX Europe 600 Index that use the GRI standard, and specifically the GRI Content Index Template, for ESG disclosure. The GRI reporting framework is not mandatory. Although European listed firms are required to produce some form of ESG disclosure, they are not mandated to follow a specific reporting framework. The advantage of focusing on the GRI is that it has been the most widely used standard for ESG disclosure globally over the past decade (Marimon et al., 2012) and has been especially prevalent in Europe in recent years (EFRAG, 2021; Halkos & Nomikos, 2021). The focus on European listed firms is due to their representation of 90% of the market capitalization of the European stock market (STOXX Ltd., 2024).

The complete list of STOXX Europe 600 constituents was obtained from the STOXX Ltd. website. First, the constituents belonging to the "Bank" (67) and "Insurance" (39) sectors were removed. Next, the remaining 494 private manufacturing firms were assessed to determine if they used the GRI Content Index Template, in their ESG disclosure. The presence of the GRI Content Index Template was verified by searching for the term "GRI Content Index" within the PDF reports downloaded from the websites of each firm, focusing on the "Investor Relations", "Sustainability", or "Non-Financial Reporting" sections. When a firm's non-financial disclosure report was not found using this approach, manual web searches were conducted using the search string "Company Name GRI Content Index".

This process identified 254 European listed firms that based their ESG disclosure on the GRI. Next, data on the firms' leverage, short-term debt, and long-term debt were gathered from the Orbis Bureau van Dijk database, as detailed in the following section. Firms lacking such data were excluded, reducing the sample to 223 firms.

The results presented in the following sections refer to 112 European firms listed on the STOXX Europe 600 Index. This limitation arises because, as discussed later in the paper, fsQCA revealed that the solutions for firms that experienced a decrease in credit access did not meet the minimum frequency and consistency thresholds required to be considered informative (Pappas & Woodside, 2021). The reason behind this result is that fsQCA is an asymmetric method, based on the principle that the conditions leading to an increase in an outcome of interest may differ from those leading to a decrease in credit access. Consequently, analyzing the conditions that result in decreased leverage may require a separate approach. As noted in the avenues for future research, investigating this specific scenario is left to future studies.

### 3.2 Data collection

The data collection process involved two steps. First, a firm's ESG disclosure was assessed using data from the GRI standard reporting (Luo & Tang, 2023).

The previous few studies conducted on Europe primarily relied on ESG ratings<sup>2</sup> as proxies for a firm's ESG disclosure (La Rosa et al., 2018) or utilize ad hoc quantitative measures derived from content analysis of ESG disclosures (D'Apolito et al., 2024). Both methods present limitations. ESG ratings often diverge (Berg et al., 2022), and ad hoc measures suffer from subjectivity and a lack of replicability (Minh et al., 2022).

The GRI Content Index comprises 84 disclosable ESG items categorized into 31 macrocategories, which are further grouped into three main pillars: economic, environmental, and social performance.

<sup>&</sup>lt;sup>2</sup> Thomson Reuters (Adeneye et al., 2023; Asimakopoulos et al., 2023a; 2023b; La Rosa et al., 2018; Lemma et al., 2022; Srivastava et al., 2022; Uyar et al., 2023; Zhang & Lucey, 2022), Bloomberg (Hamrouni et al., 2019; Lai & Zhang, 2022; Li et al., 2024), KLD (Harjoto, 2017), MSCI (Benlemlih, 2017; Do et al., 2023; Harjoto, 2017; Sheikh, 2019), or RKS (Huang et al., 2023).

ESG disclosure items within each macro-category were assigned a value of 1 if disclosed and 0 if not. Scores for each macro-category were then calculated by summing the number of disclosed ESG items and dividing this total by the number of all disclosable ESG items within a macro-category.

Only for the social performance pillar, following the frameworks of Deng et al. (2020), Hur et al. (2019), and Kolk & Pinkse (2010), macro-categories were divided into those related to social internal performance and those pertaining to social external performance. This distinction enhances the understanding of whether inward- or outward-oriented transparency in social disclosure is linked to improved access to credit. Social internal performance items encompassed ESG disclosure items from GRI 401 to 406, totaling six macro-categories, while social external performance items included ESG disclosure items from GRI 407 to 418, amounting to eleven macro-categories. fsQCA revealed that social external performance items were not associated with improved access to credit. This could be because banks are more concerned with aspects such as the diversity of the board of directors or a firm's anti-discrimination policies rather than the rights of indigenous people, which appear to be less material in credit markets today in Europe. Consequently, these macro-categories were excluded from the analyses. Thus, the analyses reported in the subsequent sections pertain to 20 macro-categories and a total of 68 ESG disclosure items (see Appendix A).

Second, data on firms' leverage, short-term debt, and long-term debt were obtained from the Orbis Bureau van Dijk database. No transformations were applied to the data, as fsQCA conducts its own data transformation during the calibration process, which will be detailed later. Financial variables were collected for the years 2021 and 2022. This timeframe coincides with the post-COVID-19 economic recovery period, during which firms' access to credit and financial health were under significant scrutiny. It also aligns with increased pressure to mitigate climate change and the consequent regulatory attention from the European Banking Authority regarding ESG disclosures as a factor in lending decisions, a focus that began with the enactment of the "Guidelines on Loan"

Origination and Monitoring" in 2020. The data represent end-of-year values. Using leverage, shortterm debt, and long-term debt as proxies for a firm's access to credit aligns with previous finance literature (e.g., Adeneye et al., 2023; Al Amosh et al., 2024; Csapi et al., 2024).

Leverage is calculated as the ratio of non-current liabilities and loans to shareholders' equity. Long-term debt is defined as the sum of a firm's long-term financial obligations to credit institutions, such as loans and credits, divided by total assets. Short-term debt is calculated as the sum of a firm's short-term financial obligations owed to credit institutions, plus the portion of long-term financial obligations payable within the year, divided by total assets. The outcome of interest is the observed change—either an increase or decrease—in a firm's leverage, long-term debt, or short-term debt. This change is computed by calculating the difference between the values of leverage, long-term debt, and short-term debt for 2022 and 2021 for all firms in the sample.

In calculating the ratios, we determined whether the observed increases in a firm's access to finance—indicated by increases in long-term debt and short-term debt—were due to actual rises in the amount of debt or declines in asset values. For both long-term and short-term debt, the increases were found to result from genuine growth in these variables, rather than from significant changes in asset values between the two years. Additionally, firms in the sample were evaluated based on their growth in non-current liabilities, loans, and shareholders' equity to ensure that the observed increases in leverage did not stem from a reduction in shareholders' equity, but rather from an increase in non-current liabilities and loans, which the analysis confirmed.

Last, the observed increases in leverage, long-term debt, and short-term debt during the post-COVID-19 period of 2021-2022 may have been influenced by government relief mechanisms, such as public guaranteed loans. However, the potential influence of public subsidies on leverage does not pose a significant concern for this analysis, even though it remains an unaccounted factor. fsQCA explores combinations of factors that lead to an outcome, rather than isolating the impact of individual variables. The method's calibration process ensures that extreme values, such as those influenced by public subsidies, do not disproportionately skew the results (Pappas & Woodside, 2021).

#### 3.3 Configurational Research Methods: fuzzy-set Qualitative Comparative Analysis (fsQCA)

Variance-based approaches, which assume linear relationships between variables, remain predominant in the social sciences. Recently, however, researchers have begun to adopt configurational approaches to examine empirical phenomena as clusters of interrelated conditions (Woodside, 2017). These methods acknowledge that multiple combinations of conditions can lead to an outcome (equifinality), that the presence or absence of one condition depends on the presence or absence of others (causal complexity), and that the conditions leading to an outcome may differ from those leading to its reverse (asymmetry) (Fiss, 2007; Ragin, 2008).

Qualitative Comparative Analysis (QCA) is a prominent configurational research method with three main variations: Crisp-Set QCA (csQCA), Multi-Value QCA (mvQCA), and Fuzzy-Set QCA (fsQCA). This paper opts for fsQCA due to its recognized advantages over the other methods (Pappas & Woodside, 2021).

The first step in fsQCA involves data calibration, where raw data from ordinal or interval scales is converted into degrees of membership in the target sets. In this paper, two types of target sets are identified. The first is the "full membership" set, which includes firms that are thorough in their disclosure regarding a specific macro-category—i.e., firms that disclose more of the ESG items within that category. The second is the "full non-membership" set, which includes firms that are less thorough in their ESG disclosure for a given macro-category—i.e., firms that disclose fewer items within that category.

To measure the extent to which a firm in the sample belongs to either the full membership or full non-membership set, calibration is performed. This process is applied to both the independent variables (e.g., leverage, long-term debt, and short-term debt) and the outcome variable (e.g., access to credit). Calibration transforms the raw data into fuzzy set scores that reflect varying levels of membership, using the following function:

$$Membership \ score = \frac{log\left(\frac{x - Crossover \ value}{Full \ membership \ value - x}\right)}{log\left(\frac{Crossover \ value - Full \ membership \ value}{Full \ membership \ value - Crossover \ value}\right)}$$

In this function, x represents the raw data value for each case. The full membership threshold is set to 1, indicating firms that are completely in the set; the full non-membership threshold is set to 0, indicating firms that are completely out of the set; and the crossover point is set at 0.5. Firms at or above the 95th percentile are considered fully in the set, while firms at the 50th percentile have ambiguous membership, and those at the 5th percentile are considered fully out of the set.

Variables with a membership score of exactly 0.50 present challenges because they do not clearly belong to either set. To address this ambiguity, a constant of 0.001 is sometimes added to adjust the value, ensuring that the case is classified as either leaning toward membership or non-membership (Fiss, 2011).

After performing calibration, the conditions in fsQCA—representing the combinations of macrocategories—are classified as "present", "absent", or "don't care". A "present" condition is one whose presence is relevant for explaining the outcome, while an "absent" condition is one whose absence is associated with the outcome of interest. A "don't care" condition means that the presence or absence of that condition is irrelevant to explaining the outcome, and it is treated neutrally across different pathways.

fsQCA computes all possible combinations of conditions that contribute to improved access to credit. The "truth table" output displays all potential combinations, with each row representing a unique configuration. The number of rows is determined by the number of conditions, resulting in  $2^k$  rows, where k is the number of conditions being analyzed.

As more variables are included in the fsQCA analysis, the number of possible configurations grows exponentially, resulting in an increasing number of combinations with zero frequency. To manage this complexity, this paper limits the analysis to ESG disclosure macro-categories within the GRI framework, which are already numerous. This approach, which focuses solely on these variables

and omits others, such as financial metrics, aligns with previous ESG studies aimed at uncovering the determinants of a firm's ESG score (Santamaria et al., 2021).

Next, the truth table is sorted based on frequency and consistency (Ragin, 2008). To ensure an adequate number of cases for each combination of conditions, a frequency threshold must be established. Setting a higher frequency threshold increases the robustness of the results, ensuring that only configurations with sufficient empirical support are included in the analysis. Conversely, a lower frequency threshold allows for more combinations but risks including configurations with too few cases, which may not offer generalizable insights. For samples smaller than 150 cases, a frequency threshold of 2 is recommended (Fiss, 2011; Ragin, 2008).

After filtering based on frequency, the truth table is sorted by consistency. Consistency measures how reliably a given configuration leads to the outcome of interest. A high consistency threshold, usually above 0.75 (Pappas & Woodside, 2021), ensures that only configurations with a strong and consistent relationship to the outcome are considered.

The identification of relevant configurations is the final step in fsQCA and involves calculating three types of solutions: complex, parsimonious, and intermediate. A solution represents a combination of conditions (i.e., the presence, absence, or irrelevance of macro-categories pertaining to a given pillar) that are consistently associated with the desired outcome and supported by a significant number of cases.

The complex solution includes all possible combinations of conditions using traditional logical operations (i.e., "AND", "OR") without any simplifications. Although comprehensive, the complexity of this solution can make interpretation difficult due to the vast number of combinations involved.

To facilitate interpretation, the complex solution is reduced to parsimonious and intermediate solutions. The parsimonious solution is a simplified version, where the Quine–McCluskey algorithm eliminates non-essential conditions that do not play a critical role in explaining the outcome. This solution identifies the core conditions—those that are necessary to drive the outcome (Fiss, 2011).

The intermediate solution strikes a balance between the complexity of the complex solution and the simplicity of the parsimonious one. It retains the core conditions from the parsimonious solution while also incorporating peripheral conditions—less essential factors that add nuance without being critical.

This paper exclusively presents intermediate solutions, a common practice when aiming for meaningful interpretations (Ragin, 2008). Previous ESG disclosure studies have also favored intermediate solutions for similar reasons (Santamaria et al., 2021). The thresholds applied in this study range from 2 to 5 for consistency, with a frequency threshold set at 0.90 (Pappas & Woodside, 2021). The specific thresholds used are detailed in the respective tables.

The analysis is performed using fsQCA 4.1 software, developed by Ragin & Davey (2022). Although there are multiple software options available for fsQCA, Ragin & Davey's (2022) software was selected due to its widespread use in prior ESG disclosure research (Santamaria et al., 2021) and the availability of detailed, step-by-step guides (Pappas & Woodside, 2021), which ensures the replicability of the analyses conducted in this study.

### 4. Results

A Mann-Whitney U test was conducted to compare firms that experienced a decrease in access to credit (those with a calibrated fuzzy-set value for the outcome below 0.5000) and those that experienced an increase in access to credit (those with a calibrated fuzzy-set value for the outcome above 0.5001) across the macro-categories related to the economic, environmental, and social performance pillars. The results indicated no statistically significant differences between the two groups. However, in the context of fsQCA, this lack of significance is not a concern.

While the two groups do not show significant differences when analyzed as whole populations, subsets of firms within each group may reveal important differences in their combinations of conditions.

#### 4.1 Descriptive statistics

Table 1 presents the descriptive statistics for the 112 European firms listed on the STOXX Europe 600 Index included in the sample during the post-COVID recovery period of 2021-2022.

### [Insert Table 1 about here]

Table 1 shows that, on average, firms in the sample exhibit a leverage fuzzy-set score of 0.664, indicating a moderate degree of membership in the set of highly leveraged firms. There is significant variation within the sample, reflected by a standard deviation of 0.161. Membership scores range from a minimum of 0.501, indicating low membership, to a maximum of 1.000, indicating full membership in the set of highly leveraged firms. It is important to clarify that a fuzzy-set score of 1.000 does not imply that these firms are fully leveraged in terms of their capital structure, just as a score of 0.501 does not imply minimal leverage. Rather, a fuzzy-set score of 1.000 indicates that these firms, within the sample, fully belong to the set of "highly leveraged" firms, while firms with lower scores only weakly belong to this set, reflecting more modest increases in leverage.

For long-term debt, the average fuzzy-set score is 0.705, with a minimum of 0.501 and a maximum of 1.000, suggesting that, on average, firms in the sample have a high degree of membership in the target set of firms that raised significant amounts of long-term debt relative to their total assets. The standard deviation is 0.165, like that of leverage.

Regarding short-term debt, firms in the sample have an average fuzzy-set score of 0.659, with a minimum of 0.502 and a maximum of 1.000. The standard deviation in this case is 0.156, slightly lower than those registered for leverage and long-term debt. This suggests that there is less variability in the sample regarding the ability of firms to raise short-term debt compared to leverage and long-term debt.

The GRI-based disclosure of various performance items in Table 1 reveals substantial variability. Regarding disclosure related to a firm's economic impacts, firms in the sample are more likely to provide information on their anti-corruption policies and anti-competitive behavior but are less inclined to disclose information on market presence, indirect economic impacts, and tax behavior. The most significant variations in disclosure are observed in procurement practices and anticompetitive behavior. For each macro-category, there are firms in the sample that provide minimal or almost no disclosure specific to that macro-category. This suggests that while some firms may be transparent in certain areas, almost every macro-category includes firms with disclosure values close to 0.

In the "environmental performance" pillar, firms in the sample, on average, tend to disclose more information on energy consumption and usage, water preservation and usage, emissions, waste production, and the environmental assessment of suppliers. In contrast, disclosure related to material usage and the environmental impact of firm activities, particularly concerning biodiversity, is less common. The highest standard deviation is observed for the environmental assessment of suppliers, reflecting significant variability in how firms approach this category. Notably, most firms consistently disclose their energy consumption, emissions, and waste management, as these items show the lowest standard deviation in the sample. Like the economic performance pillar, each macro-category in the environmental pillar includes firms with a minimum disclosure value close to 0.

Turning to the social performance of firms in the sample, disclosures related to training and education policies, diversity and equal opportunity measures, and non-discrimination policies all scored well above 0.50. However, significant variability is observed in the disclosure of labor/management relations and non-discrimination policies, suggesting that while some firms provide extensive information on these items, others offer minimal or no disclosure. Like the other pillars, each macro-category within the social performance pillar includes firms with a minimum disclosure value close to 0.

Table 2 provides a sector breakdown of the firms included in the sample.

### [Insert Table 2 about here]

The most represented sectors are industrial goods and services (19 firms) and real estate (13 firms), while the least represented sectors are automobiles and parts (1 firm), media (2 firms), retail (2 firms), and energy (3 firms).

#### [Insert Table 3 about here]

Table 3 offers a country breakdown of the firms in the analysis. The most represented countries by number of firms are Germany (14), Great Britain (19), Sweden (16), and Switzerland (16). The least represented countries include Austria (1 firm), Ireland (1 firm), Luxembourg (1 firm), Norway (1 firm), Portugal (2 firms), and Belgium (3 firms).

#### 4.2 Leverage increase

Table 4 presents the configurations of conditions related to the disclosure of GRI's economic performance macro-categories that were associated with improved access to credit, as indicated by observed increases in leverage.

#### [Insert Table 4 about here]

Solution 3 (S3) exhibits the highest unique coverage, accounting for 11.66% of the instances in the sample where firms experienced increased access to credit. With a consistency score of 0.876, S3 demonstrates a strong association with the outcome of interest. The findings indicate that firms that increased their leverage focused on disclosing their anti-corruption policies, which include assessing operations for corruption risks, providing communication and training on anti-corruption procedures, and documenting and following up on confirmed corruption incidents. In S3, disclosures related to other macro-categories are deemed irrelevant, except for economic performance items concerning taxes, such as the firm's approach to tax, tax governance, control and risk management, stakeholder engagement, management of tax-related concerns, and country-by-country reporting.

When assessing the recurrence of various macro-categories across the configurations of conditions, the disclosure of a firm's economic performance, anti-corruption policies, and anti-competitive behavior policies stand out. These categories appear in 6, 5, and 6 solutions, respectively, out of the 9 solutions identified, highlighting their consistent association with improved access to credit.

Table 5 presents the configurations of conditions related to the disclosure of GRI's environmental performance macro-categories that were found to be associated with improved access to credit. As in previous analyses, improved access to credit is proxied by the observed increase in leverage.

#### [Insert Table 5 about here]

Solution 5 (S5) has the highest unique coverage, accounting for 13.87% of the instances where leverage increased among the sample firms in 2021-2022. S5 is also distinguished by a high consistency score of 0.958. Firms experiencing an increase in leverage during this period provided comprehensive disclosure across all the macro-categories, including the use of recycled input materials, energy consumption within the organization, management of water discharge-related impacts, significant impacts of activities, products, and services on biodiversity, direct (Scope 1) GHG emissions, waste generation and significant waste-related impacts, and negative environmental impacts in the supply chain, along with actions taken to mitigate them.

In terms of the recurrence of macro-categories across solutions, increased access to finance is frequently associated with the disclosure of a firm's energy consumption, direct (Scope 1) GHG emissions, and the environmental assessment of suppliers.

Table 6 presents the configurations of conditions related to the disclosure of social performance macro-categories, as defined by the GRI, that were found to be associated with improved access to credit among. As in previous analyses, improved access is proxied by the observed increase in leverage.

### [Insert Table 6 about here]

Solution 3 (S3) accounts for 19.05% of the instances where sample firms experienced an increase in leverage, with a high consistency score of 0.981. S3 indicates that firms observed an increase in leverage when they disclosed either incidents of discrimination and the corrective actions taken or their anti-discrimination policies. Disclosures related to other macro-categories within the social pillar, such as new employee hires and turnover, minimum notice periods for operational changes, occupational health and safety management systems, average training hours per employee, and the diversity of governance bodies and employees, are classified as "don't care" conditions, suggesting that their presence or absence does not significantly influence improved access to finance.

#### 4.3 Long-term debt increase

Table 7 presents the results of the configurations of conditions related to the disclosure of the economic performance macro-categories of the GRI observed in relation to increases in long-term debt.

#### [Insert Table 7 about here]

The results align with those observed for increases in leverage. Solution 1 (S1) in Table 7 accounts for 15.72% of the instances in the sample, with a consistency score above 0.900. Increases in long-term debt are linked to the disclosure of corporate anti-corruption policies, while other conditions, such as tax behavior, are treated as absent or irrelevant.

Table 8, by contrast, presents the results related to the disclosure of the environmental performance macro-categories of the GRI among the firms in the sample.

#### [Insert Table 8 about here]

The results strongly mirror those observed for leverage, with Solution 6 (S6) demonstrating 13.55% unique coverage and a consistency of 0.974. Firms that experienced increased access to credit, as indicated by an increase in long-term debt, are those that provided thorough disclosure of their environmental impacts and policies. The only difference is observed in biodiversity disclosure, which is treated as a "don't care" condition in this analysis, whereas it was considered "present" in the leverage analysis. Disclosure related to emissions and suppliers' environmental assessment policies remain the most frequently observed "present" conditions across all solutions.

Turning to Table 9, it presents the combinations of conditions related to the disclosure of social performance macro-categories according to the GRI for the firms under analysis.

# [Insert Table 9 about here]

Unlike the previous cases, Solution 3 (S3), which has a unique coverage of 18.9% and a consistency of 0.988, identifies as "present" not only the condition related to a firm's antidiscrimination policies, as seen in S3 from Table 6, but also its training and education initiatives. These initiatives include the average hours of training per year per employee, programs for upgrading employee skills and providing transition assistance, and the percentage of employees receiving regular performance and career development reviews. Additionally, S3 highlights diversity and equal opportunity measures as "present", encompassing policies that ensure diversity in governance bodies and among employees, as well as the ratio of basic salary and remuneration between women and men.

### 4.4 Short-term debt increase

Table 10 presents the configurations related to the disclosure of a firm's economic performance according to the GRI that were observed in instances of increased access to credit, as indicated by an increase in short-term debt.

### [Insert Table 10 about here]

Solution 1 (S1), with a unique coverage of 84.5% and a consistency of 0.954, mirrors the patterns identified for observed increases in firms' leverage and long-term debt. Firms that experience improved access to credit are those that disclose their anti-corruption policies, while all other conditions are classified as "absent". This indicates that the disclosure of other macro-categories related to a firm's economic performance plays a less significant role in enhancing access to credit. Consistent with the configurations linked to increases in leverage, the disclosure of anti-corruption and anti-competitive behavior policies are the most frequently recurring conditions across all solutions.

Table 11 presents the configurations of conditions related to the disclosure of environmental performance macro-categories as defined by the GRI that are most frequently associated with observed increases in a firm's short-term debt.

[Insert Table 11 about here]

Solution 5 (S5) has the highest unique coverage (13.16%) and a consistency of 0.960. The primary distinction between this configuration and those identified for observed increases in a firm's leverage and long-term debt lies in the macro-category concerning the impact of a firm's activities on biodiversity. Specifically, while S5 in Table 5, which addresses leverage increases, emphasizes the presence of biodiversity impact disclosure, S6 in Table 8, like S5 in Table 11, designates this condition as "don't care". Consistent with findings for leverage, a firm's disclosure regarding energy consumption and usage, emissions, and suppliers' environmental assessments are the three conditions most frequently linked to observed increases in short-term debt across all solutions. Notably, the disclosure of emissions and the environmental assessment of suppliers are also the most frequently identified conditions across solutions in this context, as seen in the case of observed increases in a firm's long-term debt.

Lastly, Table 12 presents the configurations of conditions related to a firm's disclosure of the social performance macro-categories as per the GRI that are associated with observed increases in short-term debt.

### [Insert Table 12 about here]

In Table 12, significant differences emerge, with Solution 4 (S4) showing the highest unique coverage (3.97%) and a consistency of 0.975. S4 indicates that a firm's increased access to credit is associated with comprehensive social disclosure encompassing nearly all GRI macro-categories. These include employment practices, labor-management relations, occupational health and safety, training and education, and diversity policies. The sole exception is the non-discrimination policies macro-category, which is treated as a "don't care" condition.

In contrast, S3 in Table 6, which relates to an observed increase in leverage, classifies all these social disclosure categories as "don't care" conditions, with non-discrimination policies being the only "present" condition. Comparing S4 in Table 12 with S3 in Table 9, which pertains to an observed increase in long-term debt, reveals that the "don't care" conditions in S3 are employment practices,

labor-management relations, and occupational health and safety policies. However, S3 in Table 9 identifies training and education, diversity, and non-discrimination policies as "present" conditions.

### 5. Discussion

Assessing a borrower's ESG profile before granting credit is fundamental for banks and other financial institutions involved in the climate change mitigation process. From the firms' side, being more transparent may represent the key to experience, ceteris paribus, wider access to credit at lower costs. This is for at least two reasons (Houston & Shan, 2022). First, banks lending to firms that are less transparent in terms of ESG may expose to adverse media coverage and reputational damage (Nicolò et al., 2024), leading to more stringent regulatory oversight in an already heavily regulated sector (Degryse et al., 2023; Huang et al., 2024). Second, less transparent borrowers, perceived as less committed to ESG initiatives, are more exposed to ESG controversies. They are at higher risk of facing backlash from stakeholders or increased regulatory scrutiny. These challenges can result in litigation costs and lower debt repayment likelihood. Consequently, banks are less inclined to lend to them due to the inherent risks and charge higher loan spreads (Carnevale & Drago, 2024).

While, on the one hand, it is important for banks and other financial institutions to obtain information about a borrower's ESG profile, on the other hand, it is crucial for firms to understand which information is most beneficial to disclose.

The findings demonstrate that combinations of ESG disclosures, based on the GRI macro-categories, associated with an increased access to credit are various. First, the solutions with the highest unique coverage reveal that firms that experienced an increase in leverage, long-term debt, or short-term debt are those disclosing their anti-corruption policies. Second, concerning E-pillar macro-categories as per the GRI, while disclosure related to climate change always results in a greater access to finance, differences are identified in the configurations associated with increases in access to credit, particularly regarding the biodiversity impacts of a firm's activities. In the solutions with the highest unique coverage, biodiversity impact disclosure was a "present" condition for leverage increases but

was treated as a "don't care" condition for long-term and short-term debt. Third, significant differences are also observed in the macro-categories related to S-pillar according to the GRI. For short-term debt, the solutions with the highest unique coverage link increased access to finance with social disclosures covering employment practices, labor-management relations, occupational health and safety, training and education, and diversity policies. The only exception is non-discrimination policies, which are treated as a "don't care" condition. In the case of leverage increases, all these social disclosure categories are labeled as "don't care" conditions, while non-discrimination policies is the only "present" condition. For long-term debt, employment practices, labor-management relations, and occupational health and safety are treated as "don't care", whereas training and education, diversity, and non-discrimination policies are treated as "don't care".

The consistent emergence of disclosures related to anti-corruption and anti-competitive behavior as factors associated with improved access to credit can be attributed to the heightened scrutiny that firms face when incidents of corruption or anti-competitive practices occur. Such incidents increase the risk of costly legal actions or sanctions. Conversely, when firms proactively disclose measures to prevent corruption and anti-competitive practices, they are perceived as less risky by lenders. This proactive transparency can enhance a firm's creditworthiness, making it more attractive for financing.

On the other hand, the shifting significance of a firm's biodiversity impacts across various access-to-credit specifications can be attributed to several factors. In the case of leverage, firms may strategically choose to disclose their biodiversity impacts, which are inherently tied to a long-term time horizon, as a signal of their commitment to minimizing their environmental footprint. This approach suggests that their transparency regarding ESG concerns goes beyond mere compliance and reflects a genuine, forward-looking concern for the broader natural environment that could not only appeal to banks, but also to equity investors (Albarrak et al., 2019). The idea that biodiversity loss disclosure serves as a form of strategic, long-term signaling of a firm's ESG commitment is further supported by the fact that the biodiversity macro-category has the lowest reported mean value. As relatively few firms in the sample disclose this type of impact, those doing stand out from their

competitors. Firms that thoroughly disclose their biodiversity impacts thus benefit from increased access to finance, not only through credit from banks. In fact, when shifting the focus solely to measures of access to finance related to long-term and short-term debt from financial institutions, the significance of biodiversity impacts diminishes, becoming a "don't care" condition. This may be because banks, when evaluating a firm's likelihood of debt repayment, tend to prioritize the disclosure of macro-categories currently considered more "material" by financial markets, such as emissions and climate change impacts. As a result, in this context, the disclosure of biodiversity impacts is perceived as less relevant, justifying its "don't care" status.

Moving on to the differences observed regarding a firm's transparency on social issues and its relationship with access to credit, they can result from several factors as well. Results suggest that short-term creditors place significant emphasis on social factors that directly affect a firm's immediate operational stability and cash flow, such as those related to their employment practices, labor-management relations, occupational health and safety, training and education, and diversity policies. Strong employment practices and positive labor-management relations reduce the risk of strikes, work stoppages, or labor disputes, which could disrupt operations and negatively impact short-term financial performance. Similarly, robust occupational health and safety policies mitigate the risk of workplace accidents, helping to avoid legal liabilities and ensure regulatory compliance—both of which are critical for maintaining smooth operations and short-term profitability. Moreover, investments in training and education improve employee skills, which positively influence short-term cash flows. Diversity policies can also yield tangible financial benefits, such as the ability of a firm to tap into the skills of a diverse workforce. Conversely, non-discrimination policies may be seen as less critical by short-term creditors, as issues related to discrimination typically have longer-term consequences and may not immediately affect the firm's short-term financial stability.

In contrast, for leverage increases, all the aforementioned social disclosure categories were treated as "don't care" conditions, with non-discrimination policies emerging as the sole "present" condition. Long-term creditors may prioritize firms that actively mitigate risks associated with discriminatory practices, which can have lasting effects on the credit relationship if not adequately addressed. This increased borrowing capacity results in higher levels of debt relative to equity, thereby raising the leverage ratio through the debt component. The lack of emphasis on other social disclosure categories suggests that these factors do not significantly influence creditors' decisions regarding debt extensions that affect leverage. Challenges related to employment practices can be resolved over time, representing hurdles to overcome rather than long-term commitments, as is seen with non-discrimination policies.

A similar pattern emerges in the case of long-term debt. Here, employment practices, labormanagement relations, and occupational health and safety policies were also treated as "don't care" conditions, while training and education, diversity, and non-discrimination policies were classified as "present". Long-term creditors prioritize the firm's ability to sustain profitability and fulfill obligations over time. Investments in training and education demonstrate a commitment to human capital development, ensuring that the firm remains competitive. Diversity policies enhance decisionmaking and foster innovation, which can improve the firm's growth. Non-discrimination policies, in particular, help mitigate legal and reputational risks that could lead to significant financial repercussions over time, such as costly lawsuits or damage to the company's brand.

### 6. Conclusion

This study aimed to examine the combinations of ESG disclosure enhancing European firms' access to credit, as indicated by observed increases in leverage, long-term debt, and short-term debt during 2021-2022.

The reported findings contribute to the debate on ESG disclosure and access to credit, by applying fsQCA, by focusing on Europe and by referring to GRI as standardized reporting framework. Furthermore, they present practical implications for firms, banks and policymakers.

First, firms should tailor ESG disclosure to the type of financing sought: detailed disclosures related to macro-categories addressing short-term operational issues may be crucial for securing

short-term financing, while comprehensive disclosures of long-term strategic ESG commitments may be more relevant for obtaining long-term financing.

Relying on ESG disclosures based on a widely adopted reporting standard enables banks to more accurately assess the ESG risks associated with a counterparty during the credit evaluation process. By avoiding dependence on a single ESG rating provider, banks can gain better control over their lending decisions. Moreover, utilizing a straightforward ESG disclosure standard like the GRI allows banks to engage more effectively with borrowers post-lending, ensuring they maintain their ESG commitments without having to wait for updated ESG ratings.

Policymakers can also benefit from the findings presented in this paper. The results provide evidence that policy interventions related to ESG disclosure significantly influence the creditgranting process in Europe. Consequently, the banking sector has emerged as a viable transmission channel for Europe's sustainability policies and the transition toward more sustainable business models. Additionally, the results indicate that banks perceive the disclosure of specific macrocategories related to ESG pillars differently, depending on whether the lending relationship is shortterm or long-term. This insight offers policymakers the opportunity to monitor the use of ESG disclosure for credit acquisition purposes while also differentiating the impact of ESG policies based on the transmission channel—be it short-term or long-term credit relationships.

Despite its contributions to the ongoing academic debate, this study has some limitations that future research could address to further advance the literature. First, the paper relies solely on ESG disclosures based on the GRI reporting standard. While GRI is the most widely adopted framework, other non-financial reporting standards could also be considered.

Second, the sample excludes delisted firms, which may limit the generalizability of the findings to the broader European context. Future research could address this by including both listed and previously listed firms to account for the delisting effect. Notably, the configurations of conditions may vary between currently listed and previously listed firms, potentially offering new insights and contributing further to the existing academic research. Third, although the configurations of conditions provide valuable insights into the relationship between a firm's ESG disclosure and its access to credit within the European context, the analysis is limited to this geographical region. To further contribute to the academic debate, future research could extend this configurational analysis to other geographic contexts where ESG considerations are also increasingly significant in lending practices.

Fourth, as noted in the methodology section, the configurations of conditions leading to observed decreases in a firm's access to finance did not meet the minimum frequency and consistency thresholds to be considered informative. As a result, the findings reported here are limited to firms that experienced improved access to finance. Future research could explore how the configurations of conditions that result in a decrease in access to finance differ from those leading to an increase, ideally using a larger, more comprehensive sample than the one used in this study.

Last, this paper employs a measure of ESG disclosure that determines only whether a given ESG item related to a specific macro-category is disclosed, without assessing the depth of the firm's disclosure or its actual commitment to that ESG cause. Future research could develop novel measures that not only capture whether an item is disclosed but also evaluate the depth and quality of the firm's disclosures (Arvidsson & Dumay, 2022).

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Table 1: Descr	ptive statistics
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Variables	Ν	Min.	Max.	Mean	Std.
Leverage	112	0.501	1.000	0.664	0.161
LongTermDebt	112	0.501	1.000	0.705	0.165
ShortTermDebt	112	0.502	1.000	0.0	0.156
Economic performance					
EcoPer	112	0.002	1.000	0.417	0.381
MrkPre	112	0.002	1.000	0.189	0.362
IndEco	112	0.002	1.000	0.350	0.418
ProPra	112	0.002	1.000	0.421	0.495
AntCor	112	0.002	1.000	0.562	0.380
AntCom	112	0.002	1.000	0.510	0.501
Tax	112	0.002	1.000	0.370	0.449
Environmental performance					
Mat	112	0.002	1.000	0.301	0.364
Eng	112	0.201	0.701	0.469	0.158
WatEff	112	0.301	0.801	0.516	0.200
Bio	112	0.002	1.000	0.225	0.369
Emi	112	0.084	0.668	0.482	0.138
Was	112	0.201	0.701	0.450	0.187
SupEnv	112	0.002	1.000	0.475	0.417
Social performance					
Emp	112	0.002	1.000	0.453	0.321
Lab	112	0.002	1.000	0.278	0.449
OccHea	112	0.101	0.601	0.411	0.189
TraEdu	112	0.002	1.000	0.592	0.342
Div	112	0.002	1.000	0.671	0.338
NonDis	112	0.002	1.000	0.590	0.493

# Table 2: Sector Breakdown

Sector	N
Automobiles & Parts	1
Basic Resources	7
Chemicals	9
Construction & Materials	7
Consumer Products & Services	9
Energy	3
Food, Beverage & Tobacco	8
Health Care	11
Industrial Goods & Services	19
Media	2
Personal Care, Drug & Grocery Stores	5
Real Estate	13
Retail	2
Technology	6
Telecommunications	4
Utilities	6
Total	112

 Table 3: Country Breakdown

Country	N
Austria	1
Belgium	3
Denmark	4
Finland	5
France	8
Germany	14
Great Britain	19
Ireland	1
Italy	5
Luxembourg	1
Netherlands	7
Norway	1
Portugal	2
Spain	9
Sweden	16
Switzerland	16
Total	112

Conditions	Intermediate Solution								
Conditions	<b>S1</b>	S2	<b>S</b> 3	<b>S4</b>	<b>S</b> 5	<b>S6</b>	<b>S</b> 7	<b>S8</b>	<b>S</b> 9
EcoPer	•	•	$\otimes$	•	•	•	$\otimes$	•	$\otimes$
MrkPre	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$
IndEco	•	•	$\otimes$		•		$\otimes$	•	$\otimes$
ProPra	•		$\otimes$	$\otimes$	•		$\otimes$	$\otimes$	•
AntCor	•	•	•	•		•	$\otimes$	$\otimes$	$\otimes$
AntCom		•	$\otimes$	•	•	•	•	$\otimes$	•
Tax				$\otimes$	•	•	$\otimes$	$\otimes$	•
Solution Raw Coverage	0.1110	0.1311	0.1300	0.0750	0.0561	0.0798	0.0787	0.0243	0.0331
Solution Unique Coverage	0.0313	0.0146	0.1166	0.0201	0.0022	0.0248	0.0476	0.0112	0.0215
Solution Consistency	0.9536	0.9161	0.8763	10.000	0.9997	0.8703	0.8840	10.000	0.9476
Ν	112								
Overall Solution Coverage	0.4414								
Overall Solution Consistency	0.8902								

Table 4: Configurations of Causal Conditions – Economic Performance – Leverage Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "EcoPer" stands for "GRI 201: Economic Performance 2016". "MrkPre" represents "GRI 202: Market Presence 2016". "IndEco" is short for "GRI 203: Indirect Economic Impacts 2016". "ProPra" denotes "GRI 204: Procurement Practices 2016". "AntCor" is the abbreviation for "GRI 205: Anti-corruption 2016". "AntCom" signifies "GRI 206: Anti-competitive Behavior 2016". "Tax" corresponds to "GRI 207: Tax 2019". Frequency threshold: 2. Consistency threshold: 0.90.

Conditions	Intermediate Solution						
Conditions	S1	S2	S3	S4	S5		
Mat	$\otimes$	$\otimes$	$\otimes$	$\otimes$	•		
Eng	$\otimes$	$\otimes$	•	•	•		
WatEff	$\otimes$	$\otimes$	$\otimes$	•	•		
Bio	$\otimes$	$\otimes$	$\otimes$	$\otimes$	•		
Emi	$\otimes$	$\otimes$	•	•	•		
Was	$\otimes$		$\otimes$	•	•		
SupEnv		•	$\otimes$	•	•		
Solution Raw Coverage	0.5104	0.2659	0.3260	0.2166	0.1678		
Solution Unique Coverage	0.0724	0.0058	0.0130	0.0280	0.1387		
Solution Consistency	0.9832	0.9923	0.9977	1.0000	0.9584		
Ν	112						
<b>Overall Solution Coverage</b>	0.6995						
Overall Solution Consistency	0.9766						

### Table 5: Configurations of Causal Conditions – Environmental Performance – Leverage Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Mat" is for "GRI 301: Materials 2016". "Eng" stands for "GRI 302: Energy 2016". "WatEff" is the short form of "GRI 303: Water and Effluents 2018". "Bio" represents "GRI 304: Biodiversity 2016". "Emi" is the abbreviation for "GRI 305: Emissions 2016". "Was" denotes "GRI 306: Waste 2020". "SupEnv" signifies "GRI 308: Supplier Environmental Assessment 2016". Frequency threshold: 5. Consistency threshold: 0.90.

Conditions	Intermediate Solution						
Conditions	S1	S2	S3	S4	S5		
Emp	$\otimes$			$\otimes$	•		
Lab	$\otimes$	$\otimes$		$\otimes$	$\otimes$		
ОссНеа	•			$\otimes$	$\otimes$		
TraEdu							
Div	•				•		
NonDis		•	•	$\otimes$			
Solution Raw Coverage	0.2882	0.2314	0.3711	0.2440	0.2745		
Solution Unique Coverage	0.0312	0.0241	0.1905	0.1215	0.0146		
Solution Consistency	0.9996	0.8285	0.9811	0.8912	0.9988		
Ν	112						
<b>Overall Solution Coverage</b>	0.7306						
Overall Solution Consistency	0.8982						

#### Table 6: Configurations of Causal Conditions – Social Internal Performance – Leverage Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Emp" is for " GRI 401: Employment 2016". " Lab" stands for " GRI 402: Labor/Management Relations 2016". " OccHea" is the short form of " GRI 403: Occupational Health and Safety 2018". " TraEdu" represents " GRI 404: Training and Education 2016". " Div" is the abbreviation for "GRI 405: Diversity and Equal Opportunity 2016". " NonDis" denotes " GRI 406: Non-discrimination 2016". Frequency threshold: 4. Consistency threshold: 0.90.

Constitution	Intermediate Solution			
Conditions	S1	82		
EcoPer	$\otimes$	8		
MrkPre	$\otimes$	$\otimes$		
IndEco	$\otimes$	$\otimes$		
ProPra	$\otimes$	$\otimes$		
AntCor	•	$\otimes$		
AntCom	$\otimes$	•		
Tax		$\otimes$		
Solution Raw Coverage	0.1580	0.0482		
Solution Unique Coverage	0.1572	0.0473		
Solution Consistency	0.9174	0.9590		
Ν	112			
<b>Overall Solution Coverage</b>	0.2054			
<b>Overall Solution Consistency</b>	0.9265			

 Table 7: Configurations of Causal Conditions – Economic Performance – Long-Term Debt Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "EcoPer" stands for "GRI 201: Economic Performance 2016". "MrkPre" represents "GRI 202: Market Presence 2016". "IndEco" is short for "GRI 203: Indirect Economic Impacts 2016". "ProPra" denotes "GRI 204: Procurement Practices 2016". "AntCor" is the abbreviation for "GRI 205: Anti-corruption 2016". "AntCor" is ginifies "GRI 206: Anti-competitive Behavior 2016". "Tax" corresponds to "GRI 207: Tax 2019". Frequency threshold: 4. Consistency threshold: 0.90.

Conditions	Intermediate Solution						
Conditions	S1	S2	S3	S4	S5	<b>S6</b>	
Mat	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$	•	
Eng	$\otimes$	$\otimes$	$\otimes$	•		•	
WatEff	$\otimes$	$\otimes$	$\otimes$		•	•	
Bio	$\otimes$	$\otimes$	$\otimes$	$\otimes$	$\otimes$		
Emi	$\otimes$		$\otimes$	•	•	•	
Was	$\otimes$	$\otimes$		$\otimes$	•	•	
SupEnv		•	•	$\otimes$	•	•	
Solution Raw Coverage	0.4629	0.2758	0.2742	0.3061	0.2498	0.2454	
Solution Unique Coverage	0.0618	0.0070	0.0051	0.0204	0.0137	0.1355	
Solution Consistency	0.9826	0.9910	0.9964	0.9945	0.9923	0.9748	
Ν	112						
Overall Solution Coverage	0.6779						
Overall Solution Consistency	0.9718						

Table 8: Configurations of Causal Conditions - Environmental Performance - Long-Term Debt Increa
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Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Mat" is for "GRI 301: Materials 2016". "Eng" stands for "GRI 302: Energy 2016". "WatEff" is the short form of "GRI 303: Water and Effluents 2018". "Bio" represents "GRI 304: Biodiversity 2016". "Emi" is the abbreviation for "GRI 305: Emissions 2016". "Was" denotes "GRI 306: Waste 2020". "SupEnv" signifies "GRI 308: Supplier Environmental Assessment 2016". Frequency threshold: 4. Consistency threshold: 0.90.

Conditions	Intermediate Solution						
Conditions	<b>S1</b>	S2	S3	S4	S5	S6	
Emp	$\otimes$			$\otimes$	$\otimes$	$\otimes$	
Lab	$\otimes$	$\otimes$		$\otimes$	$\otimes$	$\otimes$	
ОссНеа	•			$\otimes$			
TraEdu		•	•	$\otimes$		•	
Div	•	•	•		•	•	
NonDis		•	•	$\otimes$	$\otimes$		
Solution Raw Coverage	0.2646	0.2259	0.3579	0.2025	0.1788	0.2922	
Solution Unique Coverage	0.0189	0.0187	0.1890	0.0612	0.0070	0.0000	
Solution Consistency	0.9957	0.8945	0.9886	0.9693	0.9721	0.9931	
Ν	112						
Overall Solution Coverage	0.6730						
Overall Solution Consistency	0.9433						

Table 9: Configurations of Causal Conditions - Social Internal Performance - Long-Term Debt Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Emp" is for " GRI 401: Employment 2016". " Lab" stands for " GRI 402: Labor/Management Relations 2016". " OccHea" is the short form of " GRI 403: Occupational Health and Safety 2018". " TraEdu" represents " GRI 404: Training and Education 2016". " Div" is the abbreviation for "GRI 405: Diversity and Equal Opportunity 2016". " NonDis" denotes " GRI 406: Non-discrimination 2016". Frequency threshold: 4. Consistency threshold: 0.90.

Conditions	Intermediate Solution				
Conditions	<b>S</b> 1	S2	83		
EcoPer	$\otimes$	$\otimes$	•		
MrkPre	$\otimes$	$\otimes$	$\otimes$		
IndEco	$\otimes$	$\otimes$	•		
ProPra	$\otimes$	$\otimes$	$\otimes$		
AntCor	•	$\otimes$	•		
AntCom	$\otimes$	•	•		
Tax	$\otimes$	$\otimes$	$\otimes$		
Solution Raw Coverage	0.0853	0.0927	0.0626		
Solution Unique Coverage	0.0845	0.0710	0.0408		
Solution Consistency	0.9543	0.9777	1.0000		
Ν	112				
<b>Overall Solution Coverage</b>	0.2182				
<b>Overall Solution Consistency</b>	0.9723				

 Table 10: Configurations of Causal Conditions – Economic Performance – Short-Term Debt Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "EcoPer" stands for "GRI 201: Economic Performance 2016". "MrkPre" represents "GRI 202: Market Presence 2016". "IndEco" is short for "GRI 203: Indirect Economic Impacts 2016". "ProPra" denotes "GRI 204: Procurement Practices 2016". "AntCor" is the abbreviation for "GRI 205: Anti-corruption 2016". "AntCor" is ginifies "GRI 206: Anti-competitive Behavior 2016". "Tax" corresponds to "GRI 207: Tax 2019". Frequency threshold: 4. Consistency threshold: 0.90.

Conditions	Intermediate Solution							
	S1	S2	S3	S4	S5	<b>S</b> 6		
Mat	$\otimes$	$\otimes$	$\otimes$	$\otimes$	•	$\otimes$		
Eng	$\otimes$	$\otimes$	•	•	•	•		
WatEff	$\otimes$	$\otimes$	•		•	$\otimes$		
Bio	$\otimes$	$\otimes$	$\otimes$	$\otimes$		$\otimes$		
Emi	$\otimes$	$\otimes$	•	•	•	•		
Was	$\otimes$			•	•	$\otimes$		
SupEnv		•	•	•	•	$\otimes$		
Solution Raw Coverage	0.5031	0.2716	0.2800	0.2712	0.2477	0.3435		
Solution Unique Coverage	0.0653	0.0001	0.0071	0.0144	0.1316	0.0110		
Solution Consistency	0.9795	0.9957	1.0000	1.0000	0.9609	0.9934		
Ν	112							
Overall Solution Coverage	0.7159							
Overall Solution Consistency	0.9690							

 Table 11: Configurations of Causal Conditions - Environmental Performance – Short-Term Debt Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Mat" is for "GRI 301: Materials 2016". "Eng" stands for "GRI 302: Energy 2016". "WatEff" is the short form of "GRI 303: Water and Effluents 2018". "Bio" represents "GRI 304: Biodiversity 2016". "Emi" is the abbreviation for "GRI 305: Emissions 2016". "Was" denotes "GRI 306: Waste 2020". "SupEnv" signifies "GRI 308: Supplier Environmental Assessment 2016". Frequency threshold: 4. Consistency threshold: 0.90.

Conditions	Intermediate Solution							
	<b>S1</b>	S2	<b>S3</b>	<b>S</b> 4	<b>S</b> 5	<b>S</b> 6		
Emp	$\otimes$	$\otimes$		•		•		
Lab	$\otimes$	$\otimes$	$\otimes$	•	$\otimes$			
ОссНеа		•	$\otimes$	•		•		
TraEdu			•	•	•	•		
Div	•	•	•	•	•	•		
NonDis	$\otimes$				•	•		
Solution Raw Coverage	0.2230	0.2661	0.3278	0.2520	0.2012	0.3226		
Solution Unique Coverage	0.0378	0.0170	0.0103	0.0397	0.0147	0.0000		
Solution Consistency	0.9728	0.9890	0.9549	0.9756	0.8426	0.9808		
Ν	112							
Overall Solution Coverage	0.7009							
Overall Solution Consistency	0.9290							

Table 12: Configurations of Causal Conditions - Social Internal Performance - Short-Term Debt Increase

Note: ● indicates the presence of a condition. Blank spaces indicate that the condition is not relevant. ⊗ indicates the absence or negation of a condition. "Emp" is for " GRI 401: Employment 2016". " Lab" stands for " GRI 402: Labor/Management Relations 2016". " OccHea" is the short form of " GRI 403: Occupational Health and Safety 2018". " TraEdu" represents " GRI 404: Training and Education 2016". " Div" is the abbreviation for "GRI 405: Diversity and Equal Opportunity 2016". " NonDis" denotes " GRI 406: Non-discrimination 2016". Frequency threshold: 4. Consistency threshold: 0.90.