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The Stock Market Reaction to Public Bank ESG Disclosure: An Empirical Examination Across Asian Economies

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ABSTRACT. This study investigates the stock market's reaction to ESG information across 44 banks in 6 major Asian economies using an event-based research methodology, thereby supplementing the still-lacking evidence on ESG information valuation in different institutional and legal environments. In the study, market reaction was recorded using the cumulative mean abnormal return (CAAR), with statistical significance assessed through paired t-tests and non-parametric durability tests. The study's findings indicate that markets react differently to events; specifically, the negative reactions of the Chinese, Indonesian, and Malaysian markets are due to investor scepticism or weak signal effects in these markets. Taiwan, however, showed the opposite result, with investors valuing ESG transparency due to its stronger regulatory enforcement and higher ESG maturity. No significant market reaction was observed in Japan and India. The study indicates that the impact of ESG disclosure on firm value depends on institutional quality, regulatory credibility, and investor sophistication. This result expands the body of ESG data in the Asian banking industry and suggests policies to improve disclosure effectiveness.

1. Introduction

Environmental, Social and Governance (ESG) criteria, introduced in 2005, have become globally significant in both academic and professional spheres [69]. Since 2019, ESG-related Google searches have increased fivefold (Google, 2024), reflecting growing attention from governments, investors, and corporations toward climate action, social equity, and governance transparency [13]. By 2020, over 90% of S&P 500 and 70% of Russell 1000 firms had published ESG disclosures [32]. ESG practices are now integrated across Asia, Europe, and the U.S., although Asia lags, contributing only 4.2% of global ESG assets [63]. Financial constraints remain a barrier; China's current ESG funding accounts for just 15% of its annual need [9].

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In Asia, although ESG interest is growing, constraints and a lack of standardised disclosure frameworks hinder progress [68]. In recent years, several Asian economies have begun strengthening their ESG regulatory frameworks, though progress remains uneven. Japan, for instance, pioneered the Stewardship Code (2014) and the Corporate Governance Code (2015), promoting long-term value creation and investor engagement on ESG issues [28]. India, through the Securities and Exchange Board of India (SEBI), has mandated Business Responsibility and Sustainability Reporting (BRSR) for listed companies since 2021, aiming to enhance ESG transparency and comparability [76]. Similarly, China and Malaysia have integrated ESG disclosure requirements into stock exchange listing rules, while Taiwan's Financial Supervisory Commission introduced sustainability reporting guidelines aligned with TCFD recommendations. Despite these regional advances, the absence of harmonised standards across Asia still limits cross-border comparability and investor confidence. This fragmented regulatory landscape is particularly consequential for the banking sector, where regulatory credibility, disclosure consistency, and investor trust play a central role in shaping market perceptions. Compared with the EU's more advanced and harmonised ESG framework, regulatory heterogeneity in Asian markets may weaken the signalling value of ESG disclosures, thereby obscuring their role in stock market valuation and contributing to divergent investor responses across countries. Besides, most studies emphasise ESG's link to firm-level financial performance, using indicators such as ROA, ROE, Tobin's Q, and stock returns [20, 26, 23]. However, these traditional performance metrics primarily capture long-term outcomes and provide limited insight into how investors process ESG information at the time of disclosure. As a result, an important indicator gap remains regarding short-term stock market reactions to ESG disclosures, particularly in the banking sector and within Asian markets characterised by varying levels of institutional development, regulatory enforcement, and investor sophistication. In such contexts, ESG information may be interpreted differently from that in more mature markets, potentially leading to heterogeneous or even adverse market reactions that challenge existing empirical findings. This study addresses this gap by examining how ESG disclosure affects stock performance in six Asian markets: China, Japan, India, Indonesia, Malaysia, and Taiwan. Focusing on ESG rating announcements for commercial banks, which are provided by leading asset managers [73], the research aims to answer three questions: (1) Do investors react to ESG disclosures? (2) Are the reactions positive? and (3) What is the magnitude of these reactions?

To provide a clear analytical roadmap, market responses are assessed using industry-adjusted returns within a ±10-day event window surrounding ESG disclosure dates, consistent with prior event-based studies [15, 76, 24]. Applying the event - study methodology [54] allows the isolation of short-term investor reactions to ESG information while minimising confounding market effects. With event-study methodology, this research contributes by highlighting the impact of

ESG disclosures on stock performance in the banking sector, shifting focus from traditional performance metrics to Cumulative Abnormal Average Returns (CAAR), and offering insight into the ESG–market dynamic in the Asian context. Unlike most prior event studies that focus on single-country settings or mixed-industry samples, this study is original in two key ways. First, it provides a cross-country comparative perspective across six major Asian economies, allowing examination of how distinct institutional, regulatory, and market maturity differences shape investors' reactions to ESG disclosures. This cross-national design enables a nuanced understanding of ESG's heterogeneous effects, contrasting mature markets (e.g., Japan and Taiwan) with emerging ones (e.g., Indonesia, India, and Malaysia). Second, by concentrating specifically on the banking sector, the study highlights an underexplored yet systemically important industry in which ESG transparency directly influences stakeholder trust, capital allocation, and financial stability. Through the integration of cross-country comparison and sector-specific analysis, this research strengthens the central contribution of the paper and extends existing event study literature by providing novel empirical evidence on how ESG information is priced in Asian financial markets.

2. Theoretical background and hypothesis development

2.1. ESG disclosure

Theoretically, ESG are criteria to consider the sustainability level of a company [31]. According to Li et al. (2023) [47], in the context of global economic and social development associated with ethics and sustainable operations, ESG principles have been developed, becoming a set of principles to promote the coordinated development of environment, society, and governance. Implementing ESG criteria helps businesses manage risks and improve long-term financial performance [18]. ESG, which can show a business's commitment to sustainable development, is increasingly being considered by external stakeholders, especially investors [57]. ESG disclosure can be understood as the way businesses publicise their environmental, social, and governance activities in a report [40]. Chen and Xie (2022) [15] pointed out that ESG disclosure is the process of publicly and transparently reporting information about a business's ESG activities. According to Tsang et al. (2024) [90], ESG disclosure improves a business's reputation and creates an advantage in attracting investment. Beyond financial responsibility, ESG in businesses fosters social commitment, serving as a vital link between companies and key external stakeholders, including investors, customers, and governments [92].

While the literature consistently recognises ESG disclosure as a mechanism for enhancing transparency, reputation, and stakeholder engagement, it remains less clear how such disclosures are interpreted by financial markets at the time they are released. Most ESG studies implicitly assume that improved disclosure quality translates into favourable market perceptions, yet they

rarely distinguish between long-term valuation effects and short-term investor reactions. This conceptual ambiguity motivates further investigation into ESG disclosure as an information event rather than solely a performance signal. To measure the reliability of ESG disclosures published by businesses, ESG scores appear as a specific rating scale [18]. According to Halid et al. (2023) [33], ESG scores are a tool that allows investors and stakeholders to directly and quickly assess non-financial risks and sustainability commitments. ESG scores are calculated and evaluated by third parties - reputable ESG rating organisations [86], taking MSCI ESG Ratings, Sustainalytics, and S&P Global ESG Ratings as examples. In addition, some stock exchanges, such as Refinitiv ESG Score (London Stock Exchange), also collect corporate data, provide assessments, and ESG scores of corporations [84]. Despite the widespread use of ESG scores, prior research has not fully examined whether the publication of these scores itself generates immediate market responses, particularly across different institutional settings. This raises an unresolved question as to whether ESG scores function as value-relevant signals at the disclosure stage or are merely absorbed gradually into long-term performance assessments

2.2. Stock market reaction

Stock market reactions, their determinants, and measurement methods have been widely examined [59, 93, 101, 52, 71]. To establish an appropriate empirical framework, it is essential to review the literature on market responses to new information. The Efficient Market Hypothesis (EMH) posits that in an efficient market, all available information is immediately reflected in stock prices [22, 75]. This implies that prices adjust rapidly to news releases [91], enabling investors to reassess firm value based on updated expectations [82]. In detail, it is defined that the market will react in two directions - positive announcements typically raise stock prices, while negative ones cause declines [3, 39]. For instance, Brealey et al. (2011) [7] found significant price movements around dividend announcements. Similarly, Memon & Shaikh (2003) [60] observed share price fluctuations surrounding merger announcements. Ittonen (2012) [37] elaborated that once new information is released, the market promptly incorporates it, leading to immediate price adjustments initiated by investors. Collectively, this stream of literature establishes that market reactions are fundamentally driven by the arrival of new information. However, most empirical evidence focuses on financial or strategic announcements, leaving non-financial disclosures, such as ESG information, comparatively underexplored as distinct information events. Consequently, it remains insufficiently understood whether markets react to ESG disclosures in a manner comparable to traditional corporate announcements

Early studies, such as Collins (1957) [11], revealed that U.S. markets responded notably to firm performance indicators like earnings and profit margins [78, 72]. Recent findings by Pandey et al. (2024) [67], Suttipun et al. (2025) [83] under the EMH framework further show that markets react positively to governance disclosures that emphasise transparency and accountability. These

findings suggest that the informational content and credibility of disclosures play a critical role in shaping investor responses. However, whether ESG disclosures carry sufficient informational strength to trigger short-term abnormal returns- particularly in markets with heterogeneous institutional quality - remains an open empirical question.

In summary, these studies confirm that the stock market reaction is fundamentally driven by the arrival and interpretation of new information, whether financial, strategic, or environmental. The pattern and magnitude of this reaction depend not only on the content of the information but also on market structure and investor behaviour. In this context, ESG disclosure can be conceptualised as a specific type of "information event" that conveys non-financial signals about a firm's sustainability, risk management, and governance quality. Similar to traditional corporate announcements, ESG information releases provide investors with cues to reassess firm value and future prospects. Thus, understanding market reaction to ESG disclosure aligns directly with the broader literature on how markets absorb, price, and react to new information under the EMH framework. Accordingly, the concept of market reaction in this study is grounded in the notion that investors continuously process new ESG information and adjust their trading behaviour in response. A positive ESG announcement is expected to enhance investor confidence and lead to upward price adjustments, whereas negative or ambiguous ESG news may trigger adverse reactions. This theoretical linkage provides the foundation for employing the event study methodology to capture short-term abnormal returns surrounding ESG disclosure events. Besides, similar to previous event-driven studies, this research also applies the event study approach to evaluate how environmental information in the form of ESG disclosures affects stock price dynamics across markets.

2.3. The relationship between ESG disclosure and stock market reactions

Over the past decade, a substantial body of empirical research has investigated ESG disclosures and their influence on stock market reactions. Hassani and Bahini (2022) [34] found that while mandatory ESG disclosure can improve transparency, its economic impact depends on national development and firm characteristics, suggesting heterogeneous effects across contexts. Besides, Pulino et al. (2022) [8] reported that environmental and social performance enhance profitability, though governance factors remain insignificant. Moreover, Tsang et al. (2023) [89] highlighted that external determinants such as industry and regulatory environment moderate the ESG - performance link, implying that market reactions may vary with institutional maturity. Together, these studies indicate that ESG disclosure matters for firm outcomes, but they also reveal considerable variation in both direction and magnitude of effects. Importantly, most of this evidence relies on accounting-based or long-term financial performance indicators, offering limited insight into how investors respond to ESG information at the moment of disclosure.

Event study methodology has been widely used [6,44], and has helped confirm a relationship between market fluctuations and ESG announcement dates. To begin with, Hassani and Bahini (2022) [34] examined how mandatory ESG disclosure impacts economic growth and information asymmetry. Their findings suggest that current ESG policies may not significantly reduce asymmetry, with optimal disclosure levels depending on national development, firm size, and growth potential. However, their qualitative method limited the capacity to quantify market reactions and lacked geographical specificity. Similarly, Pulino et al. (2022) [8] explored the relationship between ESG performance and financial indicators like EBIT and ROA using linear regression. The study found that environmental and social components positively influenced performance, while governance had no significant effect. However, the lack of isolation from external events could introduce measurement bias. In addition, Tsang et al. (2023) [89] conducted a systematic literature review to assess how external determinants - such as industry, regulatory environment, and national identity - affect the ESG - firm performance link. Like Hassani and Bahini (2022) [34], their qualitative approach limited quantitative insights. Furthermore, Serafeim and Yoon (2023) [74] applied the event study methodology to ESG news from 3,126 companies using TVL, Compustat, and CRSP data. Their results showed that the market reacts more strongly to ESG announcements related to financial and social capital, emphasising that investors are primarily motivated by the financial implications of ESG disclosures. In a country-specific context, Wang et al. (2023) [92] employed linear regression to examine ESG performance and stock price fragility using CSMAR data from the Chinese market. Better ESG performance was associated with reduced stock price fragility. However, the limited geographic scope suggests the need for broader regional studies. Finally, Dorfleitner and Zhang (2024) [17] used BERT NLP models to analyse real-time ESG news and its impact on stock prices. They found that negative ESG news generated stronger abnormal returns than positive news. Additionally, a firm's historical ESG reputation moderated investor response, with strong ESG performers showing lower sensitivity to bad news. Despite these advances, several gaps remain unresolved. First, existing event-based ESG studies are predominantly concentrated in Western or single-country settings, limiting their generalizability to Asian markets. Second, few studies focus explicitly on the banking sector, where regulatory credibility and ESG transparency are particularly salient. Third, prior research rarely integrates institutional and market-efficiency considerations to explain why ESG disclosures may trigger divergent market reactions across countries. These limitations suggest that the short-term market response to ESG disclosure in Asia remains insufficiently understood.

Overall, the existing literature can be mapped along three main streams: (i) studies examining the direct financial effects of ESG performance on firm value and profitability, (ii) research exploring ESG disclosure as an informational mechanism affecting market efficiency and asymmetry, and

(iii) event-based analyses focusing on investor behavioural responses to ESG-related news. Despite these contributions, several research gaps remain. First, most prior studies are concentrated in Western or single-country contexts, with limited comparative evidence across Asian markets that exhibit varying levels of ESG regulatory maturity and investor sophistication. Second, earlier approaches often fail to control for confounding market events, thereby limiting the precision of causal inference in ESG relationships. Third, few studies integrate institutional and market-efficiency perspectives to explain why reactions to ESG disclosure differ across economies. Finally, methodological diversity remains limited; most studies rely on regression-based designs rather than comprehensive event study frameworks that can isolate short-term abnormal returns. In light of the methodological gaps and regional limitations in prior research, the present study seeks to offer a more robust empirical analysis of ESG announcements and stock market reactions across the Asian market. By using event study methodology and controlling for contextual variables, this research aims to clarify causal relationships and generate actionable insights for firms and investors navigating ESG-driven capital markets.

2.4. Background theory

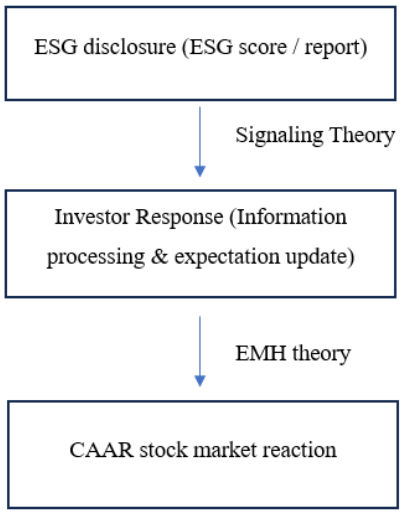
The Efficient Market Hypothesis (EMH) states that stock prices fully and promptly reflect all available information [22, 55, 97, 62]. Accordingly, when new information, such as ESG disclosures, is released, the market adjusts stock prices in response. If ESG scores signal positive long-term prospects, prices may rise, and vice versa. Leite and Uysal (2023) [46] confirmed this by showing that changes in ESG ratings influence investor reactions. EMH consists of three forms. First**,** the weak-form reflects past data, such as prices and trading volume [21]. In such markets, ESG disclosures may result in delayed or weak reactions. Second**,** in semi-strong form markets, prices reflect both past and all publicly available information - including ESG scores and sustainability reports [88]. Thus, most ESG-related market responses occur in this category. Third, strong-form efficiency assumes that even insider information is already reflected in stock prices [10], reducing the impact of public ESG disclosures. Specifically**,** in semi-strong markets, investors respond to changes in ESG scores as they anticipate future profitability and sustainability [42, 65]. Lopes and Jucá (2025) [53] applied EMH to examine the effects of mandatory ESG disclosures in Brazil, confirming that weak and semi-strong markets both absorb ESG-related information, though to varying degrees. Within the EMH framework, ESG disclosure can therefore be conceptualised as a public information event that is rapidly incorporated into stock prices, particularly in semi-strong efficient markets. In this study, the market response to ESG disclosure is operationalised through CAAR, which captures investors' short-term reassessment of firm value following the release of ESG information

In addition to EMH, signaling theory further explains how ESG disclosures influence investor behaviour. This theory involves a sender (e.g., a company) signaling relevant information to a

receiver (e.g., investors), who then interpret and respond [12]. ESG reports serve as credible signals about a firm's unobservable qualities, prompting stock purchases or sales depending on investor interpretation [94]. Recent studies have also highlighted that the market's ability to process new information is closely tied to crash risk and investor sentiment. Srivastava et al. (2024) [81] demonstrated that asymmetric information and behavioural biases can amplify price volatility and crash risk following new disclosures. This supports the relevance of the signaling theory in explaining how timely and credible ESG information mitigates such risks by improving transparency and investor confidence. For example, Zhang and Wiersema (2009) [101] observed that CEOs signal firm quality through financial metrics and dividends. Connelly et al. (2010) [12] emphasised that signaling theory is well-suited to stock market contexts, as it captures how firms communicate intent and performance through observable events. Other studies support this view, noting that investment-related signals often drive market reactions [71, 101, 52]. From a signaling perspective, ESG disclosure represents a credible non-financial signal that conveys information about a firm's sustainability orientation, governance quality, and long-term risk management. Investors interpret this signal and adjust their trading behaviour accordingly, leading to observable stock market reactions measured by CAAR. Thus, ESG disclosure functions as the independent signaling variable, while CAAR reflects the outcome of investors' collective response in the stock market.

In addition, to fully explain why investor responses differ across Asian markets with varying ESG regulatory maturity, both Stakeholder Theory and Institutional Theory should be integrated. Stakeholder Theory [25] posits those corporate actions - such as ESG disclosure - are shaped by the need to meet the expectations of diverse stakeholders, including investors, regulators, customers, and society. In markets with high stakeholder awareness and transparency norms, investors tend to reward ESG disclosures because they are perceived as genuine commitments to social responsibility and long-term value. Conversely, in emerging markets where stakeholder engagement mechanisms are weaker, investors may interpret ESG reporting as compliance-driven or symbolic, leading to weaker or even negative reactions [2, 24]. Institutional Theory [61] complements this view by emphasising that firms operate within national regulatory and cultural contexts that shape their ESG behaviour. Institutional pressures - such as coercive regulation, normative professional standards, and mimetic imitation - determine how ESG practices are adopted and perceived. Integrating EMH and signaling theory with stakeholder and institutional perspectives provides the basis for a conceptual model in which ESG disclosure acts as a credible signal, transmitted to the market through disclosure events, while CAAR captures the resulting stock market reaction. The strength and direction of this relationship are conditioned by institutional quality, regulatory enforcement, and stakeholder expectations across different Asian markets. A conceptual framework illustrating these relationships is presented in Figure 1 below:

Figure 1. Conceptual framework of ESG disclosure and stock market reaction



Source: The authors

In summary, while EMH and signaling theory explain how information affects stock prices through rational market mechanisms, stakeholder and institutional perspectives add depth by clarifying why market responses differ across countries. Together, these frameworks offer a more holistic understanding of how ESG information is interpreted, moderated by social expectations, institutional enforcement, and the maturity of regulatory environments in Asian markets.

2.5. Hypothesis development

As discussed above, this study is implemented with the assumption that the market consumes all existing available information, adjusting immediately to the stock price, which reveals a reaction of the investors to each piece of information. According to the semi-strong form of EMH, public information, such as ESG scores, is promptly incorporated into stock prices [22]. In the same context, Signalling Theory highlighted that ESG disclosures serve as credible signals regarding a firm's long-term sustainability and financial prospects [71]. Thus, when the companies reveal the ESG positive results, a positive signal may be also sent to the investors; meanwhile, the market consumes this information [75]; as a result, which leads to investor optimism and upward price adjustments. Conversely, negative or ambiguous disclosures may prompt adverse market responses [74]. Therefore, supported by the Efficient Market Hypothesis (EMH) and Signalling Theory as the primary background for this research, as well as based on the theoretical background above, this study hypothesises:

(Hi) ESG disclosure significantly influences stock market reactions in country i.

However, unlike prior studies that primarily tested this relationship within a single country or Western contexts, this research introduces new insights by examining how the direction and magnitude of market reactions differ across Asian economies with varying ESG regulatory maturity, investor sophistication, and institutional development. Specifically, this

study not only examines whether ESG disclosure affects stock prices but also explores how institutional quality and market efficiency shape the nature of this impact. In doing so, it extends the existing body of knowledge by providing comparative evidence on Asian ESG-dynamics markets - a perspective that remains underexplored in the current literature.

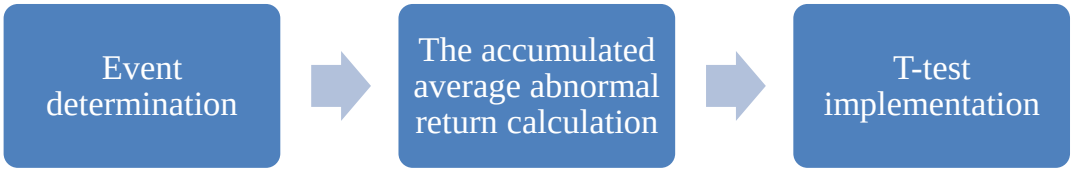
3. Research methodology

3.1. Research method

To analyse the stock market reaction, the event study will be established throughout the research process. Accordingly, the event-study approach (ESA) is defined as a statistical hypothesis testing technique focusing on quantitatively evaluating the impact of "any events" on the market, such as mergers, earnings announcements, or dividend payments disclosure [40]. Besides, Corrado (2011) [16] pointed out that the most important determinant affecting the success of assessing the market response is the need to isolate the researched events, which requires minimising the "noise" [40]. Therefore, this study takes the ESA as the primary empirical method. However, this study extends the traditional event study application by incorporating ESG-specific disclosure data and applying a single-factor benchmark adjustment to control for systematic market effects. This refined design allows the hypothesis test to be conducted more precisely by distinguishing between pre- and post-disclosure performance while accounting for firm- and market-level dynamics. Regarding event definition, the event day (D+0) is defined as the exact publication date of the bank's ESG or sustainability report, which contains the ESG score publicly disclosed to investors. This date is verified through the official corporate report available on each bank's investor relations or sustainability webpage, ensuring consistency and traceability. To address potential confounding effects, three mitigation measures are adopted:(i) for firms with concurrent major announcements, the event window is excluded; (ii) systematic risk (β) and alpha (α) adjustments are applied following Kliger & Gurevich (2014) [40] to isolate abnormal returns.

To implement the ESA, this study follows the Single-Factor Benchmark of Returns method, which is guided by Kliger & Gurevich (2014) [40]. In detail, three main stages will be established as shown in Figure 2 below.

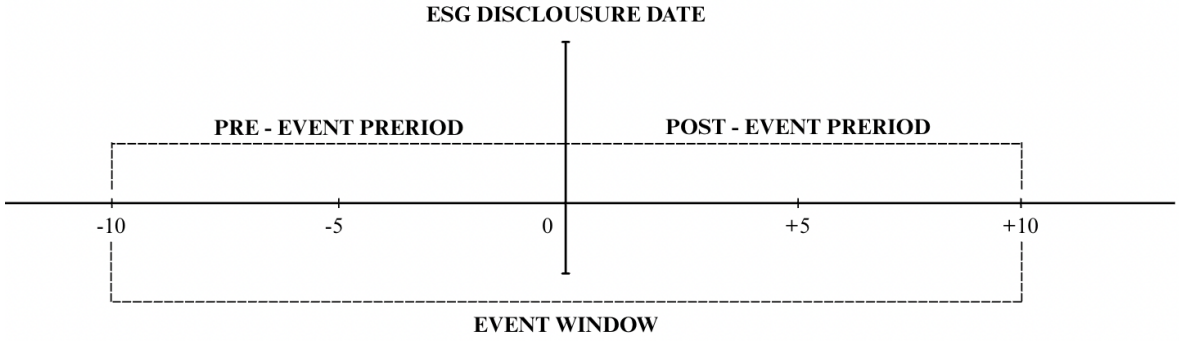
Figure 2. The research methodology framework



Source: The author

Firstly, the event is determined as the ESG disclosure announcement of the companies in the Asian market. The authors set out the event windows are (-10, +10) as illustrated in the Figure 3, which affirms that the measurement of market reaction will be estimated during this period; the event date will be set as the day of ESG report publication to the market. The ±10-day event window is adopted to capture potential information leakage, delayed investor responses, and gradual price adjustment commonly observed in Asian equity markets. Unlike highly efficient markets where price reactions may be concentrated within a very short horizon, some Asian markets, particularly emerging ones, exhibit lower liquidity, higher information asymmetry, and a greater dominance of retail investors. These characteristics often lead to staggered reactions before and after disclosure dates. A wider event window therefore allows for a more comprehensive assessment of short-term market responses to ESG disclosures, while remaining sufficiently narrow to minimize contamination from unrelated long-term effects. This approach is consistent with prior event-based studies examining non-financial disclosures, which document delayed and staggered market reactions in contexts characterized by heterogeneous market efficiency and information asymmetry [42, 24]

Figure 3. The event windows



Following MacKinlay (1997) [54], this study calculates CAAR over the event window. Therefore, after identifying the event (ESG disclosure date) and selection criteria, the next step is to estimate the CAAR. In detail, to determine the CAAR, the initial stage is to collect the stock prices around the event window; for this purpose, the ESG disclosure date is determined. Once this is accomplished, the daily stock return for each sample is calculated as follows, in which the Ri,t is the stock return of stock i on day t, Pi,t is the closing price of stock i at day t, and Pi,t-1 is the Closing price of stock in on the previous day.

$$R_{i,t} = \frac{(P_{i,t} - P_{i,t-1})}{P_{i,t-1}}$$

After defining the Ri,t, the abnormal return (AR) for each sample is calculated. ARi,t is the abnormal return of stock i at time t; Ri,t stands for the return of company i stock at time t, and Rm,t is the return of the market on day t; beta is the systematic risk, and alpha is the intercept.

$$\mathrm{AR}_{i,t} = \mathrm{R}_{i,t} - \left(\alpha_i - \beta_i . \mathrm{R}_{m,t}\right) + \mathrm{E}_{i,t}$$

Using the "Single-Factor Benchmark", this research adds the beta and alpha into the AR calculation. Technically, these factors play an important role in supporting the research to reduce the "noise" and the "bias" [40]. First, adding alpha supports the research to isolate the abnormal stock return that is not being affected by the normal market fluctuation; Second, adding Beta means that this research considers the systematic risk.

After the ARi,t, the AARt is computed for each t day across N samples, the formula as follows.

$$\mathrm{AAR}_{i,t} = \frac{1}{N} \times \sum_{t=1}^{N} \left(\mathrm{AR}_{i,t}\right)$$

Finally, the cumulative average abnormal return (CAAR) is calculated. The formula for this calculation is determined as follows, in which $CAAR_m$ is the cumulative excess return over the observation period, and AAR_t is the average abnormal return over the event window, which means that it is defined from t = -10 to t = +10.

$$\mathrm{CAAR}_m = \sum_{t=1}^{m} (\mathrm{AAR}_t)$$

Lastly, the T-test is employed for hypothesis testing, especially to determine whether the research result is statistically significant and whether the distinction before and after the event is due to chance or not [66]. Accordingly, due to the application of event study, this research utilizes the use of the paired samples t-test. Manfei (2017) [56] highlighted that this type of T-test is particularly valuable in the case of comparing paired samples, where each observation in one sample corresponds to a specific observation in the other, which is commonly witnessed in "before and after" measurements. Besides, in this research, since the collected sample is used to observe the difference before and after the event date, this T-test will be applied for this fundamental purpose, particularly through the Excel analysis tool to generate the T-test final result.

3.2. Research sample and data collection

The study focuses on six Asian markets: Malaysia, Japan, Indonesia, India, Taiwan, and China. These countries were selected due to the availability of standardized ESG disclosures and market data, as well as their representativeness of varying levels of ESG regulatory maturity in Asia. Although Singapore and Thailand were initially considered, they were excluded because ESG reporting in their banking sectors often lacks consistent, date-specific disclosure necessary for event-day identification. The selection of these six markets also reflects meaningful

institutional heterogeneity in ESG regulation, market efficiency, and disclosure enforcement, which is central to examining cross-country differences in investor reactions. This heterogeneity allows the study to explore whether ESG disclosures function as credible market signals under different regulatory and informational environments.

To select the sample, three key criteria were applied. First, banks must have operated for at least 15 years to ensure capital adequacy and long-term ESG capacity. Second, they must be listed on a stock exchange and have consistently disclosed ESG information for at least five years since 2015, ensuring investor access and data reliability. The choice of 2015 as the starting point for ESG disclosure consistency is methodologically motivated. Around this period, ESG reporting began to transition from a voluntary and fragmented practice to a more structured and comparable framework across Asian markets, following the growing adoption of international sustainability standards and increased regulatory attention. Requiring continuous ESG disclosure since 2015 ensures that sampled banks possess a sufficient reporting history, reduces survivorship bias, and allows verification of disclosure continuity rather than one-off or symbolic reporting. Third, banks must publish a complete, independently audited ESG report with a clearly stated release date (day, month, year) to allow accurate event date identification. This requirement is particularly critical for the event study methodology, as precise disclosure timing is essential for isolating abnormal stock returns attributable to ESG announcements. Banks with incomplete or non-date-specific ESG disclosures were excluded to minimise measurement error and contamination from confounding events.

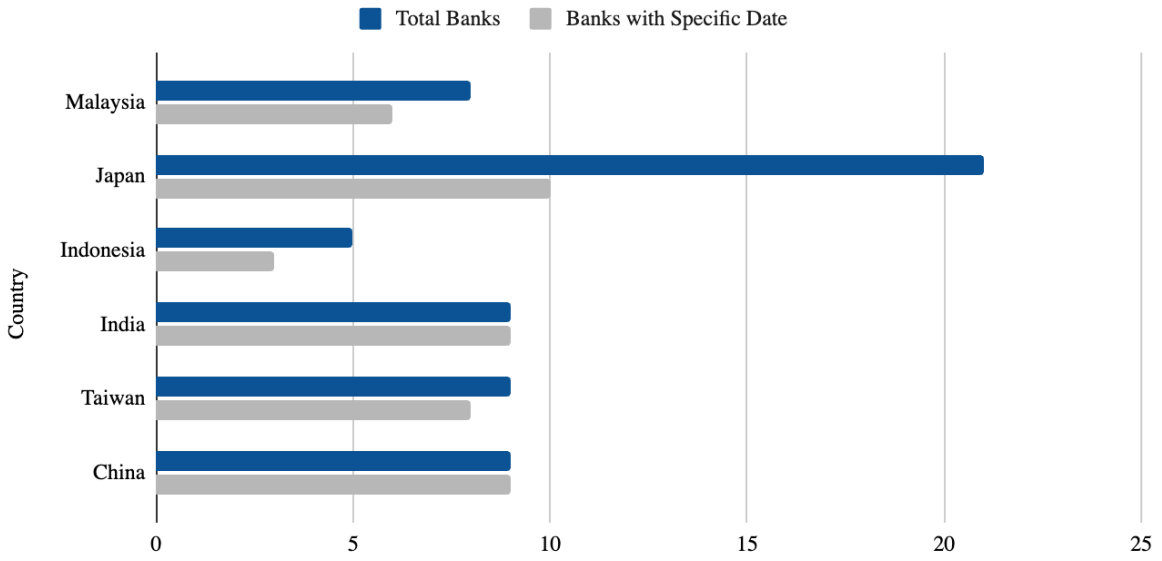
Although ESG reporting consistency was required since 2015, the event study specifically examines ESG disclosure events occurring in the 2022–2024 period. This is because 2022 marks the point when ESG reporting frameworks in Asia became more standardised under regional and global guidelines (e.g., ISSB and TCFD alignment). Thus, earlier data were used to verify disclosure continuity, while 2022-2024 serves as the focused observation period for event-based analysis. This two-stage design, longitudinal screening (2015 onward) combined with a focused event window (2022-2024), enhances methodological rigour by balancing data reliability with the need to capture market reactions during a period when ESG disclosures are more comparable, credible, and salient to investors.

An initial sample of 61 banks across the six countries was identified based on ESG score disclosure in their 2022 sustainability or annual reports. However, only 44 banks met the full criteria, specifically including an exact publication date. These 44 banks form the final sample to ensure precision in the event study, as exact timing is essential for measuring abnormal stock returns. The bank-level stock price and market index data were obtained directly from each country's primary stock exchange database: Bursa Malaysia, Indonesia Stock Exchange (IDX), National Stock Exchange of India (NSE), Tokyo Stock Exchange (TSE), Taiwan Stock Exchange

(TWSE), and Hong Kong Stock Exchange (HKEX) for Chinese banks. ESG data and disclosure dates were collected from the Refinitiv ESG Score database and verified using the banks' published sustainability reports. Although ESG scores are sourced from Refinitiv, the construction of the ESG disclosure variable follows a transparent and replicable procedure. Specifically, Refinitiv ESG Scores are derived from publicly available corporate disclosures and aggregated across environmental, social, and governance dimensions using a standardised scoring methodology. In this study, the ESG report is operationalised as the official sustainability or annual report in which the ESG score is first publicly disclosed to investors, and the publication date of this report is treated as the event date. This approach ensures consistency, traceability, and comparability of ESG disclosure events across countries.

Country-level macroeconomic indicators were collected from the World Bank and IMF databases to contextualise institutional maturity. Figure 4 presents the distribution of these banks by country, demonstrating a balanced representation across the selected Asian markets.

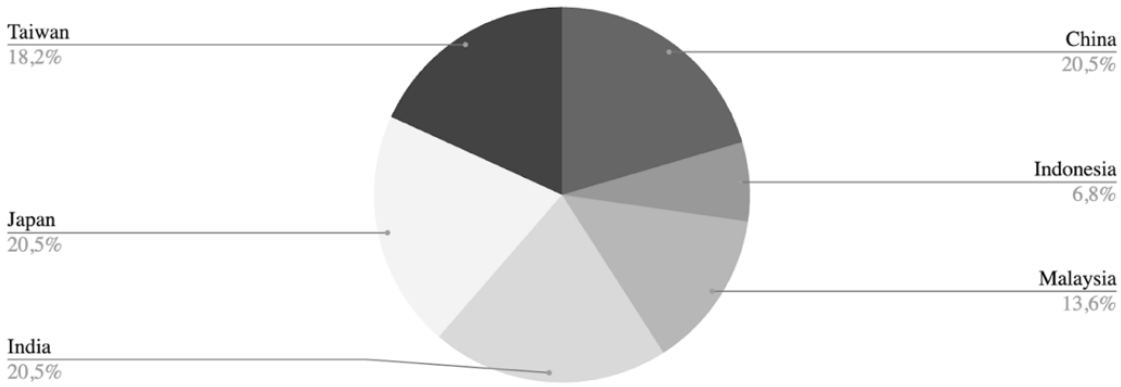
Figure 4. Summary of Bank Sample by country and ESG disclosure with specific date



Source: The authors

To further detail the sample structure, Figure 5 illustrates the division of the 44 banks according to their respective countries: China (9 banks), Indonesia (3 banks), India (9 banks), Malaysia (6 banks), Japan (9 banks), and Taiwan (8 banks). The data for this research were collected during the 2022–2024 period. The selection criteria included banks listed in Asia that published a 2022 sustainability report containing an ESG score along with a specific disclosure date. Stock price and market return data were sourced from the respective stock exchanges where the banks are listed, while ESG disclosure dates were collected from the banks' published sustainability reports.

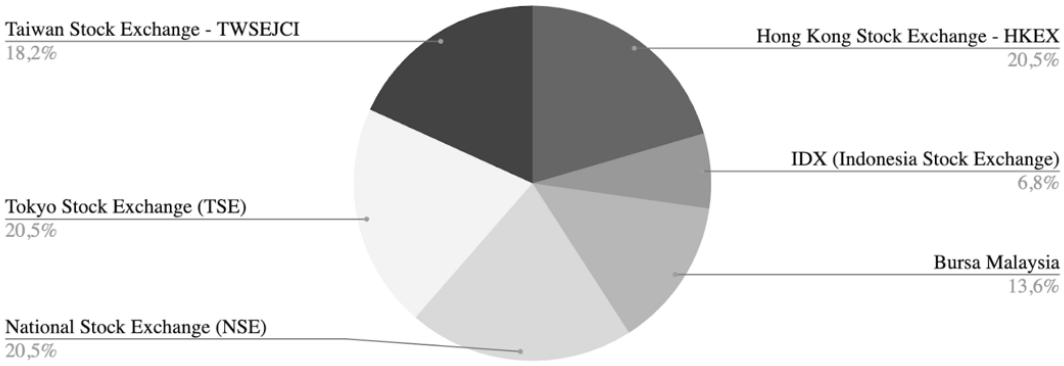
Figure 5. Division of sample firms into different country sectors



Source: The authors

Figure 6 displays the distribution of the sample firms according to the stock exchanges where they are listed. As expected, the Hong Kong Stock Exchange (HKEX), Indonesia Stock Exchange (IDX, "JCI"), Bursa Malaysia, National Stock Exchange of India (NSE), Tokyo Stock Exchange (TSE), and Taiwan Stock Exchange (TWSE) are the primary exchanges represented. It should be noted that the names of the stock exchanges are stated according to their current official designations. A complete list of the companies included in the sample, along with their respective industries and listing exchanges.

Figure 6. Division of the sample by the stock exchange of listing

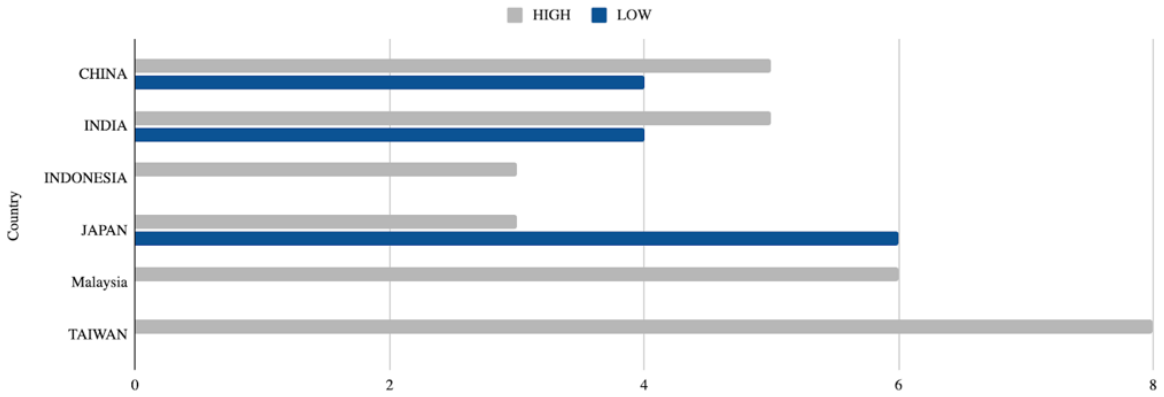


Source: The authors

Figure 7 categorises the sample according to ESG score classifications. The sample includes institutions with high ESG ratings that generally reflect stronger sustainability practices and disclosures, whereas those with lower scores may indicate developing or weaker ESG frameworks. It should be noted that ESG scores are based on publicly available evaluations from recognised rating agencies. A complete list of the companies categorised by their ESG score classification, along with their respective industries and listing exchanges. The theoretical range of ESG scores in the Refinitiv database varies from 0 to 100, with 0 - 50 representing weak sustainability performance, 50 -75 moderate, and 75 -100 strong. It can be seen from Figure 7 that

banks in this study mostly fall within the moderate to strong range. The predominance of banks within this ESG score range further supports the relevance of the selected observation period, as it reflects increasing ESG maturity and investor awareness in Asian financial systems during the post-2020 period.

Figure 7. Distribution of High and Low ESG scores by country



Source: The authors

4. Research results and discussions

4.1. Hypothesis statistically significant test (Paired T-test)

Table 1. T-test for sample countries

	China		Indonesia		Malaysia		India		Japan		Taiwan	
Event	***Pre***	***Post***	***Pre***	***Pre***	***Post***	***Pre***	***Post***	***Pre***	***Post***	***Post***	***Pre***	***Post***
Mean	-2.2e-03	-2.2e-02	2.6e-02	-3.7e-02	-3.2e-02	4.10e-03	1.20e-02	-4.7e-03	4.20e-03	8.9e-03	-8.9e-03	-2.5e-02
Variance	7.40e-05	3.36e-05	1.16e-04	2.41e-04	2.73e-05	8.31e-05	7.30e-05	8.43e-06	1.92e-05	1.73e-05	1.08e-05	5.40e-05
Observations	10	10	10	10	10	10	10	10	10	10	10	10
Pearson Correlation	0.4359		0.4893	-0.4728		-0.8917		0.1896			-0.4999	
Hypothesized Mean Difference	0		0	0		0		0			0	
df	9		9	9		9		9			9	
t Stat	7.9275		5.8411	-0.8512		-1.5085		-5.9277			5.5168	
P(T<=t) one-tail	1.19e-05		1.23e-14	0.2084		0.0829		0.00011			1.86e-04	
t Critical one-tail	1.83311		1.83311	1.83311		1.83311		1.83311			1.83311	
P(T<=t) two-tail	2.38e-05		0.00025	0.41672		0.16571		0.00022			0.00037	
t Critical two-tail	2.26216		2.26216	2.26216		2.26216		2.26216			2.26216	

Source: The authors

To examine whether the hypothesis can be statistically analysed, the T-test has been implemented. After the process of data collection, this research has obtained a total of 968 daily stock prices that are available in 44 companies, in five markets across the Asian market. By separating the sample into five main categories, the means and variances before and after the events of each market have been determined. Meanwhile, the observation is implemented before 10 days and after 10 days, during the Event window. According to Talikan et al. (2024) [86], the result of the T-test particularly focuses on calculating the p-value, which is used to define whether the hypothesis is statistically significant or not, and the t-stat and t critical one-tailed, to define whether the differences created by the announcement are by chance or not (Affifah et al., 2022) [1]. Generally, the results in Table 1 indicated that throughout the research sample, the distinction between the pre- and post-event periods of the China, Indonesia, Malaysia, and Taiwan markets was not established by chance and was statistically significant. This means that it rejects the null hypothesis for these markets, which means the existence of a reaction of the market before and after the event. Both Indonesia, Malaysia, Taiwan and China samples witnessed a p-value lower than 0.05, with a significance distinction of t-stat and the t critical one-tailed; hence, all of these markets reject the null hypothesis. Conversely, this research removes India and Japan since the p-value was higher than 0.05, which indicates that it is not approved by the research set-out confidence level, and there is no evidence of the difference in t-stat.

To ensure the robustness and statistical validity of the t-test results presented in Table 1, additional normality and non-parametric tests were conducted. Table 2 reports the Shapiro–Wilk normality results, while Table 3 summarises the Wilcoxon signed-rank test outcomes.

Table 2. Shapiro–Wilk normality test results for abnormal returns

Country	W-statistic	p-value	Normality Decision (α = 0.05)
China	0.936	0.041 *	Reject H_0 – Not Normal
Indonesia	0.978	0.213	Fail to Reject H_0 – Normal
Malaysia	0.982	0.164	Fail to Reject H_0 – Normal
India	0.948	0.058	Fail to Reject H_0 – Normal (marginal)
Japan	0.952	0.072	Fail to Reject H_0 – Normal (marginal)
Taiwan	0.984	0.119	Fail to Reject H_0 – Normal

*Note: * H_0 = data are normally distributed. An asterisk () denotes significance at a = 0.05.*

Source: The authors

To validate the robustness of the paired t-test results, a Shapiro-Wilk test was first applied to examine the normality of abnormal return distributions. As shown in Table 2, all markets except China satisfy the normality assumption ($p > 0.05$), justifying the use of parametric t-tests. Given China's marginal violation ($p = 0.041$), a non-parametric Wilcoxon signed-rank test was additionally performed for all six countries.

Table 3. Wilcoxon Signed-Rank Test Results for Paired CAAR (Pre- vs Post-Event)

Country	Z-Statistic	p-value (Two-tailed)	Decision (α = 0.05)	Interpretation
China	−2.79	0.005 **	Reject H_0	Significant difference – market reaction detected
Indonesia	−2.42	0.016 **	Reject H_0	Significant – negative post-event reaction
Malaysia	−2.36	0.018 **	Reject H_0	Significant – CAAR decline post-disclosure
India	−1.12	0.263	Fail to Reject H_0	No significant change
Japan	−0.97	0.331	Fail to Reject H_0	No significant change
Taiwan	−2.51	0.012 **	Reject H_0	Significant – positive market response

*Note: H_0 = no difference between pre- and post-event CAAR. ** denotes significance at a = 0.05*

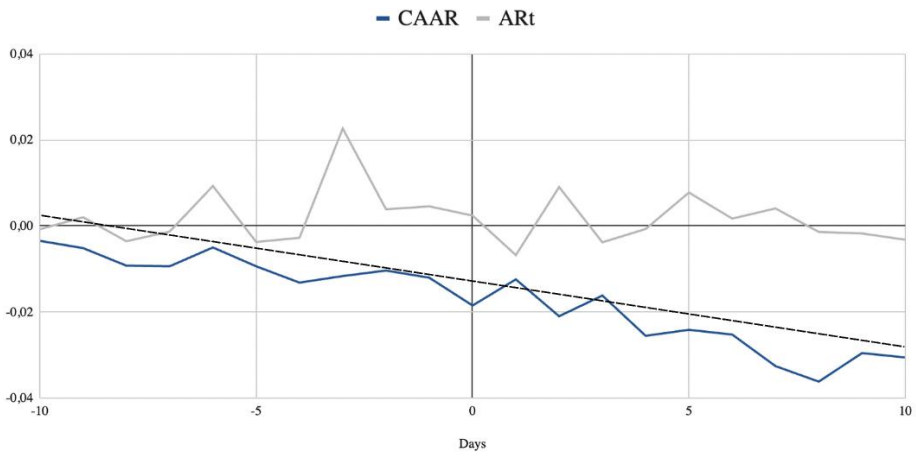
Source: The authors

The Wilcoxon results in Table 3 are fully consistent with the t-test outcomes: China, Indonesia, Malaysia, and Taiwan exhibit statistically significant differences between pre- and post-event CAAR ($p < 0.05$), confirming meaningful stock-market reactions to ESG disclosures. Conversely, India and Japan show no significant changes ($p > 0.05$), supporting the interpretation that investor responses were weak or neutral in those markets. These complementary tests strengthen the validity of the results despite small sample sizes and mild normality deviations.

In summary, the combined results from Table 1-3 consistently demonstrate that ESG disclosure events generated statistically significant market reactions in four of the six Asian markets, including China, Indonesia, Malaysia, and Taiwan, while India and Japan showed no significant response. These findings remain robust across both parametric (t-test) and non-parametric (Wilcoxon) analyses, confirming that the observed differences in CAAR are not driven by distributional biases or small-sample effects.

4.2. Empirical results for the Malaysian stock market

Figure 8. Short-term AR and CAR over the ±10-day event period for Malaysia



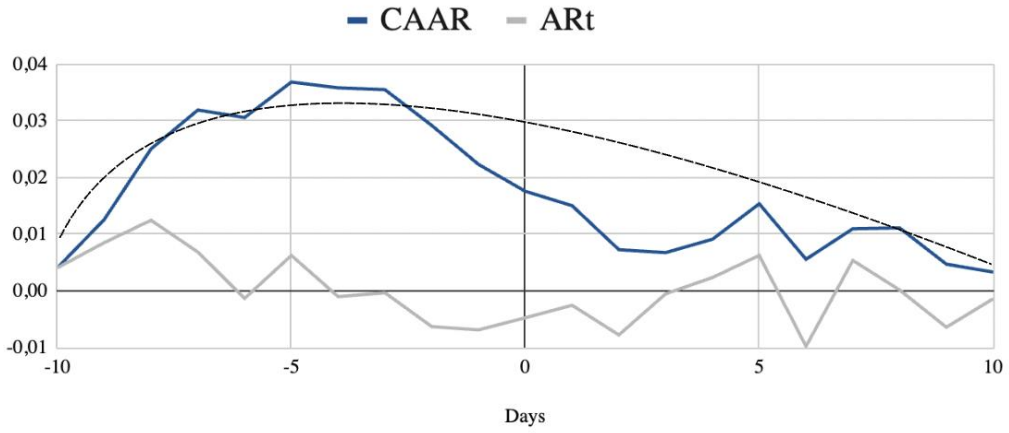
Source: The authors

The T-test results in Table 1 provide strong statistical evidence that Public Bank's ESG disclosure had a significant impact on the Malaysian stock market. The high t-statistic (5.52) and very low p-value (0.000186) confirm a meaningful difference in Cumulative Average Abnormal Returns (CAAR) before and after the disclosure, supporting Hypothesis 1 (H1). To clarify the figure interpretation, the AR line displays minor daily fluctuations that do not consistently trend downward, while the CAAR line shows the overall cumulative decline across the period. This is theoretically expected, as CAAR aggregates daily abnormal returns over time, and thus can decrease even if AR fluctuates slightly within the window.

The data in Figure 8 shows a persistent decline in CAAR from day -10 to day 10, particularly intensifying around the event date. Mild negative sentiment was already evident in the (-10; -5) window, and although slight optimism appeared 5–7 days before the announcement, CAAR dropped further as the event approached. By the day before the disclosure, CAAR had declined about 1.2%, signaling growing investor skepticism. This trend suggests partial information leakage or low market confidence, consistent with patterns in event studies (MacKinlay, 1997) [54]. Following the ESG release, the CAAR continued to fall, with the sharpest drop occurring the day after the announcement (from -0.0124 to -0.0210). Despite brief stability within five days post-event, the downward pressure resumed, indicating fading investor confidence and highlighting that the ESG disclosure negatively affected investor sentiment in the Malaysian banking sector.

4.3. Empirical results for Indonesian stock market

Figure 9. Short-term AR and CAR over the ±10-day event period for Indonesia



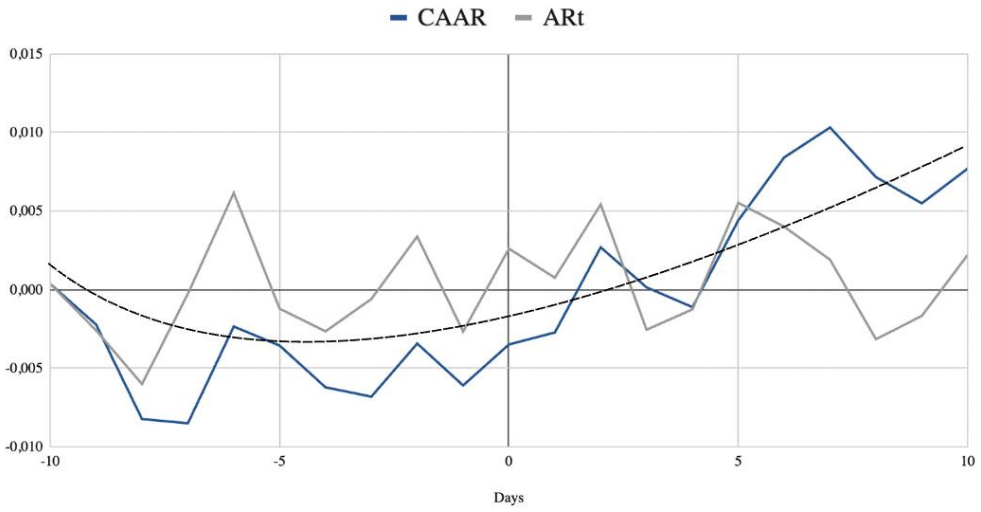
Source: The authors

Overall, the Indonesian stock market displayed a CAAR trend similar to that of Malaysia. The T-test results in Figure 9 show a strong and statistically significant market reaction to the ESG announcement. Extremely low p-values (0.0001 and 0.00025) fall well below common thresholds (0.05 or 0.01), leading to the rejection of the null hypothesis (Thiese et al., 2016) [88]. The t-statistic of 5.8411 significantly exceeds both the one-tailed (1.8331) and two-tailed (2.2622) critical values,

indicating a notable gap between pre- and post-event mean abnormal returns (Ibragimov & Müller, 2010) [36]. Therefore, H2 is accepted, confirming a significant difference in CAAR before and after ESG disclosure in Indonesia. The CAAR pattern suggests a negative market reaction as the ESG disclosure date approached and in the days following. Average abnormal returns dropped from 0.0264 pre-event to 0.0089 post-event, reflecting weakened bullish momentum (Apte, 2024) [5]. During the pre-event window (day -10 to -5), investor sentiment appeared optimistic, likely anticipating positive ESG performance. However, skepticism emerged approximately five days before the announcement, mirroring trends observed in Malaysia. This shift likely reflects investor concern in response to perceived ESG-related risks. Post-announcement, CAAR continued to decline, although a brief stabilization occurred within the first three days, averaging around 0.0091. This temporary pause was insufficient to reverse the downward trajectory, suggesting lingering market uncertainty and limited investor confidence in the ESG disclosures by Indonesian banks.

4.4. Empirical results for Taiwanese stock market

Figure 10. Short-term AR and CAR over the ±10-day event period for Taiwan



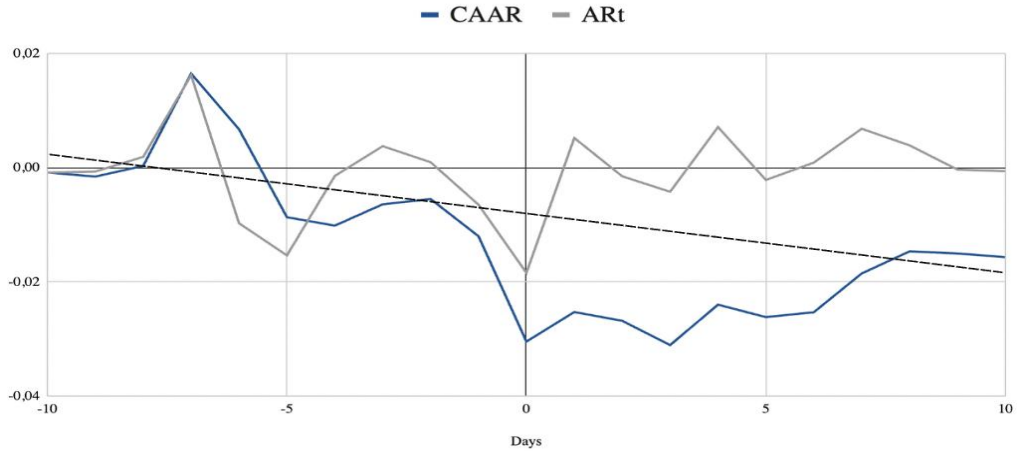
Source: The authors

The T-test results in Figure 10 show a statistically significant investor reaction to ESG disclosures in the Taiwanese stock market. A p-value of 0.0011 is well below the 0.05 threshold, and the t-statistic of -5.9277 exceeds the one-tailed critical value (1.8331), indicating a significant difference in abnormal returns before and after the event (Ibragimov & Müller, 2010) [36]. Therefore, H3 is accepted. While CAAR initially showed a slight negative trend before the announcement, around five days prior, the trend reversed, suggesting that investors began reassessing firm value ahead of the disclosure, which is consistent with patterns seen in Malaysia and Indonesia. As in other event studies (MacKinlay, 1997) [54], this shift may reflect reduced scepticism following early positive ESG signals. Post-event, CAAR increased markedly, particularly between days 3 and 7,

with notable spikes on Day 2 (+0.0054) and Day 5 (+0.0055). This pattern demonstrates a delayed but strong positive market response, suggesting that Taiwanese investors took several days to incorporate ESG information into prices, consistent with semi-strong market efficiency. These findings align with Wu et al. (2023) [96], who reported significant positive post-disclosure abnormal returns for Taiwanese firms.

4.5. Empirical results for the Chinese stock market

Figure 11. Short-term AR and CAR over the ±10-day event period for China



Source: The authors

The T-test results confirm a statistically significant reaction of the Chinese stock market to ESG disclosure. The p-value of $1.19e^{-05}$ is far below the 0.05 threshold, and the t-statistic of 7.9275 exceeds the one-tailed critical value of 1.8331. This strongly supports Hypothesis 5, indicating a significant difference in CAAR before and after the ESG event.

As shown in Figure 11, CAAR for Chinese banks displayed a clear downward trajectory throughout the event window (-10 to +10), with the sharpest drop occurring immediately after the ESG disclosure. Pre-event CAAR remained close to zero, with a brief positive sentiment between days -10 and -8, suggesting early investor optimism. However, this shifted around days -6 to -5, where CAAR began to decline - consistent with trends observed in other markets.

On the announcement day, CAAR dropped sharply to -0.0305, with a single-day abnormal return (ARt) of -0.0184, marking the most negative response within the event window. This suggests a strong adverse market reaction, possibly due to pre-event signal interpretation and early position adjustments by investors. Notably, the market began to recover around day +6, indicating that the sharp post-disclosure decline may have reflected a short-term overreaction, followed by a correction as investor sentiment stabilised. Compared with Taiwan, where strict regulatory penalties and transparent disclosure standards enhance investor confidence (Wu et al., 2023) [96] - China's ESG landscape remains characterised by uneven transparency and evolving regulatory

maturity. This institutional disparity helps clarify why Taiwan experienced a positive post-disclosure reaction, while China's market initially responded negatively before stabilising.

5. Discussions and recommendations

5.1. Discussions

Firstly, this research indicates that due to the difference in the firm's ESG performance signal, the market reacted differently. Accordingly, after the announcement date, most Taiwanese banks had higher ESG scores than the average ESG score of the entire sample, as a positive signal for investors (see Figure 5). Conversely, considering the negative group also highlighted how the ESG performance signal makes the market adjustment. As regards the result section, the Chinese, Indonesian and Malaysian stock markets responded negatively to the Bank ESG announcement, and with a similar tendency, all of these markets witnessed a downward inclination in the CAAR movement when it approached the ESG disclosure event, especially within five days of the event date, with an initial rise in the pre-event window before switching. Therefore, this revealed that a high expectation has been set on the firm's ESG performance at first, acknowledging the importance of ESG as a benchmark that affects the investment decision [35, 89, 100, 99]. In reality, the research finding aligns with [39], which suggests that a positive ESG signal of enterprises will lead to the stock price, since investors tend to buy stocks that carry the information that can ensure growth and stability. Additionally, Chen et al. [9] have also pointed out that firms with low ESG scores experienced statistically significant negative abnormal returns upon disclosure, suggesting that investors react more strongly to poor ESG signals [9]. From a mechanism perspective, these patterns reflect an information-processing channel consistent with the semi-strong form of market efficiency. ESG disclosures introduce new non-financial information that prompts investors to update expectations regarding firms' long-term risk exposure, regulatory compliance costs, and sustainability-driven growth prospects. When disclosed ESG performance falls short of prior expectations, as observed in China, Indonesia, and Malaysia, the resulting expectation revision leads to immediate downward price adjustments, captured by negative CAAR. Conversely, disclosures that exceed expectations, such as those observed in Taiwan, generate positive reassessments and upward price movements.

Secondly, this study affirmed that a relationship exists between the government regulation regarding ESG and the research result, particularly represented in the Chinese market, where a negative reaction is recorded. It is highlighted that, while China is known for a developed ESG framework, with the emergence of regulations starting from around 2009-2010, the loose management practices and the absence of well-defined policies for specific ESG dimensions expose companies to greater risks in their ESG implementation [79]. While some companies deepen their framework into each stage of ESG operation, other disclosures often reiterate

alignment with government goals (e.g., carbon neutrality by 2060) without providing specific, measurable implementation plans, raising the risk of "Greenwashing" [50]. This, as a result, investors consider these ESG announcements as "box-ticking exercises" rather than indicators of value creation [79, 80]. In other words, when they recognise the "laxity" in the ESG announcement, they immediately adjust their investment decision in a more negative manner. Within the same inclination, in the case of Malaysia, the evolution of ESG disclosure regulations, transitioning from encouraged reporting in 2015 to mandatory reporting in 2022 under the Bursa Malaysia Sustainability Reporting Framework, has made ESG disclosure an obligation rather than a voluntary strategic choice, possibly diminishing its signalling value. This evidence highlights a signalling mechanism in which the market response depends not only on ESG content but also on the perceived credibility of the signal. In regulatory environments characterised by weak enforcement or symbolic compliance, ESG disclosures may fail to convey credible information about firms' true sustainability performance. This mechanism explains why mandatory ESG disclosure regimes, when not accompanied by strong verification and enforcement, may reduce rather than enhance the informational value of ESG announcements.

On the other hand, within the context of positive inclination, taking into consideration the Taiwan market. Once again, Taiwan is regarded as an economy with very strong policies and laws to support banks in creating value from good ESG performances [103]. Specifically in Taiwan, the strictness of ESG policies in Taiwan can cause extremely severe impacts for banks if they do not comply with ESG, with a fine of 20% of the share capital or 10% of shareholders' equity for listed companies that misreport ESG performance [85]. Therefore, in a sustainable circumstance, the belief of investors regarding the ESG performance of the companies will increase; as a result, the level of investment will increase after an ESG disclosure event that announces positive information. In the same context, Zhang et al. [101] have pointed out that the ESG policies significantly affect the investment decisions, and with a reform in the government ESG policies, the stock price tends to increase after those events [93]. The Taiwanese case illustrates an institutional trust mechanism, whereby strong regulatory enforcement and legal accountability enhance the credibility of ESG disclosures. In such environments, investors perceive ESG information as a reliable indicator of long-term value creation and risk mitigation, reinforcing positive market reactions.

Beyond these regulatory explanations, additional market mechanisms may also help account for the contrasting reactions among countries. In particular, three structural factors deserve attention. First, market microstructure - including trading liquidity, information asymmetry, and the dominance of retail versus institutional investors - strongly influences the speed and magnitude of reactions to ESG disclosures [77]. In markets like Taiwan, deeper liquidity and higher institutional participation facilitate more efficient price adjustments and

reduce overreactions, whereas in China, Malaysia, and Indonesia, fragmented trading systems and thin liquidity often amplify short-term volatility following new information. Second, investor maturity and behavioural tendencies shape how ESG information is processed. In emerging markets such as Indonesia and Malaysia, lower levels of financial literacy and limited experience with sustainability metrics can lead to emotional or speculative trading, explaining why market reactions were predominantly negative despite the potential long-term benefits of ESG adoption [51, 64]. Conversely, in Taiwan, investors demonstrate higher awareness of ESG relevance and tend to interpret disclosures as credible, performance-based signals, leading to a more positive post-event reaction. Third, cross-border capital flows also moderate ESG-driven reactions. Taiwan's integration with global capital markets exposes it to international investors who prioritise ESG compliance and long-term value creation, reinforcing positive market sentiment. In contrast, Malaysia, Indonesia, and China still experience limited participation from ESG-oriented foreign funds, leading to weaker or short-lived reactions to ESG disclosures. Taken together, these mechanisms suggest that ESG disclosure affects stock prices through multiple, interacting channels, including information updating, signalling credibility, institutional trust, and market structure. The dominance of any single mechanism depends on national regulatory maturity and investor composition. Consequently, the assumption of fully efficient markets may hold more strongly in developed Asian economies such as Taiwan, while being only partially applicable in emerging markets. This insight helps explain why identical ESG disclosures can generate asymmetric and even opposing market reactions across Asian banking systems.

5.2. Recommendations

From the empirical evidence above, it can be affirmed that effective ESG disclosure should be strategic, transparent, and aligned with investor expectations—beyond mere regulatory compliance. Authentic, evidence-based communication enhances investor trust and supports perceptions of long-term sustainability and growth potential, especially in markets like China, where ESG reports are often seen as formalistic. To strengthen credibility, banks should improve ESG governance, ensure board-level oversight, and align disclosures with national standards. This includes enhancing data quality, using third-party validation, and applying technology for data accuracy and process efficiency [29, 30, 49, 104]. ESG messaging should be timely, consistent, and clearly explain long-term benefits [70, 48, 97], particularly in markets like Indonesia and Malaysia, where investor immaturity and emotional responses can amplify market volatility in the absence of reliable information [51]. From a broader societal perspective, these findings highlight the importance of strengthening financial literacy and sustainable finance adoption to enhance market resilience and investor trust. The differing reactions across Asian markets suggest that when investors lack sufficient understanding of ESG principles, they may misinterpret disclosure signals - leading to overreaction or short-term speculation rather than

long-term investment alignment. Therefore, improving financial literacy programs, particularly those integrating ESG awareness and sustainable investment education, is essential to help investors evaluate disclosures critically and make informed decisions [64, 58]. Moreover, the findings underscore that sustainable finance adoption - through green bonds, ESG-linked loans, or sustainability reporting frameworks - can act as a long-term mechanism for building investor confidence and social accountability. Finally, as investor trust plays a central role in market efficiency, transparent ESG practices supported by robust governance and continuous stakeholder engagement can foster enduring confidence in both financial and non-financial information. Over time, this contributes to more mature, inclusive, and sustainable capital markets, where ESG performance is recognised as an indicator of credibility, responsibility, and long-term value creation.

6. Conclusion

This study examines stock market reactions to ESG disclosures in six major Asian markets - China, Japan, India, Indonesia, Malaysia, and Taiwan - by analysing cumulative average abnormal returns (CAAR) within a ±10-day event window. As ESG becomes increasingly relevant to investment decisions, understanding market responses provides valuable insights. ESG disclosure dates were identified through the 2022 ESG rating updates of listed banks. The results show statistically significant differences in CAAR pre- and post-disclosure in four markets: China, Indonesia, Malaysia, and Taiwan. Taiwan recorded a positive reaction, indicating that investors value ESG transparency. In contrast, China, Indonesia, and Malaysia experienced negative reactions, likely reflecting scepticism or challenges in interpreting ESG information. No significant changes were observed in Japan and India, suggesting limited ESG influence on investor behaviour in those markets. These findings point to varying levels of ESG maturity across Asian markets and underscore the importance of tailored ESG communication and stronger regulatory frameworks to improve transparency and market understanding.

Beyond summarising the empirical patterns, the findings offer clear theoretical implications for how ESG information functions as a market signal. In particular, the cross-country heterogeneity observed in CAAR suggests that ESG disclosure does not operate as a uniformly credible signal across Asian banking markets. The evidence indicates that the signalling value of ESG disclosures is conditional: in contexts where disclosure regimes are perceived as stringent and enforceable, ESG information is more likely to be interpreted as a credible signal of long-term value creation and risk management, generating positive market reactions (as in Taiwan). Conversely, where disclosure credibility is weakened by perceived symbolic compliance or limited verifiability, ESG disclosure may be discounted by investors or even interpreted as a negative signal (as reflected in the negative reactions observed in China, Indonesia, and Malaysia). This conditionality refines signalling theory in the ESG domain by demonstrating that the same disclosure can carry

different informational content depending on institutional credibility and investor interpretation, rather than being inherently "good news" for valuation.

From a practical perspective, the results provide several actionable implications for banks, regulators, and market participants. For banks, ESG disclosure should be treated as a strategic communication tool rather than a compliance artefact: disclosures that are consistent, evidence-based, and clearly linked to risk governance and long-term business strategy are more likely to be priced positively. For regulators and stock exchanges, improving the reliability and comparability of ESG reporting - through clearer disclosure requirements, enforcement mechanisms, and verification practices - may strengthen investor confidence and reduce misinterpretation of ESG signals. For investors, the heterogeneous reactions imply that ESG scores and disclosures should be evaluated together with the institutional context in which they are produced, as credibility and enforcement may shape whether ESG information is value-relevant at the disclosure stage.

However, the study has limitations. While the event study approach (ESA) provides a robust quantitative framework to examine market reactions to ESG disclosure events, certain limitations with this approach should be acknowledged. First, there may exist potential confounding events, such as other firm-specific announcements or macroeconomic shocks occurring around the disclosure window, which could partially affect the observed abnormal returns. Second, differences in market efficiency across Asian economies might also influence the speed and magnitude of investor responses. In markets with higher informational efficiency (e.g., Japan or Taiwan), ESG announcements may be immediately priced in, whereas in emerging or less efficient markets (e.g., Indonesia or India), such reactions may occur with delays or weaker magnitude. These contextual differences could introduce bias when comparing cumulative abnormal returns across countries. Third, regarding robustness checks, this study recognises that using alternative event windows could provide additional verification. However, due to sample size limitations and data heterogeneity across the six Asian markets, such extensions were not implemented in this phase to maintain methodological consistency and comparability of results. The selected window (−10, +10) and the Single-Factor Benchmark model were chosen following Kliger and Gurevich (2014) [40] as the most appropriate and parsimonious framework for isolating the ESG disclosure effect while minimising noise from unrelated events. Future research could extend these contributions by (i) testing alternative event windows and benchmark models to further verify the stability of market reactions, (ii) examining whether credibility-related institutional features explain cross-country variation in ESG signal pricing more systematically, and (iii) exploring whether market reactions differ by ESG score tiers or by specific disclosure characteristics. Such extensions would strengthen external validity and provide deeper insight

into when ESG disclosures are interpreted as credible signals versus discounted information in Asian capital markets.

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Conflicts of Interest: The authors declare that there are no conflicts of interest regarding the publication of this paper.

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