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Does ESG Disclosure Matter in China Stock Market?

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Abstract

Environmental, Social, and Governance (ESG) is a popular investing strategy that has emerged in recent years in the financial market, as well as becoming an investment guide for institutional investors. It is also a physical manifestation of the notion of sustainable growth in the financial market and small businesses. With steady progress on the "carbon neutrality" goal, China's economy entered a new stage of high-quality growth, and domestic ESG investment fever is heating up. Actively adopting ESG would not only strengthen the governance of publicly traded firms but would also effectively contribute to the country's green and low-carbon economic transformation. However, China's ESG practice is still in its infancy, with several obstacles and challenges. Therefore, this paper aims to examine the popularity of ESG in China, the benefits of ESG reporting to stakeholders, and explore why ESG reporting is of great concern to investors. Furthermore, through event study methodology in a sample of 1,000 Chinese listed A-Share companies, the finding of accumulated average abnormal return confirms that ESG disclosure has a significantly positive impact on stock market performance, and in the performance of average abnormal return, share price overreacted after ESG disclosure. Thus, improving the transparency of nonfinancial information will provide investors and other stakeholders with more reliable information to link ESG performance and firm value.

Keywords: ESG, Sustainable investing, ESG disclosure, Stock market performance

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1. Introduction

The concept of ESG originated in Europe and America and can be traced back to the concept of socially responsible investment derived in the 18th century. Due to the impact of religious beliefs at the time, some investors refused to invest in businesses potentially harmful to society. As international institutions increasingly pay attention to environmental protection issues, the United Nations Principles for Responsible Investment (UNPRI) were established in 2006 to promote investors to integrate environmental and social factors and corporate governance into investment strategic decisions. Goldman Sachs published a research report that year formally proposing the whole ESG concept.

ESG stands for Environmental, Social, and Governance. Detail indicator systems under these three aspects are used by companies to regulate and supervise their behaviour and are the criteria of the Principles for Responsible Investment (PRI) to evaluate companies or assets. ESG emphasizes that investment criteria and decisions should be expanded from traditional financial performance to green, sustainable development, and corporate governance with good social benefits. Rating agencies evaluate the value of companies based on these three fundamentals and give the corresponding scores. ESG uses those scores as a benchmark to invest in companies that excel in all three categories. With steady progress on the "carbon neutrality" goal, China's economy entered a new stage of high-quality growth, and domestic ESG investment fever is heating up. Actively adopting ESG would not only strengthen the governance of publicly traded firms but would also effectively contribute to the country's green and low-carbon economic transformation. However, China's ESG practice is still in its infancy, with several obstacles and challenges. To examine the effect of ESG reporting on China stock market, in this study, ESG disclosure is applied, instead of the ESG rating score. As ESG reporting generally focuses on first-party data, while ESG rating is originally from third-party ESG rating providers. A company reports on particular metrics such as greenhouse gas emissions, human rights policy, and risk management methods using an ESG framework. These reports are then analyzed by ESG rating providers, who use the scoring methodology to assign values to them and get an ESG rating, allowing various firms to be compared. Therefore, ESG reporting makes information about an organization's sustainability performance more transparent, while ESG ratings make that information more accessible to investors.

Focusing on China's A-listed stock market, this paper examines whether the performance of the share price responds positively to the disclosure of ESG and whether the impact of the disclosure of ESG on the performance of the share price is long-term. To accelerate the growth of ESG investing, firms should clearly convey the value and returns of these initiatives to investors. Improving the transparency of nonfinancial information will provide investors and other stakeholders with more reliable information to link ESG performance and firm value. Moreover, financial firms should inspire investors to have a better understanding of non-financial information.

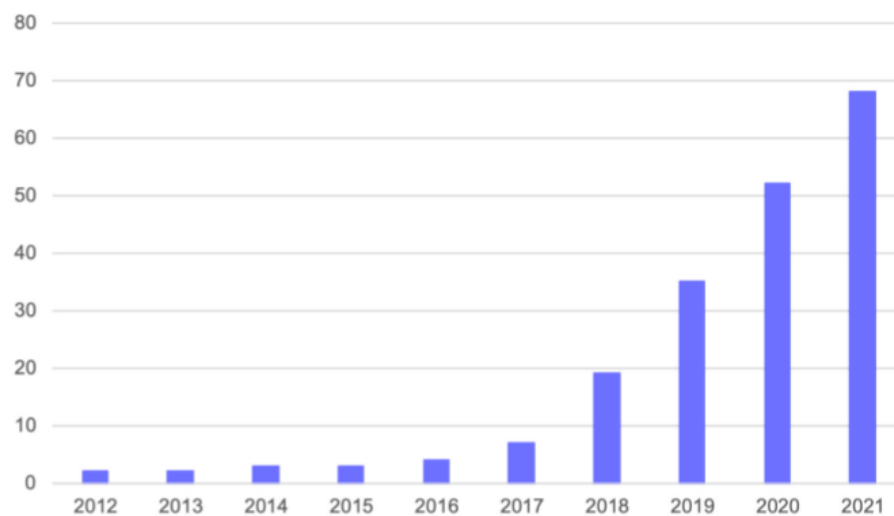
This study could contribute to fund managers; they may consider ESG factors to reallocate their diversified portfolio assets, by investing in firms with ESG information, instead of firms without ESG disclosure scores, a better return would be achieved. On the other hand, it would be a contributable indicator to reducing the cost of screening stocks, as it only needs to focus on more sustainable investment stocks.

2. Literature Review

2.1 Insights on ESG disclosure in China

ESG investing in China is becoming popular and is expanding rapidly in these years. The inclusion of A-shares in the emerging market index in 2018 was the key flashpoint for ESG in China. After 2018, the number of UN PRI signatories in China has increased exponentially (see **Figure 1**), including some asset owners, indicating that domestic investors have gradually begun to incorporate ESG into their investment strategy. By the end of October 2021, China had issued 160 ESG related products with a total volume of 354.27 billion yuan. In terms of the number and size of funds, passive index ESG funds and partial stock hybrid ESG funds are in the first place, respectively (China ESG Development White Paper 2021, 2021).

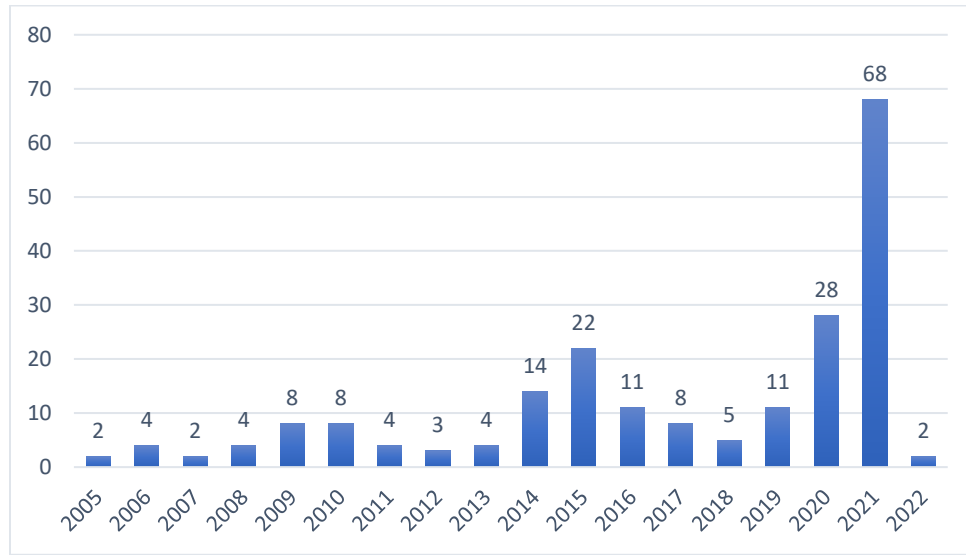
Figure 1 Number of UN PRI Signatories in China



Source: China ESG Development White Paper 2021, UN PRI Association. Data as of July 20, 2021.

ESG-themed funds have multiplied since China established a "Green Finance System" in 2015 (Peng, Luo, and Zhou 2018). The number of new ESG funds in mainland China reached a record high in 2021, with 209 ESG investment funds by the end of the year (See **Figure 2**), and many of the new launches were related to climate.

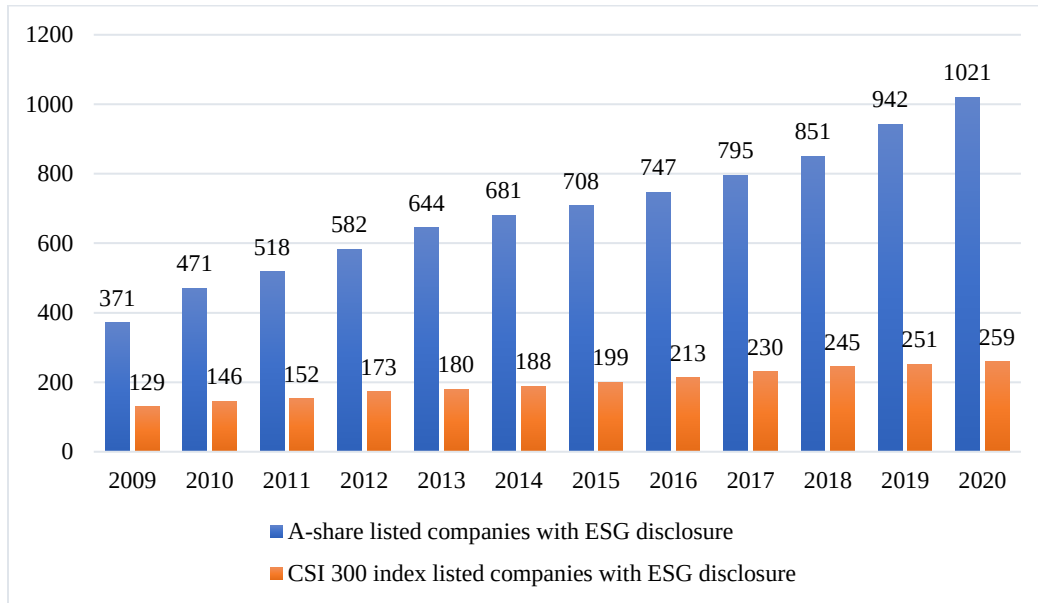
Figure 2 New ESG-themed Fund Issuance in China from 2005 to 2022



Source: Wind

With the strengthening of policy supervision on enterprises' performance of social responsibility, the amount of ESG disclosure of listed companies in China is also increasing. According to the analysis results of more than 1700 companies in "An Evolving Process: Analysis of China A-share ESG Ratings" released by ESG rating agent SynTao Green Finance, the ESG information disclosure of listed companies in China shows a steady growth trend, and the top listed companies have a strong awareness of ESG disclosure. In terms of the number of reports released, by 15 June 2020, the number of ESG reports issued by all listed companies in shares A increased from 371 in 2009 to 1,021 (See **Figure 3**). In 2020, approximately 27% of the listed companies released ESG reports, of which 259 listed companies on the CSI 300 issued ESG reports, accounting for 86%.

Figure 3 ESG Disclosure of A-shares from 2009 to 2020



Source: SynTao Green Finance

From the content of the policies issued by regulators on the ESG disclosure of companies, the ESG disclosure of listed companies has shown an obvious policy trend, and the supervision of ESG disclosure of Chinese listed companies will continue to be strengthened in the future.

2.2 ESG investing from the stakeholders' viewpoint

In the asset management sector, socially responsible investing, defined as an investment strategy that considers environmental, social, and governance (ESG) aspects, is gaining traction (Yasmine and Kooli 2022). Owing to investor growing awareness of social, environmental, and governance concerns. The relative relevance and expansion of SRI as an asset class will continue. Meanwhile, the development of SRI, paired with behavioral differences between SRI and traditional investors, poses intriguing problems for corporate finance, asset pricing, and financial intermediation research (Renneboog, Ter Horst, and Zhang 2008).

The company's environmental practices are tied to its attempts to exert a positive influence on the environment by adhering to the relevant rules. It also emphasizes areas such as climate change, carbon emissions, air and water quality, biodiversity, deforestation, energy efficiency, and waste management. Social activities are more concerned with how effectively they impact the company's stakeholders as well as the communities in which it operates. Governance component incorporates

the firm's integrity and ethical behavior inside the company's management structure, involving the high-level power organizations of enterprises, including the board of directors, political contributions, stakeholders, bribery, and corruption. (Almeyda and Darmansya 2019).

Traditionally, it is emphasized that enterprises are owned by shareholders, and their goal is to maximize shareholders' interests. However, in the concept of "stakeholder", enterprises should be responsible for any stakeholders affected by organizational decisions and actions, including shareholders, internal employees, creditors, suppliers, etc. This is the fundamental philosophy of ESG Investment, which is focused on environmental, social, and corporate governance indicators, combining business and social principles, and finding firms that prioritize the public, employees, and other corporate stakeholders, as well as shareholders' interests. In other words, shareholder value could be created through effective corporate governance, solid environmental standards, and good stakeholder relationship management (Renneboog, Ter Horst, and Zhang 2008).

As the demand for ESG grows, private equity firms and companies are forced to quickly change their basic strategy. Investors have reallocated investment decisions based on ESG factors due to massive developments in consumer awareness, consumption patterns, employee expectations, regulatory frameworks, and industry perceptions. Borgers *et al.* (2013) also suggested that companies should focus more on stakeholder issues, as a more focused stakeholder management in companies will attract more investors' attention. ESG comprises a significant number of non-financial data and provides new insights to the investing public (Li et al. 2018). Only focusing on financial performance is not enough to meet investor expectations, in which it only shows a corporate's general performance, instead of actual performance; therefore, a nonfinancial report should also be highlighted (Almeyda and Darmansya 2019). For investors, the standard criteria of excellent firms should have a sustainable competitiveness, an organizational and governance structure in place to assist management in maintaining and enhancing that competitiveness, and the structure enables management both responsibility and strong incentives to create value. Therefore, the ESG policies and investments of a firm are likely to provide a standard of work for analyzing the long-term durability of a company's competitiveness. (Hanson 2013). Therefore, ESG reports are significant, as they show investors that with less risk and a wider range of ways to generate revenue, investors may be less interested in companies that are reluctant to provide information.

For companies, they could benefit greatly from ESG disclosure. First and foremost, companies taking the initiative to assume social responsibility can establish a positive and positive social image, and then attract potential customers extensively, expand market share. Furthermore, enterprises attach importance to the working environment of employees and establish a solid talent training mechanism, which can bring a sense of belonging to employees and promote their subjective initiative, thus improving the overall production efficiency of enterprises. During downturns, the effect of ESG increases as companies with responsibility attracted their loyal shareholders to contribute to the share price, responsible investment is more resilient, and investment with ESG outperforms conventional investment (Omura, Roca, and Nakai 2021).

Moreover, green bonds carry a lower risk premium than their normal counterparts (Löffler, Petreski, and Stephan 2021). The enhancement of ESG's corporate brand will help reduce financing costs, and green bonds will broaden financing channels. Excellent ESG companies have a stronger brand reputation and greater social recognition. Corporate reputation and social recognition can effectively improve the image of an enterprise in the eyes of creditors and shareholders and enhance investors' evaluation of the profitability and solvency of the enterprise, thus reducing the financing cost of the enterprise. Additionally, companies with high environmental evaluation can obtain green certification to issue green bonds and further expand financing channels. Green certification of green bonds provides additional information, reduces the information asymmetry between investors and financiers, and then reduces the default risk of green bond issuers, making the financing cost of issuers lower.

From the perspective of China's policy, China has set a strategic goal of achieving the maximum of carbon emissions by 2030 and reaching carbon neutrality by 2060. With the introduction of relevant policies, industries with large carbon dioxide emissions, such as coal and oil, will face great challenges, while the clean energy and energy consumption reduction industries will offer important opportunities. In the future, paying attention to the sustainable development of the economy, society, and environment, and promoting the realization of the goal of high-quality national economic development and ecological construction will become an important strategic content of the global and China's future economic development. ESG products related to climate change mitigation will provide important support for the realization of a low carbon economic transformation, and investment in ESG will usher in important development opportunities.

Thus, ESG reporting attempts to strengthen business practices in order to bring the corporation closer to environmental and social sustainability. On the other hand, ESG reporting is used by corporations to obtain or keep important stakeholders' support (Unerman, J., 2007).

2.3 Research questions and hypotheses

ESG disclosure represents the transparency and accountability of the business. The higher the transparency of corporate information disclosure, the lower the risk of default (Feng and Wu 2021). With the improvement of information transparency, the enterprise's customers, investors, partners, and other groups can have a more comprehensive and accurate understanding of the enterprise's ESG status, and enhance the sense of trust between both sides. Therefore, companies that actively disclose ESG often receive higher credit ratings and lower financing costs. If the disclosure data of listed companies are seriously missing or there is no standardized disclosure, the final rating is difficult to reach the industry average level. Active disclosure of ESG related reports is a general trend.

However, a previous study shows that organizations that are more socially visible in terms of economic performance, firm profitability, leverage, and size are more likely to be subjected to different pressures from the media, regulators, and society at large. As a result, these organizations are disclosing more ESG data not only to fulfil their accountability to various stakeholder groups that may hold them socially responsible, but also to communicate and persuade the general public that they are meeting social expectations in order to alleviate those pressures. Corporates reveal their sustainability practices to demonstrate that their products and services are desired and useful to a variety of stakeholder groups, hence gaining a legitimate position in society (Abdul Rahman and Alsayegh 2021). In terms of firm performance, through regression analysis Ruan and Liu (2021) examined nonstate-owned firms, in comparison to state-owned enterprises, face more cost pressure on ESG activities, resulting in lower company performance. Non-environmentally sensitive corporations face more cost constraints on ESG activities than environmentally sensitive organizations, and the resulting deterioration in company performance is more visible. And scholars Deng and Cheng (2019) investigated that ESG indexes have a larger effect on nonstate-owned firms than on state-owned firms. The policy imposes far higher social responsibility and burden on state-owned firms than on nonstate-owned firms. Due to guaranteed government finances, state-owned firms are more stable than nonstate-owned firms. While if nonstate-owned

firms' ESGs perform poorly, shareholders become skeptical about their overall performance, resulting in a drop in stock market value.

Dye, McKinnon, and Byl (2021) highlighted that corporates that fail to comply with the ESG disclosure requirement may lead to divestment, ESG reporting has a significant impact on investor decision. (Sahut and Pasquini-Descomps 2015) provide insight into how news-based ESG (Environmental, Social, and Corporate Governance) ratings affected monthly stock market returns in Switzerland, the United States, and the United Kingdom from 2007 to 2011. (Landi and Sciarelli 2018) investigated whether socially responsible investors outperform an excess market return on the Italian Stock Exchange as a result of their investment strategy, statistically testing the relationship between yearly ESG assessments and abnormal returns. ESG reporting contributes to present management performance of corporations and identify their risks, ESG performance became a risk measurement in the current investing strategy. (Yuan et al. 2022) claimed that ESG disclosure reduces the risk of financial irregularity in firms and contributes to the mitigation of information asymmetry. Several research papers analyzed the correlation between corporate financial performance and environmental, social, and governance scores separately in western countries, while less research investigated how the stock market reacts by ESG disclosure in Asian markets. One of the purposes of this study is to enhance literature in the Asian background by investigating the influence of non-financial activities on A-share listed firms in China. Therefore, this paper examines whether share price performance responds positively to ESG disclosure and whether the impact of ESG disclosure on share price performance is long-term or temporary. Two hypotheses are generated as follows:

H1: ESG disclosure has a positive impact on share price performance

H2: The impacts of ESG disclosure on share price performance are long-term

3. Methodology

3.1 Sample and data collection methods

The population of the study consisted of a sample of 1000 A-share listed stocks on the Shenzhen Stock Exchange and Shanghai Stock Exchange from 2008 to 2020, the information was originally sourced from the Bloomberg database, where data regarding the last price, ESG disclosure, date, CSI 300 index and a number of stocks were collected.

To examine the effect of ESG reporting on the stock market, in this study, ESG disclosure is applied, instead of the ESG rating score. As ESG reporting generally focuses on first-party data, while ESG rating is originally from third-party ESG rating providers. A company reports on particular metrics such as greenhouse gas emissions, human rights policy, and risk management methods using an ESG framework. These reports are then analyzed by ESG rating providers, who use scoring methodology to assign values to them and get an ESG rating, allowing various firms to be compared. Therefore, ESG reporting makes information about an organization's sustainability performance more transparent, while ESG ratings make that information more accessible to investors.

Bloomberg's ESG disclosure scores are based on first-hand information that is exploited by regulators, investors, academics, workers, rating agencies, and others. ESG data is standardized by Bloomberg analysts to ensure that it accurately reflects a company's operational effect. Companies are encouraged to provide input to Bloomberg after the analyst analysis (Yasmine and Kooli 2022). Bloomberg reviews companies on a yearly basis, collecting public ESG data from companies' corporate social responsibility (CSR) or sustainability reports, annual reports and websites, and other public sources, as well as direct interaction with the companies. Carbon emissions, climate change effect, pollution, waste disposal, renewable energy, resource depletion, supply chain, political contributions, discrimination, diversity, community relations, human rights, cumulative voting, executive compensation, shareholders' rights, takeover defence, staggered boards, and independent directors are among the 120 environmental, social and governance indicators covered by Bloomberg ESG data.

Firms that do not provide any information are labeled N/A. It is assumed that the Bloomberg ESG disclosure score could be considered as a representation of a firm's voluntary and mandated

disclosures, which allow shareholders and stakeholders to evaluate the transparency of a publicly listed company, in light of the Bloomberg ESG score methodology. More non-financial information is revealed as the disclosure score rises. In calculating the long-run performance in this study, due to missing data on the last price of stocks in the whole period of 2008 to 2020, those stocks were eliminated, and this reduced the initial sample size from 1000 to 721. In terms of β and annual return of stocks, where the underlying index for calculating β is the CSI 300 index, calculated from the WIND database.

3.2 Measurement approach: Event study methodology

The event study methodology is an empirical research method used to measure the impact of an event, which was first proposed by (Ball and Brown 1968), and now it has developed into a major tool to study long-term abnormal returns in the capital market, which mainly focuses on the impact of the occurrence of events such as acquisition, merger, shareholding increase announcement or refinancing behavior, etc. in stock price or enterprise value.

In calculating long-run performance of A-Share listed stocks, this study applied average periodic abnormal return over 13 years before and after ESG exposure, measured by average abnormal return (AAR) (Gur-Gershoren, Zender, and Hughson 2008). Firms with ESG disclosure but without last price were excluded in the sample. To calculate the average abnormal returns, the return on the stock or index is defined as:

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

Where is the actual return for stock i in period t ; $P_{i,t}$ is the price of the stock at the end of the current period and $P_{i,t-1}$ is the price of the stock at the end of the previous period (Suherman and Buchdadi 2010).

Using the market model, the abnormal return for stock i in the event year t is defined as the difference between the realized return and its expected return:

$$AR_{i,t} = R_{i,t} - \hat{\beta}_{i,t} \cdot R_{m,t} \quad (2)$$

Where $R_{i,t}$ is the actual return for stock i in period t and $R_{m,t}$ is the actual return on the benchmark, which is CSI 300 index for the same period; $\hat{\beta}_{i,t}$ measures predicted stock's volatility in relation to the whole market.

To access the predicted return, this paper assumes that β of stocks is not affected by the ESG disclosure event. Therefore, to measure predicted return $\hat{\beta}_{i,t}$ is calculated as:

$$\hat{\beta}_{i,t} = \beta_{i,t-1} = \frac{N \cdot \sum X_i \cdot Y_i - (\sum X_i) \cdot (\sum Y_i)}{N \cdot \sum X_i^2 - (\sum X_i)^2} \quad (3)$$

Where $\beta_{i,t-1}$ serves as predicted stock's volatility in relation to the whole market, N represents number of observations, X_i is close price of stock i , Y_i refers to underlying index.

Average return for a portfolio of N stocks in a cross-sectional period t is the mean of abnormal returns, which is calculated as follows:

$$AAR_t = \frac{1}{N} \sum_{i=1}^n AR_{i,t} \quad (4)$$

Moreover, cumulative average abnormal return (CAAR) is valuable to provide a cross-sectional average of all abnormal returns, which is determined by:

$$CAAR_{T_1, T_2} = \sum_{t=T_1}^{T_2} AAR_t \quad (5)$$

However, it is undeniable that abnormal returns exist during calendar year turning points (Jacobs and Levy 1988). To control the calendar year effect on abnormal return, regression model is generated in the following:

$$AR_{i,t} = \beta_0 + \beta_1 \cdot d_{i,t} + \sum_{i=1}^n \delta_t \cdot D_{i,t} + \varepsilon \quad (6)$$

where:

$d_{i,t}$ is dummy variable of ESG disclosure. $d_{i,t} = 1$ if the stock i has ESG disclosure in period t ; $d_{i,t} = 0$ otherwise (without ESG disclosure).

$D_{i,t}$ is dummy variable of calendar year, $D_{i,t} = 1$ if the stock i is in period t ; $D_{i,t} = 0$ otherwise (not in calendar year t).

$\varepsilon \sim N(0, \sigma^2)$ is the error term.

Based on regression model, ESG disclosure and calendar year effect against abnormal return using Model 1 and Model 2, in the meantime, whether ESG disclosure without calendar year effect has impact on abnormal return is examined by Model 3.

$$\text{Model 1: } AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \delta_1 \cdot D1_{it} + \delta_2 \cdot D2_{it} + \dots + \delta_{12} \cdot D12_{it} + \varepsilon \quad (7)$$

$$\text{Model 2: } AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \delta_1 \cdot D1_{it} + \delta_2 \cdot D2_{it} + \dots + \delta_6 \cdot D6_{it} + \delta_8 \cdot D8_{it} + \dots + \delta_{12} \cdot D12_{it} + \varepsilon \quad (8)$$

$$\text{Model 3: } AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \varepsilon \quad (9)$$

Where: d = ESG disclosure; to avoid dummy variable trap or multi-collinearity, calendar year 2018 is omitted, in the meantime, calendar year serves as reference category, hereby, $D1$ = calendar year 2009, $D2$ = calendar year 2010, ..., $D12$ = calendar year 2020 in sequence, β_0 = constant, β_1 = regression coefficient, $\delta_1 \dots \delta_{12}$ = regression coefficient.

3.3 Parametric Test

Statistic test for testing $H_0: E(AAR)=0$ is measured by (Lyon, Barber, and Tsai 1999):

$$t_{AAR_t} = \sqrt{N} \frac{AAR_t}{S_{AAR_t}} \quad (10)$$

Where S_{AAR_t} refers to the standard deviation across firms at time t determined by:

$$S_{AAR_t}^2 = \frac{1}{N-1} \sum_{i=1}^N (AR_{i,t} - AAR_t)^2$$

(11)

Statistic test for testing $H_0: E(CAAR)=0$ is calculated by:

$$t_{CAAR} = \sqrt{N} \frac{CAAR}{S_{CAAR}}$$

(12)

Where S_{CAAR} is defined as the standard deviation of the cumulative abnormal returns across the sample denoted by:

$$S_{CAAR}^2 = \frac{1}{N-1} \sum_{i=1}^N (CAR_i - CAAR)^2$$

(13)

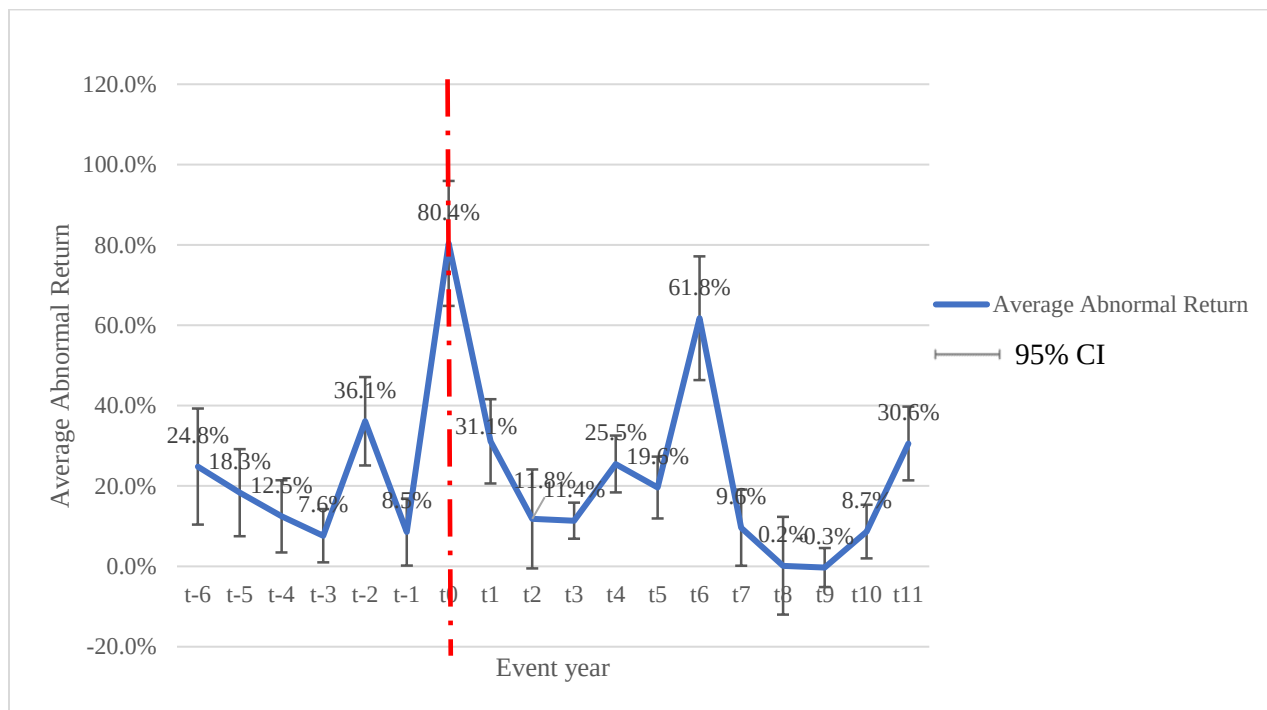
4. Results and discussion

4.1 Market Model

The results of the event study based on market model indicated in the methodology section are presented in this section, the impact of ESG disclosure on stock prices is investigated. Throughout this chapter, t-test applied for critical values is significant at 5 % level.

In **Figure 4** the average abnormal return of total sample presented from $t = -6$ to $t = 11$. Obviously, when $t=0$, the average abnormal return reaches to the highest level with 80.4%. It is statistically significant with $p\text{-value} < 0.05$ (See **Table 1**), which means that stock prices have a strong reaction when firms disclose their ESG information. However, it dramatically drops down from the peak to 31.1% at $t=1$, slightly lower than $t = -1$, with 36.1%.

Figure 1 Average Abnormal Return across Event Time



Source: author.

Table 1 Event Study Results for the Whole Sample

Event Year	Number of Observation	S_{AAR_t}	95% Confidence Interval for		t_{AAR_t}	P-value	p<0.05
			Lower Bound	Upper Bound			
-6	76	0.6321	0.0801	0.369	3.0966	0.0014	Yes
-5	99	0.5434	0.0697	0.2865	3.2615	0.0008	Yes
-4	126	0.5096	0.0501	0.2299	3.0837	0.0013	Yes
-3	140	0.3968	0.0062	0.1389	2.1628	0.0161	Yes
-2	153	0.6889	0.2247	0.4448	6.0100	0.0000	Yes
-1	209	0.6112	0.0001	0.1668	1.9736	0.0249	Yes
0	365	1.5107	0.6772	0.9882	10.5299	0.0000	Yes
1	396	1.0615	0.2028	0.4126	5.7680	0.0000	Yes
2	361	1.1899	0.0279	0.2742	2.4114	0.0082	Yes
3	361	0.4334	0.0827	0.1725	5.5932	0.0000	Yes
4	337	0.6603	0.1839	0.3254	7.0796	0.0000	Yes
5	324	0.7041	0.1356	0.2895	5.4336	0.0000	Yes
6	226	1.1747	0.4228	0.7307	7.3806	0.0000	Yes
7	226	0.7236	0.0346	0.2242	2.6886	0.0039	Yes
8	253	0.9822	-0.0678	0.1754	0.8709	0.1923	No
9	259	0.3970	-0.044	0.0532	0.1859	0.4263	No
10	283	0.5701	0.0289	0.1623	2.8220	0.0026	Yes
11	294	0.7995	0.2748	0.4583	7.8617	0.0000	Yes

Source: author.

In **Table 2** the cumulative average abnormal return (CAAR) for the 13-year event window is presented. It shows that the highest CAAR reached at $t=6$, with 3.49, which is statistically significant based on $P\text{-value} < 0.05$. All CAAR before $t=0$ are relatively low while CAAR are higher after $t=0$. Moreover, with a significance level of 5%, all the t-test of AAR and CAAR is statistically significant.

Table 2 13-Year Event Period

Event Year	AAR	CAAR	S_{AAR}	S_{CAAR}	t_{CAAR}	P-value CAAR
-6	0.2485	0.2485	0.6321	0.7951	3.4266	0.0005
-5	0.1835	0.4319	0.5434	0.7372	8.2243	0.0000
-4	0.1245	0.5564	0.5096	0.7139	12.8508	0.0000
-3	0.0763	0.6327	0.3968	0.6300	17.0600	0.0000
-2	0.3612	0.9939	0.6889	0.8300	30.0158	0.0000
-1	0.0853	1.0792	0.6112	0.7818	34.7713	0.0000
0	0.8038	1.8830	1.5107	1.2291	51.6711	0.0000
1	0.3112	2.1942	1.0615	1.0303	58.3014	0.0000
2	0.1181	2.3123	1.1899	1.0908	61.3162	0.0000
3	0.1137	2.4261	0.4334	0.6583	66.1587	0.0000
4	0.2549	2.6809	0.6603	0.8126	75.8344	0.0000
5	0.1962	2.8771	0.7041	0.8391	84.1798	0.0000
6	0.6177	3.4948	1.1747	1.0839	104.4815	0.0000

Source: author.

Table 3 shows the cumulative average abnormal return (CAAR) and parametric tests on the different event windows. With expansion of event window, CAAR is gradually higher from event window (-1; +1) to event window (-6; +6), they all are statistically significant with 5% significant level.

Table 3 Event Study Results for Event Windows

Event window	CAAR	S_{CAAR}	t_{CAAR}	p-value
(-1; +1)	1.20034	1.31252	28.4831	1.90E-130
(-3; +3)	1.86964	1.72581	50.1389	0
(-6; +6)	3.49479	2.06897	104.482	0

Source: author.

4.2 Regression Model

4.2.1 Descriptive Statistics

In the regression model, variables of research data are formed in various groups of observations, minimum, mean, and standard deviation in **Table 4** below. Regarding dependent variable abnormal return, it distributed in the range of a minimum of -1.34 and maximum of 16.00, with an average value of 0.23. For the independent variables are shown likewise below.

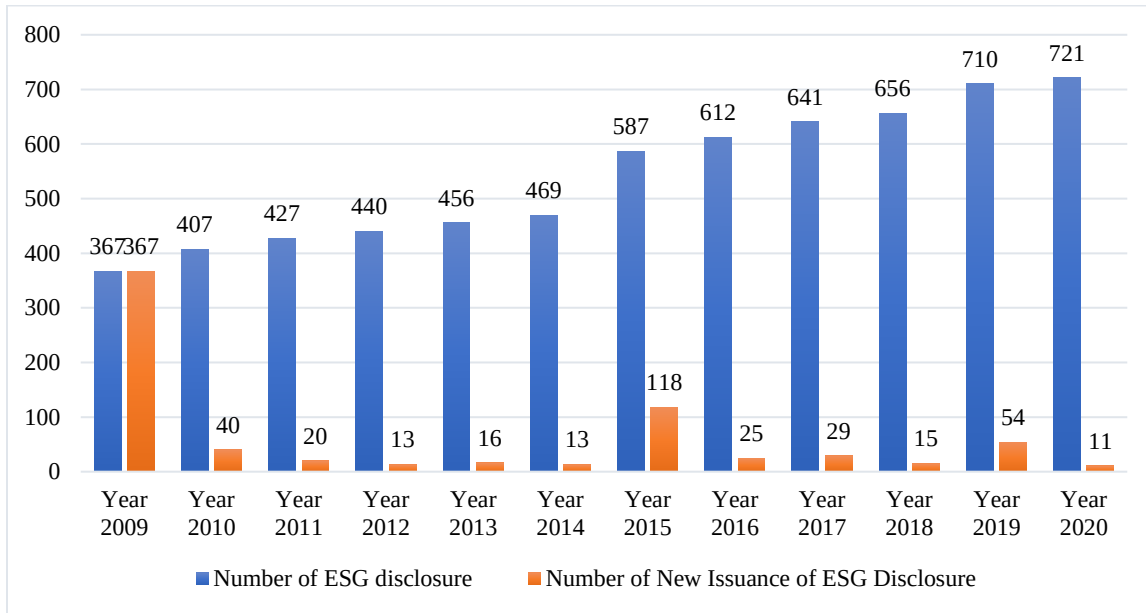
Table 4 Descriptive Statistics

Variable	N	Minimum	Maximum	Mean	Std. Deviation
AR	4630	-1.3399	16.0056	0.23428	0.89252
d	4630	0	1	0.8	0.404
D1	4630	0	1	0.03	0.177
D2	4630	0	1	0.05	0.214
D3	4630	0	1	0.06	0.234
D4	4630	0	1	0.06	0.242
D5	4630	0	1	0.06	0.243
D6	4630	0	1	0.07	0.254
D7	4630	0	1	0.08	0.27
D8	4630	0	1	0.09	0.281
D9	4630	0	1	0.1	0.302
D10	4630	0	1	0.11	0.312
D11	4630	0	1	0.12	0.33
D12	4630	0	1	0.14	0.347

Source: author.

Figure 2 indicates that in the sample, number of ESG disclosure has experienced a steady upward trend from 2009 to 2020. There is no ESG disclosure in 2008, new issuance of ESG disclosure in 2009 is highest, with 367, the second highest in 2015 with 118.

Figure 2 New Issuance of ESG Disclosure



Source: author.

4.2.2 Correlation Analysis

In addition to analyzing the correlation of ESG Disclosure and abnormal return, the influence of other factors on their correlation was also considered, such as calendar year. Calendar year were included to remove the effect of such factor on the correlation of the main observed variables, which are ESG disclosure and abnormal return in this analysis. After adjusting those factors, the interference to the research results can be reduced, the correlation between the two main observed variables can be analyzed more accurately, and the reliability of the results can be guaranteed. Pearson K (1904) proposed the person product moment correlation analysis, claiming that the correlation demonstrates a degree of linear connection between two or more variables.

In the column of abnormal return (See **Table 5**) shows that the correlation-dependent variable abnormal return with ESG Disclosure significant at 0.05 level (2-tailed), dependent variable abnormal return with D3, D4, D5, D6, D7, D9, and D10 correlation significant at the level of 0.01, and other variables are not significantly correlated with the dependent variable abnormal return. While column 2 onwards indicated that ESG disclosure has weak correlation with all the calendar year dummy variables, with significance level of 0.01. It indicates that there is multicollinearity

between the independent variables. Although independent variables are multiple categorical dummy variables with weak correlations, multicollinearity could be safely ignored.

Table 5 Correlation Matrix

	AR	d	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12
AR	1													
d	.038*	1												
D1	.027	-.185**	1											
D2	.009	-.157**	-.041**	1										
D3	-.097**	-.156**	-.045**	-.056**	1									
D4	-.071**	-.134**	-.047**	-.058**	-.064**	1								
D5	.081**	-.114**	-.048**	-.058**	-.064**	-.067**	1							
D6	-.042**	-.110**	-.050**	-.061**	-.068**	-.070**	-.071*	1						
D7	.245**	.071**	-.054**	-.066**	-.073**	-.075**	-.076*	-.080*	1					
D8	-.024	.080**	-.056**	-.069**	-.076**	-.079**	-.080*	-.084*	-.090**	1				
D9	-.083**	.107**	-.061**	-.075**	-.083**	-.087**	-.087*	-.092*	-.098**	-.103**	1			
D10	-.083**	.116**	-.064**	-.079**	-.087**	-.090**	-.091*	-.096*	-.103**	-.108**	-.118**	1		
D11	-.023	.191**	-.069**	-.085**	-.093**	-.097**	-.098*	-.103*	-.110**	-.116**	-.126**	-.132**	1	
D12	.089**	.204**	-.074**	-.090**	-.100**	-.104**	-.105*	-.110*	-.118**	-.124**	-.135**	-.141**	-.152**	1

Source: author.

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

**. Correlation is significant at the 0.01 level (2-tailed).

4.2.3 Analysis of calendar year effect

The result of the calculation is as in **Table 6** below that proves that the hypothesis about the ESG disclosure and calendar year impacts on abnormal return.

In Model 1, variable d or ESG disclosure positively affect abnormal return with regression coefficients 0.001, but it is not significant with 0.812 at the 5% level. Except for D3 or calendar year 2011 negatively impact on abnormal return, the rest of calendar years positively affect abnormal return, while only D1, D2, D5, D7, D11, D12 are statistically significant at 5% level.

Model 2 is used to test whether ESG has an effect on abnormal return by ignoring one of the independent variables D7 or calendar year 2015 in which the new issuance of ESG is the highest from 2010 to 2020, this year the Chinese stock market has experienced a bull market. Model 2 shows that without calendar year 2015 effect, d or ESG disclosure has a significantly positive impact on abnormal return, with coefficients 0.144 and significance 0.00.

Model 3 indicates that ESG disclosure has a significant and positive impact on abnormal return with regression coefficient 0.083 and significance 0.01, which means that without affecting the abnormal return of the calendar year, ESG disclosure positive significantly affects the abnormal return. Thus, the result in this study supports hypothesis 1.

Table 6 Factors affecting abnormal return*Model 1:*

$$AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \delta_1 \cdot D1_{it} + \delta_2 \cdot D2_{it} + \dots + \delta_{12} \cdot D12_{it} + \varepsilon$$

Model 2:

$$AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \delta_1 \cdot D1_{it} + \delta_2 \cdot D2_{it} + \dots + \delta_6 \cdot D6_{it} + \delta_8 \cdot D8_{it} + \dots + \delta_{12} \cdot D12_{it} + \varepsilon$$

Model 3:

$$AR_{i,t} = \beta_0 + \beta_1 \cdot d_{it} + \varepsilon$$

Variable	Model 1				Model 2				Model 3		
	Coeff.	t-test	Sig.	VIF	Coeff.	t-test	Sig.	VIF	Coeff.	t-test	Sig.
(Constant)	-.018	-.238	.812		.632	13.924	.000		.168	5.808	.000
d	.001	.024	.981	1.482	.144	4.039	.000	1.293	.083	2.560	.010
D1	.385	3.710	.000	2.171	-.321	-3.974	.000	1.283			
D2	.289	2.990	.003	2.752	-.434	-6.235	.000	1.392			
D3	-.099	-1.052	.293	3.107	-.826	-	.000	1.464			
D4	.005	.054	.957	3.287	-.729	-	.000	1.494			
D5	.528	5.651	.000	3.338	-.210	-3.313	.001	1.498			
D6	.116	1.254	.210	3.555	-.625	-	.000	1.541			
D7	1.000	10.636	.000	4.138		10.133					
D8	.181	1.939	.053	4.419	-.598	-	.000	1.694			
D9	.031	.334	.738	4.976	-.751	-	.000	1.807			
D10	.040	.440	.660	5.268	-.742	-	.000	1.866			
D11	.198	2.154	.031	5.894	-.595	-	.000	2.000			
D12	.449	4.939	.000	6.399	-.344	-6.512	.000	2.102			
Adjusted R Square	.098				.076				.001		
F-statistics	39.476				32.549				6.555		
Prob. F Statistic	.000				.000				.010		
Total Observation	4630				4630				4630		

Source: author.

4.3. Discussion

The findings of this empirical study are based on the event study methodology in which abnormal return of firms are observed to analyze the impact of ESG disclosure. In the study period, apart from abnormal return, average abnormal return, accumulated average abnormal return and statistical test were obtained. In order to investigate long-term effect, event windows were extended from (-1; +1) to (-3; +3) and (-6; +6) in sequence, CAAR is getting higher and higher, alternatively, it supports hypothesis 1 and 2, showing that ESG disclosure has a long-term positive impact on share price performance.

Regarding average abnormal return, it goes down from the peak after ESG disclosure at $t = 0$, underreaction hypothesis could be well explained. Price is the carrier of information, while securities prices did not fully reflect all information available. In different circumstances, stock market exists market underreaction. For example, post-earnings announcement drift ((Ball and Brown 1968; Bernard and Thomas 1989) and momentum investing (Jegadeesh and Titman 1993) are coherent with market underreaction and against market efficiency. This result matches with the findings from (Li et al. 2018) implying that ESG disclosures would improve a company's value through raising transparency and accountability. Higher disclosure quality could prove that the firms have the ability to strengthen firms value (Hui and Matsunaga 2014). Researchers (Cek and Eyupoglu 2020) examined that ESG is a significant predictor of a company's economic performance. However, the level of environmental, social, and governance performance's effect is strongest the year after and declines subsequently.

When a significant majority of investors neglect certain stocks, let's say those stocks that do not have ESG disclosure, they might become undervalued. This demonstrates initial low return, soon afterward, those stocks will have high returns compared to themselves without ESG disclosure in the past (Merton 1987).

By and large, the key justification for based ESG strategies outperforming traditional ESG strategies is that the stock market underreacts ESG information. In other words, the stock market does not adequately appreciate the value benefits of a positive ESG event, therefore, corporations that have such events are undervalued, and a strategy investing in those companies can generate abnormally high returns (Hvidkjær 2017).

Over time, with the investment stocks with the ESG investment strategy becoming more and more popular, the exposure of these companies has increased by the ESG reporting. It's hard to see stocks outperformance remain. A market has become essentially informationally efficient; a low return may arise. As numerous investors explore investing strategies based on intangible ESG information, underreaction to intangible ESG information would vanish, and investors who ignored value-relevant information were becoming increasingly rare. The popularity of ESG investing is temporary while naturally it's based on the actual growth of demand (Hvidkjær 2017).

5. Conclusion

The purpose of this paper is to investigate the long-term performance of firms that disclose ESG information and to analyze whether the share price performance responds positively to the ESG disclosure and whether the impact of ESG disclosure on share price performance is temporary or long-term, by using the Bloomberg database over the 2008-2020 period.

The statistical significance of the abnormal return (AR) and cumulative abnormal return (CAR) from the market model is demonstrated. The finding of accumulated average abnormal return confirms that ESG disclosure has a significantly positive impact on stock market performance. In the performance of average abnormal return, share price overreacted after ESG disclosure. Evidence of an initial highly positive but later normal positive average abnormal return suggests that the stock market did not adequately appreciate the value benefits of a positive ESG event, therefore businesses having such events are undervalued, temporarily caused the prices to overreact, in other words, firms overreacted to information about their long-term prospects.

To investigate the long-term effect, the event windows were extended from (-1; +1) to (-3; +3) and (-6; +6) in sequence, CAAR is increasing, alternatively, it supports hypothesis 1 and 2. Furthermore, the regression model strengthened that ESG disclosure has positive impact on share price, without calendar year effect, ESG disclosure positively significant affects abnormal return, which strengthened hypothesis 1.

To accelerate the growth of ESG investing, firms should clearly convey the value and returns of these initiatives to investors. Improving the transparency of non-financial information will provide investors and other stakeholders with more reliable information to link ESG performance and firm value. Moreover, financial firms should inspire investors to have a better understanding of non-financial information.

Furthermore, researcher (Jin 2020) examined a sample of US equity mutual funds over the period 2004 to 2018 and founded that ESG-screened portfolios are likely to offer less risky performance than unscreened portfolios. Fund managers could consider ESG factors to reallocate their diversified portfolio assets, by investing in firms with ESG information, instead of firms without ESG disclosure scores, a better return would be achieved. On the other hand, it would be a useful

indicator for reducing the cost of screening stocks, as it only needs to focus on more sustainable investment stocks.

Reference

- Abdul Rahman, Rashidah, and Maha Faisal Alsayegh. 2021. "Determinants of Corporate Environment, Social and Governance (ESG) Reporting among Asian Firms." *Journal of Risk and Financial Management* 14(4): 167.
- Almeyda, Raisa, and Asep Darmansya. 2019. "The Influence of Environmental, Social, and Governance (ESG) Disclosure on Firm Financial Performance." *IPTEK Journal of Proceedings Series* 0(5): 278.
- Ball, Ray, and Philip Brown. 1968. "An Empirical Evaluation of Accounting Income Numbers." *Journal of Accounting Research* 6(2): 159–78.
- Bernard, Victor L., and Jacob K. Thomas. 1989. "Post-Earnings-Announcement Drift: Delayed Price Response or Risk Premium?" *Journal of Accounting Research* 27: 1–36.
- Borgers, Arian, Jeroen Derwall, Kees Koedijk, and Jenke ter Horst. 2013. "Stakeholder Relations and Stock Returns: On Errors in Investors' Expectations and Learning." *Journal of Empirical Finance* 22: 159–75.
- Cek, Kemal, and Serife Eyupoglu. 2020. "Does Environmental, Social and Governance Performance Influence Economic Performance?" *Journal of Business Economics and Management* 21(4): 1165–84.
- Dai, Yuwen. 2021. "Can ESG Investing Beat the Market and Improve Portfolio Diversification? Evidence from China." *Chinese Economy* 54(4): 272–85.
- Deng, Xiang, and Xiang Cheng. 2019. "Can ESG Indices Improve the Enterprises' Stock Market Performance?—An Empirical Study from China." *Sustainability* 11(17): 4765.
- Dye, Jorden, M. McKinnon, and Connie Van der Byl. 2021. "Green Gaps: Firm ESG Disclosure and Financial Institutions' Reporting Requirements."
- Feng, Zifeng, and Zhonghua Wu. 2021. "ESG Disclosure, REIT Debt Financing and Firm Value." *The Journal of Real Estate Finance and Economics*. <https://doi.org/10.1007/s11146-021-09857-x> (April 18, 2022).

- “Green Gaps: Firm ESG Disclosure and Financial Institutions’ Reporting Requirements.” 2021. *Journal of Sustainability Research* 3(1). https://sustainability.hapres.com/htmls/JSR_1344_Detail.html (April 1, 2022).
- Gur-Gershgoren, Gitit, Jaime F. Zender, and Eric N. Hughson. 2008. “A Simple-But-Powerful Test for Long-Run Event Studies.” *SSRN Electronic Journal*. <http://www.ssrn.com/abstract=847791> (April 11, 2022).
- Hanson, Dan. 2013. “ESG Investing in Graham & Doddsville.” *Journal of Applied Corporate Finance* 25(3): 20–31.
- Hui, Kai Wai, and Steven R. Matsunaga. 2014. “Are CEOs and CFOs Rewarded for Disclosure Quality?” *The Accounting Review* 90(3): 1013–47.
- Hvidkjær, Søren. 2017. “ESG Investing: A Literature Review.” *Report prepared for Dansif*.
- Jacobs, Bruce I., and Kenneth N. Levy. 1988. “Calendar Anomalies: Abnormal Returns at Calendar Turning Points.” *Financial Analysts Journal* 44(6): 28–39.
- Jegadeesh, Narasimhan, and Sheridan Titman. 1993. “Returns to Buying Winners and Selling Losers: Implications for Stock Market Efficiency.” *The Journal of Finance* 48(1): 65–91.
- Jin, Ick. 2020. “ESG-Screening and Factor-Risk-Adjusted Performance: The Concentration Level of Screening Does Matter.” *Journal of Sustainable Finance & Investment*: 1–21.
- Landi, Giovanni, and Mauro Sciarelli. 2018. “Towards a More Ethical Market: The Impact of ESG Rating on Corporate Financial Performance.” *Social Responsibility Journal* 15(1): 11–27.
- Li, Yiwei, Mengfeng Gong, Xiu-Ye Zhang, and Lenny Koh. 2018. “The Impact of Environmental, Social, and Governance Disclosure on Firm Value: The Role of CEO Power.” *The British Accounting Review* 50(1): 60–75.
- Löffler, Kristin Ulrike, Aleksandar Petreski, and Andreas Stephan. 2021. “Drivers of Green Bond Issuance and New Evidence on the ‘Greenium.’” *Eurasian Economic Review* 11(1): 1–24.

- Lyon, John D., Brad M. Barber, and Chih-Ling Tsai. 1999. "Improved Methods for Tests of Long-Run Abnormal Stock Returns." *The Journal of Finance* 54(1): 165–201.
- Merton, Robert C. 1987. "A Simple Model of Capital Market Equilibrium with Incomplete Information." *The Journal of Finance* 42(3): 483–510.
- Omura, Akihiro, Eduardo Roca, and Miwa Nakai. 2021. "Does Responsible Investing Pay during Economic Downturns: Evidence from the COVID-19 Pandemic." *Finance Research Letters* 42: 101914.
- Peng, Huan, Xiaoqing Luo, and Chaobo Zhou. 2018. "Introduction to China's Green Finance System." *Journal of Service Science and Management* 11(01): 94.
- Renneboog, Luc, Jenke Ter Horst, and Chendi Zhang. 2008. "Socially Responsible Investments: Institutional Aspects, Performance, and Investor Behavior." *Journal of Banking and Finance* 32(9): 1723–42.
- Ruan, Lei, and Heng Liu. 2021. "Environmental, Social, Governance Activities and Firm Performance: Evidence from China." *Sustainability* 13(2): 767.
- Sahut, Jean-Michel, and H  l  ne Pasquini-Descomps. 2015. "ESG Impact on Market Performance of Firms: International Evidence." *Management international / International Management / Gesti  n Internacional* 19(2): 40–63.
- Suherman, and Agung Dharmawan Buchdadi. 2010. *The Long-Run Performance of Initial Public Offerings (IPOs): Comparison between Shari'Ah and Non Shari'Ah-Based Firms*. Rochester, NY: Social Science Research Network. SSRN Scholarly Paper. <https://papers.ssrn.com/abstract=1567344> (March 25, 2022).
- Yasmine, Besbes, and Maher Kooli. 2022. "Smart Beta ESG Disclosure." *Journal of Asset Management*. <https://link.springer.com/10.1057/s41260-022-00257-1> (April 5, 2022).
- Yu, Ellen Pei-yi, Christine Qian Guo, and Bac Van Luu. 2018. "Environmental, Social and Governance Transparency and Firm Value." *Business Strategy and the Environment* 27(7): 987–1004.

Yuan, Xueying, Zhongfei Li, Jinhua Xu, and Lixia Shang. 2022. “ESG Disclosure and Corporate Financial Irregularities – Evidence from Chinese Listed Firms.” *Journal of Cleaner Production* 332.

<https://search.ebscohost.com/login.aspx?direct=true&db=edselp&AN=S0959652621041603&site=eds-live> (April 1, 2022).

MSCI China ESG Leaders Index (2022): Available at:

<https://www.msci.com/documents/10199/78514cc5-a16d-493a-9774-af1012aa0420>.

China ESG Development White Paper 2021(2021): Available at:

<https://index.caixin.com/upload/chinaesgwhitepaper2021.pdf>

WIND Dataset: Available online:

<https://www.wind.com.cn/en/edb.html> (accessed on 24 March 2022).