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Exploring the asymmetric impact of sustainability reporting on financial performance in the utilities sector: A longitudinal comparative analysis

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A R T I C L E   I N F O

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A B S T R A C T

This paper explores the longitudinal impact of Environmental, Social, and Governance (ESG) scores on company performance, considering firm value and financial accounting performance. Using a longitudinal fuzzy set qualitative comparative analysis (fsQCA) on a sample of 185 global listed companies in the utilities sector from 2018 to 2021, we demonstrate that various combinations of sub-dimensions of ESG activities determine the level of financial performance (FP). We use two accounting metrics and two market-based indicators and identify different configurations across time from the perspective of each measure. According to the accounting-based indicators, a good performance on the S pillar and an absence on the E pillar generate high financial outcomes across time, regardless of their performance on the G pillar. However, from the market perspective, both the E and S pillars are determinants for generating high FP, indicating that the three dimensions of ESG do not need to exist simultaneously to lead to high financial outcomes. This research contributes to the understanding of needed improvements to sector and industry-specific analyses focusing on the utilities sector, an environmentally sensitive but scarcely studied sector. The study specifically sheds light on how publicly traded utility companies should strategically combine efforts in the E, S, and G pillars based on whether their focus is on short-term profits or, conversely, long-term profits. Additionally, it expands the application of longitudinal fsQCA to research related to sustainability.

1. Introduction

Driven by globalization, climate change, environmental pollution, and resource scarcity, stakeholder pressure on companies' environmental, social, and governance (ESG) practices has increased in recent years. The growing demand for information on the positive and negative impacts of their environmental and social actions and how they contribute to sustainable development (Paolone et al., 2021) has made ESG reporting an institutionalized practice, particularly in stock-exchange listed companies (Slacik and Greiling, 2020). There is an increasing demand from investors for responsible financial behavior (Martini, 2021) and sustainability is now viewed as a necessity rather than a luxury item (Pástor and Vorsatz, 2020).

Financial markets use ESG factors as a tool when deciding which companies to invest in (Almeyda and Darmansya, 2019) and are subject to specific mandatory regulations (e.g., Commission Delegated Regulation (EU) 2022/1288, 2022, and Regulation (EU) 2019/2088, 2019). These policies have created additional pressure on companies to commit to sustainability responsibilities and disclose ESG information. ESG factors have become crucial sources of corporate risk and have the potential to affect a company's financial performance (Zhao et al., 2018).

In this context, the scientific debate has been characterized by management scholars increasingly focusing on the relationship between a company's ESG activities and its financial performance (FP) in recent years (Bruna et al., 2022; Imperiale et al., 2023; Nicolo et al., 2023; Veltri et al., 2023). However, researchers have not reached a consensus on the direct relationship between efforts to improve a company's non-financial behavior and its financial performance (Şeker and Güngör, 2022). Scholars have attributed these mixed results to the variety of methodologies (Orlitzky et al., 2003), the omission of relevant variables and measurement errors (Paolone et al., 2022), and the ambiguity of different ESG and financial performance indicators (Margolis et al., 2011; Wang and Sarkis, 2017). Furthermore, despite the limited availability of industry-specific research (Imperiale et al., 2023; Veltri et al., 2023), it is one of the key factors driving the ESG agenda in companies. As a result, focusing research on a particular industry is recommended

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(Ali et al., 2017) due to its unique capabilities in determining stakeholders' expectations and firms' motives for FP (Baird et al., 2012).

In this regard, few industries feel as much pressure from stakeholders as the utilities sector because it is among the industries with the most significant environmental impacts (Veltri et al., 2023). Moreover, the utilities sector is controversial from a sustainability standpoint as it plays a vital role in supporting other sectors of the economy, thereby generating positive externalities. However, at the same time, it is also more prone to receiving negative perceptions from stakeholders due to its environmental impact (Hasan et al., 2022). Consequently, there may be conflicting interests in the disclosure of the ESG practices of these companies (Pizzi et al., 2021). On the one hand, they communicate their performance to gain legitimacy in the eyes of stakeholders by reporting their contribution to the Sustainable Development Goals (Slacik and Greiling, 2020; Venturelli et al., 2023); on the other hand, they might attempt to repair their legitimacy through greenwashing practices (Shahbaz et al., 2020) to manage their reputational risk (Cong et al., 2020). Due to the coexistence of both positive (providing essential infrastructure and public services) and negative externalities (impact on the ecosystem), the utilities sector presents a valid framework for studying ESG reporting and its impact on FP. This framework combines shareholder value creation with stakeholder pressures, demonstrating a commitment to sustainable development within social and environmental constraints (Imperiale et al., 2023; Nicolo et al., 2023; Slacik and Greiling, 2020).

Given these premises, the present study attempts to address some of these gaps from earlier studies and contribute to international scholarship by testing how combinations of ESG pillars can lead firms to achieve higher levels of FP in the context of utilities. Our article is original in proposing longitudinal fuzzy-set qualitative comparative analysis (fsQCA) in the global utilities sector, analyzing combinations of E, S, and G scores on FP in both the short (expressed by ROA) and long terms (represented by Tobin's Q and enterprise value). Grounded in the complexity theory, we assume that a background condition may be necessary but rarely sufficient to predict the outcome. Furnari et al. (2021) suggests applying configuration theories in research to explain phenomena where causality is complex and not easily captured with correlational arguments. Thus, we apply the fsQCA methodology to identify combinations of conditions that yield a favorable outcome (the "recipe" principle) as a configuration may be sufficient but not the only one for the result to occur (the "equifinality" principle); that is, different paths (E, S, and G pillars) can lead to the same outcome (high FP). We employ an inductive approach to develop propositions that build on our findings (Campbell et al., 2015; Federo and Saz-Carranza, 2018; Haxhi and Aguilera, 2017).

To carry out our analysis, we collected data from the Refinitiv Datastream database on a sample of 185 worldwide traded companies operating in the utilities sector (i.e., electric utilities, independent power producers, multiline utilities, natural gas utilities, and water supply) during the 2018–2021 period, resulting in a total of 740 observations.

Our research offers several contributions. First, it addresses the need for more industry-specific analyses highlighted by various scholars (Imperiale et al., 2023) by focusing on the utilities sector, an environmentally sensitive (García-Meca and Martínez-Ferrero, 2021) yet scarcely studied (Şeker and Güngör, 2022; Slacik and Greiling, 2020) sector where much remains to be learned (Nicolo et al., 2023). Second, our research contributes to the scientific debate on how ESG scores impact FP. We separately evaluate the three ESG pillars (environmental performance "E," social performance "S," and governance performance "G"), unlike the majority of previous studies that focus on Global ESG (Bruna et al., 2022; Ruan and Liu, 2021). We view ESG as a multidimensional concept where the effects of a dimension can sometimes cancel or amplify the opposite effects of another, so analyzing their sub-dimensions can be advantageous (Margolis et al., 2011). This disaggregation lets us determine which ESG component is the key to improving FP (Nollet et al., 2016). Third, most of the literature evaluates ESG using net effects methodologies, i.e., emphasizing the individual impact of the overall ESG score or each ESG pillar on effects (Chouaibi et al., 2022; Saygili et al., 2022; Wu et al., 2020), but there is a lack of studies examining the FP impact using the configuration of the three ESG pillars as analysis units (Liu et al., 2022). Lastly, our study sheds light on how utility companies could strategically combine efforts in the E, S, and G pillars based on their focus on short-term or long-term profits.

The remainder of the paper is organized as follows: Section 2 reviews the previous literature. Section 3 describes the data collection and research methodology. Section 4 summarizes the empirical results, and in-depth discussions of the findings are included in Section 5. Finally, in Section 6, we present the conclusions and limitations of the study.

2. Literature review

An increasing number of companies are now recognizing the importance of ESG factors and incorporating them into their overall risk analysis to achieve more stable financial returns as financial investors view these factors as a material risk and demand more responsible financial behavior (Martini, 2021). This non-financial aspect of companies is becoming increasingly valued by investors due to the benefits of reducing the risk of an investment portfolio and increasing its return (Broadstock et al., 2021), even in the face of unprecedented stock market volatility, such as during the COVID-19 pandemic crisis (Palma-Ruiz et al., 2020). Companies engage in ESG activities not only to achieve higher financial returns but also to signal compliance in the market (Khan, 2022). Credit institutions also value ESG performance and disclosure and integrate this information into their credit decisions (Ahmed et al., 2019). Similarly, the rating agencies have signed up to the Principles for Responsible Investment (PRI) (OECD, Secretariat of the UNEP Finance Initiative, 2021), committing to include ESG factors in their credit rating process. Therefore, there is no doubt that economies worldwide are increasingly being reconfigured toward sustainability.

For decades, scholars have sought to determine whether corporate social performance and FP are positively or negatively associated (Barnett and Salomon, 2012). Some authors argue that investing in ESG might reduce a company's profitability. According to the liberal neo-classical view, a company's purpose is to maximize profit (Friedman, 1970), so using corporate resources for other purposes implies additional costs, which can reduce profitability and competitiveness. Additionally, agency theory (Jensen, 2002) suggests that investing in ESG could generate conflicts of interest for stakeholders as managers may overinvest in ESG for their benefit (Laguir et al., 2021).

However, companies have stakeholders beyond their shareholders (Freeman, 1984). Stakeholder theory suggests that for companies to be successful, they need the support and approval of a wide range of stakeholders, including employees, customers, suppliers, governments, and non-governmental organizations (Waddock et al., 1997; Zhong et al., 2022). This view, coupled with increased awareness of the business impacts on the environment and society, results in companies focusing on non-financial objectives like sustainability to gain a competitive advantage over other companies (Parente et al., 2018). In line with this, legitimacy theory suggests that companies are interested in investing in ESG activities and disclosing them to repair, maintain, or gain legitimacy among various social groups (Veltri et al., 2023).

In light of this background, researchers have sought to analyze the financial implications of non-financial disclosures on business performance. Although Şeker and Güngör (2022) claim most studies show positive and significant results, the link between ESG and firm FP is still not well established because the literature is infused with conflicting results and paradoxes (Khan, 2022; Lee and Suh, 2022) and, therefore, the results are inconclusive and cannot be generalized (Hartzmark and Sussman, 2019; Shin et al., 2022; Wong, 2017). Accordingly, some academics have found a positive association (Abdi et al., 2022; Ahmad et al., 2021; Broadstock et al., 2021; Cho et al., 2019; Chouaibi et al., 2022; Folger-Laronde et al., 2022; Huang, 2021; Yoo et al., 2021; Zhong et al., 2022), whereas the findings of other authors have suggested a negative relationship (Duque-Grisales and Aguilera-Caracuel, 2021; Kuzey et al., 2021; Ruan and Liu, 2021; Saygili et al., 2022). Other researchers have found a non-significant relationship (Nekhili et al., 2021; Rhou et al., 2016; Şeker and Güngör, 2022; Shahbaz et al., 2020; Uyar et al., 2020) or mixed results (Almeyda and Darmansya, 2019; Yoo and Managi, 2022).

Several factors may contribute to the mixed results regarding the links between ESG and FP. First, the use of a variety of analytical methods: multiple regression (Cho et al., 2019; Şeker and Güngör, 2022; Veltri et al., 2023), fsQCA (Laguir et al., 2021; Liu et al., 2022; Sinthupundaja et al., 2019; Zhong et al., 2022), panel data (Abdi et al., 2022; Almeyda and Darmansya, 2019; Chouaibi et al., 2022; Imperiale et al., 2023; Kuzey et al., 2021; Saygili et al., 2022; Shahbaz et al., 2020; Uyar et al., 2020; Zhang et al., 2021), content analysis (Al Amosh and Khatib, 2021), TOPSIS (Bouslah et al., 2022), and mixed methods (Laguir et al., 2021; Paniagua et al., 2018).

Other factors include omitting control variables such as risk, size, and age (Wang and Sarkis, 2017) and measurement error (Paolone et al., 2022), or using different ways of quantifying financial performance such as accounting-based measures (ROA, ROE, and ROCE), market-based measures (Tobin's Q and enterprise value), or mixed measures. Market-based measures tend to be more sensitive to changes in ESG actions than other accounting-based measures. In addition, the impact of ESG practices on a company's market value is likely to be lagged, meaning that while there are short-term costs associated with investing in these practices, the rewards are likely to be long-term (Zhong et al., 2022).

Third, the heterogeneity of ESG scoring is due to the wide range of credit-rating agencies that provide different scores (Huber and Comstock, 2017). Some rating agencies focus on the transparency of ESG disclosure, referring to the reports published by firms (e.g., Bloomberg ESG Scores), while other datasets (e.g., MSCI ESG Scores) focus on the evaluations of actions representing how a firm implements and performs ESG behaviors (Yoo and Managi, 2022).

Finally, ESG disclosure is influenced by governance mechanisms (Nicolo et al., 2023), the institutional context (Veltri et al., 2023; Yu and Luu, 2021) or the specific industry (Imperiale et al., 2023). Thus, although the academic literature analyzing the ESG-FP relationship is mature, researchers agree on the need to explore sectorial dynamics (Slacik and Greiling, 2020) as the type of industry and its unique capabilities determine stakeholders' expectations and firms' motives for FP (Baird et al., 2012). In this regard, the utilities sector is under pressure from stakeholders (Veltri et al., 2023). According to legitimacy theory, companies belonging to environmentally sensitive industries are more visible, so they may be more committed to ESG practices and disclosure to address information asymmetry, satisfy investors, reduce risk and the cost of capital, and improve their legitimacy and reputation in the market.

Specifically, utility companies are often involved in business processes characterized by the coexistence of positive externalities (achieving public value creation) and negative externalities (García-Meca and Martínez-Ferrero, 2021) relating to their characteristics, such as pollution, loss of biodiversity, and deforestation (Pizzi et al., 2021). For this reason, stakeholders are stricter on ESG with these companies and hold them to higher standards. Complying can improve their reputation and increase their FP (Venturelli et al., 2023). Utility companies might even disclose ESG information strategically to repair their reputation or as a façade to enhance the company's image, as in "greenwashing" (Cho et al., 2015).

The utilities sector is highly exposed to reputational risks (Imperiale et al., 2023) within its social and political environments. It is closely related to other sectors, so disclosing ESG information is particularly critical in these industries (Nicolo et al., 2023). In any case, the disclosure of ESG practices aims to meet the expectations of stakeholders in order to improve their financial performance and corporate efficiency (Hasan et al., 2022). However, Şeker and Güngör (2022) reported no statistically significant impact on ESG-FP outcomes in utilities worldwide. Similarly, Veltri et al. (2023) did not find evidence supporting the importance of ESG factors on corporate efficiency in the utilities sector.

On the other hand, the role of ESG practices in generating value for companies is causally complex, as the different dimensions of E, S, and G can reinforce or weaken each other (Zhong et al., 2022). According to the concept of "stakeholder influence capacity" (Barnett, 2007), engaging in ESG behaviors can enhance relationships with stakeholder groups while potentially straining relationships with others. Achieving a delicate balance between these stakeholders becomes a complex task. Consequently, diverse stakeholder orientations may result in distinct ESG strategies, and there could be substitutive roles among the various dimensions (Zhong et al., 2022), suggesting the need for a configurational model. Although regression techniques have improved our knowledge of the net impact of E, S, and G activities on FP (Şeker and Güngör, 2022), studies examining combinations of the three pillars leading to the same result are still lacking (Liu et al., 2022). In this sense, fuzzy set qualitative comparative analysis (fsQCA) is considered a powerful tool to solve the problem of causal interdependence and complexity (Ragin, 2008) and can help to understand the combination of attributes (complete recipes) instead of examining each attribute separately (individual attributes) (Fiss, 2011).

3. Data and methodology

3.1. Data

The data used in the study were obtained from the Refinitiv Datastream database, comprising a sample of 185 publicly traded companies in the utilities sector worldwide. The choice of this sector was motivated by the sample being characterized by an adequate degree of homogeneity. A filter was applied to Refinitiv *TRBC Business Sector Name* "Utilities," selecting companies with ESG scores for the four fiscal years from 2018 to 2021. The final sample consisted of 740 observations from 32 countries. The data were processed and analyzed using the fsQCA 4.0 software developed by Ragin and Davey (2022).

The outcome variable in our research is FP. As previously mentioned, the literature typically uses accounting-based or market-based performance indicators. Since management decisions often influence accounting-based variables, it is necessary to consider market-based ones. Hence, this paper offers the opportunity to analyze the results for both measures, separately contrasting the effects of antecedent conditions on each. This approach allows for a more holistic view by presenting results based on accounting and market-based financial performance measures.

Furthermore, as previously discussed, there is no uniformity in calculating these ratios, as studies have used various accounting and market-based indicators. Therefore, our study also considers the possibility of using multiple indicators for the independent variables, leading to the development of the four conceptual models shown in Fig. 1.

Based on accounting data, the first two models use two RoA indicators as performance measures, namely RoA-1 and RoA-2. Models 3 and 4 examine market-based performance evaluation, for which two general-purpose indicators are also proposed: Tobin's Q (TQ) and Enterprise Value (EV). The definitions of these indicators are provided in Table 1.

Related to the antecedents or independent variables, Refinitiv assesses ESG performance by analyzing over 450 publicly available ESG measures, of which a subset of 186 of the most relevant and comparable by sector feed into the overall company assessment and scoring process. The underlying measures are based on considerations of comparability, impact, data availability, and sector relevance that vary across industry groups. These are grouped into ten categories that form the three ESG pillar scores and the final ESG score, which reflect a company's ESG

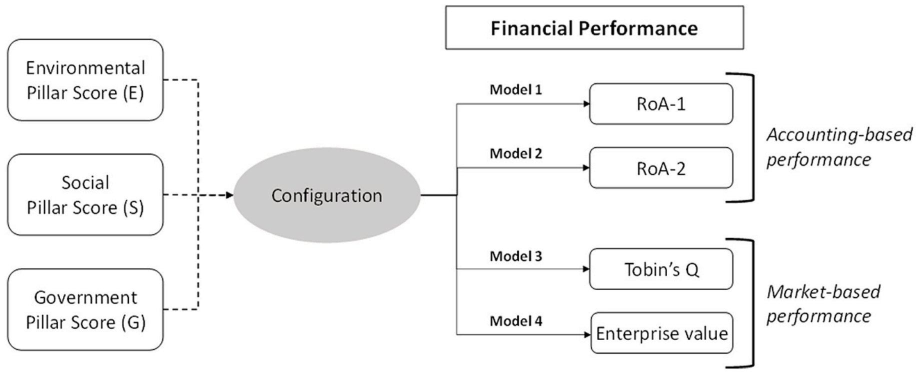

Fig. 1. Conceptual models and theoretical framework.

Table 1
Descriptions of variables.

Categories	Variable	Symbols	Definition	Theoretical Foundations
Instruments	Environmental Pillar Score	E	A company's impact on living and non-living natural systems, including the air, land, and water, as well as complete ecosystems. Refinitiv categories: Resource use, Emissions, Environmental Innovation	
	Social Pillar Score	S	A company's capacity to generate trust and loyalty with its workforce, customers, and society through its use of best management practices. Refinitiv categories: Workforce, Human rights, Community, Product responsibility	
	Governance Pillar Score	G	A company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. Refinitiv categories: Management score, Shareholders engagement, CSR Strategy	
Accounting-based outcome	Return on Assets	RoA-1	Earnings Before Interest and Taxes (EBIT) to total assets	(Abdi et al., 2022; Cavaco and Crifo, 2014; Cho et al., 2019; Velte, 2017; Wang and Sarkis, 2017; Xie et al., 2019; Yang and Baasandorj, 2017)
		RoA-2	Net income to total assets	(Barnett and Salomon, 2012; Duque-Grisales and Aguilera-Caracuel, 2021; Laguir et al., 2021; Liu et al., 2022; Yoo and Managi, 2022; Zhang et al., 2021)
Market-based outcome	Tobin's Q	TQ	Market value to total assets	(Abdi et al., 2020, 2022; Cavaco and Crifo, 2014; Cho et al., 2019; Chouaibi et al., 2022; Saygili et al., 2022; Şeker and Güngör, 2022; Veltri et al., 2023; Wang and Sarkis, 2017; Xie et al., 2019; Yang and Baasandorj, 2017; Yoo and Managi, 2022; Zhong et al., 2022)
	Enterprise Value	EV	Market Capitalization + Debt including Preferred Equity and Minority Interest - Cash and Short-Term Investments	(Frank et al., 2009; Siew et al., 2013; Zhou et al., 2016)

performance, commitment, and effectiveness. To conduct our study, we obtained data for scores of the three ESG pillars (as defined in Table 1), regardless of whether any scored zero. The only restriction applied was that the ESG indicator had to be at least 0.1, i.e., the company had been evaluated in at least one of the three pillars. The descriptive statistics of the variables are presented in Table 2.

3.2. Methodology

In this paper, we examine the influence of different ESG pillars on the FP of listed utility companies over time. To achieve this, we used a longitudinal fsQCA approach that divides the study period into multiple segments and conducts a separate fsQCA analysis for each period (Aversa et al., 2015). The aim is not to detect changes but to identify robust configurations over time.

To prepare for the configurational analysis using the fsQCA methodology (Ragin, 2008), we performed a counterfactual analysis as a preliminary step. This analysis allowed us to identify how many cases in the sample were not explained by the main effects and, therefore, would not be included in the findings of a typical variance-based approach (Pappas and Woodside, 2021, p. 14). Contrary cases were analyzed for all variables in both directions: high scores for antecedent conditions leading to low outcome scores, and vice versa, low scores for antecedent conditions leading to high scores for outcome conditions (Woodside, 2014).

fsQCA is an approach that examines sets of established relationships arising from the combination of qualitative comparative analysis (QCA) (Ragin, 1987) and the theory of fuzzy sets proposed by Zadeh (1965). It seeks to identify equifinal configurations, which combine antecedent conditions that result in the same outcome. The goal approach is not to estimate independent net effects but rather to estimate combinatorial effects and identify all necessary and sufficient conditions that lead to a specific result. In other words, fsQCA is a causal sufficiency analysis that determines which configurations or combinations of antecedent conditions are sufficient to produce the outcome, as well as a causal necessity analysis that identifies the antecedent conditions that may be necessary for the outcome to occur. In general, a condition is considered necessary if the outcome cannot occur without the presence of that condition, but the condition alone is not sufficient to produce the outcome. In fuzzy sets, there is a necessary relationship if the outcome is a subset of the condition, meaning the degree of membership of the outcome is less than or equal to the degree of membership of the condition. Therefore,

Table 2
Descriptive statistics.

	2018				2019				2020				2021			
	M	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*	*M*	*SD*	*Min*	*Max*
E	45.243	26.017	0.000	93.936	47.928	24.567	0.000	93.380	50.777	24.365	0.000	96.809	55.880	23.586	0.000	98.907
S	45.138	23.795	1.758	96.499	48.504	23.677	1.282	96.023	51.883	23.513	2.006	96.377	57.462	22.402	4.980	96.046
G	54.056	22.402	6.064	93.721	55.454	21.082	10.400	91.336	57.604	22.084	6.060	94.825	61.050	21.318	9.946	94.945
RoA-1	0.054	0.059	−0.375	0.442	0.054	0.046	−0.234	0.299	0.049	0.048	−0.395	0.225	0.043	0.049	−0.366	0.177
RoA-2	4.038	6.596	−37.898	41.065	3.780	5.495	−37.840	25.021	3.003	8.805	−92.058	22.897	2.761	6.037	−33.508	22.692
QT*	80,379	104,294	61.40	724,359	97,672	140,451.21	18.16	1,055,577	94,625	152,650	26.77	1,237,555	110,962	173,607	82.32	1,611,094
EV*	153,208	195,389	75.43	1,121,787	178,957	237,727	43.02	1,474,066	175,074	245,126	−3.02	1,692,202	198,913	278,174	−31,286.38	2,164,317

Note: The values with the symbol * are in hundreds of thousands.

in contrast to regression analysis methods, the results of fsQCA reveal the causal complexity and multiple concurrent mechanisms among variables.

In fsQCA analysis, all possible combinations of variables observed in the data are considered to determine the implications supported by the data by applying logical inference techniques. The traditional set theory defines membership in binary terms, where an element either belongs or does not belong to the set, represented by values of 1 and 0, respectively. Fuzzy sets, on the other hand, allow an element to belong to a set with a degree of truth: a value of 1 is associated with the full membership elements to the set and 0 to full non-membership, while intermediate values are associated with elements of intermediate membership so that a degree of membership is established in an interval ranging from 0.0 to 1.0. This approach allows for an element to belong to multiple sets simultaneously with different degrees of membership. The absence of strict limits between the sets provides flexibility in decision-making.

Hence, the first step in fsQCA analysis requires data calibration, which establishes the three breakpoints that define the level of membership (degree of truth) to the fuzzy set of each case (fully in, intermediate, fully out). The next step is to create the "truth table," which links the causal conditions (independent variables) with the outcome (dependent variable). The truth table computes all possible configurations (or combinations), providing 2^k rows, with k representing the number of outcome predictors and each row representing every possible combination. For each of the 2^k rows, the number of cases that support said configuration (frequency) is computed, as well as the *consistency* of each configuration, which is the degree to which that configuration is a subset of the outcome. Both values should be considered to establish minimum thresholds in the analysis, which allow for eliminating those combinations that are not present in the data and, therefore, are not considered empirically relevant causal combinations. Related to *consistency*, this involves evaluating the degree to which the empirical evidence is consistent with the established theoretical relationship. The *consistency* measure, based on fuzzy membership or membership scores, is calculated according to the following equation:

$$Consistency(X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum X_i} \quad (1)$$

where X_i is the membership score in a combination of conditions, and Y_i is the membership score in the output. Once the minimum frequency and consistency thresholds have been established, the cases that do not meet these thresholds are eliminated from the analysis.

The procedure then proceeds to the standard analysis, which generates three solutions: complex, parsimonious, and intermediate. These solutions represent the different pathways that lead to the outcome. As mentioned, complexity theory and configuration theories inherently assume *the principle of equifinality*, which is the premise that multiple combinations of antecedent conditions are equally effective (Fiss, 2011; Woodside, 2014). The complex solution includes all the possible combinations of conditions when traditional logical operations are applied. The parsimonious solution is based on simplifying assumptions and only includes the most important conditions ("core conditions"). The intermediate solution uses only a subset of these simplifying assumptions and is the most explanatory solution for the outcome.

Further, fsQCA provides both the solution consistency (as shown in Equation (1)) and the overall solution coverage. The *coverage* describes the extent to which the configuration can explain the outcome of interest and is calculated as follows:

$$Coverage(X_i \leq Y_i) = \frac{\sum(\min(X_i, Y_i))}{\sum Y_i} \quad (2)$$

4. Results

4.1. Contrarian case analysis

We conducted a contrarian case analysis to identify cases with an asymmetric relationship between the outcome variable (FP) and the antecedent conditions (ESG pillars). Due to the number of indicators and periods, we only present in the Appendix the findings for the RoA-1 result variables and Tobin's Q (Table A1), both in 2018. The results for the contrarian case analysis support the need to perform a configurational analysis because they show various relationships between the variables.

Although the findings for the total sample were not statistically significant in some cases, the level of statistical significance in others indicates a rejection of the symmetry hypothesis. For instance, in the case of the E pillar with RoA-1 (see Table A1), 32.43% of the sample consists of contrarian cases, with 17.30% of cases (32 companies) having low/very low E scores and high/very high performance, and 15.14% (28 companies) having high/very high E scores and low/very low performance. Therefore, almost 33% of the total sample of utility companies exhibit two relationships contrary to the symmetric relationship in which companies with high E scores obtain high FP and companies with low E scores have low FP. Similar results were obtained for the other variables.

4.2. Data calibration

The first step before applying fsQCA is calibration. The data was transformed into fuzzy sets. As all the variables were obtained on the same scale, a direct calibration was chosen using the 95th (full membership), 50th (crossover point), and 5th (full non-membership) percentiles as thresholds (Woodside, 2013). The calibrated data are presented in Table 3.

4.3. Analysis of necessary conditions

Before studying sufficient conditions, we analyzed whether any independent variables could represent necessary conditions to obtain the result (see Table 4). The results indicated that all conditions had a consistency value below the 0.90 threshold (Ragin, 2008), suggesting that none were necessary. Similarly, for the standard threshold of 0.90, the results did not show that any condition stands out above the rest and could be considered quasi-necessary (Schneider and Wagemann, 2010).

4.4. Sufficiency analysis of conditional configuration

We generated a *truth table* with the calibrated data by sorting the cases by frequency and consistency. Frequency represents the number of minimum cases in the sample explained by each configuration, while consistency indicates the combinations that, although present in the data, do not meet the minimum consistency threshold. Due to the sample size, we opted for a minimum frequency threshold of three cases (Fiss, 2011; Ragin, 2008). We also established a minimum consistency threshold of 0.8, although fuzzy sets allow for using a lower threshold. Additionally, we used the proportional reduction in inconsistency (PRI) measure to reduce inconsistency and only considered cases with a PRI score above 0.5 to avoid simultaneous relationships of subset configurations in the result. The results are presented using the notation proposed by Fiss (2011), where black circles indicate the presence of a condition, white circles indicate its absence, and a blank space indicates the "do not care" condition.

4.4.1. Accounting-based performance (models 1 and 2)

Table 5 presents the results of our analysis for Model 1. We identified three configurations for high FP across the four years analyzed with the RoA-1 ratio. One configuration, denoted as "s1", appeared in all four years and was the only proposal in 2019 and 2020. This configuration contains the causal configuration ∼ E*S, where the symbol "∼" denotes the absence of the condition and the symbol "*" represents logical AND. The G pillar was found to be indifferent to the outcome.

Another configuration, denoted as "s2", was only present in 2018 and required the presence of the S pillar in combination with the absence of the G pillar (S*∼G). Finally, the "s3" configuration (E*∼S*G) appeared in 2018 and 2021. This configuration was the only one that required the presence of pillar E to obtain a high FP.

The findings for Model 2 (Table 6) show again the "s1" configuration from the previous model for all years except 2020. As in the previous model, the configuration "s2" also occurred with the RoA-2 ratio in 2018. The year 2020 was the only one with its own configuration (∼E*S*∼G), which could be due to its exceptional circumstances. The COVID-19 pandemic heightened investors' concerns about social issues related to health, education, and job security.

According to the above, the "s1" configuration is repeated for all years in Model 1, while in Model 2, no configuration common to the four periods studied was found, although "s1" appeared in three periods. The "s1" configuration was consistently repeated except for 2020 in Model 2. Regarding the years, we observed that there were always two configurations ("s1" and "s2") in 2018, regardless of the indicator used to evaluate FP. In 2019, both models repeated the "s1" configuration. The year 2020 did not maintain any configuration in the two models. Finally, in 2021 the "s1" configuration was once again the predominant one with the accounting-based performance indicators.

4.4.2. Market-based performance (models 3 and 4)

The results for the market-based performance are shown below. Table 7 illustrates the findings for Model 3, which uses Tobin's Q ratio. For each year, we only found one solution that leads to high FP. Although only the "s5" configuration (E*S*∼G) was repeated in 2018 and 2020, they all have the presence of the E and S pillars in common. The main finding is that none of the configurations obtained match those of the accounting-based models. While pillar E is always part of the solution in the market-based models, it was absent (or, in a few exceptions, "do not care") in most tuning-based models.

Therefore, no configuration was repeated over time for the first

Table 3
Data calibration of variables.

	2018			2019			2020			2021		
	95%	50%	5%	95%	50%	5%	95%	50%	5%	95%	50%	5%
E	86.111	44.684	2.077	84.539	49.290	4.095	86.498	52.061	5.641	88.859	57.903	9.114
S	85.190	42.715	9.830	84.997	45.846	12.168	88.938	53.081	17.159	91.226	60.344	18.249
G	86.384	56.267	16.281	84.496	57.199	17.748	88.402	59.121	17.553	91.173	63.873	24.339
RoA-1	0.118	0.047	0.013	0.128	0.047	0.017	0.103	0.046	0.015	0.105	0.043	−0.006
RoA-2	11.292	3.743	−0.829	10.269	3.809	−0.320	9.962	3.249	−1.083	10.390	2.900	−3.840
QT*	274,608.00	42,920.83	2,970.58	374,875.17	48,014.59	2,658.95	304,106.49	42,424.69	2,288.76	365,987.07	50,351.91	3,138.89
EV*	509,128.67	81,898.01	4,020.63	631,337.76	97,253.17	4,384.44	577,015.97	88,346.73	3,940.73	613,422.13	101,318.07	4,064.94

Note: 95% full membership, 50% crossover point, 5% full non-membership; the values with the symbol * are in hundreds of thousands.

Table 4
Necessary conditions analysis.

	2018		2019		2020		2021	
	Consistency	Coverage	Consistency	Coverage	Consistency	Coverage	Consistency	Coverage
RoA-1								
E	0.6584	0.6402	0.6553	0.6163	0.6531	0.6153	0.6863	0.6388
S	0.6888	0.6838	0.7050	0.6546	0.6579	0.6541	0.6976	0.6837
G	0.6897	0.6680	0.7184	0.6608	0.6831	0.6362	0.7048	0.6830
RoA-2								
E	0.6785	0.6472	0.6465	0.6052	0.6644	0.6324	0.7049	0.6873
S	0.7046	0.6862	0.6905	0.6381	0.6427	0.6456	0.6958	0.7144
G	0.6852	0.6510	0.6759	0.6188	0.6677	0.6282	0.6690	0.6791
TQ								
E	0.8086	0.7136	0.8100	0.7081	0.8117	0.7121	0.8157	0.6960
S	0.7734	0.6969	0.8072	0.6967	0.7676	0.7106	0.7886	0.7085
G	0.7107	0.6248	0.7410	0.6336	0.7168	0.6216	0.7006	0.6223
EV								
E	0.8031	0.7124	0.8130	0.7072	0.8203	0.7111	0.8221	0.7052
S	0.7507	0.6799	0.7807	0.6705	0.7468	0.6833	0.7558	0.6828
G	0.6874	0.6073	0.7189	0.6116	0.6957	0.5962	0.6576	0.5872

Table 5
fsQCA findings for Model 1 (RoA-1).

Model 1	2018			2019	2020	2021	
	s1	s2	s3	s1	s1	s1	s3
E	○		●	○	○	○	●
S	●	●	○	●	●	●	○
G		○	●				●
Raw coverage	0.4018	0.4398	0.3335	0.4361	0.3979	0.4346	0.3534
Unique coverage	0.0532	0.1070	0.0609	0.4361	0.3979	0.1627	0.0841
Consistency	0.8705	0.8390	0.9000	0.8425	0.8278	0.8823	0.8829
Overall solution coverage:	0.5941			0.4361	0.3979	0.5186	
Overall solution consistency:	0.8266			0.8425	0.8278	0.8574	

Table 6
fsQCA findings for Model 2 (RoA-2).

Model 2	2018		2019	2020	2021	
	s1	s2	s1	s4	s1	s2
E	○		○	○	○	
S	●	●	●	●	●	●
G		○		○		○
Raw coverage	0.4079	0.4387	0.4305	0.3078	0.4216	0.4705
Unique coverage	0.0939	0.1248	0.4305	0.3078	0.0923	0.1413
Consistency	0.8668	0.8208	0.8276	0.8800	0.8974	0.8386
Overall solution coverage:	0.4326		0.4305	0.3078	0.5628	
Overall solution consistency:	0.8136		0.8276	0.8800	0.8324	

Table 7
fsQCA findings for Model 3 (Tobin's Q).

Model 3	2018	2019	2020	2021
	s5	s6	s5	s7
E	●	●	●	●
S	●	●	●	●
G	○		○	●
Raw coverage	0.4378	0.7365	0.4201	0.5586
Unique coverage	0.4378	0.7365	0.4201	0.5586
Consistency	0.8626	0.7697	0.8493	0.8061
Overall solution coverage:	0.4378	0.7365	0.4201	0.5586
Overall solution consistency:	0.8626	0.7697	0.8493	0.8061

Finally, the fsQCA findings for Model 4 are shown in Table 8. The same configuration (E*S*~G) appears yearly, the same "s5" configuration obtained in the previous model. Note that the presence of pillars E and S is always in the absence of the G pillar.

Table 8
fsQCA findings for Model 4 (EV).

Model 4	2018	2019	2020	2021
	s5	s5	s5	s5
E	●	●	●	●
S	●	●	●	●
G	○	○	○	○
Raw coverage	0.4321	0.4457	0.4206	0.4537
Unique coverage	0.4321	0.4457	0.4206	0.4537
Consistency	0.8557	0.8169	0.8402	0.8032
Overall solution coverage:	0.4321	0.4457	0.4206	0.4537
Overall solution consistency:	0.8557	0.8169	0.8402	0.8032

market-based model (Model 3), although "s5" was the predominant one. However, in the case of Model 4, only the "s5" configuration appeared in all the periods studied. The visualization by periods shows that only the "s5" configuration occurred in 2018 and 2020, regardless of the indicator used to evaluate FP. In 2019, the "s5" configuration was repeated with Model 4, but not in Model 3, in which the only one was "s6". For 2021, the "s5" configuration was also repeated with Model 4 and appeared in a unique configuration with Model 3 ("s7").

We additionally have reported the consistency and coverage of all configurations in the previous tables. Ragin (2008) and Woodside (2013) suggest that a solution is remarkable if it reflects a consistency score over the threshold of 0.74 and a coverage variation between 0.25 and 0.65. The configurations obtained in all cases are within these parameters (except the coverage in Model 3, which varies from 42.01% to 73.65%), indicating a degree of relevance.

4.5. *Robustness test*

In order to test the robustness of the model in the fsQCA methodology, a test is usually performed consisting of changing the anchor point of the calibration data, modifying the frequency, or improving the consistency threshold (Greckhamer et al., 2018). First, the robustness was tested by increasing the frequency threshold from 3 to 5, and no differences were found. In addition, we tested increasing the consistency threshold from 0.80 to 0.85 for all models. Table A2 in the Appendix shows the results for 2018, indicating that there were no significant differences. Therefore, we can conclude that the results satisfy the requirements of the robustness test.

5. Discussion

First, the contrarian case analysis identifies cases in the sample that are not explained by the main effects, i.e., asymmetric relationships between the outcome (PF) and the antecedent conditions (E-S-G scores) across models and time periods, supporting the need to conduct a configuration analysis. Thus, one of the three principles underlying configuration theory is that the same antecedent condition can have different, even opposite, effects depending on the context, allowing us to propose.

Proposition 1. *High E-S-G scores lead to low scores on FP and vice versa, indicating an asymmetrical relationship.*

Secondly, upon analyzing whether any of the conditions could be necessary to achieve the outcome, we concluded that no single condition stands out from the others, leading us to propose the following.

Proposition 2. *High scores in any of the E, S, or G pillars individually are insufficient for obtaining high FP.*

5.1. Accounting-based performance (models 1 and 2)

The first proposed model group (Models 1 and 2) used accounting-based performance indicators. Our findings reveal that the most frequently occurring configuration in these two models involved the S pillar as a decisive condition, consistent with the findings of Liu et al.'s (2022) study on China's new energy companies. This finding may be explained by the fact that the S pillar includes variables related to corporate social responsibility, which has been a consideration in the decisions of consumers and investors for longer than the variables included in the other two pillars. Similarly, as noted by Baldini et al. (2018) and Fatemi et al. (2018), corporate governance and environmental performance are key drivers of sustainability, while social issues tend to be only relevant to companies with high public visibility and stakeholder activism, as is the case in the utilities sector. Therefore, we suggest.

Proposition 3a. *High scores in the S pillar are critical for achieving high short-term FP in the utilities sector.*

On the other hand, the most repeated configuration in the two models involved the absence of the E pillar in addition to the mentioned S pillar, while the scoring on the G pillar played no role. Increasing the E score requires operating costs (such as line replacement and material substitution) that are not present in the other two pillars, leading to financial decisions that may affect short-term profitability (Yoo and Managi, 2022), which would explain the role of this pillar in the obtained configurations. Additionally, it should be noted that the disclosure of ESG-related information is not homogeneous, but there is a pattern: high-impact sectors, such as utilities, report more information on environmental and social indicators, whereas the retail sector discloses more information on governance indicators (Maubane et al., 2014). Therefore, we suggest.

Proposition 3b. *High scores in the S Pillar combined with the absence of the E Pillar can lead to high short-term FP (regardless of the assessment indicator) in the utilities sector.*

The obtained configuration, requiring the necessary presence of the S pillar and the absence of the E pillar, aligns with the findings of Conca et al. (2021), who found a positive relationship between the S score and RoA in a sample of European listed companies in the agri-food sector, while also noting a positive impact of the E score on RoA. On the other hand, Daszyńska-Zygadło et al. (2021) found that E scores negatively impacted the profitability and market value of companies in the banking industry when considering the pillars separately. Using the fsQCA methodology applied in this study allowed us to find causal configurations explaining a high FP that cannot be accounted for by models that analyze only the net effects. For example, Seker and Güngör (2022) analyzed the E, S, and G pillars separately for companies in the same sector and concluded that they did not significantly impact FP.

5.2. Market-based performance (models 3 and 4)

Models 3 and 4 indicate that the E and S pillars together are decisive conditions for high market-based performance, irrespective of whether Tobin's Q or Enterprise Value is used to assess such performance. Our analysis over time shows that the presence of both pillars is necessary for all configurations, suggesting that investors may view a company's efforts in pillars E and S as a potential profit opportunity. Therefore, companies in the utilities sector could generate better long-term or sustained profitability by implementing E and S performance improvement strategies. However, investors do not appear to place much importance on G efforts and may even penalize them. Therefore.

Proposition 4. *High scores in both E and S pillars are decisive conditions for obtaining high long-term PF in the utilities sector.*

The findings of Abdi et al. (2020) for the airline industry are consistent for the E pillar, but the authors reported a negative impact of the S pillar on market value and a positive impact of the G pillar. Similarly, Ionescu et al. (2019) found that the E score positively affects market values.

However, there was no same consensus regarding the G pillar in the obtained configurations. While this pillar was always absent in the EV assessment (consistent with the accounting models), it did not have the same behavior over time for Tobin's Q. In fact, the G pillar went from being absent or "do not care" condition to being present in 2021 in the only obtained configuration, which could be a sign of the increasing importance the market is giving to governance. One possible explanation is that the COVID-19 pandemic may have emphasized the positive influence of governance actions for investors and, consequently, their influence on market value. In this sense, Nollet et al. (2016) suggest that activities related to improvements in governance can positively affect socially conscious consumers' demand and, in turn, on a company's FP from the market's perspective. However, this effect will only be relevant in the long-term. This finding contradicts the findings of Ionescu et al. (2019) for companies in the travel and tourism industry, where governance seems to exert the most influence on market value, regardless of the geographic region where they are located.

Finally, the results show that a company's efforts in the S pillar play a universal role in the accounting profitability and market value of companies. However, the evidence on the impact of the E score on financial results is contradictory: its absence for high company profitability and its presence combined with the S pillar for high market value. Thus.

Proposition 5. *High S pillar scores play a key role in utilities' short- and long-term FP.*

6. Conclusions

In a scenario characterized by a strong focus on ESG factors, the literature has primarily aimed to determine how ESG performance impacts FP. Although most scholars have found a positive impact (Friede et al., 2015), there is a consensus that research focused on a specific sector is somewhat limited (Veltri et al., 2023). Notably, in a prominent and environmentally sensitive sector such as utilities, investment in sustainability and its disclosure is especially relevant to mitigate stakeholder pressure and gain legitimacy by improving FP (Zhong et al., 2022). However, if ESG actions are perceived as not credible or insincere in the eyes of stakeholders, they could negatively impact FP (Kaupke and zu Knyphausen-Aufseß, 2023; Wu and Shen, 2013).

This article examined the effects of environmental, social, and governance scores on financial performance in the utilities industry. Using a longitudinal fsQCA approach on a sample of 185 global firms during 2018–2021, we identified different causal configurations of the ESG pillars that lead to high FP. The main finding of the configurational analysis is that, regardless of their G score, a good performance on the S pillar and absence on the E pillar lead to high financial outcomes across time, according to accounting-based indicators. However, both E and S scores are determinants from a market perspective.

From a theoretical standpoint, our research addresses some limitations of earlier studies. Firstly, this research offers a more industry-specific analysis by focusing on the utilities sector. It provides new insights into a controversial sector from a sustainability perspective. Secondly, we disaggregated the ESG score into its three pillars rather than focusing on a global measure (Bruna et al., 2022). Although regression techniques have improved our understanding of the net impact of E, S, and G activities on FP (Nollet et al., 2016; Şeker and Güngör, 2022), we complement traditional econometric methods with a configurational approach by incorporating an interdependence or mutually reinforcing relationship between the three pillars that could lead to high PF. This approach brings a different perspective to address causal complexity. Fuzzy set comparative analysis (fsQCA) allows us to explore these interactions. Thirdly, we provide a new explanation for the inconclusive debate between the positive, negative, or neutral impact of ESG practices on FP. Our results demonstrate how different conditions (pillars E, S, and G) interact to generate short-term and long-term profits. Moreover, we corroborate that these combinations are stable by conducting a longitudinal analysis.

From a practical point of view, our findings highlight the predominant role of the S pillar in obtaining a high FP, regardless of whether FP is evaluated through accounting or market indicators. These results can guide utility companies in developing sustainable strategies for higher profitability. Given that the social pillar was the key driver affecting FP, the managers of utility companies should focus on its components, including workforce, human rights, community, and product responsibility. If their sustainable strategy focuses on long-term profits, they must continue to invest in both social (S pillar) and environmental (E pillar) practices simultaneously, enhancing their legitimacy and reputation and generating long-term value as the market does not perceive this effort as greenwashing. However, if their strategy is focused on the short term, they should pay attention to measures based on accounting data. In particular, the results show that the interaction of the S pillar with the absence of the E pillar generates high returns in the short term. Investing in environmental activities entails high operating costs and sacrificed cash flows, which can reduce profitability. Therefore, utilities should invest more efficiently in these activities.

Another practical implication of this study may be to encourage management to implement better governance practices, as it appears that they currently do not sufficiently influence the financial indicators of these companies. Our findings seem to support that investors do not really value, or negatively value, activities and investments related to governance issues, although it could be that either not enough effort is being deployed towards governance initiatives or that disclosure efforts are focusing on the other two pillars. According to agency theory, corporate governance is critical to ESG activities and disclosure. Greater transparency reduces information asymmetry and principal-agent conflict of interest, which we believe could improve the profitability of utility companies.

Our research also provided policy implications. Regulatory authorities should continue to promote ESG-related policies, especially in companies with high reputational risk, such as utilities. These policies should discourage greenwashing practices and encourage sustainability investments, especially concerning environmental aspects, which entail high costs and the sacrifice of significant resources. In addition, authorities should work on unifying the methodologies and information used by rating providers, improving the quality and reliability of ESG metrics while allowing crucial progress in sustainability research.

This study is not without limitations that, in turn, suggest new areas for research. Firstly, it may be possible to identify the groups of companies in each configuration to establish patterns and differences between activities in the sector or countries (e.g., because of the different ESG legislation applicable to them). Secondly, incorporating other variables may help explain the differences between the obtained configurations, such as size, age, indebtedness, or more in-depth analysis of governance-related aspects, such as board attributes that are considered a cornerstone in shaping ESG activities (Dwekat et al., 2022). Thirdly, a different database with a distinct evaluation process of the ESG score and its pillars could be used to contrast the results with those obtained in this study. Finally, given that configuration theories are based on the principle of causal asymmetry, which states that a condition (or a combination of conditions) that explains the presence of an outcome may be different from the conditions that lead to the absence of the same outcome, it would be of interest to conduct a study to find configurations that explain poor financial performance.

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Declaration of competing interest

The authors have no competing interests to declare that are relevant to the content of this article.

Data availability

Data will be made available on request.

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Appendix

Table A1
Results from the contrarian case analysis (RoA-1 vs. E-S-G and TQ vs. E-S-G in 2018).

Environmental pillar – RoA-1

	1	2	3	4	5
1	*8* *4.3%*	*9* *4.9%*	4 2.2%	**8** 4.3%	**8** 4.3%
2	*6* *3.2%*	*8* *4.3%*	7 3.8%	**6** 3.2%	**10** 5.4%
3	10 5.4%	5 2.7%	7 3.8%	9 4.9%	6 3.2%
4	**7** 3.8%	**7** 3.8%	8 4.3%	*7* *3.8%*	*8* *4.3%*
5	**6** 3.2%	**8** 4.3%	11 5.9%	*7* *3.8%*	*5* *2.7%*
	$phi^2 = 0.048; p < 0.917$				

Environmental pillar – Tobin's Q

	1	2	3	4	5
1	*17* *9.2%*	*10* *5.4%*	5 2.7%	**4** 2.2%	**1** 0.5%
2	*12* *6.5%*	*7* *3.8%*	9 4.9%	**6** 3.2%	**3** 1.6%
3	5 2.7%	8 4.3%	11 5.9%	7 3.8%	6 3.2%
4	**3** 1.6%	**7** 3.8%	6 3.2%	*10* *5.4%*	*11* *5.9%*
5	**0** 0.0%	**5** 2.7%	6 3.2%	*10* *5.4%*	*16* *8.6%*
	$phi^2 = 0.298; p < 0.000$				

Social pillar – RoA-1

	1	2	3	4	5
1	*10* *5.4%*	*10* *5.4%*	4 2.2%	**5** 2.7%	**8** 4.3%
2	*9* *4.9%*	*8* *4.3%*	8 4.3%	**8** 4.3%	**4** 2.2%
3	10 5.4%	7 3.8%	8 4.3%	6 3.2%	6 3.2%
4	**4** 2.2%	**6** 3.2%	10 5.4%	*8* *4.3%*	*9* *4.9%*
5	**4** 2.2%	**6** 3.2%	7 3.8%	*10* *5.4%*	*10* *5.4%*
	$phi^2 = 0.079; p < 0.555$				

Social pillar – Tobin's Q

	1	2	3	4	5
1	*14* *7.6%*	*9* *4.9%*	5 2.7%	**6** 3.2%	**3** 1.6%
2	*13* *7.0%*	*5* *2.7%*	12 6.5%	**3** 1.6%	**4** 2.2%
3	6 3.2%	12 6.5%	7 3.8%	6 3.2%	6 3.2%
4	**2** 1.1%	**7** 3.8%	7 3.8%	*12* *6.5%*	*9* *4.9%*
5	**2** 1.1%	**4** 2.2%	6 3.2%	*10* *5.4%*	*15* *8.1%*
	$phi^2 = 0.256; p < 0.000$				

Governance pillar – RoA-1

	1	2	3	4	5
1	*14* *7.6%*	*8* *4.3%*	3 1.6%	**4** 2.2%	**8** 4.3%
2	*6* *3.2%*	*11* *5.9%*	7 3.8%	**5** 2.7%	**8** 4.3%
3	5 2.7%	5 2.7%	11 5.9%	5 2.7%	11 5.9%
4	**4** 2.2%	**4** 2.2%	11 5.9%	*14* *7.6%*	*4* *2.2%*
5	**8** 4.3%	**9** 4.9%	5 2.7%	*9* *4.9%*	*6* *3.2%*
	$phi^2 = 0.178; p < 0.007$				

Governance pillar – Tobin's Q

	1	2	3	4	5
1	*11* *5.9%*	*4* *2.2%*	12 6.5%	**5** 2.7%	**5** 2.7%
2	*9* *4.9%*	*9* *4.9%*	6 3.2%	**7** 3.8%	**6** 3.2%
3	7 3.8%	8 4.3%	7 3.8%	10 5.4%	5 2.7%
4	**3** 1.6%	**9** 4.9%	7 3.8%	*7* *3.8%*	*11* *5.9%*
5	**7** 3.8%	**7** 3.8%	5 2.7%	*8* *4.3%*	*10* *5.4%*
	$phi^2 = 0.093; p < 0.367$				

Note. The main effects are represented in *italics*. The contrarian cases are in **bold**

Table A2
Findings of robustness test (year 2018)

Year 2018	Model 1			Model 2	Model 3	Model 4
	s1	s2	s3	s1	s1	s1
E	○		●	○	●	●
S	●	●	○	●	●	●
G		○	●		○	○
Raw coverage	0.4018	0.4398	0.3335	0.4079	0.4378	0.4321
Unique coverage	0.0532	0.1070	0.0609	0.4079	0.4378	0.4321
Consistency	0.8705	0.8390	0.9000	0.8668	0.8626	0.8557
Overall solution coverage:	0.5941			0.4079	0.4378	0.4321
Overall solution consistency:	0.8266			0.8668	0.8626	0.8557

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