



# The role of sustainable corporate governance in mandatory sustainability reporting quality

Tobias Gerwing<sup>1</sup> · Peter Kajüter<sup>1</sup> · Maximilian Wirth<sup>1</sup>

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## Abstract

This study analyzes the association between various sustainable corporate governance (SCG) mechanisms and mandatory sustainability reporting quality (MSRQ). To this end, we construct a novel MSRQ measure based on manually collected data from 220 German firms in their first year of mandatory sustainability reporting according to the European CSR Directive (2014/95/EU). Descriptive findings show a heterogeneous reporting quality for our sample. The regression analyses suggest an important role of SCG in ensuring high MSRQ. MSRQ increases with the number of SCG mechanisms employed. Regarding the individual mechanisms, we find that MSRQ is positively associated with a sustainable remuneration of the executive board, gender diversity at the supervisory board level, the existence of a CSR committee, engagement in CSR initiatives, and external assurance. However, we do not find any association between gender diversity at the executive board level and MSRQ, contradicting research on voluntary sustainability reporting. Finally, we derive several implications for preparers, auditors, stakeholders, and regulators.

**Keywords** Sustainability reporting · Regulation · Corporate governance · Disclosure quality

**JEL Classification** M14 · M21 · M42 · M48 · M521

## 1 Introduction

Over the last decade, a considerable number of firms have voluntarily reported sustainability information. Their decision to report underscores the firms' willingness to meet stakeholders' growing information needs (Tschopp and Huefner 2015; Merkl-Davies and Brennan 2017) and signals superior sustainability performance

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✉ Tobias Gerwing  
tobias.gerwing@wiwi.uni-muenster.de

<sup>1</sup> Chair of International Accounting, University of Münster, Universitätsstraße 14-16, Münster, Germany

compared to their competitors. Voluntary sustainability reporting can further lead to various competitive advantages, such as better access to finance (Cheng et al. 2014), reduced cost of equity capital (Dhaliwal et al. 2011), and enhanced corporate reputation (Hahn and Kühnen 2013; Heflin and Wallace 2017). However, firms that voluntarily report sustainability information face various challenges, including addressing relevant issues and guaranteeing high information accuracy. In addition, critics point out missing standardization and often an ad-hoc selection of reported aspects (Amel-Zadeh and Serafeim 2018; Christensen et al. 2021). For example, firms may present sustainability information to strategically influence user perception (Cho et al. 2009), while others may resort to boilerplate language (Crilly et al. 2016). These shortcomings may reduce the usefulness and quality of voluntary sustainability reporting and have motivated regulators to introduce mandatory sustainability reporting requirements for certain firms.

In 2014, the European Union (EU) introduced mandatory sustainability reporting for large, listed firms through the CSR Directive (2014/95/EU), which mandates the publication of a “nonfinancial statement”. This regulatory initiative was part of the new European CSR strategy in response to the 2008/09 global financial crisis and constituted the first cross-national regulation for mandatory sustainability reporting. It sought to enhance the reporting quality and, thereby, transparency of the firms’ CSR performance. In addition, it intends to motivate firms to lay more emphasis on nonfinancial aspects in internal decision-making. The CSR Directive defines only minimum requirements so that member states can adapt their actual transposition to consider national circumstances. Still, the new reporting requirements stimulated a controversial debate on the scope of the affected firms, the report’s content, and the need for external assurance. Some recently published studies show that the EU mandate led to negative average stock price reactions (Mittelbach-Hörmanseder et al. 2021), except for firms with better pre-directive voluntary sustainability reporting (Grewal et al. 2019), and real effects, such as an increase in firms’ sustainability activities (Fiechter et al. 2020).

In Germany, the CSR Directive was integrated into domestic law following the one-on-one principle. As a result, since 2017, large listed firms with more than 500 employees are required to extend their management report to include a nonfinancial statement. This requirement implies an important new issue for corporate governance: unlike voluntary sustainability reports, the nonfinancial statement has to be audited by the supervisory board (§ 171 Stock Corporation Act). As there is no content-wise mandatory external assurance, the supervisory board cannot rely on an external auditor’s opinion as it does for financial statements and management reports. However, the German legislator introduced the right of the supervisory board to order an external assurance (§ 111 Sect. 2 Stock Corporation Act). As the assurance of corporate reports is an essential mechanism to control firms, the new sustainability reporting requirements are closely embedded in the firms’ corporate governance. Thus, the legislator underlines the important role of effective corporate governance to ensure the quality of nonfinancial statements. Additionally, the EU legislator stresses the importance to make corporate governance sustainable in order to shift managers’ focus from short-term financial performance to long-term development and sustainability aspects (EC Ares(2020)4034032 2020).

From a theoretical perspective, introducing mandatory sustainability reporting implies that previously voluntary reporting firms can no longer signal superior sustainability performance by disclosing a sustainability report. Instead, in a mandatory setting, firms that want to demonstrate high sustainability performance may have incentives to publish high-quality sustainability reports. However, even in mandatory settings, managers may show opportunistic behavior and not report negative information as thoroughly as positive information. As a consequence, a lower reporting quality is to be expected which in turn limits the usefulness of the information for stakeholders. In line with prior corporate governance research on both financial reporting and voluntary sustainability reporting (Eng and Mak 2003; Michelon and Parbonetti 2012; Amran et al. 2014; De Villiers and Marques 2016; Adnan et al. 2018), we argue that (sustainable) corporate governance enhances the quality of mandatory sustainability reporting. Prior research on financial reporting demonstrates that various corporate governance mechanisms play an essential role in increasing the quality of financial reports (Ahmed and Duellman 2007; Hoitash et al. 2009; Knechel et al. 2013). However, the association between corporate governance and financial reporting cannot be generalized to sustainability reporting due to its special characteristics (e.g., its wide range of topics, the heterogeneity of contents, and the qualitative nature of reported information). Moreover, sustainability reporting lacks effective enforcement mechanisms compared to financial reporting. The enforcement of sustainability reporting may also be more complex and challenging than the enforcement of financial reporting (Christensen et al. 2021). Therefore, implementing effective corporate governance mechanisms for high-quality sustainability reporting is even more important.

Prior research further suggests that effective corporate governance might improve voluntary sustainability reporting quality (Adnan et al. 2010, 2018; Michelon and Parbonetti 2012; Mallin et al. 2013; Amran et al. 2014; Gao et al. 2016; Gerwanski et al. 2019). However, we believe that the prior findings on the association between corporate governance and voluntary sustainability reporting cannot be extended to the EU's mandatory sustainability reporting for at least three reasons. First, in a *voluntary* setting, it is plausible to assume that only firms with (apparently) high sustainability performance experience net benefits from disclosing information about their sustainability performance and thus publish reports (Clarkson et al. 2008). By contrast, firms with poor sustainability performance may avoid publishing sustainability reports as managers fear negative consequences following the disclosure. Consequently, voluntary settings face a dual selection problem as outlined by Christensen et al. (2021): Voluntary sustainability reporting depends on a firm's voluntary sustainability activities *and* its choice to report these activities. As a result, analyzing the effects of corporate governance on the reporting quality is not possible because the choice to report is also influenced by corporate governance. However, in the *mandatory* setting, firms must prepare sustainability reports regardless of their sustainability performance. Therefore, a mandatory setting allows us to better analyze the potential effects of corporate governance on the reporting quality. Additionally, the mandatory reporting setting allows us to analyze the sustainability reporting quality of a more heterogeneous group of firms and overcome the dual selection problem, at least partially.

Second, voluntary sustainability reporting is widely criticized for diverging report content and the lack of a global reporting standard (Adams 2004; O'Dwyer 2005; Fonseca et al. 2014; Hahn and Lülfs 2014). Conversely, the new EU legislation provides a reporting framework that defines a specific materiality threshold and specifies content requirements for sustainability reporting, reducing heterogeneity in report content. The mandate harmonizes the sustainability reporting format and presentation, improving the accessing and processing of sustainability information (Christensen et al. 2021). Thus, a mandatory setting should result in more homogeneous reports, where information is more accurate and easier to compare across firms. Together, the harmonization of report content and format allows stakeholders to compare the quality of sustainability reports better than before, also across industries. Third, as described above, the supervisory board's audit requirement makes the nonfinancial statement a distinct form of mandatory sustainability reporting clearly embedded in firms' corporate governance.

Nonetheless, the relationship between corporate governance and the quality of mandatory sustainability reporting is largely unexplored. In most studies, it is unclear which corporate governance mechanisms are explored and how they affect mandatory sustainability reports. The few existing studies also analyze the role of corporate governance in very specific settings of mandatory sustainability reporting, such as conflict minerals disclosures (Dalla Via and Perego 2018).<sup>1</sup> Consequently, by analyzing the implementation of the EU CSR Directive, we extend prior results to a more holistic CSR approach since the directive requires firms to report on CSR more comprehensively.

Similarly, we aim to analyze the association between corporate governance mechanisms and the quality of mandatory sustainability reporting. We focus on corporate governance mechanisms that are particularly relevant for implementing a focus on firms' long-term developments and sustainability and refer to these as sustainable corporate governance (SCG) mechanisms. From previous studies, we understand SCG as a system of various mechanisms to (1) direct and (2) control firms in a sustainable way (Gompers et al. 2003; Cremers and Nair 2005; Velte and Weber 2021). Building on agency theory as well as prior studies on corporate governance, we consider five voluntary SCG mechanisms (sustainable remuneration, gender diversity on corporate boards, the appointment of a CSR committee, engagement in CSR initiatives, and external assurance) that firms can use in addition to the mandatory audit of the nonfinancial statement by the supervisory board. Second, we test the association of these mechanisms with MSRQ. To measure MSRQ, we use a novel, manually collected disclosure score based on the EU CSR Directive (2014/95/EU), "Guidelines on nonfinancial reporting" of the European Commission, German GAAP, German Accounting Standard No. 20 (GAS 20), and GRI Standards.

<sup>1</sup> Dalla Via and Perego (2018) show a positive link between specific corporate governance mechanisms and conflict minerals disclosure as mandated by the Dodd-Frank Act. In this context, the phrasing of the legislation and enforcement appear to be crucial to the effectiveness of the disclosure regulation. As a consequence, prior studies on mandatory sustainability reporting cannot be generalized to all other mandatory settings (Hummel and Rötzel 2019).

Therefore, we apply extensive manual coding to all nonfinancial statements of our sample firms, which allows us to consider firm-specific reporting choices concerning reporting format and content.<sup>2</sup>

Our findings show heterogeneous reporting quality for our sample of listed German firms. The results also suggest that SCG might play an important role in ensuring MSRQ. MSRQ is significantly positively correlated with the number of SCG mechanisms employed. Specifically, the results provide evidence for a higher MSRQ when the executive remuneration system is linked to sustainable components. Furthermore, the association between board gender diversity and MSRQ reveals differences between the executive and supervisory boards. While we find that gender diversity on the supervisory board level is positively associated with higher MSRQ, we find no support for the association between the percentage of female members on executive boards and MSRQ. Moreover, results indicate that MSRQ is higher for firms with a CSR committee and those engaged in a CSR initiative. Finally, external assurance of nonfinancial statements is associated with higher MSRQ.

Our study contributes to the literature in several ways. First, our results emphasize the importance of SCG in the context of mandatory sustainability reporting. To the best of our knowledge, we are the first to examine the association between a comprehensive set of SCG mechanisms and the quality of mandatory sustainability reporting. Thereby, we overcome the limitation of the dual selection problem that is evident in voluntary settings. Consequently, the results on the association between SCG and the *quality* of mandatory sustainability reporting are more meaningful compared to previous studies. Our findings are thus relevant for firms to understand how SCG mechanisms may help ensure high MSRQ and satisfy stakeholder information needs. Second, unlike prior research, we not only focus on a single corporate governance mechanism but also develop a comprehensive theoretical framework that captures various SCG mechanisms, allowing us to analyze their association with MSRQ. Third, we contribute to the current review of the CSR Directive by providing empirical evidence on mandatory sustainability reporting practice in Germany as the largest EU member state (EC Ares(2020)580716 [2020](#)). Thus, our results inform regulators and standard setters in refining their reporting requirements, such as mandating external assurance for mandatory sustainability reporting. In addition, we contribute to the European Commission's initiative on SCG, which aims to shift firms' focus on long-term sustainable value creation rather than on short-term benefits (EC Ares(2020)4034032 [2020](#)). In particular, our study indicates that SCG plays a crucial role in ensuring the quality of mandatory sustainability reporting, which, in turn, ensures that sustainability reporting sufficiently satisfies stakeholders' information needs. Therefore, our study suggests that establishing SCG mechanisms is important to improve sustainability reporting quality further.

The remainder of this paper is organized as follows. Section [2](#) introduces the institutional setting, while Sect. [3](#) outlines the theoretical foundation and derives the

<sup>2</sup> We do not apply automatic textual analysis, which is criticized for its imprecision, especially when the analyzed documents have complex structures (Loughran and McDonald [2016](#)).

research hypotheses. Section 4 introduces the research design, Sect. 5 presents our results, and Sect. 6 concludes the paper.

## 2 Institutional background

The EU CSR Directive (2014/95/EU) is an important element of the EU's CSR strategy, as it defines a common standard for nonfinancial reporting for certain firms in the EU. Like any other directive, it had to be transposed into national law by the member states. In Germany, the CSR Directive Implementation Act of 2017 introduced the European requirements into German law following the one-on-one transposition principle. Therefore, large German firms with more than 500 employees whose equity or debt instruments are traded on a regulated market have to extend their (group) management report by a (group) nonfinancial statement (§§ 289b, 315b German GAAP). This new regulation offers a unique setting for analyzing the role of SCG in MSRQ, as the new sustainability reporting requirement is linked explicitly to corporate governance mechanisms. According to § 317 German GAAP, the auditor of the (group) management report has to verify only the existence of the nonfinancial statement, not the content. However, § 171 Stock Corporation Act requires that the supervisory board audits the content.<sup>3</sup> This special monitoring task was heavily debated during the legislation as it has important implications for the supervisory board's liability. To consider this matter, the German legislator introduced the right of the supervisory board to order external assurance to support its auditing duties (§ 111 Sect. 2 Stock Corporation Act); that is, the supervisory board is free to choose an external auditor or any independent assurance services provider and decide the desired level of assurance.

The new legislation comprises both formal and content-related requirements. They are codified in §§ 289b-e and 315b-c German GAAP and specified by GAS 20.<sup>4</sup> According to § 315b Sec. 1 German GAAP,<sup>5</sup> the reporting firm may include its nonfinancial statement in the management report or prepare a separate nonfinancial report within four months of the fiscal year end. Therefore, firms can choose between five different reporting formats. Specifically, they may include the nonfinancial statement in (1) a separate section of the management report or (2) integrate information throughout the management report; the separate nonfinancial report may be (3) a separate report, (4) a separate section in another group report

<sup>3</sup> Under the German two-tier system, the executive board manages the company on its own responsibility. The supervisory board appoints, monitors, and advises the executive board. The supervisory board must then independently examine the correctness of a nonfinancial statement and form its own opinion.

<sup>4</sup> GAS 20 has been developed by the Accounting Standards Committee of Germany (ASCG), which publishes recommendations for the application of accounting principles. The committee had been formally acknowledged by the Ministry of Justice as a private standard setter, pursuant § 342 German GAAP.

<sup>5</sup> In the following, references are only provided for group reporting. Equivalent reporting requirements exist for legal entities.

(e.g., in a sustainability report or an annual report), or (5) integrated throughout another group report (GAS 20.252).

The nonfinancial statement must include a brief description of the business model (§ 289c Sect. 1 German GAAP). GAS 20.257 requires that seven characteristics, including business purpose, business processes, and group structure, be addressed, if necessary for understanding the business model. Further, firms have to report on at least five nonfinancial aspects relevant to understanding the firm's development, performance, position, and impact of its activity on nonfinancial aspects (§ 289c Sect. 2 German GAAP). These nonfinancial aspects include environmental matters, employee-related matters, social matters, respect for human rights, anti-corruption, and bribery (§ 289c Sect. 2 German GAAP). For each of these aspects, firms must describe the concepts pursued, associated due diligence processes, and achieved results.

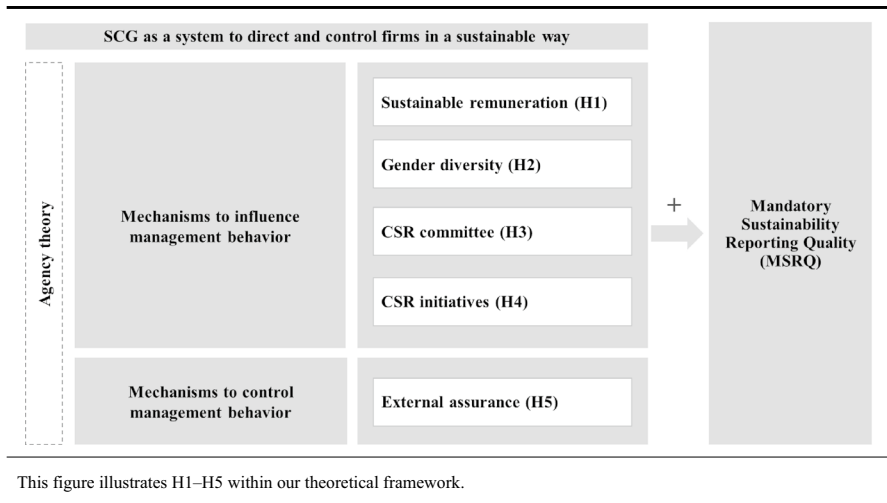
Furthermore, the main risks associated with the firm's business activities, business relationships, products, and services must be disclosed for each nonfinancial aspect. Additionally, key nonfinancial performance indicators have to be described and, if necessary for the readers' understanding, references and explanations to the financial statements must be included. If there are no concepts pursued for a particular nonfinancial aspect, firms have to provide and justify their reasons (§ 289c Sect. 4 German GAAP). When preparing their nonfinancial reports, firms can draw on one or more national, European, or international frameworks. If a firm does not use a specific framework, it must disclose its reasons (§ 289d German GAAP). This requirement underlines the regulator's intention that firms should use frameworks to enhance nonfinancial statements' comparability.

### 3 Theory and hypotheses development

#### 3.1 Theoretical framework

The growing information needs of stakeholders compel firms to account for their sustainability performance (Christensen 2016). Managers can voluntarily publish sustainability reports to inform stakeholders about the impact of their activities on the environment and society. According to agency theory, they thereby reduce information asymmetries between the firm and its stakeholders (Jensen and Meckling 1976; Hill and Jones 1992). However, *voluntary* sustainability reporting implies that managers can behave opportunistically by only disclosing positive information resulting in agency conflicts. By contrast, in a *mandatory* setting all affected firms have to disclose sustainability information regardless of whether the sustainability information is positive or negative (Christensen et al. 2021). Therefore, signaling superior sustainability performance and a commitment to stakeholders' information needs by publishing a voluntary sustainability report is no longer feasible. Instead, in a mandatory setting, firms may use the *quality* of their mandatory sustainability report as a signal. Therefore, they need to implement mechanisms to ensure a high quality of their mandatory sustainability reports. Additionally, even in a mandatory setting, managers may show





**Fig. 1** Theoretical framework

opportunistic behavior and not report negative information as thoroughly as positive information. As a consequence, a lower reporting quality is to be expected which in turn limits the usefulness of the information for stakeholders.

Following prior research (e.g., Michelon and Parbonetti 2012; Gao et al. 2016), we argue that corporate governance plays an important role in decreasing the possibility of opportunistic behavior and enhancing the quality of mandatory sustainability reporting. Specifically, researchers and regulators around the world underline the importance to build a SCG (EC Ares(2020)4034032 2020; Velte and Weber 2021). Therefore, we focus on corporate governance mechanisms that are particularly relevant for implementing a focus on firms' long-term developments and sustainability. A well-designed SCG would align manager's incentives with those of stakeholders thereby increasing sustainability reporting quality. In this study, we define SCG as a system to (1) direct and (2) control firms in a sustainable way. Besides these two main functions, the actual design of a specific corporate governance system can vary, for example, across countries and legal forms, between one- and two-tier board systems, and between the corporate governance structures of stock corporations and partnerships. Notwithstanding these particularities, and by means of an extensive literature review, we consider five SCG mechanisms related to the main functions of a SCG system that may be used separately or in combinations. Their use is voluntary and, therefore, likely to vary among firms. Building on agency theory we hypothesize that the use of these (combined) mechanisms mitigates information asymmetries and reduces agency costs. Additionally, we assume that SCG allows stakeholders to monitor the reporting process better thereby reducing opportunistic behavior in mandatory



sustainability reporting (Edgley et al. 2010). Consequently, we expect that the use of SCG mechanisms is positively associated with MSRQ (Fig. 1).

As illustrated in Fig. 1, we derive four SCG mechanisms to direct firms. These voluntary mechanisms have one common feature: they influence management behavior toward more sustainable business practices. First, setting incentives is an important mechanism. We identify sustainable remuneration as the relevant corporate mechanism linking management remuneration with sustainability components. It incentivizes the management to act in a more sustainable manner (Mahoney and Thorn 2006; Berrone and Gomez-Mejia 2009). Second, the board's gender composition is another SCG mechanism that influences sustainable corporate decision-making (Rao and Tilt 2015; Greene et al. 2020) and has considerably attracted the interest of politicians, legislators, and society at large. Gender diversity is, currently, a key topic in the efforts to improve corporate governance worldwide (Higgs Report 2003; Davies Report 2011). Third, establishing board committees is another important SCG mechanism to direct firms (Harrison 1987). In our context, a CSR committee's appointment may give sustainability issues more emphasis in corporate decisions. Fourth, firms can influence corporate decision-making by engaging in CSR initiatives as they enter into dialogue with other firms to collectively solve society's sustainability issues (Cetindamar 2007).

SCG mechanisms not only influence, but also seek to control management behavior (Fig. 1). In the two-tier board system, the supervisory board is a mandatory mechanism to monitor management. In addition, external assurance can support the supervisory board in this respect. Such assurance for sustainability reporting is voluntary in most jurisdictions.

Overall, we expect a positive association between SCG and MSRQ, and, consequently, a positive association between each of these mechanisms and MSRQ. We describe the SCG mechanisms in detail and derive the relevant research hypotheses in the following sections.

### 3.2 Sustainable remuneration

Creating sustainable incentives for the executive board is an important means of changing the management's focus on sustainable business practices (Mahoney and Thorn 2006; Berrone and Gomez-Mejia 2009). Including sustainability components in executive board remuneration may align executives' interests with those of the stakeholders and overcome the management's short-term orientation that causes corporate scandals and financial crises (Dahlsrud 2008). According to the German Act on the Appropriateness of Executive Board Remuneration ("VorstAG"), the remuneration system for the executive board should be long-term oriented, particularly toward more sustainable corporate development. The CSR Directive points in the same direction, highlighting the importance of long-term oriented executive board remuneration, for example, by integrating sustainability components into the remuneration system. Sustainable incentives may influence the decisions toward more sustainable business practices and, thus, can result in better sustainability performance. Hence, the quality of sustainability reporting should also increase since

better sustainability performance is associated with higher sustainability reporting quality (Clarkson et al. 2008; Hummel and Schlick 2016). Consequently, we argue that integrating sustainability components in executive board remuneration may be related to higher MSRQ.

Consistent with the argumentation above, prior research shows that a sustainable remuneration system mitigates the board's incentive to manage earnings and potentially mislead stakeholders (Baraibar-Diez et al. 2019). In addition, extant research indicates that long-term remuneration structures (e.g., management ownership) are positively correlated with the voluntary sustainability reporting quality (Mio et al. 2015). However, little evidence exists on whether sustainability components introduced within the executive board's remuneration system are linked to an increase in the quality of mandatory sustainability reporting. Therefore, we posit the following association:

H1: The sustainable remuneration of the executive board is positively associated with MSRQ.

### 3.3 Gender diversity

Corporate boards are responsible for representing and defending stakeholders' interests. Evidence exists that the degree of gender diversity can affect corporate board decisions (Fernandez-Feijoo et al. 2014). Prior studies also reveal that women differ in leadership style (Bear et al. 2010), personality, communication style, and educational background compared to men (Liao et al. 2015). Furthermore, women seem to be more averse to litigation and reputation loss (Srinidhi et al. 2011) and more sensitive to social and ethical issues than men (Bear et al. 2010; Hafsi and Turgut 2013; Isidro and Sobral 2015). Thus, corporate board decisions can be affected by female representation due to their different perspectives, skills, values, and beliefs (Williams 2003).

Further, a higher proportion of women on corporate boards offers a broader range of perspectives than boards consisting of males only. Women are more likely to make stakeholder-oriented decisions than their male counterparts (Galbreath 2011; Gul et al. 2013; Al-Shaer and Zaman 2016), support stakeholder engagement, and increase the credibility of sustainability reporting (Manetti and Toccafondi 2012). Therefore, we expect that gender diversity also positively affects the supervisory board's nonfinancial statement monitoring task (Carter et al. 2003; Adams and Ferreira 2009; Wellalage and Locke 2013). Consequently, board diversity may play an important role in sustainability reporting.

Previous research shows that a higher proportion of women on boards is positively associated with the quality of financial reporting and voluntary sustainability reporting (Al-Shaer and Zaman 2016; Gerwanski et al. 2019).<sup>6</sup> Specifically,

<sup>6</sup> For financial reporting, gender diversity is positively associated with earnings quality (Krishnan and Parsons 2008), lower earnings management (Srinidhi et al. 2011), analysts' earnings forecast accuracy (Gul et al. 2013), and stock price informativeness (Gul et al. 2011).

Rupley et al. (2012) demonstrate that board gender diversity is positively associated with the quality of voluntary environmental disclosure. Rao and Tilt (2015) further investigated the influence of board gender diversity on the level of voluntary sustainability information for Australian firms and found that firms with greater gender diversity were more likely to report sustainability better. Therefore, we also predict that firms with corporate boards characterized by a higher proportion of women will disclose better mandatory sustainability reports. We examine a German setting with a two-tier board structure. Hence, we derive separate hypotheses for the two boards:

H2a: Executive board gender diversity is positively associated with MSRQ.

H2b: Supervisory board gender diversity is positively associated with MSRQ.

### 3.4 CSR committee

Establishing a CSR committee can contribute to developing and adopting standards for sustainable business practices and reviewing corporate performance against those standards (Mahmood et al. 2019). In addition, CSR committees assess and monitor stakeholders' needs (Mallin et al. 2013; Ioannou and Serafeim 2017) ensuring that sustainability reports include reliable information as required by stakeholders (Martínez-Ferrero and García-Sánchez 2018). In this regard, a report tailored to stakeholders' needs has higher information content since the CSR committee may highlight the importance of sustainability issues within the firm (Adel et al. 2019). Hence, a CSR committee's existence can be an important SCG mechanism for ensuring sustainability reporting quality.

CSR committees often consist of internal members involved in a firm's management and external members, such as leaders from different disciplines (e.g., politics, media, ethics, and science). The committee members' skills, experience, and knowledge ensure that different sustainability perspectives are embedded in the reporting process (Liao and Tang 2015). In many cases, a CSR committee is chaired by a member of the firm's board (Eberhardt-Toth 2017). Such a committee typically assists in managing sustainability issues and facilitates the firm's interaction with stakeholders regarding sustainability (Peters and Romi 2015).

Prior research suggests CSR committees significantly influence voluntary sustainability reporting because they assist the firm in reporting sustainability issues (Mallin et al. 2013). Several studies also find that firms are more likely to disclose environmental information voluntarily if a CSR committee exists (Adnan et al. 2010; Peters and Romi 2015). Similarly, Amran et al. (2014) and Helfaya and Moussa (2017) report a positive association between a CSR committee's existence and the quality of voluntary sustainability reporting. Therefore, we expect that firms with a CSR committee are likely to disclose more useful sustainability information. Consequently, we predict that a SCG system that includes a CSR committee might improve MSRQ.

H3: The existence of a CSR committee is positively associated with MSRQ.

### 3.5 Engagement in CSR initiatives

Firms face the challenge of aligning their strategies with sustainability goals (Ballou et al. 2012). CSR initiatives can help them in this respect and may also positively influence mandatory sustainability reporting for three reasons. First, by participating in sustainability initiatives, firms commit themselves to SCG and implement socially responsible policies (Cetindamar 2007). Second, engaging in CSR initiatives is beneficial for creating interaction between firms and different stakeholder groups, including states, environmental groups, labor unions, and human rights organizations (Bernhagen and Mitchell 2010), giving firms a deeper understanding of stakeholder expectations (Garvare and Johansson 2010). This differentiated understanding of stakeholder expectations may, in turn, have a positive influence on the quality of sustainability reports since firms can identify issues that are material to the heterogeneous group of users. Third, when confronted with new legislation, affected firms face the challenge of addressing the new rules appropriately. Engagement within an initiative may promote a common understanding of the new regulations and support a regular exchange of practical implementation issues. This dialogue may lead to an overall improvement in the quality of mandatory sustainability reporting among the members.

One of the best-known initiatives promoting sustainable practices is the United Nations Global Compact (UNGC), the largest and most important multi-stakeholder initiative for responsible corporate governance. Becoming a member of the UNGC helps integrate sustainability in firms' strategy and ensure more detailed and comprehensive reporting. As a voluntary initiative, the UNGC seeks broad participation from a diverse group of businesses, meaning that voluntary participation in the UNGC can be interpreted as a form of interest in and commitment to sustainability (Cetindamar 2007). Further, participation allows firms to engage with different stakeholder groups, including states, environmental groups, labor unions, and human rights organizations (Bernhagen and Mitchell 2010). Other examples for CSR initiatives are the Carbon Disclosure Project (CDP) or participating in the United Nations' Sustainable Development Goals (SDG).

Several studies show that CSR initiatives can positively impact voluntary sustainability reporting (Perez-Batres et al. 2012; Tschopp and Huefner 2015). For example, prior research suggests that adherence to the UNGC principles is associated with higher voluntary sustainability reporting quality (Fortanier et al. 2011). Following our arguments above, we hypothesize that engagement in CSR initiatives such as the UNGC is also positively associated with MSRQ.

H4: Engagement in CSR initiatives is positively associated with MSRQ.

### 3.6 External assurance

External assurance is a SCG mechanism used to control the management's sustainability behavior, increasing the credibility of corporate reports (Pflugrath et al. 2011; Knechel et al. 2013). Sustainability reporting assurance encourages trust between

the executive board and stakeholders and enhances the value and usefulness of sustainability reporting (Simnett et al. 2009). Firms seek external assurance to demonstrate superior sustainability performance and increase stakeholders' confidence in firms' sustainability reporting (Braam and Peeters 2018). In addition, external assurers occupy a gatekeeper position by reducing the information asymmetries between management and stakeholders, which, in turn, can result in higher sustainability reporting quality (Fernandez-Feijoo et al. 2014; Mori Junior et al. 2014). We argue that external assurance improves the quality of mandatory sustainability reporting because the assurance process is arguably conducted using assurance principles and guidelines, which have a positive effect on the completeness and credibility of sustainability information (Adams 2004). Therefore, management may improve mandatory sustainability reporting quality in anticipation of external assurance.

The association between external assurance and mandatory sustainability reporting is empirically unexplored thus far. Further, existing research on audits of financial statements<sup>7</sup> is not transferable to mandatory sustainability reports. In contrast to financial statements, sustainability reports' external assurance is voluntary in most jurisdictions (Simnett et al. 2009). Under the CSR Directive Implementing Act in Germany, mandatory content verification is imposed on the supervisory board as an internal oversight body. However, this type of assurance might be problematic. First, stakeholders' confidence in an internal verification of sustainability information, like an assurance performed by the supervisory board, might be lower than that in an external assurance of an auditor as external auditors are committed to independence by their profession (Knechel et al. 2009). Second, the supervisory board tends to have a lower technical audit competence (Trotman and Trotman 2015), is time-restricted, and is typically less experienced in auditing (DeZoort and Salterio 2001). Therefore, the assignment of an external auditor might increase the credibility of disclosed sustainability information.

Prior research suggests that external assurance increases the perceived usefulness of information (Chen et al. 2021) and enhances the perceived credibility of voluntary sustainability reports (Hodge et al. 2009; Pflugrath et al. 2011). Furthermore, several studies suggest a positive relationship between external assurance and voluntary sustainability reporting quality (Moroney et al. 2012; Cohen and Simnett 2015; Braam and Peeters 2018). However, as outlined in the introduction, the content of voluntary sustainability reports differs from the content firms have to report according to the CSR Directive, e.g., owing to the stricter materiality definition. Due to the lack of research on the relation between external assurance and MSRQ, we formulate the following hypothesis:

**H5:** External assurance of sustainability information is positively associated with MSRQ.

<sup>7</sup> Several studies suggest that audits increase the quality of financial statements (e.g., Libby 1979; Pany and Smith 1982; Leftwich 1983; Kinney and Martin 1994; Blackwell et al. 1998; Clinch et al. 2012).

## 4 Research design

### 4.1 Empirical model

#### 4.1.1 Dependent variable

Prior research has used various criteria and indicators to determine the quality of sustainability reporting, however, there is no common standard (Hoffmann et al. 2018). In our analysis, we apply content analysis, a method used for the systematic collection of data and text evaluation (Berelson 1952; Krippendorff 2004). Following previous research (e.g., Clarkson et al. 2008; Gerwanski et al. 2019), content analysis allows us to assess the quality of mandatory sustainability reporting and construct a disclosure index. Despite the higher effort and smaller sample, we use manual content analysis to analyze the complex structure and content of the nonfinancial statements. Depending on the reporting format, we use the firms' annual reports, sustainability reports, and separate nonfinancial reports to investigate MSRQ.

We construct our disclosure index (DI) based on the EU CSR Directive (2014/95/EU), "Guidelines on nonfinancial reporting" of the European Commission, German GAAP, GAS 20, and GRI Standards. The DI comprises both formal and content items for capturing MSRQ. We include formal items (i.e., the reporting format, use of cross-references, and frameworks) to consider the various options firms have when preparing nonfinancial statements. These elements allow us to capture firms' various reporting practices. Firms get one point no matter which format they choose, as we cannot presume to judge which format is better. However, it is important for the reader that, in the case of integrated information, the nonfinancial statement includes an index providing an overview which information belongs to the nonfinancial statement and which does not. We further argue that cross-references lead to better reporting quality because cross-references allow the stakeholder to get more detailed information about an issue and therefore understand issues better. Additionally, we judge the use of a framework as a means to achieve better reporting quality because frameworks provide rules and guidance for firms' reporting practices thereby improving comparability (e.g., Fiechter et al. 2020; Christensen et al. 2021).

The content items consist of information on the business model, nonfinancial aspects, and materiality analysis. Overall, reporting quality should increase with greater understanding of the business model as well as the five aspects of the nonfinancial statement, i.e., environmental matters, employee-related matters, social matters, respect for human rights, anti-corruption, and bribery. Regarding each aspect, several issues can be material and therefore subject to report. The information is further divided into more specific criteria (e.g., explanations on the treatment of risks and the use of key nonfinancial performance indicators). Finally, we argue that a transparent derivation of the CSR issues helps stakeholders understand firm's sustainability performance better, thereby contributing to a higher reporting quality (e.g., Khan et al. 2016; Gerwanski et al. 2019).

Consequently, we integrate the materiality analysis approach into our DI. In line with previous research, the materiality analysis section is constructed using the GRI Standards (Plumlee et al. 2015).<sup>8</sup>

In total, we identify 5 formal and 21 content items. Prior research uses equal weights for all criteria (e.g., Habek and Wolniak 2016) or employs weighted scores (e.g., Daub 2007). While we use an unweighted approach, our score is implicitly weighted because only 5 out of 26 items are related to the form, and 21 out of 26 items refer to the content. When determining the DI, we face the challenge that some nonfinancial aspects are not relevant for all firms. This can be the result of the materiality analysis, as not all firms consider the five aspects to be material for their business model. To address this problem, the calculated score is compared with the individually achievable maximum score. This procedure prevents firms from being penalized if they do not meet certain criteria assessed as immaterial (Marston and Shrives 1991).

Table 1 presents the composition of the MSRQ score.<sup>9</sup> For each item, the score can range from a minimum of 0 to a maximum of 1. We follow prior literature and use three approaches to score the individual items (e.g., Wallace and Naser 1995; Cormier et al. 2005; Clarkson et al. 2008; Gerwanski et al. 2019). The first scoring approach (A) measures if the item is included or not. The second approach (B) relies on a more differentiated basis and measures if the item is missing (0), mentioned (0.5), or explained (1). We define mention as a disclosure in less than three sentences and explanation as a disclosure in three or more sentences. Finally, items with the scoring approach C are scored based on quantile assessment (25%-, 50%-, 75%-, and > 75%-quantile). For example, the quarter of firms that uses the least objectives gets 0.25 points. Regarding the five nonfinancial aspects, a maximum of 10 points can be achieved per aspect. However, if the firm states that less or more than five aspects are material for its business, i.e., “n” aspects are reported, the maximum number of points ( $n \cdot 10$  points) is scaled to ( $5 \cdot 10$  points) 50.

Ensuring reliability and validity of the content analysis is important for replicating the results and better understanding the data, deriving valid inferences, and accepting the drawn inferences (Krippendorff 2004). To ensure reliability, we defined specific criteria to analyze nonfinancial statements. Two researchers were responsible for the content analysis, which included three steps: First, to ensure reproducibility (inter-coder reliability), pre-coding was performed by two researchers, consisting of a general analysis of a statement's structure and, more importantly, a discussion of issues requiring interpretation due to unclear and ambiguous reporting practices. Second, two researchers conducted in-depth analyses of the nonfinancial statements separately and independently. Third, the discussion of decisions that

<sup>8</sup> GRI Standards are built upon a multi-stakeholder engagement principle, which enables organizations and stakeholders to play an active role in the development of the standards. The firms should disclose aspects that reflect their significant economic, environmental, and social impacts or that substantively affect the evaluations and decisions of stakeholders. Consequently, a firm has to define the thresholds that determine an aspect as material, while considering the analysis of these two viewpoints. The focus on material issues aims to increase the relevance, credibility, and accessibility of reports.

<sup>9</sup> We provide an online appendix to describe our MSRQ score in more detail.



**Table 1** Composition of the MSRQ score

Category	Item	Scoring approach	Score range (min/max)
<i>MSRQ formal score</i>			
Reporting format	Report format	A	0/1
	Index	A	
Cross-references	Number per sentence	C	0/1
Framework	Application	B	0/2
	Explanation	B	
<i>MSRQ content score</i>			
Business model	Business purpose	B	0/7
	Structure of the group	B	
	Input factors	B	
	Business processes	B	
	Products and services	B	
	Supply and sales markets	B	
	External factors	B	
Nonfinancial aspects	Objectives	C	0/50
	Objectives with time reference	C	
	Adopted actions	C	
	Due diligence	C	
	Due diligence (supply chain)	C	
	Involvement of corporate management	C	
	Results	C	
	Risks	C	
	Nonfinancial indicators	C	
	References and links to annual report	A	
Materiality analysis	Identification of relevant aspects	B	0/4
	Prioritization of material aspects	B	
	List of stakeholder groups	B	
	Approach for integrating stakeholders	B	
<b>MSRQ total score</b>	<b>Σ 26</b>		<b>Σ 0/65</b>

This table presents the components of the MSRQ formal and content scores, which sum up to the MSRQ total score. It contains 26 items, the corresponding scoring approach, and the score range. Approach A measures if the item is included or not. Approach B differentiates whether the item is missing (0), mentioned (0.5), or explained (1). We define mention as a disclosure in less than three sentences and explanation as a disclosure in three or more sentences. Items with the scoring approach C are scored based on a quantile assessment (25%-, 50%-, 75%- and > 75%-quantile). For example, the quarter of firms that uses the least quantitative objectives gets 0.25 points. Further details on the MSRQ score are presented in the online appendix.

allowed room for interpretation and the plausibility verification of outliers ensured a uniform and consistent assessment. The results were recorded in a codebook. Overall, this protocol improved transparency (Gibbert et al. 2008).

Additionally, a pre-test was conducted to avoid intra-coder reliability problems. This formative check included a revision of categories after analyzing 15 nonfinancial statements. As a result, coding instructions were refined and clarified. Manual re-coding, which benefits from the deployment of human abilities, thus overcoming the shortcomings of automatized mechanical measurement, was used in this study (Krippendorff 2004). Further, at the end of the evaluation procedure, the first 15 reports analyzed were reexamined with the same analytical tools. The results only indicated minor deviations. Therefore, we conclude that the stability of the results is high, and biases due to individual inconsistencies or learning curve effects are low. Finally, our analytical tool ensures high validity as it is based on the EU CSR Directive (2014/95/EU), “Guidelines on nonfinancial reporting” of the European Commission, German GAAP, GAS 20, and GRI Standards that comprehensively state the regulatory requirements.

#### 4.1.2 Independent Variables

We employ *Sustainable\_Remuneration*, *Gender\_Diversity*, *CSR\_Committee*, *CSR\_Initiative*, and *External\_Assurance* to capture the different SCG mechanisms. Data for all variables have been manually collected from firms’ stand-alone sustainability reports, annual reports, and the UNGC website.

First, we employ *Sustainable\_Remuneration* to capture the inclusion of sustainability components in the executive board’s remuneration system. To be classified as sustainable, the remuneration component must be linked to nonfinancial measures. Examples of sustainable components are the consideration of customer or employee satisfaction, innovation progress, and CO<sub>2</sub> reduction. The variable equals 1 if a firm has at least one sustainability component established and quantified in the executive board remuneration. If the sustainability component is not quantified, the variable equals 0.6666. If we find that the remuneration system is associated with CSR but a specific nonfinancial measure is not mentioned, we assign 0.3333 points. Examples of such an association with CSR are sustainable components that are not further specified or nonfinancial goals considered in the remuneration system. Finally, *Sustainable\_Remuneration* equals 0 for firms with a remuneration system that is not associated with CSR.

Second, we measure *Gender\_Diversity* in corporate boards considering the two-tier system described above. We use two different proxies. First, *Gender\_Diversity\_Executive\_Board* is the proportion of women in the executive board at the end of the fiscal year 2017, and second, *Gender\_Diversity\_Supervisory\_Board* is the proportion of women in the supervisory board at the end of the fiscal year 2017.

Third, we assess whether the corporate board is supported by a CSR committee in charge of sustainability issues. *CSR\_Committee* equals 1 for sample firms with a CSR committee, and 0 otherwise. We differentiate between CSR committees and CSR working groups. A CSR committee is often headed by a member of the executive board and consists of employees at the management level and CSR specialists. Additionally, external specialists from politics, media, ethics, and science can be part of this committee. The committee advises the executive board in decision-making, whereas CSR working groups merely collect and prepare information.

Fourth, *CSR\_Initiative* measures the engagement in CSR initiatives of firms. We use UNGC membership as a proxy to determine the influence of engagement in CSR initiatives because it is the largest and most important multi-stakeholder initiative. Furthermore, the UNGC requires members to annually report their progress to embed the initiative's 10 principles in their strategies and operations.<sup>10</sup> *CSR\_Initiative* equals 1 if a firm is a member of UNGC at the end of the fiscal year 2017, and 0 otherwise.<sup>11</sup>

Finally, firms can decide to obtain assurance for their nonfinancial statements by external parties, for which we use *External\_Assurance*. The variable equals 1 if a firm's nonfinancial statement is assured by an external party (auditor or another independent service provider), and 0 otherwise.

### 4.1.3 Control variables

There was a considerable time lag between the introduction of the EU CSR Directive, the implementation of the member states, and the first-time application of affected firms. Consequently, affected firms could have anticipated the disclosure mandate and potentially changed their decision to voluntarily report sustainability information in the years between 2014 and 2017 (Fiechter et al. 2020). To account for that, we include control variables to capture the association between firms' incentives to report on sustainability information voluntarily and MSRQ. To this end, we hand-collected information on whether a firm has experience in publishing a separate sustainability report prior to the CSR Directive and how many reports it published until 2017. Further, we examine how often firms have included a section on sustainability in their annual report prior to the fiscal year 2017. We assume three groups of firms: (1) Firms that voluntarily adopted sustainability reporting before the fiscal year 2014, (2) firms that adopted sustainability reporting on an early mandatory basis between the fiscal year 2014 and 2016, and (3) firms that adopted sustainability reporting for the first time from the fiscal year 2017 onwards.<sup>12</sup> Based on this data, we define *Voluntary\_CSR\_Adopter* as firms with a sustainability reporting experience of at least four years prior to the mandate, and *Early\_mandatory\_CSR\_Adopter* as firms with a maximum of three years of sustainability reporting experience before the mandate.<sup>13</sup>

<sup>10</sup> UNGC participating firms are required to align their operational activities and strategies with 10 universally accepted principles (e.g., in the areas of human rights, labor standards, and anticorruption). Additionally, firms have to inform their stakeholders about the implementation progress of UNGC principles and, thus, adopt a more holistic reporting.

<sup>11</sup> For robustness analyses, we additionally examine whether a firm joins the carbon disclosure project (CDP) or follows the UN's Sustainable Development Goals (SDG).

<sup>12</sup> We divide our sample firms into three groups following the literature on mandatory IFRS adaption (Daske et al. 2008).

<sup>13</sup> We do not include a variable for firms that adopted sustainability reporting for the first time from the fiscal year 2017 onwards because this variable is perfectly multicollinear with *Voluntary\_CSR\_Adopter* and *Early\_mandatory\_CSR\_Adopter*.

**Table 2** Measurement and data source of test and control variables

Variable	Measurement	Data source
<i>Test variables</i>		
Sustainable_Remuneration	1 if a firm has at least one sustainability component established and quantified in the executive board remuneration 0.6666 if a firm has at least one sustainability component established in the executive board remuneration but not quantified 0.3333 if the remuneration system is associated with CSR, and 0 otherwise	Annual reports/sustainability reports
Gender_Diversity_Executive_Board	Percentage of female members in the executive board	Annual reports/firms' websites
Gender_Diversity_Supervisory_Board	Percentage of female members in the supervisory board	Annual reports/firms' websites
CSR_Committee	1 if a firm has a CSR committee, and 0 otherwise	Annual reports/sustainability reports
CSR_Initiative	1 if a firm is member of the UNGC, and 0 otherwise	UNGC websites/firms' websites
External_Assurance	1 if a firm has its mandatory sustainability report assured by an external party, and 0 otherwise	Nonfinancial statements
<i>Control variables</i>		
Voluntary_CSR_adopter	1 if a firm has at least four years of sustainability experience prior to the mandate, and 0 otherwise	Firms' websites
Early_mandatory_CSR_adopter	1 if a firm has a maximum of three years of sustainability experience prior to the mandate, and 0 otherwise	Firms' websites
Size	Natural logarithm of total assets	Thomson Reuters Datastream
Leverage	Total debt to total assets	Thomson Reuters Datastream
Profitability	Return on assets	Thomson Reuters Datastream
Ownership_Structure	Percentage of closely held shares	Thomson Reuters Datastream
Analyst_Coverage	Number of analyst earnings forecasts	Thomson Reuters Datastream

This table presents the definitions and data sources for our test and control variables

**Table 3** Summary of the sample selection process

Firms affected by the CSR Directive Implementation Act	540
<i>Less</i>	
Firms not listed	282
Parent company publishes group statement	15
Firms with headquarters abroad	6
Firms with on average less than 500 employees	6
Insolvency	10
No material issues	1
Final sample	220

This table displays the sample selection process of our analysis

Moreover, and in line with the literature, we include the following firm-specific characteristics as additional variables to control for firm-level reporting incentives (Daske et al. 2013; Christensen et al. 2015). We measure *Size* using the natural logarithm of a firm's prior year-end total assets, *Leverage* by the ratio of the firm's total liabilities to total assets at prior year-end, and *Profitability* by the return on assets. Further, we add *Ownership\_Structure* (percentage of closely held shares at the prior year-end) and *Analyst\_Coverage* (number of analyst earnings forecasts during the prior year) to control for firms' information environment in our regression. We obtain data for these controls from Thomson Reuters Datastream. A detailed description of the control variables' measurement and sources is provided in Table 2.

#### 4.1.4 Regression model

To obtain inferences in our regression analyses, we use ordinary least squares (OLS) regressions. In all Models, we use Fama–French 5 industry-fixed effects and robust standard errors. We estimate the following equation:

$$\begin{aligned}
 MSRQ_j = & \beta_0 + \beta_1 Sustainable\_Remuneration_j + \beta_2 Gender\_Diversity_j + \beta_3 CSR\_Committee_j \\
 & + \beta_4 CSR\_Initiative_j + \beta_5 External\_Assurance_j + \beta_6 Voluntary\_CSR\_Adopter_j \\
 & + \beta_7 Early\_mandatory\_CSR\_Adopter_j + \beta_8 Size_j + \beta_9 Leverage_j \\
 & + \beta_{10} Profitability_j + \beta_{11} Ownership\_Structure_j + \beta_{12} Analyst\_Coverage_j + \epsilon_j
 \end{aligned}$$

## 4.2 Sample selection

Our study examines MSRQ for all firms affected by the CSR Directive Implementation Act of 2017 in Germany, as of December 31, 2017 (540 firms).<sup>14</sup> However, we

<sup>14</sup> We use the enforcement list of BaFin with the status as of July 1, 2017, lists of foreign stock exchanges from the EU/EEA area, and company directories from the banking and insurance sector as a starting point to determine the initial sample (Hans Böckler Stiftung 2016).

**Table 4** Descriptive statistics – MSRQ score

	Mean	Std. dev	Min	25%	Median	75%	Max
MSRQ formal score	0.575	0.211	0	0.469	0.594	0.688	1
Reporting format	0.855	0.353	0	1	1	1	1
Cross-references	0.563	0.371	0	0.250	0.625	0.875	1
Framework	0.442	0.299	0	0.250	0.500	0.500	1
MSRQ content score	0.314	0.138	0.049	0.203	0.311	0.426	0.655
Business model	0.448	0.233	0	0.286	0.429	0.643	1
Nonfinancial aspects	0.293	0.139	0.044	0.182	0.293	0.405	0.658
Materiality analysis	0.356	0.282	0	0.125	0.375	0.500	1
MSRQ total score	0.331	0.136	0.060	0.221	0.323	0.438	0.657

This table presents descriptive statistics for our MSRQ score. It comprises formal, content, and total scores. The table further displays the standard deviation (Std. dev.), mean, first quartile (25%), median (50%), third quartile (75%), and the minimum and maximum scores. A sample of 220 firms is used for the analysis

exclude firms that are not listed (282 firms). Furthermore, we exclude firms that are not required to prepare a nonfinancial statement according to German GAAP. These are firms whose nonfinancial statement is included in the consolidated management report of the parent company according to § 289b Sect. 2 German GAAP (15 firms), with headquarters abroad (6 firms), or with less than 500 employees on average (6 firms). We exclude 10 firms that had to file for insolvency and thus did not publish a nonfinancial statement. Finally, we exclude one firm exempted from the reporting obligation because it did not identify any material issues. The final sample includes 220 firms. Due to missing data, our sample size reduces to 186 firms once we use all control variables described in Sect. 4.1.3. Details on the sample selection process are provided in Table 3.

## 5 Results

### 5.1 Sustainability reporting practice and SCG mechanisms

#### 5.1.1 Sustainability reporting practices

We present descriptive statistics for the MSRQ score in Table 4. The distribution of the total score underlines the heterogeneous quality of the nonfinancial statements in our sample. The MSRQ has a mean of 0.331 and a standard deviation of 0.136. Voluntary CSR adopters have an average MSRQ of 0.394, while early mandatory CSR adopters have an average MSRQ of 0.348. The MSRQ of these two groups of firms is significantly higher than firms without any sustainability reporting experience prior to the mandate (mean of MSRQ=0.273). This result suggests that voluntary CSR adopters and early mandatory CSR adopters rely on their established reporting infrastructure to address the new regulatory requirements better and thus

disclose a higher quality of mandatory sustainability reports. The average formal score is 0.575, with a standard deviation of 0.211. The standard deviation for the formal score is slightly higher compared to the content score (0.314). To examine the validity of our MSRQ measure, we determine firms' ESG disclosure score provided by Bloomberg's online database as an alternative proxy for the extent of CSR disclosure. In untabulated results, we find that MSRQ and Bloomberg's ESG disclosure score are positively and highly significantly correlated (0.552).

Concerning the reporting format, 48 firms (21.8%) disclose their nonfinancial statement in a separate section of the management report, and 10 firms (4.5%) integrate information throughout the management report. To disclose the separate nonfinancial report, 76 firms (34.5%) prepare a separate report, 42 firms (19.1%) use a separate section in another group report (sustainability report or an annual report), and 44 firms (20.0%) integrate the report throughout another group report. Consequently, most firms (73.6%) use a reporting format outside of the management report. Moreover, the findings signal not only a wide variety of reporting formats but also in the use of cross-references and frameworks. 165 of the firms in our sample (75%) use cross-references to other corporate publications such as the annual report or firm websites to present further information on the selected items. Regarding frameworks, the majority of firms (137 firms; 62.3%) uses a framework, such as the GRI Standards, to prepare their nonfinancial statements.

The mean of our content score is 0.314 (standard deviation=0.138). The content score has a wide range (minimum of 0.049 and maximum of 0.655), indicating that the overall content reporting quality is rather low and heterogeneous. This pattern can also be observed in the subscores for the business model, nonfinancial aspects, and materiality analysis. Descriptions about the business model reveal that the average score is 0.448. Twelve firms (5.5%) refrain completely from describing the business model. Regarding the subscores for the nonfinancial aspects, none of our sample firms reached the maximum score of 1 (average of 0.293), while for the materiality analysis subscore, only eight firms (3.6%) reached the maximum score. Our descriptive findings show that the MSRQ of our sample firms is heterogeneous. This evidence can be explained by firms' significant discretion and explicit choices in fulfilling reporting requirements. In addition, our results indicate that the legal reporting requirements, their specification by GAS 20, and the use of frameworks offer significant flexibility in preparing nonfinancial statements, which also might affect reporting quality.

Table 5 summarizes descriptive statistics for our test (SCG mechanisms) and control variables. Based on hand-collected data, we find that 177 firms (80.5%) do not use a sustainable executive board remuneration system. 17 firms (7.7%) have an executive board remuneration system associated with CSR, 11 firms (5.0%) link the executive board remuneration system to nonfinancial measures, and 15 firms (6.8%) quantify the link. This illustrates that linking executive board remuneration to sustainability performance is still uncommon in practice. Regarding gender diversity on the executive board, we find only 6.4% of all members to be women. Dividing the sample into small and large firms<sup>15</sup> reveals

<sup>15</sup> In this study, we use a median split to categorize firms as small and large based on their total assets.



that gender diversity does not significantly differ between large and small firms. On the supervisory board, 21.5% of supervisory board members are women on average. Large firms have 26.7% women in their supervisory boards, compared to 16.3% in small firms. These findings illustrate that women are still largely underrepresented in German corporate boards, especially on the executive boards.

Moreover, 51 firms (23.2%) of our sample have established a CSR committee, whereas nine firms (4.1%) have established a CSR working group. In addition, 50 firms (22.7%) are engaged in CSR initiatives as UNGC members. Comparing large and small firms reveals that this only applies to five of the small firms (4.5%), whereas 45 (40.9%) of the large firms are UNGC members. This indicates a high voluntary engagement in CSR initiatives of large firms. Finally, the majority of firms, 114 firms (51.8%), purchased external assurance for their nonfinancial statements. The frequent use of external assurance may reflect the liability concerns of supervisory board members. Regarding the level of assurance, the “limited” assurance of nonfinancial statements dominates (107 firms, 93.9%). Only seven nonfinancial statements (6.1%) have been audited with “reasonable” assurance. Six of the seven firms with “reasonable” assurance of their nonfinancial statements disclose these statements in a separate section of the management report or integrated the information throughout the management report. Hence, reasonable assurance is likely linked to the general audit of the management report. Regarding the type of external assurance provider, 103 firms that decided to buy assurance for their nonfinancial statements engaged a Big 4 auditor (90.3%), while only nine firms (7.9%) chose a non-Big 4 auditor, one firm (0.9%) chose an assurance provider outside the auditing profession, and one firm did not specify the service provider (0.9%). This finding is in line with previous studies showing that Big 4 auditors are considered more experienced in assuring sustainability information than other assurance providers (DeAngelo 1981; Craswell et al. 2002; Martínez-Ferrero and García-Sánchez 2018). 92 firms (80.7%) chose the same assurance provider for their nonfinancial and financial statements.

Analyzing firms’ preadoption in sustainability reporting, we find that 91 firms (41.4%) are voluntary CSR adopters, while 23 firms (10.5%) are early mandatory adopters. The remaining 106 firms (48.2%) did not have any sustainability reporting experience prior to the mandate. These findings indicate that most of our sample firms (89.5%) are either voluntary CSR adopters or late CSR adopters. Only a minority of firms (23 firms; 10.5%) started sustainability reporting between 2014 and 2016. Concerning *Size*, we observe significant differences. According to the median-split, the total assets of an average large firm are more than 120 times larger than those of an average small firm. Moreover, we find that the average firm has a leverage ratio of 33.5% and a return on assets of 4.6%. Finally, on average, 40.0% of the shares are closely held (*Ownership\_Structure*) (212 firm observations) and, on average, each firm has 12.4 analyst earnings forecasts within the fiscal year (*Analyst\_Coverage*) (187 firm observations).

**Table 5** Descriptive statistics – Test and control variables

Variable	Mean	Std. dev	Min	25%	Median	75%	Max
Sustainable_Remuneration	0.127	0.288	0	0	0	0	1
Gender_Diversity_Executive_Board	0.064	0.137	0	0	0	0	1
Gender_Diversity_Supervisory_Board	0.215	0.143	0	0.101	0.25	0.333	0.5
CSR_Committee	0.232	0.423	0	0	0	0	1
CSR_Initiative	0.227	0.420	0	0	0	0	1
External_Assurance	0.518	0.500	0	0	1	1	1
Voluntary_CSR_Adopter	0.414	0.494	0	0	0	1	1
Early_mandatory_CSR_Adopter	0.105	0.307	0	0	0	0	1
Size	14.474	2.227	10.447	12.682	14.303	15.926	21.182
Leverage	0.335	0.234	0	0.139	0.322	0.485	1
Profitability	0.046	0.062	– 0.347	0.027	0.048	0.074	0.272
Ownership_Structure	0.400	0.292	0	0.121	0.407	0.640	0.997
Analyst_Coverage	12.369	9.102	1	4	10	20	36

This table presents the descriptive statistics for the test and control variables used in the analyses. For each variable, the table displays the standard deviation (Std. dev.), mean, first quartile (25%), median (50%), third quartile (75%), and the minimum and maximum score. A sample of 220 firms is used for the analysis of our test variables. This sample size reduces for the control variables due to missing data

**Table 6** SCG mechanisms

Number of implemented SCG mechanisms	0	1	2	3	4	5	Mean	Std. dev
Total firms	68	66	38	25	15	8	1.44	1.40
- Thereof large firms	8	31	25	23	15	8	2.27	1.39
- Thereof small firms	60	35	13	2	0	0	0.61	0.77

This table details information on the use of SCG mechanisms. It comprises the number of implemented SCG mechanisms of all firms in our sample as well as for large and small firms. The table further displays the corresponding mean and standard deviation (Std. dev.)

### 5.1.2 SCG mechanisms

Results on the use of SCG mechanisms reveal that firms use, on average, 1.44 of our 5 SCG mechanisms (Table 6).<sup>16</sup> Moreover, the standard deviation of 1.40 is high, which shows a heterogeneous application of mechanisms to direct and control firms. We find that 68 firms (30.9%) do not use any of the mechanisms and 66 firms (30.0%) use one mechanism. In contrast, only a minority of 23 firms (10.5%) use four or five mechanisms. Thereby, on average, large firms tend to combine significantly more SCG mechanisms (2.27) to ensure MSRQ compared to small firms (0.61).

<sup>16</sup> Our test variables *Sustainable\_Remuneration* and *Gender\_Diversity* are not scaled metrically. For simplification, we assume that the mechanism *Sustainable\_Remuneration* is fulfilled for a score from 0.6666 and *Gender\_Diversity* is fulfilled from a proportion of 30% of women in the supervisory board.

**Table 7** Correlation matrix

Variable	MSRQ	Sustain- able_ Remuner- ation	Gender_ Diver- sity_ Execu- tive_ Board	Gender_ Diversity_ Supervi- sory_Board	CSR_ Commit- tee	CSR_Inti- tiative	External_ Assur- ance	Volun- tary_CSR_ Adopter	Early_ manda- tory_ CSR_ Adopter	Size	Leverage	Profit- ability	Owner- ship_Struc- ture	Analyst_ Coverage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	
(1)	1.000***													
(2)	0.431***	1.000***												
(3)	0.067	-0.075	1.000***											
(4)	0.382***	0.260***	-0.030	1.000***										
(5)	0.498***	0.369***	-0.092	0.258***	1.000***									
(6)	0.432***	0.288***	0.034	0.313***	0.396***	1.000***								
(7)	0.562***	0.311***	-0.061	0.299***	0.400***	0.306***	1.000***							
(8)	0.394***	0.249***	0.071	0.228***	0.348***	0.514***	0.237***	1.000***						
(9)	0.042	-0.048	0.008	0.022	-0.012	-0.079	0.002	-0.287***	1.000***					
(10)	0.608***	0.439***	-0.015	0.433***	0.499***	0.549***	0.530***	0.458***	0.036	1.000***				
(11)	0.256***	0.179**	0.077	0.111*	0.120*	0.147**	0.180**	0.109	-0.028	0.418***	1.000***			
(12)	0.006	0.054	0.002	-0.041	-0.007	-0.036	-0.025	0.035	-0.008	-0.106	-0.243***	1.000***		
(13)	-0.171**	-0.173**	-0.018	-0.198***	-0.155**	-0.296***	-0.124*	-0.218***	-0.049	-0.290***	-0.144***	-0.098	1.000***	
(14)	0.585***	0.399***	-0.041	0.367***	0.486***	0.488***	0.522***	0.480***	-0.077	0.726***	0.109	0.001	-0.360***	1.000***

This table displays the Pearson correlations between the variables used in our analysis. \*, \*\*, and \*\*\* represent significance at the 10, 5, and 1 percent levels, respectively

Consequently, the results indicate that for large firms, which also tend to be characterized by a complex corporate structure, multiple SCG mechanisms are applied to direct and control the firm. Therefore, from an agency theory perspective, the results suggest that large firms with complex corporate structures implement significantly more mechanisms to reduce agency conflicts. Additionally, the average MSRQ is 0.270 for firms that use less SCG mechanisms than the average firm. In contrast, the average MSRQ is 0.425 for firms that use more SCG mechanisms than the average firm.

The correlation analyses show that five of our six proxies are positively correlated (Table 7). The correlation coefficients range from a minimum of  $-0.092$  between *CSR\_Committee* and *Gender\_Diversity\_Supervisory\_Board* to a maximum of  $0.400$  between *CSR\_Committee* and *External\_Assurance*. Moreover, the correlation analyses indicate possible relationships between MSRQ and our SCG mechanisms of interest. In line with our predictions, MSRQ is positively and significantly correlated with *Sustainable\_Remuneration* ( $0.431$ ), *Gender\_Diversity\_Supervisory\_Board* ( $0.382$ ), *CSR\_Committee* ( $0.498$ ), *CSR\_Initiative* ( $0.432$ ), and *External\_Assurance* ( $0.562$ ), indicating a potential positive association between SCG mechanisms and MSRQ. This finding provides first support for our hypotheses. However, the correlation between MSRQ and *Gender\_Diversity\_Executive\_Board* is positive ( $0.067$ ) but not significant. Testing the correlation between Bloomberg's ESG disclosure score and our SCG mechanisms yields similar results. In this vein, Bloomberg's ESG disclosure score is positively and significantly correlated with *Sustainable\_Remuneration* ( $0.317$ ), *Gender\_Diversity\_Supervisory\_Board* ( $0.226$ ), *CSR\_Committee* ( $0.364$ ), *CSR\_Initiative* ( $0.633$ ), and *External\_Assurance* ( $0.283$ ). In addition, we find that MSRQ is positively and significantly correlated with the number of SCG mechanisms employed ( $0.638$ ).

## 5.2 SCG mechanisms and mandatory sustainability reporting quality

To examine the association between SCG mechanisms and MSRQ, we use different regression Models in Table 8. In Model 1, we estimate all test variables' joint influence on the full sample size (220 observations). If we add all control variables, the number of observations drops to 186 (Model 8). To reduce the variance in the estimates, we test the association between our test variables and MSRQ individually, including our control variables (Models 2–7). Within all Models, we use the total MSRQ score as our dependent variable. All Models show good fit and high explanatory power (adj.  $R^2$  between  $45.9\%$  (Model 3) and  $58.7\%$  (Model 8) and p-values of the corresponding F-statistics smaller than  $0.01$ ). The influence of the coefficients of our test variables in Model 8 is similar to Models 2–7, measured by the sign and magnitude of the coefficient.<sup>17</sup> Therefore, we only refer to Models 2–7 for the hypotheses tests in this section.

<sup>17</sup> Moreover, we calculate variance inflation factors (maximum:  $4.19$ ), apply the Farrar-Glauber Chi-square test ( $p < 0.01$ ), and the condition number test (condition number:  $3.44$ ). From these tests and our regression results in Table 8, we conclude that multicollinearity is not an issue in our analysis.

**H1: Sustainable remuneration** Our first hypothesis predicts a positive association between the sustainable remuneration of the executive board and MSRQ. The empirical results support H1. Firms that have included sustainability components in their executive board remuneration system have, on average, a 10.1 percentage point higher MSRQ (Model 2,  $p=0.000$ ). The majority of firms (80.5%) links their executive board remuneration system only to financial goals. Our results indicate that these firms would benefit, *ceteris paribus*, from 3.4 percentage point higher MSRQ if they link their remuneration system with CSR. Hence, our findings underline that firms may improve sustainability reporting by integrating sustainability components in the executive board's remuneration system. One reason might be that managers enhance the quality of mandatory sustainability reporting to signal superior sustainability performance to the firm's owner. Thereby, managers attempt to show that they meet the expectation to drive the firm's sustainability performance, which, in turn, likely has a positive impact on their compensation.

**H2a and H2b: Gender diversity** The executive board is responsible for preparing the nonfinancial statement, and the supervisory board must review its content. In this context, H2 hypothesizes a positive association between gender diversity in these two boards of the German two-tier system and MSRQ. Our results partly confirm this assumption. Based on the OLS regression results, we find no support for the association between the presence of women on executive boards and MSRQ (H2a) in our Model 3 ( $p>0.1$ ), which contrasts the research on voluntary sustainability reporting in international settings (e.g., Al-Shaer and Zaman 2016; Gerwanski et al. 2019). Hence, in the German setting, there is no evidence to conclude that the executive board reports better on sustainable issues if the board is characterized by a higher proportion of women. In our sample, a minority of the firms have women on the executive board (53 firms; 24%), and the distribution is strongly left-skewed. Therefore, we may not have sufficient heterogeneity in our data to investigate the relationship between gender diversity on executive boards and MSRQ.

Moreover, we find a significantly positive association between gender diversity on the supervisory board and MSRQ in Model 4 ( $p\leq 0.01$ ). Therefore, our regression results support H2b. A supervisory board with a higher proportion of women is associated with higher sustainability reporting quality. This result is in line with prior research examining voluntary sustainability settings (e.g., Rupley et al. 2012; Rao and Tilt 2015). We conclude that a supervisory board with a higher proportion of women might be more skeptical and conscientious in reviewing sustainability reporting than a supervisory board with only men. This might ultimately increase the quality of mandatory sustainability reports as well.

**H3: CSR committee** H3 assumes a positive association between the existence of a CSR committee and MSRQ. The empirical results show a highly significant positive association. Firms with a CSR committee have, on average, a 6.9 percentage point higher MSRQ (Model 5,  $p<0.01$ ), supporting H3. Firms may appoint such a committee to promote a specific culture and set standards that emphasize sustainability.

**Table 8** Empirical results for the association between SCG mechanisms and MSRQ

Variable	Hypothesis and predicted sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Sustainable_Remuneration	<b>H1: +</b>	0.088*** (3.94)	0.101*** (4.39)						0.083*** (3.77)
Gender_Diversity_Executive_Board	<b>H2a: +</b>	0.120** (2.40)		0.045 (1.05)					0.063 (1.61)
Gender_Diversity_Supervisory_Board	<b>H2b: +</b>	0.132*** (2.63)			0.172*** (3.24)				0.143*** (2.92)
CSR_Committee	<b>H3: +</b>	0.066*** (3.75)				0.069*** (3.45)			0.054*** (3.09)
CSR_Initiative	<b>H4: +</b>	0.045** (2.62)					0.055** (2.54)		0.037* (1.90)
External_Assurance	<b>H5: +</b>	0.092*** (5.69)						0.068*** (3.70)	0.054*** (3.13)
Voluntary_CSR_Adopter			0.030* (1.85)	0.031* (1.81)	0.032* (1.95)	0.027 (1.65)	0.021 (1.15)	0.042** (2.51)	0.019 (1.19)
Early_mandatory_CSR_Adopter			0.045* (1.86)	0.039 (1.64)	0.040* (1.71)	0.040 (1.58)	0.043* (1.74)	0.045* (1.75)	0.044* (1.91)
Size			0.017*** (3.26)	0.020*** (3.56)	0.014*** (2.68)	0.015*** (2.70)	0.014** (2.54)	0.014** (2.57)	0.001 (0.27)
Leverage			0.095*** (2.71)	0.099*** (2.68)	0.115*** (3.34)	0.107*** (3.08)	0.109*** (3.04)	0.094** (2.57)	0.109*** (3.46)
Profitability			0.157* (1.66)	0.203** (2.07)	0.215** (2.44)	0.205** (2.15)	0.223** (2.30)	0.195* (1.96)	0.190** (2.42)

**Table 8** (continued)

Variable	Hypothesis and predicted sign	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Ownership_Structure			0.052* (1.97)	0.046* (1.66)	0.049* (1.83)	0.044* (1.69)	0.055** (2.01)	0.026 (0.94)	0.046* (1.92)
Analyst_Coverage			0.003*** (3.15)	0.004*** (3.29)	0.004*** (3.33)	0.004*** (3.13)	0.004*** (3.34)	0.003** (2.20)	0.002** (2.19)
Firm observations		220	186	186	186	186	186	186	186
Industry-fixed	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F test		27.0	21.6	20.7	20.8	21.6	21.7	24.5	20.8
VIF <sub>max</sub>		1.46	3.34	3.29	3.58	3.48	3.67	3.47	4.19
Adj. R <sup>2</sup>		48.3%	49.7%	45.9%	48.3%	49.3%	47.6%	50.1%	58.2%

This table presents results of the multivariate analyses on the association between different corporate governance mechanisms and mandatory sustainability reporting quality. The dependent variable in Models 1–8 is the firm's MSRQ total score. All variables are defined in Table 2. \*, \*\*, and \*\*\* represent significance at the 10, 5, and 1 percent levels, respectively. F-statistic to determine the overall model fit is calculated in each model. T-statistic is shown between parentheses. We use the Fama-French 5 industry-fixed effects and robust standard errors in all models



By establishing a “tone from the top”, CSR committees may provide oversight of the firm’s sustainability reporting processes and, thus, can positively influence reporting quality. In this context, and in line with prior research, our results underscore that CSR committees can ensure that mandatory sustainability reports include useful information and can, therefore, increase reporting quality (Fortanier et al. 2011).

**H4: CSR initiative** H4 hypothesizes a positive association between the engagement in CSR initiatives and MSRQ. The regression results support H4. Firms that are UNGC members have, on average, a 5.5 percentage point higher MSRQ (Model 6,  $p=0.012$ ). By being members of the UNGC, firms commit themselves to follow the initiative’s 10 principles. As a result, they may interact more closely with stakeholders and gain a deeper understanding of their expectations, which, in turn, improves MSRQ. Many UNGC members from Europe were confronted with the new legislation. The UNGC may offer a platform for first-time users to critically discuss how to prepare the nonfinancial statement for the first time. Therefore, interaction with other UNGC member firms might improve MSRQ. Our findings are in line with the literature on the beneficial effects of UNGC membership (e.g., Schembera 2018) and disagree with the critical view that questions the UNGC’s usefulness (e.g., Berliner and Prakash 2014). For robustness analyses, we additionally collect data on whether a firm joins the carbon disclosure project (CDP) or follows the UN’s Sustainable Development Goals (SDG). Our inferences for the association between firms’ engagement in CSR initiatives and MSRQ remain identical when employing our alternative measures.

**H5: External assurance** Finally, H5 predicts a positive association between the external assurance of mandatory sustainability reporting and MSRQ. In line with our expectations and the literature, our findings reveal a significantly positive association between *External\_Assurance* and MSRQ, supporting H5. Firms that purchase an external assurance for their nonfinancial statements have, on average, a 6.8 percentage point higher MSRQ (Model 7,  $p=0.000$ ). This result is in line with the literature on the effects of external assurance on voluntary sustainability reporting (O’Dwyer et al. 2011; Moroney et al. 2012). We identify two possible explanations for our results. First, external assurance may help firms disclose high-quality reports and mitigate information asymmetries, increasing transparency. Second, the assurance process may have a significant impact on reporting, and firms improve their disclosure quality ex-ante in anticipation of external assurance. Therefore, our results contribute to the broad research stream on the benefits and costs of external assurance for sustainability reporting (e.g., Hodge et al. 2009; Pflugrath et al. 2011; Chen et al. 2021).

**Controls** Regarding the influence of the control variables, we find a significant association between *Size* and MSRQ in Models 2–7. However, we find no significant association between *Size* and MSRQ in Model 8. *Size* is significantly correlated with all our test variables, except for *Gender\_Diversity\_Executive\_Board*. This indicates that *Size* itself has no direct influence, but the positive effect of *Size* is captured by

our test variables. Further, we find a significant positive association between *Leverage*, *Profitability*, *Ownership\_Structure*, *Analyst\_Coverage*, and MSRQ. Moreover, voluntary CSR adopters and early mandatory CSR adopters seem to have higher quality reporting standards than firms without any sustainability reporting experience before the mandate. We assume that firms may build upon previous reports and rely on an established infrastructure to prepare their nonfinancial statements.<sup>18</sup>

## 6 Conclusion

This study analyzes the role of SCG in ensuring MSRQ, motivated by recent regulatory changes in the EU. According to the CSR Directive (2014/95/EU) and its corresponding national laws of EU member states, certain large listed firms have to extend their management report with a nonfinancial statement, a distinct form of mandatory sustainability reporting. The regulatory initiative aims to enhance the quality of sustainability reporting and influence decision-making towards more sustainable practices. The new reporting requirement is thus closely embedded in the firms' corporate governance. In Germany, the supervisory board has been charged with auditing the nonfinancial statement (§ 171 Stock Corporation Act), although external assurance regarding the reporting contents remains voluntary.

We argue that, in contrast to voluntary settings, firms may use the quality of their mandatory sustainability report to signal stakeholder commitment. Consequently, firms may voluntarily implement SCG mechanisms to ensure the high quality of their reports. We analyze four relevant SCG mechanisms that influence management behavior toward more sustainability and one mechanism to control management sustainability behavior. We hypothesize a positive association between all five mechanisms and the quality of mandatory sustainability reporting.

Although the legislation provides a reporting framework with specific materiality thresholds and specified content requirements, we find heterogeneous reporting quality from our sample of listed German firms. Our results call into question the aim of the regulation to achieve a higher quality of sustainability reporting. Thus, we conclude that there is significant room for improvement in many cases to enable stakeholders to better process and compare sustainability information for decision-making. Moreover, our results indicate that firms use various voluntary SCG mechanisms in addition to the mandatory audit by the supervisory board to ensure MSRQ. However, we find that the use of these mechanisms is heterogeneous. Large firms tend to combine more SCG mechanisms to direct and control the entity than small firms.

In line with our hypotheses, we find a significantly positive association between four of the five relevant SCG mechanisms and MSRQ (sustainable remuneration of the executive board, the existence of a CSR committee, engagement in CSR

<sup>18</sup> In untabulated additional analyses we include controls for sustainability performance (Thomson Reuters ESG score (TRESGS)) and other corporate governance characteristics (Thomson Reuters governance pillar (GSCORE)) in our regressions. This procedure yields similar inferences. However, the number of observations drops to 81 due to missing data.

initiatives, and external assurance). However, the results regarding gender diversity are ambiguous. While we find an association between gender diversity in the supervisory board and MSRQ, we surprisingly find no association between gender diversity in the executive board and MSRQ, which contradicts the research on voluntary sustainability reporting (Al-Shaer and Zaman 2016; Gerwanski et al. 2019). Overall, and in line with agency theory, this study suggests that firms can use SCG mechanisms to increase MSRQ which in turn might help mitigate information asymmetries and reduce agency conflicts between firms' managers and stakeholders.

Our findings have important implications for preparers, auditors, stakeholders, and regulators. For instance, preparers can improve their MSRQ by using various SCG mechanisms. As a result, they might signal superior sustainability performance and provide their stakeholders with more useful information about the impact of their business activities on sustainability. Furthermore, external auditors are supported by our findings that their assurance likely increases MSRQ. This is also an important signal to investors and other stakeholders and supports their call for the external assurance of mandatory sustainability reporting. Additionally, our results are relevant for regulators, such as the EU and national legislatures, when reviewing the effectiveness of the CSR Directive and its implementation in the member states. For example, regulators might, like the EU Commission in its proposal for a revised CSR Directive (EC Ares(2020)580716 2020), consider mandating external assurance, given its positive association with MSRQ. Overall, our study suggests that making corporate governance more sustainable may be a means to ensure high-quality mandatory sustainability reporting.

Like any empirical study, our research is subject to limitations. Although we are convinced that our empirical results are plausible when considering the hypothesized relations, the research design gives rise to endogeneity concerns. For example, there might be reverse causality. Firms might be incentivized to join CSR initiatives as they learn more about CSR issues when preparing mandatory sustainability reports. Furthermore, despite we carefully selected and theoretically derived our determinants, we acknowledge that our analysis may miss out other important factors that could drive MSRQ. For example, divergent national cultures or social norms may explain different qualities of mandatory sustainability reporting across countries. Moreover, even though we added several control variables that might be associated with our dependent variable, we acknowledge that more exist and were not included in the analyses due to the lack of data (e.g., internal audits and external enforcement). However, we cannot fully address all endogeneity concerns and believe that we mitigated these concerns as much as possible by the theoretical background and careful selection of key SCG mechanisms related to mandatory sustainability reporting. We further acknowledge that our research design does not allow drawing causal inferences. Hence, we caution the reader to interpret our results in the light of this limitation.

Further limitations might result from the manual coding procedure. Nevertheless, we took all necessary measures to mitigate subjectivity and ensure consistent coding. Moreover, our results may be affected by the first-time application of the new regulation in one country, as firms may adapt their governance structures to the changing regulatory environment in subsequent periods. As such,

it remains to be examined whether heterogeneity in reporting quality is a cross country phenomenon and declines as firms gain experience. Finally, firms have discretion and explicit choices in fulfilling reporting requirements in our German setting. Therefore, our heterogeneous results could be partly explained by this institutional setting.

Although we add to the scarce literature on mandatory sustainability reporting (e.g., Grewal et al. 2019; Fiechter et al. 2020; Mittelbach-Hörmanseder et al. 2021), there are many potential avenues for future research. Further studies might thus replicate our analysis by considering more periods or countries. Additionally, future research can validate our disclosure score by comparing it to other quality measures (e.g., derived from automated textual analysis). Moreover, subsequent studies can analyze other SCG mechanisms or focus on different assurance providers and audit committee compositions (Simnett et al. 2009; Pflugrath et al. 2011; Reimsbach et al. 2018). As our empirical measures for the SCG mechanisms may not fully capture the underlying construct, future research may confirm our results using additional and more distinct measures. For example, other board characteristics, such as overall board diversity, board experience, and team behavior, may be examined. We acknowledge that such factors are difficult to measure. However, they might give us a more complete view on the determinants of MSRQ. This may also explain that we did not find a significant association between gender diversity on the executive board and MSRQ. Finally, as we explore SCG's role in MSRQ, future research might investigate the consequences of MSRQ on reporting firms and their stakeholders. Currently, the European Commission is considering revising mandatory sustainability reporting in the EU and plans to substantially extend the scope of the regulation. This development may offer fruitful opportunities for future research by extending our analysis to a larger and more heterogeneous group of firms. Such investigations may further enhance our understanding of the factors shaping MSRQ, which is highly relevant given the importance of sustainable business behavior and stakeholders' related information needs.

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## Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

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