










Corporate Value at Risk: Why We Should Care About Climate (IFRS S2) and Cybersecurity Risks?

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ABSTRACT

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This paper analyses the effects of cybersecurity risk disclosure (CyRD) and climate risk disclosure (CRD) on corporate value in rising Asian countries, in light of escalating regulatory demands and heightened stakeholder expectations for openness and non-financial disclosures. The research aims to address a knowledge gap in the literature by presenting empirical data from a previously neglected Asian environment. The study is grounded in signaling and legitimacy theories and utilises data from 2020 to 2024, encompassing a sample of multi-sector enterprises across 12 Asian nations. Multiple regression models were employed, accounting for control variables (size, leverage, profitability), to assess the net impact of disclosures. The findings indicate that cybersecurity risk disclosure is positively related to corporate value, as it enhances governance, operational resilience, and fosters investor confidence, ultimately leading to improved market valuations. Climate risk disclosure is also found to have a stronger impact, communicating a company's commitment to long-term sustainability, helping attract institutional investors, and reducing regulatory and reputational risks. The study highlights scientific value by providing new evidence from an emerging context, confirming that non-financial disclosures are strategic tools for value creation and risk mitigation, while offering practical recommendations for managers, investors, and policymakers to strengthen disclosure frameworks and support sustainable growth.

1. INTRODUCTION

In recent decades, the world has witnessed rapid transformations in the economic and regulatory environment, as a result of the expansion of digitization and the increasing severity of climate change, which has made non-financial risks—specifically cyber and climate risks—represent growing threats to the stability and firms market value. This shift has been reflected in the growing interest of stakeholders and regulators in the need to disclose these risks in corporate reports [1].

At the cyber level, the rise in cyberattacks has prompted companies to reconsider their internal systems, leading financial markets to demand greater transparency about protection mechanisms and potential risks. In 2011, the U.S. Securities and Exchange Commission (SEC) issued guidance requiring listed companies to include information about cyber risks in their periodic reports [2-4]. However, the actual compliance and quality of disclosures still vary widely between companies and sectors, which raises questions about the extent to which these disclosures are useful in influencing investors' decisions [5, 6]. Therefore, the need arose to have integrated cybersecurity-related activities to increase

confidence in reports, improve competitive status, and increase the market value [7].

On the climate side, recurring environmental disasters and the high economic costs associated with climate change have prompted international institutions—such as the Task Force on Climate-Related Financial Disclosures (TCFD)—to issue voluntary climate disclosure standards, starting in 2017 [8]. Many governments and exchanges have gradually begun to adopt these standards, but compliance remains limited in many emerging markets, making it difficult to assess the actual impact of these disclosures on the market [9]. In the United States alone, for example, large climate-related disasters (costing more than \$1 billion) from 2013 to 2022 totaled over \$1.1 trillion. Estimates indicate that the global economic impact of climate change can reach \$7.9 trillion by 2050 [10].

Despite the increasing recognition of climate change as an important matter, compulsory regulatory structures to CRD remain inadequate because they require a high degree of professional appreciation and strategic awareness, unlike financial disclosures that are subject to clear accounting standards in many countries [11]. Since climate-related risks continue to move with greenhouse gas emissions, hard work

is required to understand and gauge their impact on the organization value [8, 12].

Even if more people are interested in these concerns, a study of the literature shows that there is still a considerable gap in understanding how disclosing these risks affects business value, especially in Asia, where there is a lot of economic and legal variation [13, 14]. Most of the studies that have come before this one have just looked at one form of disclosure (either cyber or climate) and not put them together into a single model for analysis.

Based on the foregoing, the key research question for this project is: How much do firms in Asian markets lose value when they talk about cybersecurity and climate risks?

The study's goal is to look at how cybersecurity and climate risk disclosure affect the value of publicly traded firms in 12 Asian nations from 2020 to 2024, taking into account different institutional and legislative considerations. The study starts from two different theoretical points of view: signal theory, which says that transparency is a sign of good management, and legitimacy theory, which says that to get public support, you need to match the expectations of society and regulators [15].

The study seeks to make scientific and applied contributions through the following:

- Examine the relative impact of both cyber and climate disclosure on three measures of company value (Tobin's Q, market-to-book value, and stock profitability).
- Highlight the importance of enhancing the quality of disclosure in emerging markets, as a strategic tool to improve reputation and reduce regulatory risks.
- Support policymakers in developing more effective and transparent disclosure standards.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Cybersecurity risk disclosure and firm value

According to the American Institute of Certified Public Accountants (AICPA, 2018), "Cyber security is one of the most important issues facing management and board members in almost all companies-large or small, public or private." Despite government requirements, for qualitative details about cyber security risk without the requirement of probability or impact estimates, companies are still responsible for the content and quality of their disclosures [16].

Several studies have indicated the relationship between cyber risk disclosure and improved transparency and accounting information quality. For instance, Elnagar et al. [1] found that voluntary disclosure of cybersecurity risk significantly increases the quality of both financial reporting and is positively associated with market value. Furthermore, previous studies [17, 18] mentioned that firms which have a high reputation tend to provide broader disclosures in this area that targeting to protect personal data, avoid potential financial losses, and legal punishment.

Similarly, Matemane et al. [19] investigated how the management board moderate the relationship between CyRD and firm performance in South Africa, and concluded that cyber risk may adversely affect performance under certain conditions, like governance level and organizational control.

A study by Ghose et al. [20] showed that voluntary reporting on cybersecurity risk strengthens the reputation of a company in the financial markets and investors' trust. The same concept was found by Arora et al. [21] in emerging markets like India.

A study by Chen et al. [6] indicated that market reactions and investors are highly negative when companies reduce the disclosures of cybersecurity risk and reporting transparency. Also, Berkman et al. [22] stated that the cultivation of cybersecurity reduces regulatory pressure and experienced risks, thus increasing the company's value.

In the same vein, Kosutic and Pigni [23] developed an ideological model, which links cybersecurity skills to long-term competitive benefits. Conversely, Florackis et al. [24] showed that companies facing high cybersecurity risk often experience poor performance. Start-ups and small companies may especially lack resources to effectively handle these risks [25]. Although advanced cybersecurity measures improve the prevention of incidents, some studies argue that they may not necessarily correlate with better profitability [26]. For example, Chen et al. [6] pointed out that some disclosures are too general and unhelpful, and may be viewed as an attempt to avoid liability rather than transparency.

This variation in results suggests that the impact of cyber risk disclosure is not linear and may be influenced by the governance context, level of institutional development, and regulatory oversight. Hence, the first hypothesis can be stated as follows;

H1: There is a positive impact of cybersecurity risk disclosure on firm value.

2.2 Climate risk disclosure and firm value

In light of global interest in sustainability, the visibility of disclosure of climate risk can be evaluated by firms' ability to meet the increasing stakeholders and the ability to create long-term value [27]. Transparent climate-related CRD helps identify climate-related risks and opportunities, improves the company's reputation, and contributes to long-term stability [28]. However, Arian and Sands [29] and Vestrelli et al. [9] stated that many companies still do not quite recognize the environmental implications of climate risk. In other words, transparency in climate disclosure is linked to companies' ability to innovate environmentally [20, 30] found that managers consider climate risk as a material risk for operating activities, and companies at high CRD levels are at a lower risk of experiencing a decline in share value and have better investor communication [31].

In addition, increasing the risk of climate risk often leads to unfavorable market reactions [32]. A study in the Sri Lankan context has shown that FV is positively influenced by an increase in climate-related disclosures, especially in the event of clear organizational or societal pressure [33]. Therefore, CRDs have been shown to promote green innovation, especially for FIRMS that are facing ethical obligations [11, 34]. To provide a deeper understanding of the relationship between non-financial disclosure and corporate value in disparate regulatory and economic environments in the emerging Asian context, the second hypothesis can hence be formulated as follows;

H2: There is a positive impact of climate risk disclosure on firm value.

3. METHODOLOGY

3.1 Sampling and data collection

The study selected a sample of companies operating in Asia between 2020 and 2024. Based on the official classification of the UN, 49 countries are included in Asia. In this regard, 12 countries were chosen based on the availability and quality of relevant data. Through a comprehensive review of economic and non-economic reports, the final sample included, in addition to extensive information, 367 companies across several industry sectors. This resulted in a total of 1,835 company observations.

Data related to the FV and the disclosure of cybersecurity and climate risks are collected from financial and sustainability reports published in the official Financial Markets for each country. The Bloomberg database was also used, which provides economic, environmental, social, governance, and climate information in its financial and non-financial reports and websites. Table 1 provides a detailed breakdown of the distribution of the sample by country.

Table 2 shows the distribution of companies according to the industry to which each company belongs. The industrial sector is the most representative of the sample at a rate of 32.7%, followed by the finance sector at a rate of 26.7%. The services sector included a rate of 9.54%, followed by the investment sector at a rate of 13.35%.

Table 1. Study sample

Country	No. of Firms	Percentage of Firms	No. of Obse	Percentage of Obse
China	30	8.17%	150	8.17%
Japan	40	10.90%	200	10.90%
South Korea	35	9.54%	175	9.54%
Malaysia	20	5.45%	100	5.45%
Hong Kong	20	5.45%	100	5.45%
Indonesia	12	3.27%	60	3.27%
Iraq	50	13.62%	250	13.62%
Qatar	40	10.90%	200	10.90%
Kuwait	20	5.45%	100	5.45%
Saudi Arabia	50	13.62%	250	13.62%
UAE	30	8.17%	150	8.17%
Jordan	20	5.45%	100	5.45%
	367	100.00%	1835	100.00%

Table 2. Distribution of firms by sector

Sector	No. of Firms	Percentage of Firms	No. of Obse	Percentage of Obse
Industrials	120	32.70%	600	32.70%
Financial	98	26.70%	490	26.70%
Technology	65	17.71%	325	17.71%
Investment	49	13.35%	245	13.35%
Services	35	9.54%	175	9.54%
	367	100.00%	1,835	100.00%

This study selected a research sample from Asia for several reasons and functions:

1. To address a research gap: current literature lacks sufficient empirical studies that investigate the relationship between cybersecurity and climate risk information and fixed value in the Asian context. This gap emphasizes the need for area-specific insight.

2. Economic and institutional diversity: Asia encompasses a wide range of economies-from emerging markets to

developed economic hubs-which enables the study of disclosure practices in different institutional and regulatory environments.

3. Enhancing Stability and governance standards: Many Asian countries are quickly adopting environmental, social, and governance standards (ESG) and climate-related rules. The study of companies in this transition phase provides timely and policy-relevant conclusions.

In addition, the study expects to introduce several new contributions due to the following reasons:

1. Integrated analysis of CyRD and CRD: Unlike previous studies that usually focus on a type of risk information, this study simultaneously checks the effect of Cybersecurity risk disclosure (CyRD) and Climate risk disclosure (CRD).

2. Application of double theoretical contours: The study applies both signal theory and legitimation theory to explain the effect of non-financial disclosures on fixed evaluation. This double principle approach increases the explanatory power of the finding.

3. Region-specific evidence from Asia (2020–2024): Data sets cover the latest and dynamic periods in different Asian markets, which provide reference -specific insight into how disclosure practices affect market beliefs and investor behavior.

4. Multidimensional evaluation of climate disclosure: CRD is measured using a four-dimensional structure that corresponds to a working group on the climate-related economic disclosures (TCFD), which captures control, strategy, risk management and metric/goals. This detailed approach strengthens the study methodology.

5. Politics-oriented insight: the potential results provide actionable guidance to decisions makers, who aim to increase the transaction transparency and support permanent trading practice due to increasing cyber and climate risk.

3.2 Variable measurement

3.2.1 Cybersecurity risk disclosure (CyRD)

The cybersecurity risk management report aims to communicate information about management’s assurances related to its effective evaluation of control procedures designed to manage cybersecurity risks through a report attached to the financial statements. If the cybersecurity risk management report is disclosed, it takes the value (1), and (0) otherwise [35].

3.2.2 Climate risk disclosure (CRD)

Climate risk disclosure (CRD) is measured using content analysis based on Climate-Related Financial Disclosures (TCFD) framework, which consists of four dimensions [20]. Adopting the TCFD framework also enhances measurement reliability and makes results comparable to international literature [12].

- Climate Risk Governance (CRG): This dimension includes elements regarding disclosure of climate risk governance, as each element takes (1) for disclosure, and a value of (0) otherwise.

- Strategy of Climate Change (SCC): This dimension includes elements regarding the strategy for dealing with climate change. Each element takes (1) for disclosure, and (0) otherwise.

- Climate Risk Management (CRM): This part includes elements regarding disclosure of climate risk management, and each element takes (1) for disclosure and (0) otherwise.

• **Measures and Objectives (MO):** This dimension included elements regarding disclosure of climate change management measures and objectives, and each element takes (1) for disclosure and (0) otherwise. Each indicator was calculated by the following formula:

$$CRD_{it} = \sum_{i=1}^n X_{it}/n \quad (1)$$

3.2.3 Firm value (FV)

FV is measured by utilizing the following formulas [36].

• **Tobin's Q (TQ):** anchored as the sum of the market value of equity (CMVE), the book value of equity (PS) and book value of debt (BOPT) divided by total assets (TA), Eq. (2), according to Chung et al. [36].

$$Tobin'sQ = (CMVE + (PS) + (BEPT)) / (TA) \quad (2)$$

• **Price-to-book value (PBV):** Per share price is defined as a ratio of market price per share to book value per share, Eq. (3) [9, 37, 38].

$$PBV = Marketpricepershare / Bookvaluepershare \quad (3)$$

• **Earnings per share (EPS):** It is determined by dividing the total earnings by the number of outstanding shares, Eq. (4) [39].

$$EPS \Rightarrow Total\ Earnings / Outstanding\ shares \quad (4)$$

These indicators have gathered the market's view on the value, performance, and long-term development opportunities for a company.

3.2.4 Control variables

The following firm-level control variables were incorporated [9, 40].

• **Leverage:** The sum of long-term debt and debt in current liabilities divided by the book value of total assets.

• **Size:** The natural logarithm of company sales.

• **PROF:** Profitability in this study is controlled for because, according to information costs theory, firms with higher profits are willing to spend more money and other resources to voluntarily publish and distribute non-financial information.

However, although these models are effective, the study acknowledges the possibility of self-bias (endogeneity) or missing, unnoticed variables, which calls for the use of more advanced models (such as 2SLS or fixed effects models) in later studies.

4. RESULTS AND DISCUSSION

4.1 Descriptive analysis

Table 3 presents descriptive data for all research variables. Analysis includes mean, median, standard deviations, skewness and kurtosis. The results suggest that the variables are normally distributed, which justifies the use of parametric statistical methods.

Table 3 indicates that the mean for Cybersecurity risk disclosure (CyRD) is 0.201, with a median of 0.181 and a standard deviation of 0.106. These figures refer to moderate variation in CyRD levels in the sample. Furthermore, the table also explains that the mean for CRD is 0.304, with a median of 0.264 and a standard deviation of 0.118. From the four CRD dimensions, the average scores are as follows: CRM (0.310), CRG (0.304), SCC (0.302) and MO (0.300). This indicates that climate risk management (CRM) is the most prominent revealed dimension, highlighting its centrality in corporate environmental risk strategies.

The table shows that firm value was measured using three indicators. The highest average score was for Tobin's Q (0.327), followed by EPS (0.313) and PBV (0.301). This suggests that Tobin's Q is the most representative measure to capture the long-term company when it comes to disclosing cybersecurity and climate risk. Table 4, moreover, shows the descriptive analysis of companies by industry.

Table 3. Descriptive analysis of research variables

Variable	Mean	Median	Sta. Dev.	Skewness	Kurtosis	Minimum	Maximum
CyRD	.201	.181	.106	.128	-1.227	.063	.363
CRD	.304	.264	.118	.283	-.571	.133	.498
CRG	.304	.270	.127	.317	-.578	.125	.520
SCC	.302	.260	.111	.426	-.487	.130	.490
CRM	.310	.275	.129	.319	-.393	.125	.540
MO	.300	.275	.108	.117	-.260	.125	.500
TQ	.327	.333	.112	.335	.155	.133	.533
PBV	.301	.357	.164	-.995	-.116	.000	.500
EPS	.313	.283	.125	.285	-.417	.133	.533
LEV	.310	.275	.129	.319	-.393	.125	.540
SIZE	.302	.250	.123	.293	-.660	.125	.500
PROF	.300	.275	.108	.117	-.260	.125	.500

Table 4. Descriptive analysis of companies by industry

Variable	Mean	Median	Sta. Dev.	Skewness	Kurtosis	Minimum	Maximum
Industrials	.418	.380	.149	.352	-.953	.125	.500
Financial	.517	.515	.131	-.263	1.936	.325	.533
Technology	.581	.480	.145	.013	-2.991	.133	.540
Investment	.447	.460	.133	-.133	-2.281	.000	.500
Services	.457	.435	.106	.693	.324	.125	.500

4.2 Correlation analysis

Table 5 shows Pearson's correlation matrix between all variables used in the model, which shows that most relationships are statistically significant at the 1% or 5% level, with no serious concerns about linear multicollinearity between independent variables, which enhances the validity of subsequent regression models. The results show that CyRD correlates positively and strongly with firm value when measured by Tobin's Q ($r=0.777$) and earnings per share (EPS) ($r=0.754$), while there is no significant relationship with the price-to-book value (PBV) measure. The magnitude of the correlation (0.777) indicates a significant economic impact. It can be said that companies that demonstrate higher levels of disclosure tend to have higher market valuations, reflecting enhanced investor confidence and reduced perceived risk. This result is

consistent with previous studies [1, 21, 41]. Climate risk disclosure (CRD), furthermore, shows a stronger correlation with firm value, particularly with EPS ($r=0.982$) and Tobin's Q ($r=0.848$), indicating that transparency in environmental disclosure is a key strategic factor for increasing firms' competitiveness and attracting investors, especially for firms facing financing or regulatory challenges. This effect is not just statistically significant, but reflects an economic impact that can influence management performance and investment decisions. This result is consistent with the studies conducted by previous studies [9, 33, 11]. In addition, relationships between control variables show strong correlations with both CyRD and CRD, meaning that these factors may play an intermediate or modifying role in the relationship between disclosure and company value. This requires taking them into account in regression models to avoid bias in estimates [1].

Table 5. Pearson correlation matrix

Coefficient	1	2	3	4	5	6	7	8	9	10	11	12
(1) CyRD	1											
Sig.	---											
(2) CRD	.740**	1										
Sig.	.006	---										
(3) CRG	.718**	.996**	1									
Sig.	.009	.000	---									
(4) SCC	.734**	.992**	.984**	1								
Sig.	.007	.000	.000	---								
(5) CRM	.722**	.994**	.997**	.981**	1							
Sig.	.008	.000	.000	.000	---							
(6) MO	.763**	.980**	.967**	.968**	.955**	1						
Sig.	.004	.000	.000	.000	.000	---						
(7) TQ	.777**	.848**	.963**	.815**	.840**	.844**	1					
Sig.	.003	.000	.000	.001	.001	.001	---					
(8) PBV	.278	.609*	.858**	.580*	.619*	.605*	.512	1				
Sig.	.381	.035	.000	.048	.032	.037	.089	---				
(9) EPS	.754**	.982**	.607*	.974**	.970**	.975**	.861**	.541	1			
Sig.	.005	.000	.036	.000	.000	.000	.000	.069	---			
(10) LEV	.722**	.994**	.976**	.981**	1.000**	.955**	.840**	.619*	.970**	1		
Sig.	.008	.000	.000	.000	.000	.000	.001	.032	.000	---		
(11) SIZE	.760**	.998**	.997**	.988**	.991**	.979**	.865**	.595*	.988**	.991**	1	
Sig.	.004	.000	.000	.000	.000	.000	.000	.041	.000	.000	---	
(12) PROF	.763**	.980**	.995**	.968**	.955**	1.000**	.844**	.605*	.975**	.955**	.979**	1
Sig.	.004	.000	.000	.000	.000	.000	.001	.037	.000	.000	.000	---

Note: *: Correlation is significant at the 0.05 level (2-tailed), **: at the 0.01 level (2-tailed)

4.3 Hypothesis testing

Regression analysis is used to predict relationships between the dependent variable (FV) with the independent variables (CRD, CRD) for the purpose of testing the main hypotheses (H1, H2). Several steps have been taken to reduce the potential for internal variation and bias through:

- Inclusion of key control variables LEV, SIZE, PROF that represent the most prominent factors that may affect a company's value, reducing the problem of missing variables.
- Examination of linear Multicollinearity using values (VIF) for all models, which were low ($\leq 1,000$), confirming the stability of the estimates.
- Correlation analysis (Table 5) to check that there are no very strong correlations between independent variables, which enhances the validity of the model.

Furthermore, the primary objective of the study is to explore the directional relationship, not the causal estimation, so the use of OLS is appropriate at this stage for hypothesis testing.

H1: *There is a positive impact of disclosing cybersecurity risks on the firm value.*

This hypothesis emerges the testing of three sub-hypotheses divided according to the selected measures of company value (Tobin's Q, PBV, EPS). Table 6 shows the results of the regression model used to measure the impact of cybersecurity risk disclosure (CyRD) on a company's value according to a scale (Tobin's Q) shows that the coefficient value of the independent variable (CyRD) was 0.823, which is statistically positive at a significance level of less than 5% ($t=3.413$, $p=0.003$). This indicates a strong positive relationship between the degree of cybersecurity risk disclosure and the value of the company, which supports the sub-hypothesis (H1.a).

In practice, this large coefficient size indicates that a single increase in the level of cybersecurity risk disclosure translates into a significant increase in Tobin's Q of 0.823, a ratio that is economically significant, especially in sectors that rely on market confidence and institutional reputation. Thus, these results not only imply a moral impact but also underscore the economic importance of disclosure as a tool to enhance

investor confidence and reduce the perception of future risks. The model results also show that R² value was 0.604, which means that cybersecurity risk disclosure, taking into account the control variables LEV, SIZE, PROF, explains about 60% of the change in a company's value, which is a relatively high level of interpretation.

Table 6. The impact of CyRD on firm value based on TQ

Variable	Coefficient	Std. Error	t-Stat	Sig.	VIF
CyRD	.823	.211	3.413	.003	1.000
LEV	.729	.149	4.891	.001	1.000
SIZE	.787	.145	.865	.000	1.000
PROF	.875	.176	.844	.001	1.000
R-Square			.604		
Adjusted R-Square			.565		
F-statistic			15.272		
Sig. (F-statistic)			.003		

Table 7. The impact of CyRD on firm value based on PBV

Variable	Coefficient	Std. Error	T-Stat	Sig.	VIF
CyRD	.429	.468	.917	.381	1.000
LEV	.782	.314	2.490	.032	1.000
SIZE	.789	.337	2.342	.041	1.000
PROF	.914	.380	2.402	.037	1.000
R-Square			.078		
Adjusted R-Square			-.015		
F-statistic			.840		
Sig. (F-statistic)			.381		

The control variables also showed significant effects, enhancing the reliability of the model and indicating that the relationship between CyRD and TQ is influenced by internal factors such as financial leverage, company size, and profitability. Based on the above, it can be said that the results not only support the hypothesis statistically but also demonstrate a clear economic impact that makes cybersecurity risk disclosure a strategic tool for raising a company's value.

Moving on to Table 7, the results of the regression model that tests the effect of CyRD on the FV when measured by the price-to-book value index (PBV), the findings show that the value of the coefficient (0.429) is positive but statistically insignificant (p=0.381), and the F test indicates that the model as a whole is not stable (F=0.840, p>0.05), which means that disclosing these risks does not adequately explain changes in a company's value according to this measure. Accordingly, the sub-hypothesis (H1.b) is rejected.

However, the magnitude of the coefficient (0.429) must be viewed from a practical perspective. Although not statistically significant, this initial positive trend may reflect that cyber risk disclosure can contribute to enhancing market confidence in the long term. However, its impact on the PBV measure may be limited by the nature of this indicator, which is influenced by accounting factors rather than being a direct reflection of investor perceptions.

The results also indicate that control variables (LEV, SIZE, PROF) had a relatively significant impact, highlighting that PBV assessments are influenced more by internal structural factors than voluntary risk disclosure. This suggests that cyber risk disclosure may not be a major factor in book pricing decisions, but it may be more important in other metrics like Tobin's Q or EPS that directly reflect market trends.

Table 8 shows the regression model results that measure the impact of CyRD on the firm's value according to the EPS index. The results showed that the coefficient for CyRD was 0.892, which is a positive and statistically significant (t=3.631, p=0.005), and the R² value was 0.569. This means that cybersecurity risk disclosure, with the inclusion of the control variables, explains about 57% of the variance in firm value. This indicates good explanatory power of the model.

Table 8. The impact of CyRD on firm value (EPS)

Variable	Coefficient	Std. Error	T-Stat	Sig.	VIF
CyRD	.892	.246	3.631	.005	1.000
LEV	.941	.075	12.578	.000	1.000
SIZE	1.005	.049	20.637	.000	1.000
PROF	1.130	.082	.975	13.806	1.000
R-Square			.569		
Adjusted R-Square			.526		
F-statistic			13.185		
Sig. (F-statistic)			.005		

From an impact size perspective, the coefficient (0.892) is relatively large, indicating that an increased level of CyRD is coupled with a substantial increase in EPS, which reflects an important economic impact. For investors' decisions, this finding suggests that disclosure is a strategic tool for improving confidence in future financial performance and reducing the risk of uncertainty.

The control variables also showed high coefficients and strong semantics, indicating that EPS is influenced by internal factors besides disclosure. However, the clear positive impact of (CyRD) indicates that transparency in cyber risks is considered one of the tools that contribute to raising the market value of companies by improving financial expectations and attracting investors. Accordingly, the sub-hypothesis (H1.c) can be accepted, noting that the magnitude of this impact justifies the adoption of broader disclosure policies in governance and risk management strategies.

Based on the results of Tables 6-8, the first main hypothesis (H1) can be confirmed and accepted, which states that there is a positive and significant impact of CyRD on an FV. This finding suggests that cyber risk disclosure is not just a regulatory obligation, but rather a strategic tool that enhances investor and market confidence by reducing uncertainty associated with cyber threats and providing a more transparent picture of a company's ability to manage risk.

This finding is consistent with previous studies [5, 17, 21, 41], which demonstrated that disclosure enhances market value by improving corporate reputation and attracting investments. Although it contradicts a study [26] that found no significant effect, the results of this study confirm that the magnitude of the effect (Coefficient=0.892) indicates that an increase in disclosure may translate into a significant improvement in corporate value, an effect with clear economic significance.

According to signaling theory, cyber risk disclosure is a way to send positive signals to markets about a company's quality and credibility [42]. Thus, companies that demonstrate high transparency in this area are perceived as more prepared to face future risks, which reduces perceived risks and increases their investment attractiveness [43, 44]. Therefore, these results highlight the importance of disclosure not only for achieving statistical significance, but also for achieving practical economic value that increases the company's competitiveness in the markets.

H2: *There is a positive and significant impact of climate risk disclosure on firm value.*

Table 9 shows the results of a regression model that measures the impact of climate risk disclosure (CRD) with its four sub-indices, GCC, SCM, MRC, and MG on a company's value according to Tobin's Q index. The results showed that the coefficient value for (CRD) was 0.809, which is a positive and highly significant coefficient ($t=5.063$, $p<0.01$). The R^2 value was 0.719, which means that CRD, with the introduction of the control variables explains about 72% of the change in the company's value, which is a high level of interpretation that highlights the strength of the model. In terms of effect Size, the coefficient (0.809) indicates that an increased level of climate risk disclosure is associated with a significant improvement in firms' valuation in markets (Tobin's Q), an impact that can not only be considered statistically significant, but also shows strategic value, especially for companies operating in regulatory environments and markets with a growing interest in environmental sustainability.

Table 9. The impact of climate risk disclosure on firm value based on TQ

Variable	Coefficient	Std. Error	T-Stat	Sig.	VIF Values
CRD	.809	.160	5.063	.000	1.000
CRG	.758	.143	5.291	.000	1.000
SCC	.826	.186	4.452	.001	1.000
CRM	.729	.149	4.891	.001	1.000
MO	.875	.176	4.969	.001	1.000
LEV	.729	.149	4.891	.001	1.000
SIZE	.787	.145	5.443	.000	1.000
PROF	.875	.176	4.969	.001	1.000
R-Square			.719		
Adjusted R-Square			.691		
F-statistic			25.637		
Sig. (F-statistic)			.000		

All four disclosure indicators GCC, SCM, MRC, and MG revealed positive coefficients and significant connotations, reflecting that each dimension clearly contributes to improving the company's value. In contrast, control variables demonstrated a significant impact, indicating that the relationship between disclosure and value is influenced by internal structural factors. According to signal theory, climate risk disclosure sends positive signals to investors about a company's seriousness in managing long-term risks and the sustainability of its business, which enhances market confidence and raises its valuation.

Accordingly, the sub-hypothesis (H2.a) which states that climate risk disclosure has a significant and positive impact on a company's value according to Tobin's Q index can be accepted. These findings indicate that environmental disclosure is not just an obligation, but rather represents a strategic tool to enhance institutional legitimacy, attract capital, and increase competitiveness in markets.

Table 10 presents the results of a regression model that tests the impact of climate risk disclosure (CRD) on a firm's value according to the Price to Book Value Index (PBV). The results showed that the coefficient (CRD) was 0.846, which is positive and statistically significant ($t=2.430$, $p<0.05$). The R^2 value was also 0.371, meaning that climate risk disclosure, with the inclusion of the control variables explains about 37% of the variance in the company's value. Although the explanatory power is lower than the Tobin's Q index results in

Table 9, the result is still statistically and economically significant.

Table 10. The impact of climate risk disclosure on firm value based on PBV

Variable	Coefficient	Std. Error	T-Stat	Sig.	VIF Values
CRD	.846	.348	2.430	.035	1.000
CRG	.781	.324	2.414	.036	1.000
SCC	.856	.380	2.250	.048	1.000
CRM	.782	.314	2.490	.032	1.000
MO	.914	.380	2.402	.037	1.000
LEV	.782	.314	2.490	.032	1.000
SIZE	.789	.337	2.342	.041	1.000
PROF	.914	.380	2.402	.037	1.000
R- Square			.371		
Adjusted R-Square			.308		
F-statistic			5.905		
Sig. (F-statistic)			.035		

From an effect size, the coefficient (0.846) indicates that an increased level of climate risk disclosure is associated with a significant improvement in a company's value when measured in PBV, an effect that cannot be considered merely statistically significant, but rather shows practical value for companies in enhancing investor confidence and raising their book valuations. Disclosure of climate risks is a signal to markets and investors that the company is aware of environmental risks and has clear strategies to manage them. This signal thus reduces investor uncertainty and enhances a company's credibility, improving its valuations even on accounting-based metrics such as PBV.

All four disclosure indicators GCC, SCM, MRC, and MG showed positive and significant coefficients, reflecting that each dimension of disclosure adds real value. In addition, control variables showed a significant effect, suggesting that PBV valuations are influenced by a combination of disclosure and structural factors.

Based on these results, the sub-hypothesis (H2.b), which states that climate risk disclosure has a significant and positive impact on a company's value according to the PBV index can be accepted. This result hence confirms that environmental disclosure not only serves regulatory compliance, but is a strategic tool for building market confidence and enhancing a company's value.

Table 11. The impact of climate risk disclosure on firm value based on EPS

Variable	Coefficient	Std. Error	T- Stat	Sig.	VIF Values
CRD	1.047	.063	16.620	.000	1.000
CRG	.964	.068	14.126	.000	1.000
SCC	1.103	.082	13.309	.000	1.000
CRM	.941	.075	12.578	.000	1.000
MO	1.130	.082	13.806	.000	1.000
LEV	.941	.075	12.578	.000	1.000
SIZE	1.005	.049	20.637	.000	1.000
PROF	1.130	.082	13.806	.000	1.000
R- Square			.965		
Adjusted R-Square			.962		
F-statistic			276.230		
Sig. (F-statistic)			.000		

Table 11 presents the results of a regression model that tests the impact of Climate Risk Disclosure (CRD) on a firm's value according to the Earnings Per Share Index (EPS). The table's

results showed that the coefficient for (CRD) was 1.047, which is a positive and strongly statistically significant coefficient ($t=16.620$, $p<0.01$). The R^2 value also showed a very high value of 0.965, which means that climate risk disclosure explains 96% of the change in EPS. This result reflects the exceptional explanatory power of the model.

From an effect size perspective, the coefficient value (1.047) shows that increased climate risk disclosure is coupled with a significant improvement in corporate profitability per share, indicating a tangible economic impact. This result not only demonstrates statistical significance, but also argues that climate risk disclosure is a strategic lever that can make a significant difference in market assessments. Furthermore, disclosure of climate risks sends clear signals to markets and investors that the company is adopting proactive strategies to manage long-term risks. This signal boosts investor confidence and reduces uncertainty, which leads to higher financial valuations.

When looking at the four dimensions of disclosure GCC, SCM, MRC, and MG, we find that they all showed positive and significant coefficients, indicating that the impact is not limited to just one dimension, but rather an integrated cumulative impact that supports the company's position in the markets. In addition, control variables have proven their role in influencing EPS, suggesting that the relationship between disclosure and value is influenced by a combination of internal and external factors.

Based on these results, the sub-hypothesis (H2.c) can be accepted, which confirms the positive and moral impact of climate risk disclosure on a company's value according to the EPS index. Hence, the results show that disclosure not only achieves regulatory compliance, but is also a strategic element that enhances institutional legitimacy, reassures investors, and contributes to creating a strong competitive advantage.

Based on the results of Tables 9-11, the second main hypothesis (H2) can be confirmed and accepted, which states that climate risk disclosure positively affects a company's value. Analyses' findings showed that disclosure across its four dimensions GCC, SCM, MRC, MG explains a significant proportion of the variance in Tobin's Q, PBV, EPS value indices, with explanatory power reaching 96% of changes in EPS ($R^2=0.965$), with high impact coefficients exceeding 1.0 in some indices, suggesting that climate risk disclosure represents a fundamental economic and strategic factor rather than just a regulatory obligation.

- According to signal theory [42], climate risk disclosure sends positive signals to markets that a company is adopting proactive environmental risk management strategies, which reduces investor uncertainty and enhances their confidence in the sustainability of financial performance, which is reflected in improved value indicators such as EPS and Tobin's Q.

- Legitimacy theory [45, 46] shows that climate risk disclosure helps companies enhance their social and regulatory legitimacy by demonstrating their commitment to sustainability practices and good governance, which reduces legal and regulatory risks and improves their corporate reputation, which increases their attractiveness to investors [47, 48].

The analysis also shows that the four dimensions of disclosure GCC, SCM, MRC, and MG all contribute in an integrated and cumulative manner to raising the company's value; The positive coefficients and statistical connotations of each indicator reflect that the impact is not limited to a specific aspect (such as climate management or risk governance), but

rather expresses a comprehensive strategic approach that enhances the company's competitiveness and reduces financial risks resulting from climate change [49].

Thus, these findings confirm that climate risk disclosure is not simply a regulatory requirement or a response to stakeholder demands [9, 11, 33], but rather a strategic tool with a dual impact: on the one hand, it sends signals of confidence to markets, and on the other hand, it gives the company social and regulatory legitimacy, which supports the stability of its market value and enhances the long-term sustainability of its performance.

5. CONCLUSIONS AND IMPLICATIONS

The study confirms that cybersecurity risk disclosure (CyRD) and climate risk disclosure (CRD) are key pillars that enhance transparency and sustainability, and directly impact the value of companies within Asian markets. Based on annual financial data covering 367 companies in 12 countries for the period 2020-2024, the results showed that disclosure in both areas is positively and significantly related to company value metrics Tobin's Q, PBV, and EPS. This not only reflects statistical significance, but also indicates a tangible economic impact represented by increasing investor confidence, improving corporate reputation, and reducing financial risks [50].

5.1 The results conclusion to two main findings

First, the study showed that disclosing cybersecurity risks is associated with increased company value. Companies that adopt clear disclosure policies about these risks are viewed in the markets as more credible and less vulnerable to attacks, which enhances their market value [1, 17, 18, 21]. Transparency in this area also helps mitigate the financial risks resulting from cyber-attacks, which reduces uncertainty and enhances the company's value [44].

Second, the study demonstrated that climate risk disclosure contributes to raising a company's value by enhancing its reputation and demonstrating its commitment to governance and sustainability [45]. The disclosure also helps companies reduce potential financial risks resulting from climate change, which enhances the stability of their performance in investors' interest [49].

5.2 The practical implications of these findings extend into three main categories

Management: Companies must develop comprehensive and systematic disclosure policies, including identifying and assessing risks and developing strategies to mitigate them, with periodic disclosure through financial and sustainability reports. High transparency gives companies a clear competitive advantage and helps them attract capital [2].

Investors: The level of risk disclosure provides a reliable indicator of the quality of a company's governance and its ability to adapt to future challenges, enabling investors to make more informed investment decisions based on risk and return assessments [1, 21, 41].

Policymakers: There is a need to develop mandatory frameworks and standards for climate and cyber risk disclosure, consistent with global best practices, to enhance transparency and attract investment [51].

6. RECOMMENDATIONS AND FUTURE STUDIES

With cyber risks and climate change constantly increasing, disclosure in these two areas is likely to become a globally mandatory requirement in the coming years. This shift will encourage companies to integrate disclosure into their environmental and social governance (ESG) strategies, potentially giving them access to low-cost financing and attracting sustainable investments. Companies that start adopting these practices early will also have a long-term competitive advantage, while lagging companies may face greater regulatory and financing challenges.

The study results indicate that risk disclosure is no longer just a voluntary practice, but a strategic necessity to support transparency and enhance market stability. Therefore, governments and regulators in Asia must establish binding legislative frameworks for disclosing climate and cyber risks, enhancing regional competitiveness at the global level and creating a more sustainable and attractive business environment for investments to achieve a balance between profitability and corporate sustainability. Finally, the study recommends the following:

- Expand future studies to include the interactions of non-financial disclosures with corporate governance characteristics such as board structure and institutional investor ownership.

- Use advanced economic models to address the problem of self-bias, such as two-stage regression (2SLS) models or dynamic models.

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