# The Linkage between Environmental Performance Factors and the Valuation of Companies: A Discussion of Channels of Transmission in the Financial Market

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**Abstract:** Previous researches have demonstrated the transmission from environmental performance factors of listed companies to their market capitalization in both short term and long term in various markets. This paper uses the recent statistics of CSI 300 constituent stocks from SynTao Green Finance ESG database to verify both the short and long term transmission from environmental performance factors to the market capitalization of listed companies, verifying that the value law of environmental information is applicable to the A-share market of Mainland China. A more abstract understanding of this law of value leads to a discussion of the interaction of markets, companies, and environmental information, as well as concepts of the market effectiveness, corporate transparency, and financial materiality of environmental information.

## 1. Introduction

In the capital market, the transmission from information about the environmental performance factors of listed companies to the market capitalization of listed companies can be analyzed in both the short and long term. Short-term transmission is mainly when new information reveals that the environmental performance of a listed company is at risk, or that the operations of a listed company are harmful to the environment and that the listed company is responsible, including information that the company discloses in compliance with regulations, negative news reports about the company, announcements by environmental and financial regulators, etc. The emergence of such information that was not previously known to the market and therefore not internalized in the price causes the company's share price to fall rapidly in the short term, potentially below the company's fair value, and to rebound later. There are many similar cases, such as in September 2015, when the EPA revealed that Volkswagen had planted special software in some of its models to circumvent emissions inspections, and that these models emitted exhaust fumes in excess of the limit in normal use. Days later, Volkswagen admitted that it had indeed manipulated tailpipe emissions, and its share price traded in Germany plummeted and triggered a change in the company's management.

Long-term transmission is mainly the environmental performance factors of listed companies that affect the market judgment of the intrinsic value of listed companies. As one of the main categories of non-financial information that capital markets mainly refer to, environmental factors are often juxtaposed with social and corporate governance information and are collectively referred to as ESG (environmental, social & corporate governance). Using discounted cash flow (DCF) models[1], The MSCI study (MSCI, 2019) proposes a specific transmission path from ESG to intrinsic value of listed companies and empirically validates the transmission path using MSCI's ESG data, which includes that companies with better ESG performance 1) have higher profits that generate greater cash flows, 2) have a lower probability of unexpected severe events, lower

[1] That is, the value of a company in the present is a discount on the cash flows the company will generate in the future.

systemic risk exposure, larger investor base, more transparent information, and therefore a lower discount rate for lower risk, and thus higher value.

In addition, the laws of market value related to environmental factors have been shifting in recent years as climate targets such as set by the Paris Agreement have become binding and have been refined and implemented. From the perspective of a market in equilibrium, the market is pricing the environmental risk of listed companies, with the company's environmental performance as the independent variable and the company's value as the dependent variable. From the perspective of a shifting market, listed companies have an advantage if they can adapt to changes in the market, and a risk if they cannot. At a more macro level, which is less concerned with the specific environmental performance of a listed company, a company's valuation by investors can be improved by building the market's perception of the company's positive outlook and telling a successful business story that perfectly fits the company's interests with the investment (Damodaran, 2018). For example, positioning a company whose main business is oil as a provider of integrated energy solutions is more conducive to hedging the negative impact of the global outlook for a shift from fossil to new energy sources on a company's valuation. Oil giants ExxonMobil, Royal Dutch Shell, Chevron, BP and Total invested $1 billion in climate-related marketing and lobbying from 2015 to 2018, including spending about $195 million annually on marketing expenses to reflect the companies' environmentally friendly stance, particularly to promote their plans and efforts to transition to low-carbon energy sources (InfluenceMap, 2019).

## 2. Methodology

The transmission from the environmental performance information of listed companies to the market value of listed companies is theoretically valid, but whether the law generalized from other markets can be applied to the current Chinese A-share market needs to be verified by recent data. The Chinese stock market has special characteristics, for example, between January and May 2010, 13 consecutive suicides occurred in Foxconn's Shenzhen Longhua Industrial Park, resulting in 10 deaths and 3 injuries, which aroused widespread public attention. A studied by Xiao Hongjun et al. found (Xiao, Zhang, & Zeng, 2010) that this incident did not have a significant impact on the stock prices of Foxconn, a Hong Kong listed company, and Hon Hai Precision, a Taiwan listed company that controls Foxconn. The stocks of Foxconn's lending banks, Hong Kong-listed Bank of China, Industrial and Commercial Bank of China, and China Construction Bank, were also not significantly affected. In contrast, shares of Standard Chartered Bank, a UK-based, Hong Kong-listed lender, and Apple, HP, and Dell, Foxconn's US-listed purchasers, reacted sensitively to the incident.

In this paper will use the statistical data of the CSI 300 constituents in the SynTao Green Finance[2] ESG database in recent years to verify the short- and long-term transmission of environmental performance information of listed companies to the market capitalization of listed companies, reflecting that the value law of environmental information is applicable to the A-share market in mainland China. CSI Index Co., Ltd.'s CSI 300 Index is commonly used to observe the overall financial performance of the A-share market, as the CSI 300 constituents are the 300 listed companies with the largest and most liquid A-share market capitalization in mainland China, accounting for about 60% of the A-share market capitalization. The situation of these constituent companies can, to a certain extent, reflect the overall situation of A-share listed companies and the value law of the A-share market. The SynTao Green Finance ESG database released in 2018 is based on the SynTao Green Finance ESG indicator system, which collates information and quantitatively evaluates the environmental, social, and corporate governance performance of listed

[2] SynTao Green Finance is one of the first organizations in mainland China to conduct sustainable finance consulting and research. The parent company of Shang Dao Rong Green is one of the first organizations engaged in CSR consulting in mainland China, providing corporate clients with services such as sustainability strategic planning, sustainability report writing, stakeholder communication, and public welfare project design.

companies. The indicator system sets generic indicators and industry-specific indicators under the three dimensions of environmental, social and corporate governance. Generic indicators are applied to companies in all industries, while industry-specific indicators are for companies in specific industries and are substantive indicators due to industry characteristics. For example, the indicator of organic food is specific to the industries of agriculture, animal husbandry, and food and beverage manufacturing. For each of the company's indicators, the entry into the database includes both information content and information sources. The information content is intercepted and organized into structure, and needs to be standardized, concise and sufficient to meet the needs of quantitative evaluation. The quantitative evaluation of indicators has five levels of scores from 0, 25, 50, 75 and 100, with corresponding evaluation criteria. The sum of all index scores, after weighting and adjustment, is the total ESG performance evaluation score of a company. Based on the total score, SynTao Green Finance evaluates listed companies on a ten-point scale from A+ to D. A+ companies have adequate ESG disclosure and excellent ESG performance, and have not caused any significant negative ESG events in the past three years; D companies have inadequate ESG disclosure or poor ESG performance, and have caused any significant negative ESG events in the past three years.

## 3. Findings

In order to verify the short-term financial impact of environmental performance factor of listed companies, this paper analyzes the negative environmental events of listed companies in the mining sector in the CSI300 constituent stocks in the SynTao Green Finance ESG database between April 2012 and June 2018 using an approach that is similar to event study3. These negative environmental events, 170 in total, are classified in the database under the categories of air pollution, water pollution, solid waste pollution and others, and the sources of information are mainly media reports and information released by regulators. The incidents are classified into high, medium and low severity according to their severity: high severity is reported by mainstream media, and companies are responsible for causing serious environmental pollution; low severity is mostly information on administrative penalties issued by regulators; the rest are classified as medium severity.

**Table1.** Examples of event severity

| Severity | Company | Source | Event Summary |
|---|---|---|---|
| Low | Xishan Coal Electricity Group | People's Government of Guciao City, Shanxi Province<br>2017-5-3 | On January 21, 2016, the sewage plant of Shanxi Xishan Coal Gasification Co., Ltd, a subsidiary of Xishan Coal and Electric Power, was found to have discharged sewage in excess of the standard. The company was required to immediately correct the violations and was fined 205,735 yuan. |
| Medium | Shandong Gold Mining Co., Ltd | China Economic Net2014-6-4 | In June 2014, the acquisition of the Jinlong mine in Yinan County of Shandong Gold Group, the parent company of Shandong Gold, raised concerns among local villagers. It is understood that the mine has been mined for 50 years and the surface resources have been exhausted, and the deep mining may cause damage to groundwater resources. In response, Shandong Gold responded that its company's move is fully compliant. |
| High | Zhongjin Gold | Sina Finance<br>2014-2-21 | There are illegal emissions from the gold mining of Zhongjin Gold, causing serious pollution of the local environment in Tongguan County, Weinan City, Shaanxi Province, with residents suffering from dry cough and itching. ishaanxi.com, a portal site under the supervision of the Shaanxi Provincial Committee, posted an article in January 2014 in which the Environmental Protection Bureau of Weinan City named Zhongjin Gold's illegal discharges, resulting in serious heavy metal pollution of soil, surface water and ambient air. ishaanxi.com subsequently removed the article. Despite repeated criticism from the local environmental protection bureau and requests for rectification, Zhongjin Gold still has private wastewater outfalls and fails to properly dispose of solid waste from tailings. |

[3] The event study is a statistical method of measuring the impact of events on stock prices.

For each event, the date when the event information was published by the first original source in the Internet was used as the time when the negative environmental information was disseminated to the capital market, and the percentage change of the company's stock price between the two closest trading days before and after this time was calculated to observe the impact of the negative environmental information on the stock price. In order to exclude the impact of the overall market fluctuation on the stock price as much as possible, the percentage change of the company's stock price is subtracted from the percentage change of the CSI 300 index between the two closest trading days as the impact of the event itself on the stock price after excluding the market impact. The calculation results are summarized according to three categories of severity, high, medium and low, and the average value is calculated. The results show that the proportion of stock price changes brought about by the three types of event information are all negative on average, and the higher the severity, the larger the average change. Excluding the effect of overall market volatility, the difference between the percentage change in stock price and the percentage change in CSI 300 is calculated and similar results are obtained.

**Table 2.** Percentage change in stock price between trading days before and after the negative event

| Severity of Events | Number of Events | Average Change of Stock Price | percentage change in stock price exceed the percentage change in CSI 300 |
|---|---|---|---|
| Low | 119 | -0.58% | -0.53% |
| Medium | 24 | -1.25% | -1.24% |
| High | 27 | -4.95% | -3.78% |

In order to verify the long-term financial impact of environmental performance factor of listed companies, this paper analyzes, an ESG performance-based screening of CSI 300 constituents from December 30, 2019 to December 30, 2022 was conducted to see if such a screening strategy could make a difference in returns for investors. The first group consists of companies with an A (including +A, A and A-) ESG rating among the CSI 300 constituents, which have relatively good ESG performance; the second group consists of companies with a C4 (including +C, C and C-) ESG rating among the CSI 300 constituents, which have relatively poor ESG performance. Both groups of companies are weighted using the same free float market capitalization as the CSI 300 index, which is adjusted every 6 months the same to the CSI 300 index. The CSI 300 Index itself also constitutes a control against the above two groups.

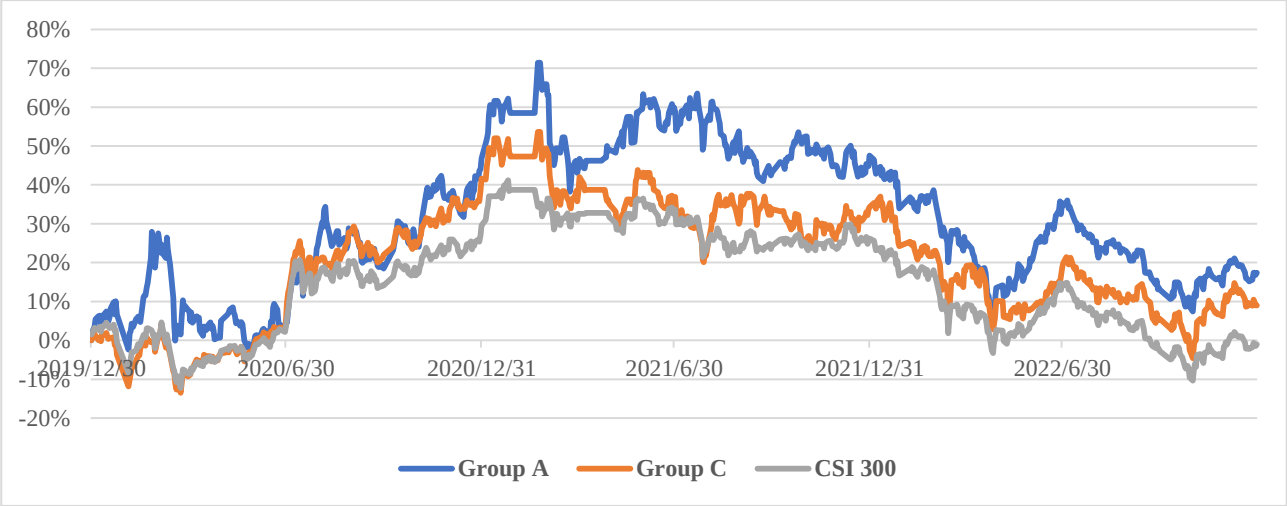


**Figure 1.** The investment return of the group with A rating, C rating and CSI 300

Using Wind Financial Terminal to backtest the market for the three strategies from December 31, 2019 to December 30, 2022, we found that the total return for the first group was 17.39% and the

[4] The reason for choosing C is because there are no companies with a D rating in the CSI 300 constituents in those years.

total return for the third group was 2.89%, while the total return for the CSI 300 was -1.07%. Stocks invested in companies with better ESG performance gained better returns, while those invested in companies with worse performance still outperformed the CSI 300 and did not produce much difference from the sample as a whole. However, we can still use ESG as a factor to form an effective investment strategy that yields greater value in the long run, i.e., companies with superior ESG performance can generate greater value in the long run.

## 4. Discussion

The transmission paths summarized by previous studies and the validation using SynTao Green Finance ESG data by this paper are only some side illustrations of the particular market of A-shares in mainland China in recent years and cannot be described for other markets or other different time intervals. A higher level of abstraction of the transmission from the environmental performance factors of listed companies to firm value would allow the law of value to apply to a wider range of situations. This involves the connection and interaction between environmental information, the company and the market, and can be analyzed through the relationship between the three concepts of financial materiality of environmental information, transparency of the firm, and effectiveness of the market. Financial materiality means that information can influence the price of the market and can affect the cost of financing, cost-to-income ratio, and assets and liabilities of the company. Corporate transparency is the degree of understanding of the company's business situation that can be achieved through the information available in the market related to the company. The transparency of a company can be enhanced if the company accurately discloses and adequately disseminates information related to its own operations. Market effectiveness is the extent to which prices in the market accurately reflect the relevant information available in the market and change instantaneously in response to new disclosures. There are many factors that affect market effectiveness beyond corporate transparency, such as whether prices are free to move or controlled by regulators, whether the integration and transmission of information by the media, information service providers is accurate and adequate, etc. In a more efficient market, the dissemination of information and price fluctuations is more similar to a concert hall than the gradual spread of ripples on a lake, i.e., the same information and corresponding price changes can reach all market participants instantly. The interaction between firms, markets, and information can be summarized as follows: 1) The effectiveness of markets and the financial materiality of information are mutually constitutive, and together they present the results of the operation of environmental information in the "black box" of markets through prices. 2) Corporate transparency and the financial materiality of information can promote each other, as environmental information is financially material so firms have an incentive to disclose it. 3) Corporate transparency and market effectiveness are mutually reinforcing, as individual corporate transparency is the basis for the market to effectively reflect environmental information in market pricing. The law of value will drive companies to improve their transparency.

An important reason for the active disclosure of environmental information by Chinese A-share listed companies in recent years has been the formation and mutual promotion of the interactive relationship between companies, markets and information, which has brought about substantial improvements in corporate transparency, market effectiveness and financial materiality of information. It is reasonable to expect that such a trend will continue in the future. Using the perspective of actor-network theory (ANT) (Liu, 2021), by analyzing the seemingly anomalous social phenomenon of profit-oriented companies focusing on environmental protection, we can see that inanimate actors such as corporate environmental information are actually acting on a wide range of social actors, including companies. Environmental information has become a link between companies and consumers, purchasers, investors, financial institutions, media, NGOs, local residents, the general public, etc. The decisions and behaviors of these actors are indeed influenced by environmental information, for example, consumers decide whether to buy a product based on whether it is environmentally friendly, investors focus their investments based on the company's

environmental information disclosure, and the government, through Government incentives for good environmental performance through policies, etc. For example, for a product, obtaining credible green certification is more convincing to buyers than portraying the product's green attributes in advertisements; for a listed company, continuous and standardized disclosure of its environmental performance data is required to make investors use the structured disclosure system to make a decision. For a listed company, it needs to disclose its environmental performance data consistently and in compliance with regulations in order for investors to understand the environmental performance of the listed company through a structured database; for a company under government regulation, it cannot gain legitimacy in its operations if it fails to disclose environmental information truthfully. For companies, because environmental information does have influence on the market and society, and can affect value judgments, companies are motivated to disclose environmental information and take the initiative to communicate environmental information. In the midst of interlocking links, in order to achieve a communication effect that is more beneficial to the company's production and operation, the company has to follow the rules, requirements and characteristics of environmental information, and is continuously constrained by the environmental information itself, as well as by the various market and social links behind the environmental information, using the environmental information as various nexus points.

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