

Market Reactions to Firms' Inclusion in the Sustainability Index: Further Evidence of TCFD Framework Adoption

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This study investigates the market reactions to firms' inclusion in the Environmental, Social, and Governance (ESG) index. Specifically, we investigate whether firms that adopt the Task Force on Climate-Related Financial Disclosures (TCFD) framework experience variations in abnormal returns. Analyzing a sample of 71 companies from the FTSE ESG index in Taiwan between 2019 and 2021, we discern a positive market reaction to companies incorporated into the ESG index. Additionally, companies that embrace the TCFD framework demonstrate elevated abnormal returns. Contrary to prior research indicating a negative market impression of Asian companies with superior sustainability achievements, our study implies a growing favorable perception by Asian investors toward companies actively participating in sustainability initiatives.

Keywords: sustainability index, task force on climate-related financial disclosures (TCFD), market reactions, environmental, social, and governance (ESG)

1. INTRODUCTION

In 2016, the Principles for Responsible Investment (PRI), supported by the United Nations, stated that investor perceptions impact company strategy, notably in Environmental, Social, and Governance (ESG) issues. While sustainability appears imperative, prior studies yield varied insights into investors' views on firms' ESG engagement. Western studies, like [1], illustrate positive investor perspectives on ESG activities. Similarly, [2] underscore the benefit on cost of equity capital for sustainable firms. However, research on Asian firms, such as [3-5], presents differing results, attributing varied Asian investor sustainability views to lenient regulatory frameworks. [3] find that firms with better CSR scores in North America and Europe have lower costs of equity. However, this negative association does not hold for Asian countries. [4] find negative impacts of CSR on firm value in China. [5] use a Taiwanese sample and find a positive association between carbon emissions and firm value. Their findings suggest that investors in Asian countries hold a different attitude toward sustainability than those in Western countries owing to low regulatory requirements for sustainability. Such a negative association for Asian firms may reflect the low demand for sustainability due to the lack of regulatory pressure and compliance costs.

The United Nations' Sustainable Development Goals (SDGs) from 2015 guide global policies and funding for sustainable development, prompting countries to prioritize these

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goals in addressing climate change and overall sustainability¹. Embracing this, Asian regulators², including the People's Bank of China and seven other Chinese bodies, issued the Guidelines for establishing the Green Financial System in 2016 to promote green investment and deter polluting industries [6]. Taiwan has been proactive in its sustainability endeavors. In Taiwan, the Corporate Governance Evaluation has been issued and ongoing since 2014. The Corporate Governance 3.0³, announced in 2020, aims to enhance corporate sustainability and guide investors and stakeholders to make sustainable investments. The Taiwanese government mandates companies to report the financial ramifications of ESG, spotlighting climate-linked ESG factors. By 2023, they will incorporate international standards like the Task Force on Climate-Related Financial Disclosures (TCFD). The Taiwan Financial Supervisory Commission (FSC) steers institutional investors towards green industries via the Green Finance Action Plan 3.0⁴, decreasing corporate climate risk exposure.

Taiwan's commitment to ESG attracts attention. Under its regulatory guidance, over 600 of its roughly 1,700 publicly traded companies release sustainability reports, with 53.7% being verified. This commitment prompted the international investment group, FTSE Russell⁵, to launch its inaugural ESG index in Taiwan - the FTSE4Good TIP Taiwan ESG Index⁶. Sampling 71 companies chosen by the FTSE ESG index in Taiwan between 2019 and 2021, we discern a positive market reaction to companies incorporated into the ESG index. Besides, firms adopting the TCFD framework demonstrate elevated abnormal returns.

This study examines the market response to a firm's inclusion in the FTSE ESG index to understand investor perceptions of a firm's sustainability efforts. Prior research has investigated the effects of sustainability index inclusions, yielding varied results on stock prices *e.g.*, [7-10]. However, most prior studies focus on Europe and the US, where sustainable development concepts are more mature than in Asia. As sustainability emerged later in Asia, investors might view ESG index inclusions differently. Additionally, Taiwan's milder regulations and reduced litigation risk may amplify the influence of intermediaries, such as external certifications and index companies, on investors' perceptions of corporate sustainability [11]. Therefore, examining Taiwanese intermediaries is of great importance.

Further, the impact of specific sustainability report disclosures has been explored. For instance, environmental disclosures are found to predict a company's future profitability,

¹ More details can be found at <https://sdgs.un.org/publications/transforming-our-world-2030-agenda-sustainable-development-17981>.

² Taiwan is a critical part of the global supply chain, but it faces significant climate risks. In 2019, Taiwan produced 256.0 million metric tons of CO₂ from energy use, ranking 22nd in the world and contributing 0.76% of global emissions. This may affect the decisions of end-brand manufacturers when choosing suppliers. (Global Views Monthly ESG, 2023; PwC, 2023).

³ The "Corporate Governance 3.0 - Sustainable Development Roadmap" is a program initiated by the FSC from 2021 to 2023 to align with global ESG trends. It targets bolstering the competitiveness of Taiwan's capital market. More details can be found at <https://www.sfb.gov.tw/en/home.jsp?id=271&parentpath=0,117,118,120>.

⁴ The Green Finance Action Plan 3.0 promotes the financial sector to act on climate change risks and opportunities. It guides businesses towards reducing carbon emissions for sustainable development. More details can be found at <https://www.fsc.gov.tw/en/home.jsp?id=526&parentpath=0,4,419>.

⁵ A recent report by Accenture (2022) indicates a rising tide in ESG investing. It projects that the adoption of ESG investing among affluent Asian investors is set to double in 2022.

⁶ Collaboratively issued with the Taiwan Index Plus Corporation, this index is reviewed semiannually in June and December and seamlessly integrates ESG concepts with stock selection.

offering additional information, decreasing investor uncertainty, and aiding analyst forecasts. Such factors influence investors anticipated future cash flows and cost of capital, thus impacting company value [12, 13]. [14] emphasize climate change disclosures, noting that carbon information mitigates the premium investors require due to suboptimal corporate carbon practices [15]. This suggests that climate-related disclosures affect firm value.

The Financial Stability Board (FSB) of the G20 pioneered climate-related financial disclosures by founding the Task Force on Climate-Related Financial Disclosures (TCFD) in 2015. This Task Force set out a framework and guidelines for climate-linked financial disclosures. These guidelines mandate companies to evaluate and address potential climate risks and opportunities and integrate this data with financial details. Consequently, TCFD disclosures, being forward-looking, could sway investors' expectations on future cash flows and funding costs [16]. Given the potential risks climate poses to a firm's operations, this study probes investors' views on companies with public climate disclosures.

This study is structured as follows: Section 2 presents the literature review and our research questions. Sections 3 and 4 present the research design and results, respectively, and Section 5 presents the conclusions and implications of the study.

2. LITERATURE REVIEW AND RESEARCH QUESTIONS

In the literature on sustainability and financial performance, some studies report that the advantages arising from a company's investment in ESG activities might take time to manifest. They may not always lead to significant enhancements in financial performance over an extended period. This is owing to the potential for large expenditures on ESG initiatives in the short term (or even the long term) to result in costs that surpass the benefits, thereby undermining operational performance [3]. Other studies link the benefits of sustainability to firms' operational and financial performance, finding that good social responsibility and good relationships with stakeholders can improve a firm's image, which in turn attracts consumers and leads to higher revenue and shareholder benefits [17, 18]. Some studies also affirm the impact of sustainability performance on the stock market, finding that it is associated with higher investor preferences [19]. Overall, previous research reports positive impacts of sustainability performance on firms.

In the literature, a general consensus exists that announcements of inclusion in indices elicit a positive reaction in stock prices, while announcements of exclusion typically result in negative stock price reactions. [20] report that news of inclusion positively impacts a company's stock price, while exclusion news has the opposite effect. Similarly, studies focusing on the U.S. S&P 500 index observe positive news boosts stock prices, whereas negative news leads to declines [21].

Investors increasingly focus on ESG investments, and the ongoing sustainability debate influences corporate risk [6]. Yet, the current abundance of sustainability information, coupled with a lack of standardized requirements, challenges general investors in effectively assessing corporate sustainability performance [22]. Constituent selection outcomes, rooted in sustainability concepts and provided by third-party index compilation companies, can serve as a beacon for investors, signaling a company's sustainability performance. This potential clarity may reduce information asymmetry, shape investors' perceptions of a company's sustainability achievements, and subsequently influence their company evalua-

tions. When a company gains inclusion in the ESG index, it signals that professional entities have thoroughly vetted and deemed them as having robust ESG engagement, thereby bolstering investor confidence and possibly uplifting stock prices.

Research based on US or European samples examines market reactions to firms' inclusion in ESG-related indexes, revealing varied investor perceptions of firms' ESG performance. Some studies indicate index inclusion events positively influence stock prices [7, 9]. [8] echo these findings, suggesting investors view inclusion as the assurance of sustained firm performance. [10], analyzing the Domini Social 400 Index (currently the MSCI KLD 400 Social Index), observe that inclusion boosts stock prices for the enlisted firms but diminishes their competitors'. This reaction intensifies in industries marked by unclear information, underscoring the value of external oversight for investor information. Notably, variations in study periods hint at evolving investor ESG perceptions over time. Appendix details the sample data and research periods.

Research indicates that Asian and Western investors differ in their reactions to firms' ESG engagements. Specifically, [3] reveal that sustainability is often undervalued in Asia, with Asian investors perceiving ESG activities as financially burdensome, evidenced by higher equity costs for involved firms. This sentiment aligns with [5] findings concerning carbon emissions, though their data only extends up to 2016.

Several factors account for this East-West discrepancy. The Institutional Theory posits that variations in historical and cultural contexts shape institutional development [23-24]. Thus, ESG concepts, more entrenched in European and American psyches, lead to mature, accepted ESG-related institutions [25, 26]. Stakeholder theory implies that consumers prefer responsible firms [27]. European and American companies often have recognizable end brands, so they embraced ESG earlier. In contrast, Asian businesses, predominantly being foundries, view ESG primarily as an added cost. [3] observe that while better CSR scores correlate with lower equity costs in the West, the pattern doesn't apply in Asia. Supporting this, [5] link increased carbon emissions with higher firm value in Asia, attributing the distinct Asian investor stance to the region's lenient sustainability regulations.

Asian regulators have recently shifted their stance on sustainability. In 2015, the United Nations introduced the "Sustainable Development Goals (SDGs)," targeting 17 primary objectives, including Earth's environmental conservation, by 2030. Mirroring global concerns on climate change, Asian nations are now prioritizing sustainability. In 2016, the Taiwan National Council for Sustainable Development rolled out the Taiwan Sustainable Development Goals (TSDGs), drawing from the UN SDGs. Consequently, Taiwan has introduced Corporate Governance 3.0 and green finance initiatives, motivating corporations to invest in sustainability. Given this shift, not just Western but also Asian investors now view firms' ESG activities more favorably. This leads to the primary research question:

RQ1: Do Asian investors react positively to firms' inclusion in an ESG index?

Investors leverage TCFD disclosures to gauge the climate change risks and opportunities their investees encounter. The TCFD framework requires companies to reveal the climate challenges they face across four central elements: governance, strategy, risk mana-

gement, and metrics and targets⁷. The TCFD task force offers recommendations to guide these disclosures, dividing climate risks into “transition risk” (risks from shifting to a low-carbon economy) and “physical risk” (risks from extreme climate events). Incorporating these, companies must also identify opportunities emerging from climate threats to steer their future operations. Such disclosures equip investors with insights into a firm’s strategies against climate risks and emergent business prospects [28]. Therefore, adopting the TCFD framework signals a positive stance to the market.

Literature on TCFD is sparse, and its effects remain ambiguous. While studies using Western data suggest that TCFD adoption can lower equity costs [29], and boost firm value [30], [31] argue that firms often disclose trivial information that lacks investor utility. This discrepancy underscores the need for further TCFD research.

In Taiwan, TCFD adoption is not widespread. Still, embracing the TCFD framework might influence investor evaluations of companies within the sustainability index. It signals a proactive stance on climate risk. [32] outline the link between climate risk and asset pricing, categorizing climate-related risks into transition, physical, and liability risks. Transition risks arise from the shift to green technologies, physical risks from climatic changes like temperature rises and extreme events, and liability risks from potential litigations against pollutant sectors. These risks can escalate operational costs and sway asset pricing, such as how a carbon tax might alter equipment competitiveness. Given the TCFD framework’s aim to disclose a firm’s climate risk management strategies⁸, such disclosure aids investors in forecasting future cash flows by unveiling risks and potential pricing opportunities. Consequently, we propose:

RQ2: Does adopting the TCFD framework affect the market reactions to firms’ inclusion in an ESG index?

3. DATA AND RESEARCH DESIGN

To examine our research questions, we use the official announcement date of the FTSE ESG index constituent list as the event date. Introduced in Taiwan by a global organization, the FTSE ESG index was launched in December 2017. However, the constituent list only became public on August 23, 2019, marking the beginning of our sample period. Table 1 details the sample selection process. Five announcements occurred during our sample window from August 2019 to June 2021. Notably, the December 2019 announcement introduced only a financial firm, which we omitted from our sample due to its unique attributes, following the guidance of [11]. Consequently, our final sample encompasses 71 firms from the remaining four announcements. Table 2 illustrates the sample distribution by industry and year. As the complete constituent list was released only in 2019, a surge of new inclusions is evident for that year. The industry distribution reveals a dominant presence of technology and communication firms within the index constituents.

⁷ More details can be found in the TCFD report at <https://assets.bbhub.io/company/sites/60/2021/10/FINAL-2017-TCFD-Report.pdf>.

⁸ More details can be found in the KMPG report at <https://assets.kpmg.com/content/dam/kpmg/ca/pdf/2022/02/do-asset-prices-fully-reflect-climate-risks-and-opportunities.pdf>.

Table 1. Sample selection.

Inclusion Announcement	Event date	New inclusions	Financial firms	Observations
The first publication	2019/8/23	73	(17)	56
Technical Notification	2019/12/11	1	1	0
Technical Notification	2020/6/10	1	0	1
Technical Notification	2020/12/9	5	0	5
Technical Notification	2021/6/8	9	0	9
Total		89	18	71

Table 2. Sample distribution by industry and year.

Industry	2019	2020	2021	Total
Consumer Products	5	1	0	6
Technology and Communication	24	2	4	30
Transportation	10	1	3	14
Extractives and Minerals Processing	5	1	1	7
Financials	1	0	0	1
Food and Beverage	2	0	0	2
Resource Transformation	8	1	1	10
Services	1	0	0	1
Total	56	6	9	71

Following [19, 33], we use the cumulative abnormal return (*CAR*) to capture investors' perspectives on firms' engagement in ESG activities. The abnormal return (*AR*) is a firm's return adjusted by the market return. The market-adjusted model calculates abnormal returns by subtracting the overall market performance. Thus, it serves as a robust method to account for confounding events [34]. Setting the announcement date as the event date ($t = 0$), *CAR* is the sum of *AR* from the day before ($t = -1$) to the day after ($t = +1$) the event date. The following models are used to investigate RQ1 using the univariate tests:

$$AR_{i,t} = Return_{i,t} - Return_{m,t} \quad (1)$$

$$CAR_{i,t(-1,+1)} = AR_{i,-1} + AR_{i,0} + AR_{i,+1} \quad (2)$$

To test RQ2, we develop the following multivariate regression model following [18, 50, 52]:

$$CAR_{i,t(-1,+1)} = \beta_0 + \beta_1 TCFD_i + \sum \beta_k CONTROLS_i + Industry \& Year \text{ fixed effects} + \varepsilon_i \quad (3)$$

In RQ2, our focal variable is *TCFD*. A firm's ESG disclosure is marked as adopting the TCFD framework (with *TCFD* set to 1) if it satisfies three criteria. First, the term "Task Force on Climate-related Financial Disclosures" or "TCFD" must be explicitly mentioned in the report. Second, the report should delineate the TCFD's four core elements: Governance, Strategy, Risk Management, and Metrics and Targets. Lastly, the report should detail the potential impacts of transition or physical climate risks, as articulated in the TCFD

proposal, along with the company's response to these challenges. *TCFD* is set to 0 for the firm that has ESG disclosures but does not adopt the TCFD framework.

For controls, *ILL* is a binary variable that equals one if a firm has committed a violation within three years preceding its entry to the constituents. This is informed by [11], who found that the protective effect of a sustainability report vanishes if a firm with a three-year CSR history broadcasts CSR news. *AWARD* represents whether a firm has received the CSR World Award for Sustainable Citizenship by World Magazine within the three years preceding the constituent's selection, based on the definitions by [36]. *ASSURANCE* is denoted by the latest report uploaded the year prior to a company's selection.

Further, *SIZE* controls for the firm's dimensions. Literature shows that smaller companies typically manifest higher risk-adjusted returns [37], while stock prices of larger firms respond more swiftly to fresh information [38]. *MTB* captures the effect of the market capitalization ratio to book value on stock returns and growth of the firm. *INT_OWN*, informed by [11, 33], measures the percentage of institutional investor ownership, acknowledging its potential influence on stock prices and the potential repercussions of strong corporate governance on a firm's CSR performance. *LEV* addresses the possible ties between a firm's financial leverage and stock price or return, as these factors might be linked to a firm's risk profile, capital costs, investments, and strategic decisions, which in turn can influence its valuation and shareholder wealth [39]. *ROE* controls for financial performance and is also a selection metric for the Taiwan Sustainability Index. *LIQUIDITY*, a control for the possible impact of stock liquidity on returns, represents the turnover rate [40]. *PRE_CAR*, which embodies the "cumulative abnormal returns 30 days before the event period," according to [11], is incorporated to adjust for any pre-event occurrences that might skew stock prices during the event window. To account for the data's unique nature, we also control for *AGAIN* and *EVER*. *AGAIN* indicates if a firm has been chosen as a constituent of the Taiwan Sustainability Index multiple times. *EVER* is a dummy variable defined as whether the firm has disclosed the news of inclusion in the sustainability index before the official list was released.

4. RESULTS

Table 3 presents the descriptive statistics. The mean *CAR* for the constituents is 0.523, suggesting that market investors positively view inclusion in the ESG index. Additionally, approximately 28% of the firms follow the TCFD framework to make ESG-related disclosures.

Table 4 reports the results of the univariate analysis. Our tests show that all *ARs* around the event dates are higher than zero. Furthermore, significantly positive market reactions are found on the event date. The mean value of *CAR* is 0.523 and is positive and significant at the one-tail level (t -stat. = 1.423). This suggests that investors interpret a firm's induction into the sustainability index favorably.

Table 5 presents the results of the multivariable regression analysis for RQ2. The association between *TCFD* and *CAR* is positive and significant (coefficient = 2.521, p -value = 0.003). It indicates the market's inclination to favorably value firms embracing the TCFD framework. Such an observation insinuates that investors place importance on climate disclosure, rewarding firms that curtail climate-related information gaps.

Table 3. Descriptive statistics.

Variables	Mean	Std.	Q1	Median	Q3
<i>CAR</i> _(-1,+1)	0.523	3.097	-0.950	0.333	1.361
<i>TCFD</i>	0.282	0.453	0.000	0.000	1.000
<i>ILL</i>	0.169	0.377	0.000	0.000	0.000
<i>AWARD</i>	0.451	0.501	0.000	0.000	1.000
<i>ASSURANCE</i>	0.831	0.377	1.000	1.000	1.000
<i>SIZE</i>	18.993	1.057	18.151	19.142	19.808
<i>MTB</i>	1.828	1.671	0.737	1.142	2.329
<i>LIQUIDITY</i>	0.306	0.460	0.101	0.146	0.224
<i>ROE</i>	12.455	11.150	5.104	9.680	16.992
<i>INT_OWN</i>	71.646	16.847	58.840	75.690	83.230
<i>LEV</i>	0.498	0.183	0.374	0.503	0.606
<i>PRE_CAR</i>	0.191	8.229	-5.348	-0.019	5.585
<i>AGAIN</i>	0.099	0.300	0.000	0.000	0.000
<i>EVER</i>	0.296	0.460	0.000	0.000	1.000

Table 4. Univariate analysis.

	<i>AR</i> _{<i>t</i>-1}	<i>AR</i> _{<i>t</i>}	<i>AR</i> _{<i>t</i>+1}	<i>CAR</i> _(-1,+1)
Mean	0.020	0.320	0.182	0.523
<i>t</i>-stat.	0.089	2.160**	0.979	1.423†

Note: The notations **, and † indicate the two-tailed significance level at 5% and the one-tailed significance level at 10%, respectively.

As anticipated, the coefficients of the control variables behave consistently. The coefficient of *AWARD* is significantly negative (coefficient = -1.330 , p -value = 0.043). It suggests that the market's positive reaction to award-winning companies' selection news is not as marked as to their non-award-winning counterparts, possibly because their stellar reputation diminishes any new information's impact. The coefficient for *INT_OWN* is also negative (coefficient = -0.110 , p -value = 0.005), hinting that a larger share of institutional ownership might mean more non-public information is pre-emptively known. Therefore, the stock price might have already adjusted, diluting the positive market reaction to announcements. Lastly, the negative coefficient of *AGAIN* (coefficient = -4.935 , p -value = 0.018) signals that the market's positive response is not as robust for firms re-entering the index as for those entering for the first time.

For robustness, we conduct two tests on the regression results. First, following [11], we apply the market model to re-estimate the *CAR*, where the estimation period spans 180 days to 31 days prior to the event dates, ensuring at least 100 days of data. In addition, we winsorize the continuous variables at the top and bottom 5%. Winsorization is not conducted in the main table because of the small sample sizes. Consistent with the main findings, the untabulated results show that firms adopting the *TCFD* framework experience higher abnormal returns than others do.

Table 5. Regression results.

Variables	Dependent Variable: $CAR_{(-1,+1)}$	
	Coefficient	<i>p</i> -value
<i>Intercept</i>	8.473 [†]	0.180
<i>TCFD</i>	2.521***	0.003
<i>ILL</i>	-2.323*	0.099
<i>AWARD</i>	-1.330**	0.043
<i>ASSURANCE</i>	3.550***	0.009
<i>SIZE</i>	-0.086	0.816
<i>MTB</i>	-0.666*	0.080
<i>LIQUIDITY</i>	-3.092**	0.012
<i>ROE</i>	0.186**	0.019
<i>INT_OWN</i>	-0.110***	0.005
<i>LEV</i>	1.566	0.356
<i>PRE_CAR</i>	0.100**	0.013
<i>AGAIN</i>	-4.935**	0.018
<i>EVER</i>	-0.061	0.956
<i>Industry fixed effect</i>	Yes	
<i>Year fixed effect</i>	Yes	
Adjusted R ²	0.244	
Observations	71	

Note: The notations ***, **, and * indicate two-tailed significance levels at 10%, 5%, and 1%, respectively. The notation † indicates a one-tailed significance level at 10%.

5. CONCLUSIONS

This study delves into the positive market reactions towards the inclusion in the sustainability index in Asia, a finding distinct from previous research. We further ascertain heightened abnormal returns for firms that embrace the TCFD framework. Contrary to prior studies indicating a negative link between an Asian firm's ESG performance and its value, our research posits a shift in Asian investors' perspectives. As global ESG trends and governmental promotions influence the market, there's a burgeoning consciousness towards sustainable investing in Asia. Our findings bear multiple implications. Firstly, they underscore the effectiveness of policy promotions. For businesses, our study illuminates current stakeholder concerns, offering guidance on prospective disclosures. Ultimately, the data signifies a pivotal transformation in ESG perceptions, with Asian investors increasingly resonating with sustainability matters.

However, our study is not devoid of limitations. Given our reliance on the event study methodology and the nascent nature of the Taiwan Sustainability Index, which updates its constituents bi-annually, we grapple with a constrained sample size. As a pathway forward, subsequent research could broaden the sample size and explore associated areas of study.

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APPENDIX

Literature	Sample	Period	Main findings
Curran and Moran (2007)	UK firms	1999-2002	Insignificant reactions to the inclusion in the FTSE4Good UK Index
Consolandi, Jaiswal-Dale, and Poggiani (2009)	European firms	2002-2006	Positive reactions to the inclusion in the Dow Jones Stoxx 600 index
Doh, Howton, Howton, and Siegel (2010)	U.S. firms	2000-2005	Insignificant reactions to the inclusion in the Calvert social index.
Ramchander, Schwebach, and Bertels (2012)	U.S. firms	1990-2007	Positive reactions to the inclusion in the Domini Social 400 Index
Feng, Wang, and Huang (2015)	Global firms	2002-2010	A negative association between cost of equity and CSR performance for North American and European firms; an insignificant association for Asian firms
Ahsan, Al-Gamrh, and Mirza (2022)	Chinese firms	2009-2017	Negative impacts of CSR on firm value in China
Han, Huang, Liu, and Hsu (2023)	Taiwanese firms	2012-2016	A positive association between carbon emissions and firm value



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