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When climate risk disclosure becomes credible: accounting conservatism and firm value in ASEAN financial institutions

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Article

Keywords:

Posted Date: April 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9206133/v1

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Additional Declarations: No competing interests reported.

Abstract

Climate risk disclosure is becoming increasingly important in financial institutions, but its market relevance depends on whether such disclosure is seen as credible and informative. This study examines whether climate risk disclosure is associated with firm value in ASEAN financial institutions and whether accounting conservatism strengthens that association by enhancing disclosure credibility. The analysis covers 417 firm-year observations from 139 listed banks and insurers across ASEAN during 2021–2023. Climate risk disclosure is measured from annual reports using semantic network text analysis based on the Semantic Brand Score approach, while firm value is proxied by Tobin's Q. The findings show that aggregate climate risk disclosure is positively associated with firm value. This relationship becomes stronger when firms exhibit greater accounting conservatism, and the moderating effect remains significant when conservatism is measured using a volatility-adjusted specification. These results suggest that climate-related disclosure is more value relevant when it is embedded in a more disciplined reporting environment. However, the disaggregated analysis shows that climate-risk dimensions are not interpreted uniformly. Under the baseline conservatism specification, only market-related disclosure shows limited positive association with firm value. Under the volatility-adjusted specification, policy/legal and market disclosures are associated with less favorable valuation effects, whereas reputational disclosure is positively associated with firm value and is strengthened by conservatism. Overall, the study shows that the usefulness of climate risk disclosure depends not only on the presence of disclosure, but also on its credibility and content. The findings contribute evidence from ASEAN financial institutions, where climate-related reporting is increasingly relevant but interpreted selectively by the market.

Introduction

Climate risk disclosure has become an increasingly important element of corporate communication, risk governance, and stakeholder accountability. As climate-related uncertainty intensifies, firms are under growing pressure to explain how environmental risks may affect strategy, operations, and long-term resilience. In this context, disclosure is no longer treated only as a compliance exercise. It also functions as a mechanism through which institutions communicate preparedness, legitimacy, and responsiveness to systemic climate challenges (D. K. Ding & Beh, 2022). Prior research suggests that disclosure quality can shape how markets interpret environmental risk information and incorporate it into valuation and portfolio decisions (Vestrelli et al., 2024). Regulatory and standard-setting initiatives have further elevated expectations for transparency by promoting accountability, comparability, and market discipline (Flammer et al., 2021; Matsumura et al., 2024). Yet the consequences of climate disclosure are not uniformly positive. More extensive disclosure may reassure stakeholders, but it may also reveal material exposure, heighten uncertainty, and increase perceived downside risk (Dzieliński et al., 2022). The central issue, therefore, is not simply whether climate-related disclosure exists, but when such disclosure is regarded as credible and decision-useful.

This question is particularly important for financial institutions. Banks and insurers are exposed to climate risk through multiple channels, including borrower default risk, collateral impairment, underwriting outcomes, investment portfolio reallocation, and capital adequacy pressures. Because financial institutions intermediate capital and transmit risk across the wider economy, their climate-related disclosures may carry broader interpretive significance than those of many non-financial firms (Batten et al., 2020). The ASEAN region provides a useful setting in which to examine this issue. Climate exposure across ASEAN is substantial, but disclosure regimes, supervisory expectations, and green-finance infrastructures remain uneven across member states. Such heterogeneity creates meaningful variation in disclosure expectations, comparability, and credibility signals, making ASEAN financial institutions an informative context for examining how climate-related narratives are interpreted in the market.

Climate risk disclosure is also inherently multi-dimensional. Widely used frameworks distinguish between physical and transition risks and encourage firms to communicate exposures across several relevant categories (TCFD, 2017). In corporate reporting, these risks are often reflected in disclosures related to physical risk, policy and legal risk, market risk, technological risk, and reputational risk. These dimensions do not necessarily carry equal informational value. Physical hazards may affect asset quality and insurance liabilities, whereas transition-related developments may alter profitability, portfolio structure, regulatory exposure, and strategic positioning (Lee & Alam, 2024). At the same time, climate-related risks in financial institutions extend beyond the firm level because they may affect broader financial stability and depend on macro-financial governance and policy coordination

(D'Orazio & Popoyan, 2023; Luiz, 2024). For that reason, aggregate disclosure scores may conceal important variation in how specific climate-risk narratives are interpreted.

A further complication concerns credibility. Climate disclosure may reduce information asymmetry, but it may also be discounted when stakeholders perceive it as symbolic, boilerplate, or opportunistic. Concerns about greenwashing and disclosure quality therefore remain central to understanding how climate-related communication is interpreted (Flammer et al., 2021; Kim et al., 2023; Patten, 2002). This places the broader reporting environment at the center of the analysis. Accounting conservatism is particularly relevant because it reflects disciplined recognition of losses relative to gains and is often associated with lower overstatement risk, stronger reporting reliability, and more constrained managerial discretion (Ball & Shivakumar, 2005; Basu, 1997; Givoly & Hayn, 2000; Khan & Watts, 2009; Watts, 2005). In climate-risk settings, such discipline may matter more because narrative disclosure often contains forward-looking and difficult-to-verify claims. A more conservative reporting environment may therefore strengthen the credibility of climate disclosure by reducing the scope for opportunistic interpretation. At the same time, conservatism is not uniformly beneficial. Excessive prudence may delay recognition of positive developments and dampen perceived adaptability in settings where innovation and transition capacity are strategically important (LaFond & Watts, 2011; Roychowdhury & Watts, 2007).

Although prior studies have shown that climate disclosure and broader ESG transparency can be associated with firm value, less is known about the conditions under which climate disclosure is interpreted as credible in emerging-market financial institutions. Evidence remains limited on whether stronger reporting discipline changes how climate-related narratives are assessed, particularly in settings where institutional conditions and disclosure expectations vary (Eccles et al., 2014; Flammer et al., 2021; Khan et al., 2015; Vestrelli et al., 2024). Existing studies also suggest that disclosure content matters, implying that different climate-risk dimensions may not be interpreted uniformly (Matsumura et al., 2024; TCFD, 2017). The present study addresses these gaps by examining whether accounting conservatism strengthens the association between climate risk disclosure and firm value in ASEAN financial institutions, and whether this conditioning role differs across specific climate-risk dimensions.

Three research questions guide the analysis. First, is climate risk disclosure associated with firm value in ASEAN financial institutions? Second, does accounting conservatism strengthen that association by enhancing the perceived credibility of climate-related narratives? Third, do specific disclosure dimensions, namely physical, policy and legal, market, technological, and reputational risk, differ in their association with firm value and in the conditioning role of conservatism?

To address these questions, climate risk disclosure is measured from annual reports using semantic network text analytics based on the Semantic Brand Score approach, which captures both the prevalence and semantic connectivity of climate-related terms. Accounting conservatism is proxied using the firm-year CScore developed by Khan & Watts (2009), complemented by a volatility-adjusted Modified CScore as a sensitivity test. Using 417 firm-year observations from 139 listed banks and insurers in ASEAN from 2021 to 2023, the study examines whether climate disclosure is more strongly associated with firm value when it appears within a more disciplined reporting environment.

This study contributes in three ways. First, it extends research on climate-related disclosure by shifting attention from disclosure volume alone to the conditions under which disclosure becomes credible and decision-useful. Second, it contributes evidence from ASEAN financial institutions, a setting characterized by material climate exposure and uneven disclosure and green-finance development. Third, it clarifies that climate-risk dimensions are not equally informative and that the role of accounting conservatism depends on the broader earnings information environment. In doing so, the study positions firm value not simply as a pricing outcome, but as an observable indicator of how climate-related information is interpreted when credibility is at stake.

Literature review and hypothesis development

Climate risk disclosure and firm value

Climate risk disclosure has become a central element of corporate transparency because it informs stakeholders about a firm's exposure to climate-related threats and its preparedness to manage them. In capital markets, disclosure quality shapes how investors interpret environmental risk information, making climate risk disclosure potentially relevant to market assessment

(Vestrelli et al., 2024). Regulatory and standard-setting developments have reinforced this connection by promoting comparability, accountability, and market discipline in climate-related reporting (Flammer et al., 2021; Matsumura et al., 2024). From a signaling perspective, firms may use climate risk disclosure to communicate risk-management capability and strategic readiness in response to systemic climate threats (D. K. Ding & Beh, 2022; Spence, 1973). From a stakeholder-oriented perspective, greater transparency can strengthen trust and legitimacy, thereby supporting longer-term performance outcomes (Albuquerque et al., 2019; Freeman et al., 2010).

The expected effect of climate risk disclosure on firm value is nevertheless not uniformly positive. More granular disclosure can reduce information asymmetry, but it can also reveal high exposure, increase perceived uncertainty, and heighten stock-price volatility when investors revise risk assessments upward (Dzieliński et al., 2022). This tension is particularly salient in financial institutions because climate risks can affect valuation through borrower default risk, collateral impairment, underwriting outcomes, portfolio reallocation, and capital adequacy pressures (Batten et al., 2020). Despite this ambiguity, prior evidence generally suggests that disclosure is more likely to be interpreted favorably when it is substantive, decision-useful, and capable of improving risk pricing (Eccles et al., 2014; Flammer et al., 2021; Khan et al., 2015; Vestrelli et al., 2024). In that sense, firm value is treated here as an observable outcome of how the market interprets climate-related information rather than as a purely mechanical reward for disclosure volume.

Hypothesis 1

(H1). Climate risk disclosure is positively associated with firm value.

Accounting conservatism and the credibility of climate risk disclosure

A central challenge in climate reporting concerns credibility. Investors may discount climate disclosures when such disclosures appear symbolic, boilerplate, or opportunistic, which makes the broader reporting environment highly relevant to interpretation (Kim et al., 2023; Patten, 2002). Concerns about greenwashing further reinforce the need to distinguish between disclosure presence and disclosure credibility (Flammer et al., 2021; Kim et al., 2023). In this context, accounting conservatism is relevant because it reflects a reporting orientation that recognizes losses more promptly than gains and thereby limits the overstatement of performance and net assets (Basu, 1997; Givoly & Hayn, 2000; Watts, 2005).

Prior accounting research has linked conservatism to stronger reporting reliability, lower information asymmetry, and tighter constraints on managerial discretion (Ball & Shivakumar, 2005; Khan & Watts, 2009). Related work also suggests that conservatism can discipline capital allocation by discouraging overinvestment in low-quality projects and tempering overly optimistic managerial narratives (H. Ding et al., 2018). These properties are particularly relevant in climate-risk settings because climate disclosures often contain narrative, forward-looking, and difficult-to-verify claims. Under conditions of uncertainty, managers may have stronger incentives to manage impressions, selectively frame risk exposure, or overstate preparedness, thereby increasing the risk of opportunistic disclosure (Ismail & Obiedallah, 2023; Khalifa et al., 2024). A more conservative reporting environment may mitigate these concerns by signaling stronger discipline and a greater willingness to recognize downside risk, which in turn can increase investor confidence in climate-related narratives (Ball & Shivakumar, 2005; Basu, 1997; LaFond & Watts, 2011).

At the same time, conservatism is not unambiguously beneficial. Excessive prudence may delay the recognition of favorable developments and suppress perceived growth prospects, particularly in settings where innovation, transition investment, and strategic repositioning are important (LaFond & Watts, 2011; Roychowdhury & Watts, 2007). The key theoretical expectation therefore does not concern a universally positive direct effect of conservatism on valuation. The more relevant expectation is that conservatism conditions how climate risk disclosure is interpreted by enhancing the perceived credibility of the information environment in which that disclosure appears.

Hypothesis 2

(H2). Accounting conservatism strengthens the positive association between climate risk disclosure and firm value.

Climate risk dimensions and differential informativeness

Climate risk disclosure is not a homogeneous construct. Disclosure frameworks such as the TCFD distinguish between physical and transition risks and encourage firms to communicate climate exposure across relevant categories (TCFD, 2017). In firm-level reporting, these risks are commonly expressed through physical risk, policy and legal risk, market risk, technological risk, and reputational risk disclosures. Physical risks relate to climate-driven hazards that can damage assets and disrupt economic activity, whereas transition risks arise from regulatory, market, and technological changes associated with decarbonization pathways (Lee & Alam, 2024). In financial institutions, these channels extend beyond firm-level exposure because they may also affect broader financial stability and depend on macro-financial governance and policy coordination (D'Orazio & Popoyan, 2023; Luiz, 2024).

These dimensions are unlikely to carry equal informational value. For financial institutions, transition-oriented disclosures may be particularly informative because they map more directly onto valuation-relevant channels such as portfolio repricing, funding conditions, regulatory capital pressure, litigation risk, and supervisory expectations. Market-related disclosures may signal how institutions respond to changing investor preferences, carbon-sensitive asset allocation, and transition-related portfolio shifts. Policy and legal disclosures may communicate regulatory compliance risk, litigation exposure, and uncertainty associated with evolving climate policy regimes. By contrast, physical-risk narratives may be interpreted more ambiguously if investors regard them as sector-wide exposures, already reflected in macro risk premia, or described in relatively standardized language (Dzieliński et al., 2022). Reputational disclosures may also be discounted when not accompanied by verifiable governance actions or concrete implementation signals (Kim et al., 2023). Technology-related disclosures can be interpreted in mixed ways because they may signal both adaptive readiness and transition cost or execution risk.

A disaggregated approach is therefore analytically preferable to relying only on an aggregate disclosure score because it allows identification of which climate narratives are most informative in the market's assessment of financial institutions. Prior work suggests that materiality and risk type matter for valuation relevance, making it reasonable to expect stronger market sensitivity to transition-oriented narratives than to other disclosure categories (Matsumura et al., 2024; Vestrelli et al., 2024).

Hypothesis 3

(H3). Transition-oriented disclosure dimensions, particularly policy and legal risk and market risk disclosures, are more strongly associated with firm value than other climate risk disclosure dimensions.

Methods

Research design and sample

This study employs a quantitative panel design to examine whether climate risk disclosure is associated with firm value and whether accounting conservatism strengthens that association in ASEAN financial institutions. The analysis focuses on listed banks and insurers because these institutions are directly exposed to climate-related risks through lending, underwriting, portfolio allocation, and regulatory capital channels, while also occupying a central role in the transmission of climate-related risk across the wider economy (Batten et al., 2020).

The baseline panel covers fiscal years 2020 to 2023. Because the empirical models use one-year lags for the main explanatory variables and include a lagged dependent variable in the dynamic specifications, the effective estimation window is 2021 to 2023. After applying standard data-availability screens, the final sample consists of 139 firms and 417 firm-year observations. This sample structure allows analysis of both aggregate climate risk disclosure and disaggregated disclosure dimensions across ASEAN financial institutions.

Data sources and preparation

Two data streams are combined. The first consists of annual reports collected for each firm-year and converted into machine-readable text. These reports provide the textual corpus used to construct climate risk disclosure measures. The second consists of financial statement and market valuation data used to calculate Tobin's Q, accounting conservatism proxies, and control

variables. These data were obtained from annual financial reports and related market disclosures and then organized into a firm-year panel dataset. Continuous financial variables were winsorized at the 1st and 99th percentiles to reduce the influence of extreme observations, consistent with common practice in empirical accounting and finance research.

Variable definitions

Firm value

Firm value is proxied by Tobin's Q. Following standard valuation research, Tobin's Q is defined as the ratio of the market value of the firm to the book value of its assets. The variable is calculated as follows:

$$Tobin'sQ_{it} = \frac{MarketValueofEquity_{it} + BookValueofLiabilities_{it}}{BookValueofTotalAssets_{it}}$$

where *i* indexes firms and *t* indexes fiscal years.

Climate risk disclosure

Climate risk disclosure is measured using Semantic Brand Score (SBS)-based text analytics (Fronzetti Colladon, 2018). SBS is appropriate for disclosure measurement because it captures not only the frequency of topic-related terms but also their semantic importance within a document through network-based connectivity. This feature makes the approach more informative than simple keyword counts when the objective is to assess how strongly climate-related narratives are embedded in annual-report discourse.

Two forms of disclosure measures are constructed. The first is an aggregate climate risk disclosure score representing overall climate-related disclosure intensity in the annual report. The second consists of five disaggregated disclosure dimensions aligned with common climate-risk taxonomies and TCFD-oriented categories: physical risk, policy and legal risk, market risk, technological risk, and reputational risk (TCFD, 2017). Each dimension is measured using a curated dictionary of climate-related terms mapped to the relevant category. The full dictionaries and preprocessing rules are provided in the replication materials.

Accounting conservatism (moderator)

Accounting conservatism is measured using two firm-year proxies. The baseline measure is the firm-year CScore proposed by Khan & Watts (2009), which operationalizes conditional conservatism based on asymmetric timeliness in earnings recognition, building on Basu (1997). CScore provides a time-varying firm-level measure of the extent to which bad news is recognized more promptly than good news in accounting earnings.

The credibility mechanism proposed in H2 may be sensitive to the broader earnings information environment. When earnings are unstable, investors may rely less on narrative disclosure and more on hard performance signals, which can attenuate the apparent credibility-enhancing role of conservatism (Adams & Neururer, 2020; Christiansen et al., 2012; Gherghina et al., 2024; LaFond & Watts, 2011; Roychowdhury & Watts, 2007). To examine this possibility, an additional sensitivity analysis is conducted using a volatility-adjusted conservatism proxy.

The sensitivity measure is a Modified CScore (ModCScore), which incorporates earnings volatility into the conservatism construct. This extension is intended to capture the possibility that conservatism may convey different informational content when the earnings environment is unstable. Specifically, ModCScore is defined as follows:

$$ModCScore_{it} = CScore_{it} \times EarnVol_{it}$$

where *EarnVol* represents firm-specific earnings volatility based on historical profitability outcomes. In the main implementation, earnings volatility is computed as the rolling standard deviation of earnings scaled by total assets over the available historical window and then aligned to the firm-year panel. This modified measure is used to assess whether the moderating role of conservatism remains visible when reporting discipline is evaluated under conditions of greater earnings instability.

Control variables

The baseline models include control variables commonly used in valuation specifications for financial firms. Firm size is measured as the natural logarithm of total assets. Capital expenditure is measured as capital expenditure scaled by total assets. Additional descriptive variables reported in Table 1 include leverage, cash proportion, and earnings volatility. Leverage is not included in the baseline interaction specifications because it is embedded in the construction of the Khan & Watts (2009) CScore and may induce substantial multicollinearity if entered simultaneously.

Text processing and SBS computation

All text mining and SBS computations were conducted in RStudio following Fronzetti Colladon (2018). The workflow consists of five stages. First, annual report texts were compiled at the firm-year level and cleaned to remove non-informative elements where possible, including repeated headers, footers, navigation artifacts, and formatting residues. Second, the text was normalized through lowercasing, whitespace standardization, punctuation cleanup, tokenization, and stopword removal using standard English stopword lists supplemented with report-specific artifacts. Third, a curated dictionary of climate-risk keywords was applied to identify term occurrences for each disclosure dimension: physical, policy and legal, market, technological, and reputational risk. Fourth, a word co-occurrence network was constructed for each firm-year document, with nodes representing terms and edges representing within-document co-occurrence. Fifth, SBS scores were computed by combining three standardized components: prevalence, diversity, and connectivity. Prevalence captures the frequency of risk-related terms, diversity captures the distinctiveness of terms linked to the focal climate-risk term set, and connectivity captures the brokerage role of those terms within the document network. These components are aggregated to generate both dimension-level scores and the composite climate risk disclosure score.

Model specification and estimation strategy

To examine whether climate risk disclosure is associated with firm value and whether accounting conservatism conditions that association, dynamic panel models are estimated using one-year-lagged disclosure variables and a lagged dependent variable. The lag structure is intended to reduce simultaneity concerns and to align disclosure with subsequent market assessment. The first specification tests the aggregate disclosure effect and its interaction with accounting conservatism. The second specification replaces the aggregate disclosure measure with the five climate risk disclosure dimensions to assess whether the association differs across risk categories.

Baseline CRD–value model with conservatism moderation

The baseline specification is estimated as follows:

$$Q_{it} = \alpha + \rho\, Q_{it-1} + \beta_1 CRD_{it-1} + \beta_2 Cons_{it-1} + \beta_3 (CRD_{it-1} \times Cons_{it-1}) + \gamma\, Controls_{it} + \epsilon_{it}$$

1

where Q_{it} is Tobin's Q for firm *i* in year *t*, $CRD_{i,t-1}$ is the lagged aggregate climate risk disclosure score, and $Cons_{i,t-1}$ is accounting conservatism, measured using either CScore or Modified CScore depending on the specification. $Controls_{it}$ includes the control variables, and ε_{it} is the error term. All key explanatory variables are lagged by one year.

Disaggregated disclosure model

To examine whether specific climate risk dimensions are more strongly associated with firm value, the aggregate disclosure variable is replaced by the five disaggregated disclosure dimensions. The following specification is estimated:

$$Q_{it} = \alpha + \rho\, Q_{it-1} + \sum_k (\beta_k RiskDim_{k,it-1} + \delta_k (RiskDim_{k,it-1} \times Cons_{it-1})) + \theta\, \mathrm{Cons}_{it-1} + \gamma\, \mathrm{Controls}_{it} + \epsilon$$

2

where $RiskDim_k$ represents the five SBS-based climate risk disclosure dimensions: Physical, Policy/Legal, Market, Technology, and Reputation. The interaction terms test whether the moderating role of accounting conservatism varies across disclosure

categories.

The main models are estimated using Panel EGLS with cross-section weights to accommodate heteroskedasticity across firms and improve estimation efficiency in the panel setting. All disclosure variables, conservatism measures, and interaction terms are lagged by one year. Given the short time dimension of the panel, the estimated models are interpreted primarily as dynamic association models rather than strict causal tests.

Robustness and sensitivity analysis

Several additional procedures are used to assess robustness. First, descriptive statistics and pairwise correlations are reported for all variables, and variance inflation factor diagnostics are examined to assess multicollinearity. Second, the main interaction model is re-estimated using the Modified CScore in place of the standard CScore to test whether the conservatism-based credibility channel remains visible when the earnings environment is unstable. Third, the disaggregated climate-risk specification is re-estimated using ModCScore to examine whether the interaction between conservatism and specific disclosure dimensions weakens when volatility is incorporated into the moderator. These sensitivity analyses help determine whether the baseline credibility mechanism remains stable across alternative information environments.

Results

Table 1
Descriptive statistics

Variable	Mean	St. Dev	Min	Max
Tobin's Q	1.1259	2.1091	0.3145	4.3513
Size	19.5920	2.7522	1.7236	26.8498
Leverage	0.2359	0.2665	0.0031	2.0087
Cash Proportion	0.1414	0.2105	0.0324	0.9126
Capex	0.0031	0.0981	-0.7500	1.5000
Earnings Volatility	7.3965	0.9371	4.2540	9.7149
Physical	0.6761	0.5804	0.0000	3.2760
Policy Legal	1.8956	0.8035	0.0000	3.9922
Market	3.3383	4.7183	0.0000	56.5604
Technology	2.1971	1.3232	-11.5630	4.9350
Reputation	1.6169	0.6929	0.0000	4.0000
Climate Disclosure	10.1223	5.2503	1.000	25.7206
CScore	-0.4646	0.0821	-1.0372	-0.2305
ModCScore	-0.0051	5.3e-05	-0.0052	-0.0047
Climate Risk × CScore	-4.7008	2.5012	-28.3701	-0.4059
Climate Risk × ModCScore	-0.0517	0.0255	-0.3165	-0.0051

Table 1 reports descriptive statistics for the main variables. Tobin's Q has a mean of 1.1259 and ranges from 0.3145 to 4.3513, indicating meaningful variation in market valuation across ASEAN financial institutions. Firm size is also widely dispersed, consistent with the inclusion of both larger and smaller institutions. Leverage, cash proportion, and capital expenditure further indicate substantial heterogeneity in balance-sheet structure and investment intensity across the sample. Climate risk disclosure measures also vary across categories. Market-related disclosure shows the highest mean and the greatest dispersion, followed

by technology-related disclosure, whereas physical, policy and legal, and reputational disclosures are more tightly clustered. This pattern suggests that transition-oriented narratives differ more strongly across firms than other climate-risk categories.

Correlation analysis

Table 2 presents the Pearson correlation matrix for the variables used in the analysis. Overall, the pairwise correlations are generally moderate, suggesting that severe multicollinearity is un-likely to distort the regression estimates. The bivariate association between aggregate climate risk disclosure and Tobin's Q is weak, which indicates that the disclosure effect emerges more clearly once firm characteristics and interaction terms are incorporated into the multivariate models. The composite climate disclosure score is, as expected, strongly correlated with several of its component dimensions, particularly market-related disclosure, reflecting the construction of the aggregate measure. Aside from these expected relationships, the remaining correlations are relatively limited in magnitude and suggest that the variables capture distinct aspects of firm characteristics, disclosure content, and reporting conditions.

Multicollinearity diagnostics

Table 3
Variance Inflation Factor (VIF) Diagnostics

Variable	R^2	VIF
Climate Disclosure	0.171	1.206
CScore	0.057	1.061
Size	0.166	1.199
Capex	0.080	1.087

Table 3 reports variance inflation factor diagnostics for the main explanatory variables. The VIF values range from 1.06 to 1.21, which is well below conventional thresholds of concern. These results indicate that the explanatory variables do not exhibit problematic linear dependence and that the estimated regression coefficients can be interpreted without serious multicollinearity concerns.

Baseline regression results

Table 4
Baseline Regression Results: Climate Risk Disclosure, Accounting Conservatism, and Firm Value

Variables	**Tobin's Q**
Lagged Tobin's Q	0.354***
Climate Disclosure (-1)	0.041***
CScore (-1)	−4.778***
Climate Risk × CScore	0.088***
Size	0.111***
Capex	0.387
Constant	−3.781***
R^2	0.986
F-statistic	133.752

Note. *p < .1; **p < .05; ***p < .01. The dependent variable is Tobin's Q. ClimateDisclosure represents the aggregate climate risk disclosure score. CScore measures firm-level accounting conservatism following (Khan & Watts, 2009). Standard errors are heteroskedasticity-consistent. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 4 reports the baseline dynamic panel estimates of the association between aggregate climate risk disclosure, accounting conservatism, and firm value. The coefficient on lagged Tobin's Q is positive and highly significant ($\beta = 0.354, p < 0.01$), indicating persistence in firm valuation over time. This result suggests that market valuation in ASEAN financial institutions continues to reflect firm-specific characteristics that remain relevant across periods.

The coefficient on lagged Climate Disclosure is positive and statistically significant ($\beta = 0.041, p < 0.01$), indicating that more extensive climate risk disclosure is associated with higher subsequent firm value. This finding supports H1 and is consistent with the view that climate-related transparency can improve market assessment when disclosure helps investors evaluate firms' preparedness, risk exposure, and governance quality (Eccles et al., 2014; Flammer et al., 2021; Khan et al., 2015; Vestrelli et al., 2024).

The coefficient on lagged CScore is negative and significant ($\beta = -4.778, p < 0.01$), suggesting that accounting conservatism, when considered independently in the baseline specification, is associated with lower firm value. However, the interaction between Climate Disclosure and CScore is positive and highly significant ($\beta = 0.088, p < 0.01$), indicating that the positive association between climate risk disclosure and firm value becomes stronger in firms operating in a more conservative reporting environment. This result supports H2 and is consistent with the argument that climate-related disclosure is more likely to be interpreted as credible and decision-useful when it is embedded in a reporting context characterized by greater discipline, timelier loss recognition, and tighter constraints on managerial discretion (Ball & Shivakumar, 2005; Basu, 1997; Khan & Watts, 2009; LaFond & Watts, 2011).

Among the control variables, firm size is positive and statistically significant, whereas capital expenditure is positive but not statistically significant. The model also shows high explanatory power ($R^2 = 0.986$), and the F-statistic indicates that the specification is jointly significant. Overall, the baseline results support the study's central argument: climate risk disclosure is positively associated with firm value, and this association is amplified when a more conservative reporting environment accompanies disclosure.

Climate risk category analysis

Table 5 reports the disaggregated specification, in which aggregate climate risk disclosure is decomposed into five dimensions: physical, policy and legal, market, technology, and reputational risk. The coefficient on lagged Tobin's Q remains positive and

highly significant *(β = 0.846, p < 0.01*), again indicating persistence in firm valuation over time.

Among the direct effects, only market-related disclosure shows a positive and weakly significant association with firm value (β = 0.079, p < 0.10). By contrast, physical, policy and legal, technology, and reputational disclosures are not statistically significant in their standalone terms. These results indicate that climate-risk dimensions are not interpreted uniformly by the market. At the same time, the evidence suggests only limited support for the view that transition-oriented disclosures are consistently more value-relevant than other disclosure categories. The weak positive association for market-related disclosure is nevertheless broadly consistent with the argument that investors may respond more readily to climate narratives that are directly linked to repricing, portfolio adjustment, and changing market expectations, as these channels are more immediately legible in the valuation of financial institutions (Matsumura et al., 2024; Vestrelli et al., 2024).

Table 5
Climate Risk Disclosure Dimensions and Firm Value: Moderating Role of Accounting Conservatism (CScore)

Variables	**Tobin's Q**
Tobin's Q(t − 1)	0.846***
Physical(t − 1)	0.144
Policy/Legal(t − 1)	0.108
Market(t − 1)	0.079*
Technology(t − 1)	−0.178
Reputation(t − 1)	0.245
CScore(t − 1)	−3.285***
Physical × CScore	0.238
Policy/Legal × CScore	0.258
Market × CScore	0.162
Technology × CScore	−0.452
Reputation × CScore	0.655
Size	0.092***
Capex	3.331***
Constant	−3.279***
R^2	0.863
F-statistic (Prob.)	181.076

The dependent variable is Tobin's Q. Physical, Policy/Legal, Market, Technology, and Reputation are SBS-based disclosure scores for the five climate risk disclosure dimensions. CScore is the accounting conservatism measure following Khan & Watts (2009). All disclosure variables, CScore, and interaction terms are lagged by one year. Size is the natural logarithm of total assets and Capex is capital expenditure scaled by total assets. The model is estimated using Panel EGLS with cross-section weights. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01

The coefficient on CScore is negative and statistically significant (*β = −3.285, p < 0.01*), indicating that accounting conservatism is associated with lower firm value when considered directly in the disaggregated specification. However, none of the interaction terms between CScore and the five disclosure dimensions is statistically significant. This pattern suggests that the credibility-enhancing role of conservatism observed in the aggregate specification does not appear to be concentrated in any single climate-risk category. In other words, once climate disclosure is decomposed into specific dimensions, conservatism does not differentially strengthen the valuation relevance of physical, policy and legal, market, technology, or reputational disclosure. This

finding is consistent with the broader view that investors may evaluate individual climate narratives selectively, depending on perceived materiality, immediacy, and verifiability, rather than relying on a uniform dimension-specific credibility signal (Dzieliński et al., 2022; Kim et al., 2023).

Among the control variables, firm size and capital expenditure are both positive and statistically significant, suggesting that larger institutions and firms with higher investment intensity exhibit higher market valuation in this specification. Overall, the disaggregated results indicate that climate-risk narratives are heterogeneous in their association with firm value, but the evidence does not show a clear dimension-specific moderating role for accounting conservatism. Accordingly, Table 5 provides only limited support for H3.

Sensitivity analysis using volatility-adjusted conservatism

Table 6 replaces CScore with Modified CScore (ModCScore), which incorporates earnings volatility into the conservatism measure. The coefficient on lagged Tobin's Q remains positive and highly significant (β = 0.492, p < 0.01), indicating persistence in firm valuation over time. Climate Disclosure is also positive and significant (β = 0.082, p < 0.01), suggesting that aggregate climate risk disclosure remains associated with higher firm value. ModCScore is negative and significant (β = −7.992, p < 0.01), but the interaction between Climate Disclosure and ModCScore is positive and highly significant (β = 0.151, p < 0.01). This indicates that the positive association between climate risk disclosure and firm value becomes stronger in firms with higher volatility-adjusted conservatism. Overall, Table 6 reinforces the baseline evidence that climate risk disclosure is positively associated with firm value and that conservatism strengthens this relationship, even when conservatism is measured in a way that reflects earnings instability (Ball & Shivakumar, 2005; Khan & Watts, 2009).

Table 6
Sensitivity Analysis Using Volatility-Adjusted Conservatism (ModCScore)

Variables	**Tobin's Q**
Tobin's Q (-1)	0.492***
Climate Disclosure (-1)	0.082***
ModCScore (-1)	−7.992***
Climate Risk (-1) × ModCScore (-1)	0.151***
Size	−0.018***
Capex	2.059***
Constant	−3.342***
R^2	0.991
F-statistic	201.363

The dependent variable is Tobin's Q. Climate Disclosure (CRD) is the SBS-based aggregate climate disclosure score. ModCScore is the volatility-adjusted conservatism proxy. CRD, ModCScore, and their interaction are lagged by one year. Size is the natural logarithm of total assets and Capex is capital expenditure scaled by total assets. The model is estimated using Panel EGLS with cross-section weights. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

Sensitivity analysis with risk dimensions under ModCScore

Table 7 extends the disaggregated analysis by replacing CScore with Modified CScore (ModCScore), which incorporates earnings volatility into the conservatism measure. The coefficient on lagged Tobin's Q remains positive and highly significant (*β = 0.880, p < 0.01*), indicating persistence in firm valuation over time. Among the direct effects, policy/legal disclosure is negative and significant (*β = −4.367, p < 0.01*), market disclosure is also negative and significant (*β = −0.191, p < 0.05*), whereas reputational disclosure is positive and highly significant (β = 6.026, p < 0.01). Physical and technology disclosures are not significant. These results suggest that climate-risk dimensions are not valued uniformly by the market, which is consistent with evidence that investors price climate-related risks and opportunities asymmetrically (Li et al., 2024; Vestrelli et al., 2024).

Table 7
Sensitivity Analysis Using ModCScore with Risk Dimensions

Variables	Tobin's Q
Tobin's Q(t − 1)	0.880***
Physical(t − 1)	2.125
Policy/Legal(t − 1)	−4.367***
Market(t − 1)	-0.191**
Technology(t − 1)	-0.854
Reputation(t − 1)	6.026***
ModCScore(t − 1)	-5.101
Physical × ModCScore	4.001
Policy/Legal × ModCScore	-8.561***
Market × ModCScore	-0.396**
Technology × ModCScore	-1.680
Reputation × ModCScore	11.871***
Size	0.040***
Capex	1.617***
Constant	-3.401*
R^2	0.916
F-statistic (Prob.)	311.637

The dependent variable is Tobin's Q. Physical, Policy/Legal, Market, Technology, and Reputation represent the five SBS-based disclosure dimensions. ModCScore is the volatility-adjusted conservatism proxy. All disclosure variables, ModCScore, and interaction terms are lagged by one year. Controls include Size and Capex. The model is estimated using Panel EGLS with cross-section weights. Significance levels: * p < 0.10, ** p < 0.05, *** p < 0.01.

The coefficient on ModCScore is not statistically significant, but the interaction terms reveal a differentiated pattern. Policy/legal × ModCScore is negative and highly significant *(β = −8.561, p < 0.01*), market × ModCScore is also negative and significant (*β = −0.396, p < 0.05*), and reputation × ModCScore is positive and highly significant (*β = 11.871, p < 0.01*). The interactions for physical and technology disclosure are not significant. Overall, the results indicate that the moderating role of conservatism is category-specific rather than uniform. Policy/legal and market disclosures appear to be interpreted more as signals of regulatory burden, transition cost, or market pressure, whereas reputational disclosure appears to be viewed more favorably when supported by a more credible information environment (Bingler et al., 2024; Ernst et al., 2025; Yang et al., 2025).

Discussion

The findings show that climate risk disclosure is positively associated with firm value among ASEAN financial institutions, supporting the view that climate-related transparency can improve market assessment by helping investors evaluate preparedness, governance quality, and exposure to emerging risks. This result is consistent with prior studies showing that climate-related and sustainability disclosures can be value-relevant when they reduce information asymmetry and improve the informational basis for market pricing (Eccles et al., 2014; Flammer et al., 2021; Khan et al., 2015; Vestrelli et al., 2024). In that sense, the evidence supports the idea that climate disclosure is not merely symbolic communication. At the aggregate level, it appears to function as a market-relevant signal of how financial institutions understand and communicate their climate-related risk position.

A central implication of the study is that accounting conservatism operates as a credibility condition for climate risk disclosure. In both the baseline specification and the volatility-adjusted aggregate specification, the interaction between climate disclosure and conservatism is positive and significant. This indicates that the valuation relevance of climate disclosure becomes stronger when it appears within a more conservative reporting environment. The result is consistent with the argument that conservatism can enhance disclosure credibility by constraining managerial discretion, encouraging timelier recognition of downside outcomes, and reducing concerns that climate narratives are overly optimistic or opportunistic (Ball & Shivakumar, 2005; Basu, 1997; LaFond & Watts, 2011). It also aligns with recent evidence that the market places greater value on climate disclosure when that disclosure is credible rather than merely extensive (Yang et al., 2025).

At the same time, the results suggest that conservatism should not be interpreted as an unqualified valuation advantage. In the aggregate models, the direct coefficient on conservatism is negative, while the interaction term remains positive. This pattern implies that the market does not necessarily reward conservative reporting on a standalone basis, but does appear to value climate disclosure more when it is embedded in a disciplined reporting environment. One plausible interpretation is that conservatism carries a dual meaning. On the one hand, it signals reliability and constraint, which strengthens the credibility of narrative climate disclosure. On the other hand, it may also reflect greater recognition of downside risk, lower short-term optimism, or more limited perceived upside, which can depress valuation when conservatism is considered independently (LaFond & Watts, 2011; Roychowdhury & Watts, 2007). The contribution of this study is therefore not to show that conservatism is uniformly beneficial, but rather that it conditions how climate disclosure is interpreted.

The disaggregated analysis under the standard conservatism specification presents a more qualified picture. Once aggregate climate disclosure is decomposed into physical, policy/legal, market, technology, and reputational dimensions, only market-related disclosure remains weakly associated with firm value, while the interaction terms are not statistically significant. This suggests that the aggregate credibility mechanism is clearer and more stable than the dimension-specific mechanism. It also indicates that investors do not assign uniform valuation relevance to individual climate-risk narratives. Although the weak positive effect for market disclosure is broadly consistent with the idea that investors pay attention to climate information that maps directly onto repricing, portfolio adjustment, and changing market expectations, the absence of broader significance means that the evidence provides only limited support for the expectation that transition-oriented categories are consistently the most informative (Li et al., 2024; Matsumura et al., 2024).

This contrast between the aggregate and disaggregated findings is theoretically important. At the aggregate level, climate disclosure may function as a broad signal of preparedness, transparency, and governance responsiveness. Investors may therefore respond positively to the overall presence of climate-related discussion because it indicates that the institution is engaging with climate risk in a visible and systematic way. By contrast, once disclosure is broken into specific categories, the market may evaluate each category in a more selective and economically grounded manner. Category-level narratives can reveal not only preparedness, but also concrete exposure, compliance burden, transition cost, or strategic vulnerability. As a result, the aggregate disclosure score may primarily capture an information effect, whereas some individual dimensions may capture a risk effect. This interpretation is consistent with prior work showing that climate disclosure can either improve valuation through transparency or reduce it by making exposure more salient (Dzieliński et al., 2022; Vestrelli et al., 2024; Yang et al., 2025).

The most nuanced evidence emerges in the disaggregated model using ModCScore. Under this specification, policy/legal and market disclosure are negatively associated with firm value, and their interactions with ModCScore are also negative, whereas reputational disclosure and its interaction with ModCScore are positive. This pattern suggests that once conservatism is evaluated in conjunction with earnings instability, investors interpret climate categories very differently. Policy/legal and market disclosures appear to be read more as signals of regulatory burden, transition cost, litigation exposure, repricing pressure, or heightened market discipline than as reassuring evidence of preparedness. This is consistent with international evidence that investors price climate-related risks and opportunities asymmetrically across categories (Li et al., 2024). It is also consistent with research showing that low-quality or imprecise climate narratives can resemble “cheap talk,” thereby heightening transition and reputation risk concerns rather than alleviating them (Bingler et al., 2024).

By contrast, the positive results for reputational disclosure suggest that this category may produce greater valuation benefits when it appears within a more credible information environment. Reputational climate disclosure may signal accountability,

stakeholder responsiveness, and strategic commitment to managing climate-related expectations. When investors regard the surrounding reporting environment as credible, such disclosure may be interpreted less as impression management and more as a meaningful indicator of legitimacy and organizational intent. This interpretation is supported by evidence that credible climate disclosure improves firm value partly through better information environments and stronger corporate reputation (Yang et al., 2025). It also fits broader evidence that reputation-related sustainability information and disclosure assurance shape investor judgments by increasing perceived credibility and strengthening willingness to invest (Ernst et al., 2025).

Taken together, these findings refine the paper's theoretical contribution. The main insight is not simply that climate disclosure matters, nor that conservatism matters, but that the credibility of climate disclosure is strongest at the aggregate level and more context-dependent at the category level. The aggregate results indicate a relatively robust credibility mechanism: climate disclosure is more favorably interpreted when supported by conservative reporting discipline, even when conservatism is measured in a volatility-adjusted way. The dimension-level results, however, show that credibility does not operate uniformly across all types of climate disclosure. Some categories, especially policy/legal and market disclosure, can become more negatively interpreted when they reveal economically material exposure under a more demanding information environment, while reputational disclosure may benefit from that same credibility environment. This pattern is consistent with signaling theory, but it also shows that the content of the signal matters as much as the credibility of the sender (Arian & Sands, 2024; Spence, 1973).

These results also carry practical implications. For managers of financial institutions, the evidence suggests that climate disclosure is most effective when it is credible, internally consistent, and embedded in a disciplined reporting environment. Simply increasing the amount of climate disclosure may not be sufficient, particularly if specific categories reveal costly transition exposure without adequate evidence of strategic readiness. For regulators and standard setters, the findings reinforce the need to improve disclosure quality, comparability, and credibility across ASEAN, where supervisory expectations and green-finance infrastructure remain uneven. For investors, the results imply that climate disclosure should not be read as a uniformly positive signal. Aggregate disclosure may indicate transparency and preparedness, but individual categories can communicate very different implications depending on the surrounding earnings and reporting environment.

Several limitations remain. The short panel limits the ability to identify endogeneity and to adjust for dynamics, so the findings should be interpreted as evidence of conditional association rather than definitive causality. The text-based disclosure measures may also capture reporting style as well as substantive communication. In addition, ASEAN regulatory heterogeneity is analytically useful but difficult to isolate fully in a pooled design. Future research could extend the time horizon, more explicitly separate banks and insurers, exploit regulatory shocks, and examine whether external assurance further strengthens the credibility channel.

Overall, the findings suggest that climate risk disclosure matters in ASEAN financial institutions, but its market relevance depends on credibility and on the type of climate narrative being disclosed. Conservatism strengthens the aggregate value relevance of climate disclosure, yet category-level effects remain heterogeneous. The broader implication is that markets respond not simply to the presence of climate disclosure, but to whether that disclosure is credible and what kind of climate information it conveys.

Conclusion

This study examines whether climate risk disclosure is associated with firm value in ASEAN financial institutions and whether accounting conservatism strengthens that relationship by enhancing disclosure credibility. Using text-based measures of climate risk disclosure derived from annual reports and panel data from listed banks and insurers across ASEAN, the findings show that aggregate climate risk disclosure is positively associated with firm value. This suggests that climate-related transparency is relevant to market assessment and that investors respond favorably when firms communicate their climate-related exposure and preparedness more extensively.

The results further indicate that accounting conservatism plays an important conditioning role. In the aggregate specifications, the interaction between climate risk disclosure and conservatism is positive and significant under both the standard CScore and the volatility-adjusted ModCScore. This pattern suggests that climate disclosure becomes more value-relevant when it is

embedded in a more disciplined reporting environment. In other words, the market appears to place greater weight on climate-related narratives when the surrounding accounting context signals stronger recognition of downside risk and tighter reporting discipline.

At the same time, the disaggregated results show that climate-risk dimensions are not interpreted uniformly. Under the baseline conservatism specification, only market-related disclosure shows limited positive association with firm value, while the interaction terms are not significant across individual categories. Under the volatility-adjusted specification, policy/legal and market disclosures are associated with less favorable valuation effects, whereas reputational disclosure is positively associated with firm value and is strengthened by ModCScore. These findings suggest that the market does not respond equally to all climate-risk narratives. Rather, the valuation relevance of specific disclosure categories depends on the type of information conveyed and the broader information environment in which that disclosure is interpreted.

This study contributes to the literature by showing that the usefulness of climate risk disclosure depends not only on its presence but also on its credibility and content. The findings highlight ASEAN financial institutions as an important setting in which climate-related information is increasingly relevant yet selectively interpreted by the market. Several limitations remain, including the short panel period, the text-based nature of the disclosure measures, and the pooled treatment of regulatory heterogeneity across ASEAN. Future research could extend the time horizon, more explicitly distinguish between banks and insurers, and examine whether external assurance further strengthens the credibility of climate-related disclosures.

Declarations

Competing interests

The authors declare no competing interests

Ethical statements

This article does not contain any studies with human participants performed by any of the authors.

Author Contribution

D.R. and P.Y.S. contributed to conceptualization and methodology. D.H.S. contributed to software and visualization. D.R., P.Y.S., R.M., and D.H.S. contributed to validation. D.R. and D.H.S. contributed to formal analysis. D.R. and R.M. contributed to investigation. R.M. and D.H.S. contributed to resources. D.R., R.M and D.H.S contributed to data curation. D.R. and R.M. prepared the original draft. P.Y.S. and D.H.S. contributed to review and editing. D.R. and P.Y.S. contributed to supervision. P.Y.S. and R.M. contributed to project administration. All authors read and approved the final manuscript.

Acknowledgment

No specific grant from funding agencies in the public, commercial, or not-for-profit sectors supported this research.

Data Availability

For the purposes of peer review, the authors have provided the materials necessary to evaluate and verify the findings of this study through the submission system. These materials include the final analysis dataset used in the panel estimations, supporting data preparation files, variable definitions and coding rules, the EViews syntax used for estimation, the climate-risk keyword dictionaries, and the R code used for PDF-to-text conversion, text cleaning, stopword removal, keyword capture, and Semantic Brand Score-related processing. A source list identifying the annual reports and market disclosures used in the study is

also provided. The source documents were obtained from publicly available corporate disclosures. These materials are available to editors and referees for peer review and will be deposited in an appropriate public repository upon publication.

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Table 2

Table 2 is available in the Supplementary Files section.

Supplementary Files

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- Table2.docx