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Statistical Analysis of Sustainability Information Disclosure on Financial Reports Quality in Saudi Listed Firms

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Abstract: This study examines the relationship between sustainability information disclosure and financial reporting quality in Saudi listed firms. The analysis uses panel data from 190 firm-year observations of nonfinancial companies listed on the Saudi Exchange (Tadawul) over the period 2023–2025. Sustainability disclosure is measured through an ESG index covering environmental, social, and governance dimensions. Financial reporting quality is captured using total accruals as an accounting-based measure and the market-to-book ratio as a market-based measure. The results show a significant association between sustainability disclosure and accrual-based reporting behavior, indicating that higher ESG disclosure is linked to greater accrual intensity. In contrast, sustainability disclosure does not exhibit a significant relationship with market-based valuation measures, which are primarily driven by firm fundamentals. These findings highlight the multidimensional nature of financial reporting quality and provide Saudi-specific evidence on the reporting implications of sustainability disclosure.

Keywords: Sustainability Information Disclosure - Financial Reports Quality.

1. Introduction

Financial reporting quality reflects how far accounting numbers represent the firm's underlying economic performance and whether they are credible and useful for decision making by investors and other stakeholders[1]. Because this quality is not a single attribute, empirical accounting research typically captures it through more than one proxy so that the assessment reflects both the reliability of accounting estimates and the information content of earnings. One of the most established approaches focuses on accruals quality, where stronger reporting quality is associated with a tighter mapping between accruals and operating cash flows and smaller estimation errors embedded in accruals. This interpretation remains central in current empirical work and recent review evidence also confirms that accrual based measures continue to form a core part of how financial reporting quality is operationalized in modern studies [2-4].

A related stream measures financial reporting quality through earnings properties such as earnings persistence and the extent to which current earnings help predict future cash flows, because informative earnings should carry forward looking content about subsequent performance[5].Recent evidence demonstrates that the quality of accruals is affected by fundamental factors, including cash flow volatility and operational characteristics. This supports the idea that the quality of financial reporting is linked to the consistency and transparency of the reporting environment over time [6]. Cross country evidence also shows that accrual quality is still a good way to measure reporting quality in situations where institutional enforcement varies from market to market [7].

This understanding of reporting quality naturally brings the firm's broader information environment into focus, since financial statements are interpreted alongside the disclosures and narratives that surround them. Sustainability disclosure becomes relevant here because it expands the set of externally visible claims about governance, risk management, and performance, giving investors, analysts, auditors, and regulators more opportunities to evaluate consistency between narrative statements and accounting quality. In policy oriented accounting work, sustainability reporting is increasingly treated as part of the corporate reporting system rather than a separate narrative exercise, implying that sustainability disclosure can strengthen reporting discipline when it raises scrutiny and increases the perceived cost of low credibility reporting[8]. Global benchmarking evidence also points to a broad expansion in sustainability related disclosure coverage in recent years, reinforcing the practical importance of examining how this expanding disclosure layer interacts with financial reporting quality [9].

Yet sustainability disclosure can also be strategically managed, which helps explain the rapid growth of green washing and impression management research. Systematic review evidence frames green washing in sustainability reporting as the

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dissemination of misleading or selectively favorable sustainability claims, and related evidence documents impression management gaps between sustainability disclosures and other corporate reporting narratives. This makes it empirically important to test whether sustainability disclosure functions as informative transparency or reputational window dressing in a given enforcement setting[10, 11]. The credibility side of the story has also strengthened through the assurance infrastructure, as the IAASB issued ISSA 5000 as a comprehensive sustainability assurance standard designed to enhance confidence in sustainability information across topics and frameworks[12].

Recent standard setting has further reinforced the capital market framing of sustainability reporting through the IFRS Sustainability Disclosure Standards. IFRS S1 requires entities to disclose sustainability related risks and opportunities that are useful to users of general-purpose financial reports, and IFRS S2 sets climate related disclosure requirements. Both standards were issued in June 2023 and are effective for annual reporting periods beginning on or after 1 January 2024, subject to jurisdictional adoption, which increases the relevance of examining how sustainability disclosure interacts with financial reporting quality in modern capital markets[13]. International regulatory momentum toward mandatory sustainability reporting has also expanded in major jurisdictions, emphasizing the role of enforcement and comparability in shaping disclosure consequences [14].

The Saudi capital market provides a useful setting for examining this relationship because sustainability disclosure has expanded while still showing material variation across listed firms. This relevance is reinforced by the Saudi Exchange ESG Disclosure Guidelines, which aim to raise ESG awareness and support listed companies in preparing more consistent ESG reporting[15]. Official reporting by the Saudi Capital Market Authority also documents an increase in the number of Main Market listed companies disclosing sustainability information in 2024 compared with 2023, supporting the presence of measurable adoption dynamics and cross firm differences within the same market [16].

However, robust evidence from the Saudi market regarding the impact of sustainability information disclosure on financial reporting quality is still evolving and requires further validation through alternative measures, a wider range of listed firms, and extended time periods. Current evidence from Saudi Arabia indicates a potential positive relationship; however, further investigation is warranted due to variations in disclosure practices and monitoring intensity among issuers, as well as the differing nature of sustainability reporting, which can be substantive in some firms and merely symbolic in others [17]. Recent causal evidence from mandated ESG disclosure settings indicates a relationship between disclosure requirements and changes in earnings quality and capital market quality. This underscores the significance of examining disclosure regimes affect reporting quality in specific institutional contexts [18].

So, this study investigates the relationship between sustainability information disclosure and financial reporting quality in Saudi listed companies. It also evaluates whether increased disclosure guidance and institutional pressure lead to significant enhancements in the credibility and informativeness of financial reports. This study concentrates on firms listed on the Saudi Main Market, aiming to contribute Saudi-specific evidence to the broader discussion regarding the impact of sustainability-related transparency on reporting discipline. It seeks to provide practical implications for regulators and listed firms on aligning sustainability disclosure with credible and decision-useful reporting quality[19]. Accordingly, the remainder of the study is organized as follows. The theoretical background and related literature are reviewed, followed by a description of the research design. The results are then presented and discussed, and the study concludes with the final discussion.

2. Theoretical Background & Literature Review

Prior empirical research on sustainability related disclosure and financial reporting quality can be read as a connected transparency narrative. When firms expand ESG disclosure, they widen the observable information set available to investors and other stakeholders, which can increase scrutiny and raise the expected cost of opportunistic reporting. The accounting policy literature also frames sustainability reporting as increasingly connected to mainstream corporate reporting rather than an isolated nonfinancial narrative, supporting the idea that sustainability disclosure can spill over into the credibility and usefulness of accounting numbers when it strengthens monitoring and consistency constraints[8]. Previous research shows that higher ESG disclosure is generally associated with better financial reporting quality and is not used to mask weak reporting practices. Evidence from U.S. listed firms indicates that higher ESG ratings are not linked to lower reporting quality[20]. Similar findings appear when reporting quality is measured using earnings informativeness, as ESG disclosure is associated with more persistent earnings and better prediction of future cash flows, particularly for the social dimension[5]. However, other studies report mixed results, showing that carbon emission disclosure in highly polluting settings is associated with lower reporting quality and that this relationship varies across ownership structures [21].

The disclosure reporting quality link becomes more explicit when it is tied to managerial discretion, particularly earnings management as a mechanism through which reporting quality can be weakened. Evidence that distinguishes between mandatory and voluntary ESG disclosure provides a sharp boundary condition. Mandatory ESG disclosure improves the quality of financial reporting and has informative advantages over voluntary disclosure, while voluntary disclosure is

materially weaker in its reporting consequences in the same setting [22]. Prior research indicates that the association between ESG disclosure and the quality of financial reporting varies across different firms. This issue is particularly pertinent in regional markets, where variations in ownership structures and monitoring effectiveness exist among companies. Recent evidence from GCC countries suggests that the relationship between ESG disclosure and earnings management is non-linear, with the impacts of ESG dimensions differing across firms. The findings indicate that the effects of ESG disclosure vary among firms[23]. Evidence from Saudi Arabia indicates that ESG disclosure is typically linked to improved financial reporting quality among publicly listed firms. This suggests a potential positive relationship in the Saudi market; however, it underscores the necessity for additional testing with varied measures and a wider range of firms to validate the strength of this association[17].

Evidence from Saudi Arabia enhances the local significance by demonstrating that ESG disclosure is systematically linked to governance capacity and firm fundamentals. Research from Saudi Arabia indicates that the structure of boards and governance reforms correlate with patterns of ESG disclosure. Additionally, financial performance and governance mechanisms may significantly influence ESG disclosure among nonfinancial firms in Saudi Arabia. This suggests that ESG disclosure should be viewed as an outcome of reporting capability, likely to correlate with the overall quality of reporting discipline and information environment[24-26]. Evidence from Saudi Arabia indicates a connection between ESG disclosure and measurable market quality, including firm performance and profitability within substantial Tadawul samples. This underscores the significance of such disclosures in capital markets and prompts investigations into whether variations in disclosure lead to enhanced financial reporting quality [27, 28].

From another point , evidence from the Saudi market shows that sustainability reporting is associated with lower real earnings management and that institutional ownership strengthens this disciplining link, aligning with the idea that monitoring intensity matters for whether sustainability disclosure becomes informative transparency rather than reputational window dressing[29]. Complementary Saudi evidence also, finds that sustainability commitment and sustainability reporting practices are linked to earnings management behavior using both accrual based and real earnings management proxies, reinforcing that reporting consequences can be observed through discretion channels rather than disclosure volume alone[30]. Timeliness channels provide additional Saudi support for the discipline story, as ESG performance is linked to shorter financial reporting lag in Tadawul samples, and sustainability reporting level is linked to audit report lag in Saudi nonfinancial firms, both of which are commonly interpreted as features of stronger reporting routines and documentation quality[31, 32]. Finally, evidence from Saudi listed firms also links ESG performance to lower financial distress risk, which is consistent with sustainability orientation being related to stronger organizational resilience and a more stable information environment, providing an additional incentive based lens for why ESG and reporting quality may move together in the Saudi setting[33].

These transparency, monitoring, and Saudi market findings become more concrete once sustainability disclosure is framed as sustainability related financial disclosure rather than standalone narrative reporting. Under IFRS S1, entities are required to provide sustainability related information that is useful to users of general-purpose financial reports and could reasonably be expected to affect the entity's prospects, and IFRS S2 specifies climate related disclosures. Both standards are effective for annual reporting periods beginning on or after 1 January 2024, which draws sustainability reporting closer to core accounting because it pushes firms to explain how sustainability related risks and opportunities translate into current and expected financial effects on financial position, performance, and cash flows[34, 35] .Taken together, the integrated evidence supports expecting a positive association between sustainability information disclosure and financial reporting quality, while also implying that the strength of the relationship is more likely when disclosure is credible, monitored, and supported by verification. At the same time, boundary conditions highlighted in the literature, particularly the distinction between mandatory versus voluntary disclosure and the possibility of heterogeneous or nonlinear effects across firms and ESG dimensions, make it methodologically necessary to test the relationship directly in the Saudi institutional environment rather than assuming uniform effects across settings[17, 22, 23, 34, 35].

3. Research design

3.1 Sample Construction

Current study examines the relationship between sustainability information disclosure and financial reporting quality in Saudi listed firms, the empirical analysis is conducted using a panel dataset covering the period from 2023 to 2025, based on an initial selection of 70 firms. The data are collected from firms' annual reports and sustainability/ESG reports (when available), in addition to accounting and financial statement information obtained from the Mubasher database. The sample is restricted to non-financial firms listed on the Saudi Exchange (Tadawul) in order to ensure comparability in accounting structures and reporting practices across firms; therefore, banking and insurance companies are excluded because they operate under distinct regulatory environments and follow different financial reporting requirements. In addition, firm-year observations with incomplete information required to measure sustainability disclosure or to compute financial reporting quality proxies and

the associated control variables are excluded to maintain consistency in variable measurement. As a result of these screening criteria, the final sample includes only firm-year observations for companies that remain listed during the study period, apply a consistent fiscal year-end, and provide sufficient disclosure and accounting data to support reliable statistical estimation. Consequently, the final dataset comprises 190 firm-year observations, which is lower than the theoretical maximum of 210 observations (70 firm's × 3 years) due to the exclusion of firm-year observations with missing disclosure and/or incomplete accounting information. This sampling structure provides a suitable foundation for estimating the panel regression models used to analyze the association between sustainability information disclosure and financial reporting quality in Saudi listed firms.

3.2 Measurement of Variables

This section outlines the construction of the variables and their role in the empirical analysis. First, the analysis focuses on sustainability information disclosure as the main independent variable. Sustainability information disclosure represents the main independent variable in this study. The level of disclosure is measured through a disclosure index developed from a systematic review of firms' annual reports and, where available, standalone sustainability or ESG reports. Sustainability disclosure is measured across three main dimensions: environmental (ENV), social (SOC), and governance (GOV). For each firm-year observation, a disclosure score is calculated for each dimension based on the number of reported disclosure items relative to the total relevant items. Higher scores indicate a higher level of disclosure. The three dimension scores are then combined to form an overall sustainability disclosure score (ESG-Score) [36, 37]. This method allows the analysis to examine both the separate effects of each sustainability dimension and the overall effect of sustainability disclosure.

Second, financial reporting quality (FRQ) is examined as the dependent variable using two alternative accounting-based proxies. On the one hand, the market-to-book ratio (MB) is calculated as the market value of equity divided by its book value and is used to reflect differences between market-based valuations and accounting-based measures. On the other hand, total accruals (TA) capture the non-cash component of earnings and are computed as the difference between net income and operating cash flows (TA = NI − CFO), scaled by total assets to enhance comparability across firms. In this study, total accruals are employed as an accrual-based reporting outcome, reflecting the extent of accrual intensity rather than a direct indicator of superior or inferior financial reporting quality[1, 38, 39]. Finally, to mitigate potential omitted-variable bias, the empirical models incorporate a set of firm level control variables. Specifically, profitability is controlled for using return on assets (ROA), measured as net income divided by total assets. In addition, financial risk is captured through leverage (LEV), measured as total liabilities relative to total assets. Moreover, firm size (SIZE) is proxied by the natural logarithm of total assets to account for scale related effects. Lastly, industry specific heterogeneity is addressed by including sector (SECTOR) dummy variables, which control for systematic differences in disclosure behavior and financial reporting practices across industries [40-42].

3.3 Hypotheses & Empirical Model

To examine the relationship between sustainability information disclosures related to Environmental, Social, and Governance (ESG) dimensions and financial reporting quality, this study formulates a set of regression models. Model (1) investigate the direct effect of environmental, social, governance, and aggregate ESG disclosure on financial reporting quality, respectively, when quality is measured using total accruals (TA). Model (2) re-estimates the same relationships using the market to book ratio (MB) as an alternative proxy for financial reporting quality. Firm size, financial leverage, profitability, and sector effects are included as control variables in all model specifications to account for firm specific and industry related influences.

H_1: Sustainability information disclosure has significant effect on financial reporting quality measured by total accruals (TA) in Saudi listed firms.

$$TA_{it} = \theta_0 + \theta_1\ ESG_{it} + \theta_2\ SIZE_{it} + \theta_3\ LEV_{it} + \theta_4\ ROA_{it} + \theta_5\ SECTOR_{it} + \varepsilon_{it} \quad (1)$$

***H_{1a}:** Environmental disclosure (ENV) has significant effect on financial reporting quality measured by total accruals (TA).*

$$TA_{it} = \theta_0 + \theta_1\ ENV_{it} + \theta_2\ SIZE_{it} + \theta_3\ LEV_{it} + \theta_4\ ROA_{it} + \theta_5\ SECTOR_{it} + \varepsilon_{it} \quad (1\text{-}1)$$

H_{1b}: Social disclosure (SOC) has significant effect on financial reporting quality measured by total accruals (TA).

$$TA_{it} = \theta_0 + \theta_1\ SOC_{it} + \theta_2\ SIZE_{it} + \theta_3\ LEV_{it} + \theta_4\ ROA_{it} + \theta_5\ SECTOR_{it} + \varepsilon_{it} \quad (1\text{-}2)$$

H_{1c}: Governance disclosure (GOV) has significant effect on financial reporting quality measured by total accruals (TA).

$$TA_{it} = \theta_0 + \theta_1\ GOV_{it} + \theta_2\ SIZE_{it} + \theta_3\ LEV_{it} + \theta_4\ ROA_{it} + \theta_5\ SECTOR_{it} + \varepsilon_{it} \quad (1\text{-}3)$$

H_2: Sustainability information disclosure has significant effect on financial reporting quality measured by market-to-book ratio (MB)in Saudi listed firms.

$MB_{it} = \theta_0 + \theta_1 ESG_{it} + \theta_2 SIZE_{it} + \theta_3 LEV_{it} + \theta_4 ROA_{it} + \theta_5 SECTOR_{it} + \varepsilon_{it}$ (2)

H_{2a}**:** Environmental disclosure (ENV) has significant effect on financial reporting quality measured by market-to-book ratio (MB).

$MB_{it} = \theta_0 + \theta_1 ENV_{it} + \theta_2 SIZE_{it} + \theta_3 LEV_{it} + \theta_4 ROA_{it} + \theta_5 SECTOR_{it} + \varepsilon_{it}$ (2-1)

H_{2b}**:** Social disclosure (SOC) has significant effect on financial reporting quality measured by market-to-book ratio (MB).

$MB_{it} = \theta_0 + \theta_1 SOC_{it} + \theta_2 SIZE_{it} + \theta_3 LEV_{it} + \theta_4 ROA_{it} + \theta_5 SECTOR_{it} + \varepsilon_{it}$ (2-2)

H_{2c}**:** Governance disclosure (GOV) has significant effect on financial reporting quality measured by market-to-book ratio (MB).

$MB_{it} = \theta_0 + \theta_1 GOV_{it} + \theta_2 SIZE_{it} + \theta_3 LEV_{it} + \theta_4 ROA_{it} + \theta_5 SECTOR_{it} + \varepsilon_{it}$ (2-3)

Where:

- **FRQ_{it}** : Financial reporting quality of firm *i* in year *t*, measured alternatively by total accruals (TA) **or the** market-to-book ratio (MB)
- **TA_{it} :**Total accruals of firm *i* in year *t*
- **MB_{it} :**Market-to-book ratio of firm *i* in year *t*
- **ENV_{it}** :Environmental disclosure score of firm *i* in year *t*
- **SOC_{it} :** Social disclosure score of firm *i* in year *t*
- **GOV_{it} :** Governance disclosure score of firm *i* in year *t*
- **SID_{it} :** Aggregate sustainability (ESG) disclosure score of firm *i* in year *t*
- **$SIZE_{it}$:** Firm size of firm *i* in year *t*
- **LEV_{it} :** Financial leverage of firm *i* in year *t*
- **ROA_{it} :** Return on assets of firm *i* in year *t*
- **SECTOR :**Industry (sector) dummy variables
- **θ_0**: Constant term
- **ε_{it}** : Error term

4. Results & Discussion

4.1. Descriptive statistics and correlation analysis

Table (1) reports the descriptive statistics for the study variables based on 190 firm-year observations. The mean value of the overall ESG disclosure score is 33.87, with a relatively high standard deviation of 21.14, indicating substantial variation in sustainability disclosure practices across Saudi listed firms. At the dimensional level, governance disclosure records the highest mean (46.56) compared to environmental (25.54) and social disclosure (30.82), suggesting that governance-related information is more extensively disclosed, while environmental and social disclosures remain comparatively lower. The wide dispersion within each ESG dimension further reflects heterogeneity in disclosure behavior. Regarding financial reporting quality, total accruals (TA) show a mean of 0.035 with a standard deviation of 1.62, indicating noticeable differences in accrual-based accounting practices across firms. The market-to-book ratio (MB) has an average value of 0.27, reflecting variation in market valuation relative to book values. For the control variables, the average ROA is 0.044, leverage averages 0.445, and firm size has a mean of 22.22, with sufficient dispersion across observations. Overall, these statistics indicate adequate variability across the study variables, supporting their use in the subsequent regression analysis.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ESGSCORE	190	33.869	21.14	.85	82.271
Env	190	25.535	25.331	0	85.201
SOC	190	30.82	22.688	.272	85.886
GOV	190	46.557	23.03	3.162	91.351
TA	190	0.035	1.623	-.957	1.183

MB	190	.27	.125	.01	.574
ROA	190	.044	.06	-.178	.414
LEV	190	.445	.163	.044	.876
SIZE	190	22.217	1.592	18.999	26.112
SECTOR	190	.7	.459	0	1

Furthermore, figure (1)display the sample means of the main study variables and indicate strong scale differences, with ESGSCORE and SIZE taking much larger average values while ROA, LEV, MB, and SECTOR remain clustered near zero on the same axis, implying that the visual comparison is largely driven by measurement units; Figure (2) reinforces this issue by adding TA_million, whose very large mean compresses the remaining variables and suggests that accruals should be transformed (e.g., log/standardized) or plotted separately for clearer interpretation; finally, Figure (3) presents the distribution of ESG–Environmental scores and shows a right-skewed pattern with many low observations and a long tail toward higher values, evidencing substantial cross-firm heterogeneity in environmental disclosure intensity within the sample.

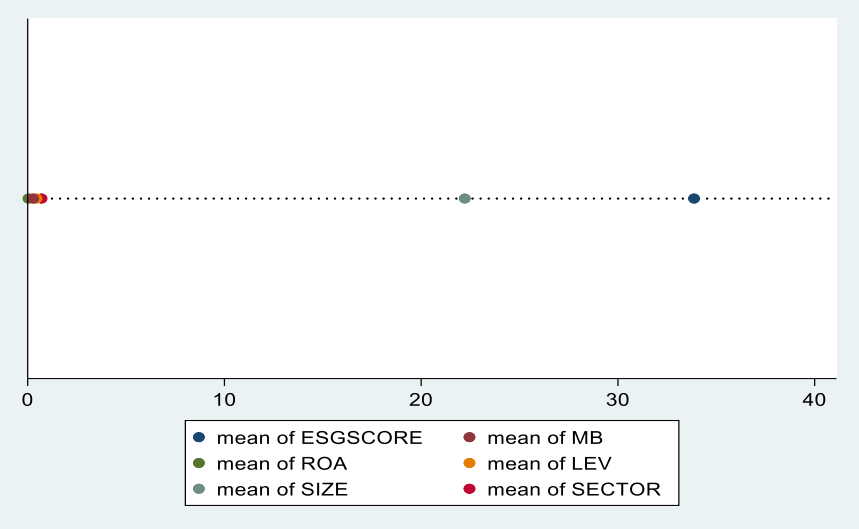

Fig. 1: Mean Values of Study Variables (Descriptive Statistics)

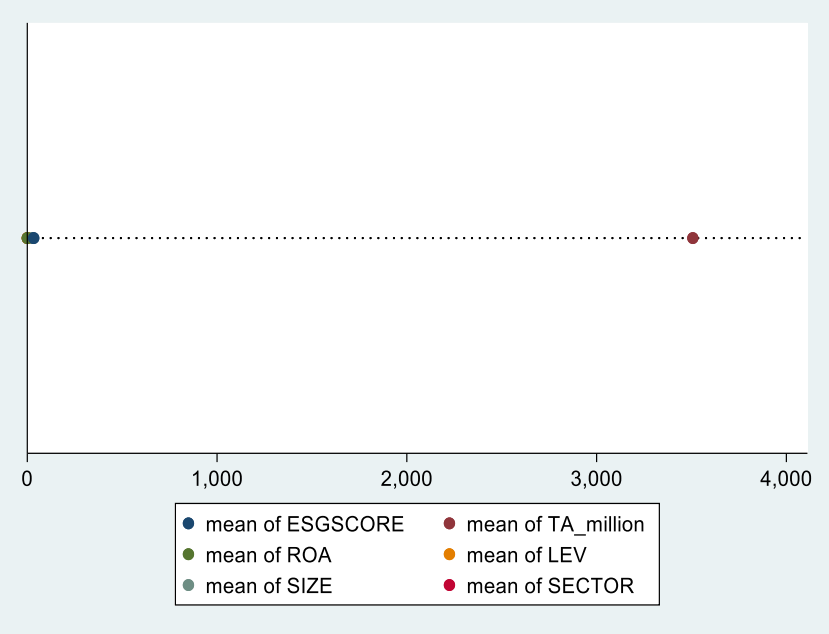

Fig. 2: Mean Values of Study Variables Including Total Accruals

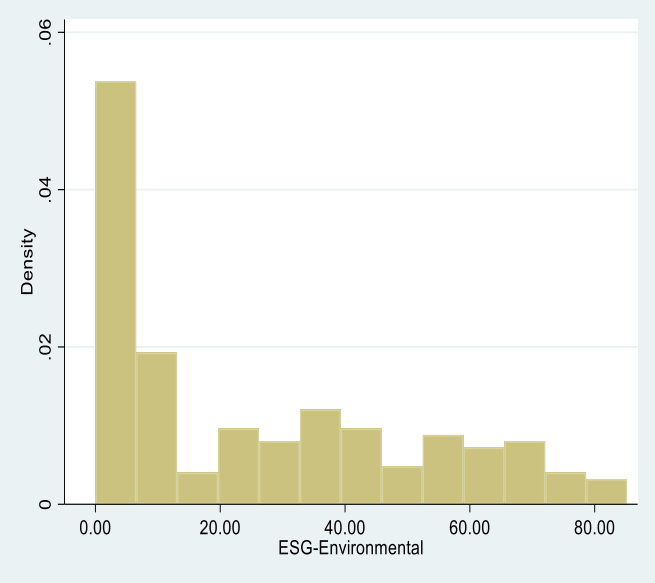

Fig. 3: Distribution of Environmental Disclosure Scores

In addition to, table (2) reports the pairwise correlations among the study variables. The results show that the overall ESG disclosure score is highly correlated with its three components. In particular, the correlation reaches 0.868 with environmental disclosure, 0.935 with social disclosure, and 0.798 with governance disclosure, which is consistent with the construction of ESGSCORE as an aggregate index. When moving to financial reporting quality, total accruals display a positive association with the overall ESG score at 0.247 and with governance disclosure at 0.243, whereas the relationship with social disclosure appears weak and not statistically significant. Along the same lines, the market to book ratio is positively correlated with the overall ESG score at 0.202 and with environmental disclosure at 0.298, indicating that higher sustainability disclosure tends to coincide with higher market valuation. Regarding the control variables, firm size shows positive correlations with most ESG disclosure measures as well as with both total accruals and the market to book ratio. By contrast, leverage is negatively associated with profitability and market valuation.

Table 2: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) ESGSCORE	1.000								
(2) Env	0.868	1.000							
	(0.000)								
(3) SOC	0.935	0.753	1.000						
	(0.000)	(0.000)							
(4) GOV	0.798	0.514	0.655	1.000					
	(0.000)	(0.000)	(0.000)						
(5) TA	0.247	0.351	0.114	0.243	1.000				
	(0.001)	(0.000)	(0.116)	(0.001)					
(6) MB	0.202	0.298	0.109	0.225	0.393	1.000			
	(0.005)	(0.000)	(0.134)	(0.002)	(0.000)				
(7) ROA	0.172	0.308	0.042	0.178	0.816	0.573	1.000		
	(0.018)	(0.000)	(0.568)	(0.014)	(0.000)	(0.000)			
(8) LEV	-0.127	-0.278	-0.005	-0.127	-0.366	-0.299	-0.462	1.000	
	(0.081)	(0.000)	(0.940)	(0.081)	(0.000)	(0.000)	(0.000)		
(9) SIZE	0.342	0.435	0.202	0.332	0.446	0.535	0.501	-0.180	1.000
	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)	(0.013)	

4.2 Regression Results

The regression results reported in Tables (3) to (6) provide consistent evidence on the association between sustainability disclosure and financial reporting quality measured by total accruals. Starting with the overall ESG disclosure score, the coefficient on ESGSCORE is positive and statistically significant ($\beta = 84.96$, $p < 0.01$), indicating that higher levels of sustainability disclosure are associated with higher total accruals. When the analysis is disaggregated across ESG dimensions,

environmental disclosure shows a positive and significant association with total accruals (β = 76.30, p < 0.01), while social disclosure is also positively related to total accruals, though with a relatively smaller magnitude (β = 57.43, p < 0.05). Governance disclosure exhibits a similar pattern, with a positive and statistically significant coefficient (β = 68.60, p < 0.01). Across all specifications, profitability (ROA) remains strongly positive and highly significant, suggesting that more profitable firms tend to report higher accruals, whereas firm size, leverage, and sector effects do not display statistically significant relationships with total accruals. The overall explanatory power of the models is stable, with R-squared values around 0.67, indicating that the included variables explain a substantial portion of the variation in accruals. Taken together, these findings suggest that sustainability disclosure, whether measured in aggregate or by individual ESG dimensions, is systematically associated with accrual-based measures of financial reporting quality, providing empirical support for the first main hypothesis.

Table 3: Regression results of sustainability disclosure on financial reporting quality (TA)

TA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ESGSCORE	84.963	29.828	2.85	.005	26.114	143.812	***
ROA	217736.57	43173.59	5.04	0	132557.64	302915.49	***
SIZE	103.529	873.515	0.12	.906	-1619.864	1826.922	
LEV	1650.925	4238.378	0.39	.697	-6711.142	10012.993	
SECTOR	-1262.816	1131.383	-1.12	.266	-3494.968	969.337	
Constant	-11020.961	17147.705	-0.64	.521	-44852.364	22810.441	
Mean dependent var	3506.995		SD dependent var		16232.862		
R-squared	0.679		Number of obs		190		
F-test	10.471		Prob > F		0.000		
Akaike crit. (AIC)	4018.590		Bayesian crit. (BIC)		4038.072		
*** *p*<.01, ** *p*<.05, * *p*<.1							

Table 4: Regression results of environmental disclosure on financial reporting quality (TA)

TA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Env	76.296	29.149	2.62	.01	18.787	133.806	***
ROA	216048.74	43301.976	4.99	0	130616.52	301480.97	***
SIZE	22.49	897.797	0.03	.98	-1748.809	1793.79	
LEV	3058.838	4247.347	0.72	.472	-5320.925	11438.601	
SECTOR	-1407.421	1124.366	-1.25	.212	-3625.729	810.886	
Constant	-8742.844	17537.714	-0.50	.619	-43343.711	25858.023	
Mean dependent var	3506.995		SD dependent var		16232.862		
R-squared	0.679		Number of obs		190		
F-test	10.390		Prob > F		0.000		
Akaike crit. (AIC)	4018.540		Bayesian crit. (BIC)		4038.023		
*** *p*<.01, ** *p*<.05, * *p*<.1							

Table 5: Regression results of social disclosure on financial reporting quality (TA)

TA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
SOC	57.432	27.303	2.10	.037	3.565	111.298	**
ROA	218446.94	43801.177	4.99	0	132029.83	304864.06	***
SIZE	295.971	904.236	0.33	.744	-1488.033	2079.975	
LEV	692.906	4333.363	0.16	.873	-7856.563	9242.374	
SECTOR	-1402.702	1156.468	-1.21	.227	-3684.345	878.94	
Constant	-13695.591	17668.455	-0.78	.439	-48554.403	21163.22	
Mean dependent var	3506.995		SD dependent var		16232.862		
R-squared	0.674		Number of obs		190		
F-test	10.057		Prob > F		0.000		
Akaike crit. (AIC)	4021.329		Bayesian crit. (BIC)		4040.811		
*** *p*<.01, ** *p*<.05, * *p*<.1							

Table 6: Regression results of governance disclosure on financial reporting quality (TA)

TA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GOV	68.602	25.9	2.65	.009	17.503	119.701	***
ROA	216721.76	42503	5.10	0	132865.87	300577.65	***
SIZE	168.248	809.586	0.21	.836	-1429.017	1765.513	
LEV	1576.341	4120.104	0.38	.702	-6552.38	9705.061	
SECTOR	-923.796	1148.585	-0.80	.422	-3189.886	1342.293	
Constant	-12934.951	16405.955	-0.79	.431	-45302.925	19433.023	
Mean dependent var	3506.995		SD dependent var		16232.862		
R-squared	0.676		Number of obs		190		
F-test	10.625		Prob > F		0.000		
Akaike crit. (AIC)	4019.959		Bayesian crit. (BIC)		4039.441		
*** p<.01, ** p<.05, * p<.1							

Also, the regression results reported in Tables (7) to (10) examine the effect of sustainability disclosure on financial reporting quality measured by the market-to-book ratio. As shown in Table (7), the coefficient of the overall ESG disclosure score is positive but statistically insignificant (β = 0.000, t = 0.34, p = 0.737), indicating that aggregate sustainability disclosure does not have a meaningful impact on market-to-book values. Also, environmental disclosure shows a positive but insignificant coefficient (β = 0.000, t = 0.46, p = 0.640), while social disclosure also remains statistically insignificant (β = 0.000, t = 0.58, p = 0.560). Governance disclosure follows the same pattern, with a positive but insignificant association with MB (β = 0.000, t = 0.70, p = 0.480). In contrast, profitability (ROA) is consistently positive and highly significant across all models, with coefficients ranging from 0.797 to 0.805 and p-values below 0.01, suggesting that market valuation is primarily driven by firm performance rather than sustainability disclosure. Firm size also exhibits a positive and statistically significant relationship with MB in all specifications (β ≈ 0.025, p < 0.01), whereas leverage and sector effects remain statistically insignificant. The explanatory power of the models is relatively stable, with R-squared values ranging from 0.416 to 0.418, indicating that variations in market-to-book ratios are largely explained by firm fundamentals rather than sustainability disclosure variables.

Table 7: Regression results of sustainability disclosure on financial reporting quality (MB)

MB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ESGSCORE	0	0	0.34	.737	-.001	.001	
ROA	.8	.152	5.26	0	.5	1.1	***
LEV	-.052	.049	-1.06	.29	-.149	.045	
SIZE	.026	.005	4.78	0	.015	.036	***
SECTOR	-.014	.016	-0.87	.386	-.045	.017	
Constant	-.308	.115	-2.67	.008	-.536	-.081	***
Mean dependent var	0.270		SD dependent var		0.125		
R-squared	0.416		Number of obs		190		
F-test	26.246		Prob > F		0.000		
Akaike crit. (AIC)	-341.924		Bayesian crit. (BIC)		-322.442		
*** p<.01, ** p<.05, * p<.1							

Table 8: Regression results of environmental disclosure on financial reporting quality (MB)

MB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Env	0	0	0.46	.645	0	.001	
ROA	.797	.152	5.25	0	.498	1.097	***
LEV	-.049	.05	-0.98	.327	-.148	.05	
SIZE	.025	.005	4.62	0	.015	.036	***
SECTOR	-.014	.016	-0.89	.374	-.045	.017	
Constant	-.301	.118	-2.56	.011	-.533	-.069	**
Mean dependent var	0.270		SD dependent var		0.125		
R-squared	0.417		Number of obs		190		
F-test	26.280		Prob > F		0.000		
Akaike crit. (AIC)	-342.027		Bayesian crit. (BIC)		-322.545		
*** p<.01, ** p<.05, * p<.1							

Table 9: Regression results of social disclosure on financial reporting quality (MB)

MB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
SOC	0	0	0.58	.56	0	.001	
ROA	.805	.152	5.28	0	.504	1.106	***
LEV	-.054	.049	-1.10	.275	-.15	.043	
SIZE	.026	.005	4.89	0	.015	.036	***
SECTOR	-.015	.016	-0.92	.358	-.046	.017	
Constant	-.307	.114	-2.69	.008	-.532	-.082	***
Mean dependent var	0.270		SD dependent var		0.125		
R-squared	0.417		Number of obs		190		
F-test	26.324		Prob > F		0.000		
Akaike crit. (AIC)	-342.160		Bayesian crit. (BIC)		-322.678		
*** $p<.01$, ** $p<.05$, * $p<.1$							

Table 10: Regression results of governance disclosure on financial reporting quality (MB)

MB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
GOV	0	0	0.70	.483	0	.001	
ROA	.799	.152	5.26	0	.5	1.099	***
LEV	-.051	.049	-1.03	.303	-.148	.046	
SIZE	.025	.005	4.71	0	.015	.036	***
SECTOR	-.013	.016	-0.83	.407	-.044	.018	
Constant	-.304	.114	-2.66	.008	-.53	-.079	***
Mean dependent var	0.270		SD dependent var		0.125		
R-squared	0.418		Number of obs		190		
F-test	26.376		Prob > F		0.000		
Akaike crit. (AIC)	-342.317		Bayesian crit. (BIC)		-322.835		
*** $p<.01$, ** $p<.05$, * $p<.1$							

The figure (4) is a component-plus-residual (partial residual) plot showing a clear and strong relationship between ESG-SCORE and the dependent variable's adjusted component. As ESG-SCORE increases, the component-plus-residual values decline almost linearly, indicating that the partial effect of ESG-SCORE remains negative after controlling for the other covariates in the model. The relatively tight clustering of points around the fitted line suggests a stable linear association with limited influence from extreme outliers.

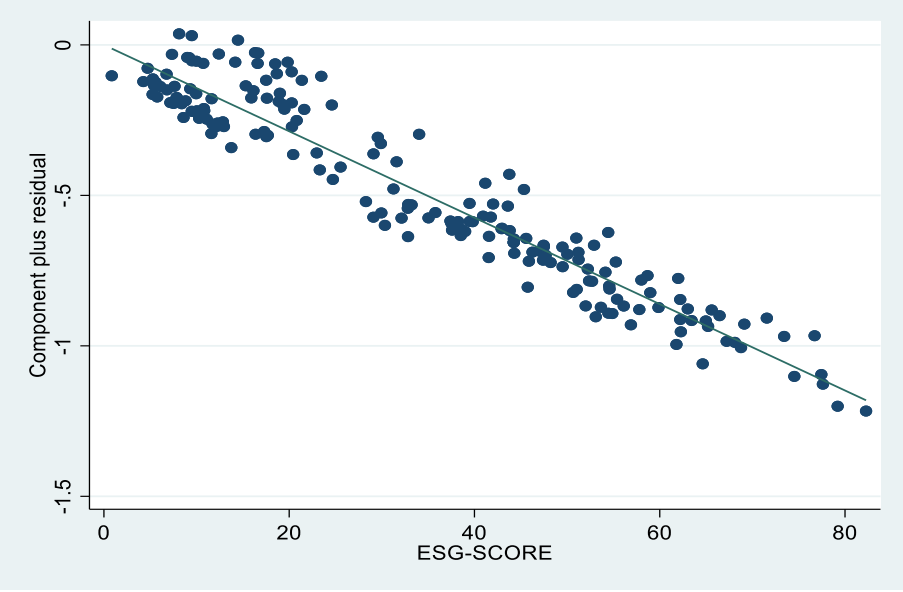

Fig. 4: Component-Plus-Residual Plot for ESG-SCORE (Partial Relationship with the Dependent Variable)

Also, figure (5) presents a set of component-plus-residual (partial residual) plots for the MB model, illustrating each variable's partial association with MB after controlling for the remaining covariates. The plot for ESGSCORE shows a clear negative slope and a statistically significant coefficient ($t \approx -3.71$), indicating that higher overall ESG disclosure is associated with lower MB in the multivariate setting, while the pillar-level measures ENV, SOC, and GOV display small but positive and significant partial effects ($t \approx 3.47$–3.63). Among the controls, ROA exhibits the strongest positive relationship with MB ($t \approx 5.33$), SIZE is also positively related ($t \approx 3.94$), LEV is negatively related ($t \approx -4.00$), and SECTOR shows a weaker, borderline negative association ($t \approx -1.87$), suggesting limited incremental explanatory power from sector coding relative to firm fundamentals.

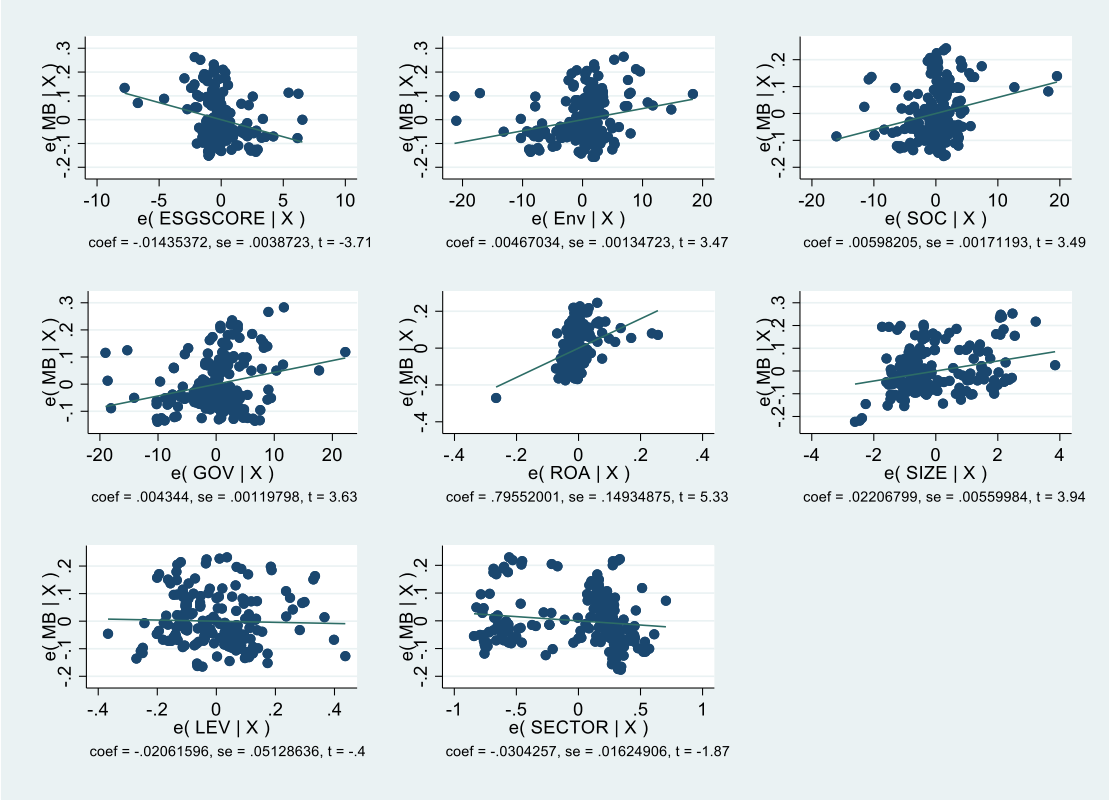

Fig. 5: Component-Plus-Residual (Partial Residual) Plots for the (MB) Regression Model

A comparison of accounting-based and market-based results indicates a distinct divergence in the relationship between sustainability disclosure and financial reporting quality. Sustainability disclosure demonstrates a consistent and statistically significant relationship with total accruals across all specifications of quality measurement. The aggregate ESG disclosure score exhibits a positive correlation with total accruals ($\beta = 84.96$, $p < 0.01$). This correlation is maintained across environmental disclosure ($\beta = 76.30$, $p < 0.01$), social disclosure ($\beta = 57.43$, $p < 0.05$), and governance disclosure ($\beta = 68.60$, $p < 0.01$). The findings indicate a strong correlation between sustainability disclosure and internal accounting quality, as well as accrual-based reporting behaviour. This aligns with contemporary accounting research that posits enhanced nonfinancial disclosure influences earnings properties via improved internal discipline and monitoring mechanisms[43, 44].Conversely, when assessing financial reporting quality through the market-to-book ratio, sustainability disclosure does not demonstrate statistically significant effects. The coefficient for the overall ESG disclosure score is positive yet not statistically significant ($\beta = 0.000$, $p = 0.737$). Comparable insignificant findings are noted for environmental ($p = 0.640$), social ($p = 0.560$), and governance disclosure ($p = 0.480$). This pattern suggests that sustainability information is not promptly integrated into market-based valuation measures, consistent with recent findings indicating that capital markets may react weakly or inconsistently to ESG disclosures, especially in contexts where disclosure practices and credibility are still developing[45, 46] The findings suggest that the effects of sustainability disclosure primarily manifest within the accounting system prior to influencing market-based evaluations of financial reporting quality.

4.3 Robustness Analysis: Generalized Linear Models (GLM)

Tables (11) and (12) display the results of robustness tests utilizing generalized linear models. Sustainability disclosure continues to be positively and statistically significant in relation to financial reporting quality when assessed through total accruals, aligning with the primary regression findings. The coefficient for ESG disclosure in the TA model is 84.96, with a

p-value of 0.004, indicating a significant association. Conversely, when assessing financial reporting quality through the market-to-book ratio, the coefficient for ESG disclosure is statistically insignificant (p = 0.708), suggesting a lack of meaningful market-based impact. In both models, profitability demonstrates a significant positive correlation with financial reporting quality, whereas firm size, leverage, and sector effects are statistically insignificant. The findings indicate that the primary conclusions of the study remain consistent across various estimation techniques and are not affected by the application of generalized linear models.

Table 11: Robustness analysis using GLM – Sustainability disclosure and financial reporting quality (TA)

TA	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ESGSCORE	84.963	29.431	2.89	.004	27.28	142.647	***
ROA	217736.57	42598.683	5.11	0	134244.68	301228.45	***
SIZE	103.529	861.883	0.12	.904	-1585.731	1792.789	
LEV	1650.925	4181.939	0.39	.693	-6545.524	9847.375	
SECTOR	-1262.816	1116.318	-1.13	.258	-3450.758	925.127	
Constant	-11020.961	16919.363	-0.65	.515	-44182.304	22140.381	

Mean dependent var	3506.995	SD dependent var	16232.862
Number of obs	190	Chi-square	53.778
Prob > chi2	0.000	Akaike crit. (AIC)	4018.590

*** *p<.01, ** p<.05, * p<.1*

Table 12: Robustness analysis using GLM – Sustainability disclosure and financial reporting quality (MB)

MB	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
ESGSCORE	0	0	0.37	.708	-.001	.001	
ROA	.8	.14	5.73	0	.526	1.074	***
SIZE	.026	.006	4.30	0	.014	.038	***
LEV	-.052	.051	-1.03	.302	-.151	.047	
SECTOR	-.014	.016	-0.85	.397	-.045	.018	
Constant	-.308	.134	-2.30	.021	-.571	-.046	**

Mean dependent var	0.270	SD dependent var	0.125
Number of obs	190	Chi-square	144.332
Prob > chi2	0.000	Akaike crit. (AIC)	-341.924

*** *p<.01, ** p<.05, * p<.1*

5. Discussion

The empirical findings of this study offer significant new information about the connection between financial reporting quality in Saudi listed companies and the disclosure of sustainability information. The results show that sustainability disclosure and accrual-based reporting behavior are consistently and statistically significantly correlated across all model parameters using total accruals as an accounting-based proxy. In particular, there is a positive correlation between total accruals and the aggregate ESG disclosure score as well as its individual environmental, social, and governance dimensions. This suggests that companies with more comprehensive sustainability disclosure typically have higher accrual intensity. Instead of indicating consistent gains or declines in the integrity of financial reporting, this pattern indicates that sustainability disclosure is tightly linked to organizations' internal accounting procedures and estimation methodologies. These results' resilience to different model specifications and estimation methods supports the stability of the accounting-based evidence and suggests that the observed relationship is not the result of a single sustainability dimension's influence but rather of a broad disclosure structure.

Conversely, when evaluating financial reporting quality through the market-to-book ratio, sustainability disclosure shows no statistically significant relationship. In all models analyzed, neither the overall ESG score nor the specific ESG dimensions exhibit significant explanatory power for market-based valuation metrics. In contrast, firm fundamentals, including profitability and size, continue to be the main determinants of market-to-book ratios. This divergence between accounting-based and market-based results underscores the complex nature of financial reporting quality and indicates that the impacts of sustainability disclosure typically manifest within the accounting system prior to being evident in market valuations. In the context of Saudi Arabia, where sustainability disclosure is predominantly voluntary during the study period, capital market participants may not fully integrate sustainability-related information into their valuation decisions, instead relying on conventional financial performance indicators.

The findings have significant implications for regulators, standard setters, and publicly listed firms in the Saudi capital market. The findings demonstrate that sustainability disclosure is engaging with firms' accounting systems, especially via accrual-based reporting quality. This highlights that sustainability reporting is not simply an isolated narrative activity but is increasingly integrated with fundamental financial reporting processes. This underscores the necessity for regulators and supervisory authorities to improve disclosure guidance, enforcement mechanisms, and assurance practices, ensuring that sustainability information meets a rigor equivalent to that of financial reporting. Enhanced alignment with international frameworks, specifically the IFRS Sustainability Disclosure Standards (IFRS S1 and IFRS S2), can facilitate greater consistency, credibility, and integration of sustainability information in financial statements. The findings for listed firms highlight the necessity for enhanced coordination between sustainability reporting functions and accounting departments, as sustainability-related disclosures seem to impact estimation-intensive areas, including provisions, impairments, and forward-looking judgments. The restricted market response indicates that enhanced standardization, comparability, and assurance of sustainability disclosures may be required before this information is fully integrated into valuation decisions by investors and other market participants.

In general, the results show that sustainability disclosure has a bigger effect on the quality of accounting reports. Also, the different results from accounting-based and market-based measurements show how important it is to use more than one proxy when looking at the effects of sustainability disclosure on reporting. The evidence indicates that sustainability reporting is progressively being integrated into corporate reporting systems, although its incorporation into market-based evaluations is still restricted, highlighting the dynamic evolution of sustainability disclosure practices and their assimilation into the financial reporting.

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The data presented in this study are available on request from the corresponding author.

Conflicts of Interest:

The authors declare no conflict of interest.

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