



# The Impact of ESG Performance on Business Performance before and after the COVID-19—Taking the Chinese Listed Companies as a Sample

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Under the influence of the COVID-19 in 2020, almost all industries have been hit unprecedentedly. The overall economy is on a downward trend, making economic development a high degree of uncertainty. Therefore, this paper takes the Chinese A-share listed companies that have been evaluated based on the Environmental, Social and Governance (ESG) performance in the three years from 2019 to 2021 as samples and analyzes the impact of ESG performance on business performance before and after the COVID-19 through the empirical method of the OLS and quantile regression. The findings of this study are summarized as follows: 1) The performance of ESG during the pandemic played a significant role in resisting its impact on revenue and earnings per share (EPS). 2) The performance of ESG during the pandemic has a negative and significant relationship with changes in the company's free cash flow. However, if the ESG performance is maintained above the level of the previous period and the social responsibility report is actively disclosed by the GRI reporting guidelines, it will have a positive and significant impact on the changes in the company's free cash flow. 3) The performance of ESG during the pandemic has no obvious effect on the company's performance recovery after the pandemic, including the increase in revenue and EPS, and the increase in free cash flow. Based on the research findings, this paper also suggests that companies should continuously and progressively implement corporate social responsibility (CSR) and that the state should further improve the requirements for CSR.

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## 1. INTRODUCTION

The COVID-19 pandemic broke out in Wuhan during the Spring Festival and spread rapidly to all parts of the country [1]. The impact was extensive. Almost all industries were a hitherto unknown impact, and the overall economy was on the decline, which caused the economic development to show high uncertainty. During the pandemic, many enterprises suffered huge losses, yet they are still willing to contribute to society. The efforts of these enterprises deeply impressed the general public and lots of people have a rapid increase in their favor of the brands of these companies. After the pandemic eased, the state also commended companies that should undertake CSR as possible they can. Now the pandemic has been well controlled, the overall economic level has gradually returned to the situation before the pandemic, and all walks of life have resumed usual business. However, some enterprises cannot resist the strong impact during the pandemic, and the recovery progress is slow or cannot survive this difficulty. This situation makes people think that the implementation cost of CSR should not occur in usual operation, so the implementation of CSR should erode corporate profits. In the early stage, some scholars abroad did get such results [2]. In recent years, the Environmental, Social and Governance (ESG) concept has been highly valued all over the world and has gradually become an important investment measurement standard. It has an increasing impact on companies' long-term strategic development, financing, and business environment. It is a necessary condition for the stable and sustainable development of an enterprise and an important standard to measure whether the company has a sufficient sense of social responsibility and sustainable development ability. Many countries have issued ESG investment policies and regulations, many practical ESG accounting standards have been formed internationally, and many economies are trying or have launched green asset classification standards. The mainstream of ESG marks the new understanding and judgment of the society on enterprise value creation. In 2020, the COVID-19 outbreak worldwide caused many production activities to be reduced or even blocked. The COVID-19 did create a short-term dramatic effect but did not change the direction of the long-term process. Although the occurrence of COVID-19 is a major crisis, it has

achieved good results in China. In this period of improvement, it is also an important opportunity to verify the impact of CSR on business performance. Although ESG can enhance the financial value of enterprises and produce spillover effects on stakeholders through ESG, there are some pain points and difficulties in ESG information disclosure and evaluation system from the perspective of global ESG development. After consulting the relevant literature, many scholars have studied this related topic in recent years. We found first there is no major crisis during the research period, so it is difficult to analyze whether the implementation of ESG plays an obvious role in the usual operating environment. Next, there are few research in the secondary literature on this related topic in China, and it is mostly presented in the form of a summary. This paper will empirically analyze and explore the relationship between the corporate social responsibility performance of domestic listed companies and the recovery of business performance after the epidemic. It is expected that the research findings of this paper will provide enterprises with a deeper understanding of the core concept and substantive role of social responsibility, and further to provide reference guidelines for enterprises to formulate social responsibility strategies, or it can provide a quantitative and reliable reference basis for national economic policies.

## 2. LITERATURE REVIEW

[3] showed that good ESG performance can promote the development of Chinese enterprises through research on China's energy industry. [4] found a positive and significant relationship between ESG and financial performance. Over time, the positive impact of ESG on financial performance is mostly stable. Moreover, in the empirical research on the company, a large part of them believe that ESG has a positive correlation with financial performance. Therefore, in the capital market, when ESG does better, the company's financial performance will be better, and the relationship will maintain a stable positive correlation model over time. [5] believe that there is a positive correlation between ESG and financial indicators, and ESG plan can improve the financial performance of European enterprises. Therefore, the better the ESG of an enterprise, the better the return on net assets (ROE) and return on assets (ROA). According to

[6], on the premise of considering a certain time lag, it can be seen that there is a reverse interactive causal relationship between the ESG performance and financial performance of enterprises. The ESG performance of enterprises is generally based on the enterprise's economy, but the performance of enterprises with strong profitability is not good in ESG. On the contrary, the relationship between ESG and the financial performance of enterprises with poor profitability does not show a positive interactive causality, which is large because ESG investment is still in the primary stage in China and there is still a lot of room for improvement.

According to [7], there is a positive correlation between the fixed asset ratio and current liability ratio of paper enterprises and ESG, while there is a negative correlation between solvency and operating capacity and ESG. And for the paper industry, systemic risk has no significant impact on ESG performance. It can be seen that a reasonable capital structure helps to improve the ESG index, but when the solvency and operating capacity develop well, it will cause enterprises to ignore sustainable development, which will have a negative impact on the ESG index. Therefore, when an enterprise's ESG is better, it will have a positive correlation with the enterprise's asset structure. Moreover, [8] found that the solvency, profitability and reasonable capital structure of power enterprises have a significant positive impact on the company's ESG development, and good operating capacity will make the company ignore the importance of sustainable development, resulting in a negative impact on ESG performance. From the perspective of financial indicators, when the ESG of an enterprise develops steadily, the solvency, profitability and capital structure of the enterprise will develop according to the positive correlation. [9] showed that environmental performance has a positive relationship with corporate financial performance. Generally speaking, there are several aspects to improve enterprise environmental performance. One is to pass the environmental management system certification, which has a positive impact on enterprise environmental performance. The second is government regulation, which can positively regulate the environmental performance of enterprises by balancing the protection between government regulation and enterprise environment. Third, industry competition and public opinion supervision. In industry competition, too fierce competition will lead to enterprises' inaction in environmental protection,

while public opinion supervision is to maintain independence and authenticity, which has a positive regulatory effect on enterprise environmental performance. Among them, improving the environmental performance of enterprises will have a positive effect on the financial performance of enterprises. Therefore, the better the environmental performance of enterprises, the greater the positive impact on the financial performance of enterprises. [10] believed that the good environmental performance of enterprises can significantly improve the financial performance of enterprises, and can significantly promote the financial performance of the current period, the first lag period and the second lag period. Among them, rewarding government intervention enhances the role of environmental performance on enterprise financial performance, while punitive government intervention weakens the role of environmental performance on enterprise financial performance. Therefore, enterprises should take the initiative to undertake environmental responsibility, improve environmental performance and better promote the financial performance of enterprises. [11] found that environmental investment increased the financial burden of the company and reduced the financial performance through the performance study of Listed Companies in Romania. It is not conducive to the improvement of the company's financial performance. [12] believes that environmental performance has no significant impact on the company's financial performance measured by return on assets. The research conducted in Indonesia shows that appropriate environmental rating will not have a good or bad impact on the company's finance. To further reflect the impact of environmental performance, it is necessary to formulate accurate environmental disclosure standards, improve public awareness and improve the evaluation standards of environmental performance. Therefore, the more capital market participants do not pay attention to the behavior of environmental performance ranking, the less significant the impact of environmental performance on financial performance. [13] showed that CSR has a nonlinear impact on improving the efficiency of working capital management. Working capital is an indispensable part of enterprise production and operation, and the management efficiency of this part is a part of the embodiment of enterprise financial performance. The cognition of stakeholders plays a regulatory role in the performance of CSR and the efficiency of working capital management, which can

strengthen the improvement of working capital management efficiency by the performance of CSR. Therefore, the working capital management efficiency can be maximized only by the harmonious operation of the three.

[14] research shows that CSR can increase financial results and promote the development of enterprises. Because ESG investment can provide more transparent company performance data than traditional financial data, it has more accuracy for the company's financial disclosure, is more likely to be sought after by a new generation of investors and enterprise holders, improves the company's governance ability and sustainable development ability, and is more conducive to restoring the enterprise's business ability after the epidemic. [15] believe that the performance of CSR in the current period has no significant relationship with financial performance, but has a positive deferred effect on the later period. And from the research on the interaction between current CSR and disclosure willingness and economic cycle, it can be seen that in the economic contraction period, the voluntary disclosure of CSR report in the current period will significantly improve the current financial performance. Therefore, as a whole, enterprises should actively perform social responsibility and take social responsibility as a long-term investment. Although the return of social responsibility in the current period is small, from the perspective of time effect, the performance of social responsibility will improve the financial performance of enterprises to a certain extent. The research of [16] shows that there is a virtuous circle between the implementation of corporate social responsibility and the profitability of corporate operations, that is to say, all social responsibility policies increase financial resources and improve corporate financial performance, thereby bringing greater social benefits. Moreover, [17] found that there is a low degree of significant positive correlation between CSR and corporate performance, and it can be seen that among enterprises, the correlation between shareholders' responsibility and corporate economic performance is the highest, and the supplier's responsibility and corporate performance show a low degree of positive correlation. On the other hand, [18] studied the relationship between ownership structure, incentive mechanism and internal control in corporate governance and their role in financial performance. The results showed that the role of ownership structure and internal control was to improve the financial performance of enterprises,

and there was an intermediary effect in the impact of incentive mechanism on financial performance. There is a positive correlation between incentive mechanism and internal control, and incentive mechanism plays different roles in different equity. When equity is more concentrated, equity incentive and salary incentive can improve financial performance. When equity is more dispersed, equity incentive can improve financial performance better than salary incentive. Therefore, in corporate governance, we should pay attention to the setting of equity structure, and set up corresponding incentive methods to play the role of internal control, so as to promote the improvement of financial performance. It can be seen that the better the corporate governance of the enterprise, the better the financial performance of the enterprise.

### 3. METHODOLOGY

Based on the literature review, we summarized the hypothesis that ESG has a positive effect on financial performance. Therefore, this paper will explore whether ESG performance can reduce losses during the epidemic in 2020 and whether it can contribute to the better recovery of business performance after the epidemic. Considering that the COVID-19 has gradually recovered in the second half of 2020, this paper takes Chinese A-share listed companies with ESG rating by Sino-Securities index from 2019 to the third quarter of 2021 as a sample for empirical analysis. The sample data are taken from WIND and CSMAR databases. After downloading the data, the researchers deleted the incomplete samples first, and then deleted the extreme values. There are 3740 samples from 2019 to 2020 and from the third quarter of 2020 to the third quarter of 2021.

At present, there are many domestic ESG rating agencies for listed companies, such as the Sino-Securities index, FTSE Russell, CAVSI, and RKS. This paper adopts the rating results of the Sino-Securities index information service Co., Ltd., which was established in September 2017. It is an independent third-party professional service organization for various asset management institutions, mainly providing comprehensive services of index and index investment. Moreover, the company has obtained the market authorization of the Shanghai Stock Exchange and the Shenzhen Stock Exchange, focusing on the research and development of index and

index investment, and provides whole industry chain services including research and consultation, product design, marketing promotion, valuation, and data information. Its rating method has the characteristics of being close to the Chinese market, wide coverage, and high timeliness; it is conducive to a more complete sampling in this paper.

In terms of research design, this paper is quantitative. It uses the least square method to set the change range of financial performance in every two years as the explanatory variable, whether the ESG and ESG performance in the previous year regress, and whether the social responsibility report is disclosed according to the GRI reporting guidelines as the explanatory variable. The functions to explore include, 1) whether the performance of ESG can reduce the loss when the pandemic occurs, and 2) whether the company can recover its original business performance more quickly after the epidemic recovery.

### 3.1 Research Models

The research models are as follows:

The changes from 2019 to 2020 (whether the performance of ESG can reduce the loss when the pandemic occurs):

$$\Delta SALES_{it} = \alpha_0 + \alpha_1 ESG20_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (1)$$

$$\Delta EPS_{it} = \alpha_0 + \alpha_1 ESG20_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (2)$$

$$\Delta FCF_{it} = \alpha_0 + \alpha_1 ESG20_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (3)$$

The changes from the 3<sup>rd</sup> quarter of 2020 to the 3<sup>rd</sup> quarter of 2021 (can the company recover its original business performance more quickly after the epidemic recovery):

$$\Delta SALES_{it} = \alpha_0 + \alpha_1 ESG21_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (4)$$

$$\Delta EPS_{it} = \alpha_0 + \alpha_1 ESG21_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (5)$$

$$\Delta FCF_{it} = \alpha_0 + \alpha_1 ESG21_{it} + \alpha_2 NOREG_{it} + \alpha_3 GRI_{it} + \alpha_4 IND_{it} + \alpha_5 DEBT_{it} + \alpha_6 SCALE_{it} + \alpha_7 AGE_{it} + \alpha_8 STATE_{it} + \epsilon_{it} \quad (6)$$

Where,

Explanatory variables: This paper takes the increase or decrease of sales revenue, earnings per share, and cash flow as the alternative variables of financial performance. Moreover, this paper uses ESG, whether ESG performance has not regressed, and whether social responsibility reports are disclosed following GRI reporting guidelines as explanatory variables.

GRI referring to the research of [19], it is found that the active disclosure of social responsibility reports contributes to the implementation effect of ESG and then improves financial performance. Therefore, whether the social responsibility report is disclosed following GRI reporting guidelines is set as one of the variables, which is a virtual variable. If the sample companies disclose the implementation of ESG following GRI reporting guidelines, it is set as "1", otherwise it is set as "0".

$\Delta SALES$ : The changes in sales revenue from 2019 to 2020 and from the third quarter of 2020 to the third quarter of 2021.

$\Delta EPS$ : The changes in earnings per share from 2019 to 2020 and changes in earnings per share from the third quarter of 2020 to the third quarter of 2021.

$\Delta FCF$ : The changes in free cash flow from 2019 to 2020 and from the third quarter of 2020 to the third quarter of 2021.

ESG: Converts the ESG rating into the corresponding score. The rating of Sino-Securities index is divided into nine levels, from low to high: C, CC, CCC, B, BB, BBB, a, AA and AAA. This paper converts them into scores of 1-9, respectively and indicates the year in the variable code.

NOREG: Knowing that ESG is a behavior with long-term impact and the correlation between the current period and the previous ESG performance can be illustrated from this variable, whether the ESG rating remains at the level of the previous period is set as one of the variables in the research design. If there is no retrogression from the previous period, it is set as "1", and if not, it is set as "0".

Control variables: This paper selects company size, debt ratio, company age, property right nature, and industry as control variables.

The Liability to assets ratio (DEBT): Referring to [20], this study measures the ratio of total liability to total assets as a controlled variable.

Company scale (SCALE): Learning from the research of [21], it is considered that the size of the company has a significant impact on the financial structure. Therefore, this paper uses the company size as one of the control variables. This paper takes the total assets of the sample company as the alternative variable of the company size. To narrow the absolute value gap between this variable and other variables, but do not affect the relative relationship, its natural logarithm is taken.

Company age (AGE): According to the research of [22], the age of the company has a significant impact on the financial structure. Therefore, the company age is used as one of the control variables in this paper, and the calculation basis is the number of years from the year of establishment to December 31, 2020, and September 30, 2021, respectively.

Nature of property rights (STATE): State-owned enterprises are one of the characteristics of Chinese governance. [23] showed that the nature of property rights has a significant impact on the improvement of financial performance by shareholder relationship networks and sustainable competitive advantage. Therefore, this paper selects the nature of property rights as one of the control variables, which is a virtual variable. If it is a state-owned enterprise, set it to '1', otherwise set it to '0'.

Industry (IND): According to the eighth announcement of the General Tax Bureau of the Ministry of Finance of February 7, 2020, Announcement No. 8: The four industries that suffered harshly from COVID-19 the most, include transportation, catering, accommodation, and tourism. Therefore, considering the large range of these four types of changes; therefore, take these four related industries as control variables; and expressed in the form of virtual variables; if it belongs to these four categories of industries, it is set as "1"; Otherwise set to "0".

### 3.2 Data Analysis

[24] contend that informed objective decisions are based on facts and numbers, real, realistic and timely information. Furthermore, according to

[25], "descriptive statistics deals with describing a collection of data by condensing the amounts of data into simple representative numerical quantities or plots that can provide a better understanding of the collected data" (p. 272). Therefore, Tables 1 and 2 are generated.

## 4. RESULTS AND DISCUSSION

The first three variables in Table 1 represent the changes in sales revenue, earnings per share, and free cash flow of all samples during the pandemic in 2020. From the mean and standard deviation, most of the sample companies have been seriously impacted by COVID-19 and tend to reduce their income, decline their surplus and tighten their working capital. The average value of ESG20 is 6.362, and the data distribution is relatively scattered. Based on the ESG variable and NOREG variable, it can be seen that compared with the previous ESG performance in this period, most sample companies can maintain the level of the previous period, and a small number of sample companies are affected by the epidemic and regress compared with the previous period. According to the GRI index, most sample companies can not disclose social responsibility reports in accordance with GRI reporting guidelines. On the whole, the sample companies were seriously impacted by the pandemic during the sample period.

The first three variables in Table 2 represent the changes in sales revenue, earnings per share, and cash flow of all samples during the epidemic period in 2021. From the mean and standard deviation; The vast majority of sample companies have been seriously impacted by the pandemic and tend to reduce their income, decline their surplus and tighten their working capital, but they have rebounded compared with 2020. The average value of ESG21 is 6.426, and the dispersion of data distribution is the same as that of the previous year. Based on the ESG variable and NOREG variable, it can be seen that compared with the previous ESG performance in this period, most sample companies can maintain the level of the previous period, and a small number of sample companies are affected by the epidemic, which is backward compared with the previous period; In terms of overall data, there is little difference from the previous year. According to the GRI index, most sample companies still fail to disclose social responsibility reports in accordance with the GRI reporting guidelines, but the situation is better than that of the previous year. Meanwhile, the

maximum sales revenue during the pandemic period in 2021 decreased compared with the previous year. It shows that the sample company is still in the impact of COVID-19 during the sample period, but the situation has warmed up.

Next, before the empirical analysis, we should first evaluate the rationality of the research model. This paper uses the linear regression model. The first thing to pay attention to is whether the selection of variables is homogeneous. Observe that the collinearity index VIF values in Tables 3

to 8 are between 1.027 and 1.839. This implies that there was no serious multicollinearity problem among independent variables as all the VIF values of explanatory variables in all models were less than 2 ([26], p. 1910). Therefore, there is no obvious homogeneity of the regression model. Next, we will examine whether the linear model design is predictive, from the F values in Table 3 to Table 8; it is between 3.471 and 23.356, which is also significant, indicating that the design of linear regression model in this paper is still reasonable.

**Table 1. The descriptive statistics of variables\_ the year 2019 and 2020 (N = 3740)**

	Min.	Max.	Ave.	Stdv.
ΔSALES	-0.732	1.592	0.051	0.336
ΔEPS	-31.500	7.000	-0.744	4.653
ΔCF	-12.710	95.803	3.003	12.691
ESG20	3.000	9.000	6.362	1.324
NOREG	0.000	1.000	0.857	0.350
GRI	0.000	1.000	0.091	0.288
IND	0.000	1.000	0.081	0.273
DEBT	0.067	0.982	0.447	0.215
SCALE	10.602	18.359	13.250	1.472
AGE	9.438	35.751	21.278	5.568
STATE	0.000	1.000	0.443	0.497

Note: refer to 3 Methodology for the description of variable code.

**Table 2. The descriptive statistics of variables \_the third quarter of 2020 and 2021 (N = 3740)**

	Min.	Max.	Ave.	Stdv.
ΔSALES	-0.608	3.025	0.291	0.482
ΔEPS	-16.708	23.857	0.577	3.938
ΔFCF	-38.476	63.339	0.113	9.725
ESG21	3.000	9.000	6.426	1.321
NOREG	0.000	1.000	0.879	0.326
GRI	0.000	1.000	0.091	0.288
IND	0.000	1.000	0.081	0.273
DEBT	0.067	1.043	0.453	0.217
SCALE	10.621	18.431	13.331	1.481
AGE	10.438	36.751	22.278	5.568

Note: refer to 3 Methodology for the description of variable code.

**Table 3. The empirical results of model (1)\_the year 2019 and 2020 (N = 3740)**

	Coefficient	t	Significance	VIF
(constant)	-0.069	-1.152	0.249	
ESG20	0.035	6.575	0.000***	1.656
NOREG	0.013	0.770	0.441	1.252
GRI	-0.006	-0.282	0.778	1.275
IND	0.003	0.158	0.875	1.029
DEBT	0.007	0.221	0.825	1.382
SCALE	0.003	0.521	0.602	1.839
AGE	-0.007	-6.440	0.000***	1.081
STATE	-0.024	-2.052	0.040**	1.165
F value	14.637	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code. Note 2: when  $p < = 0.01$ , the significance is \*\*\*, when  $0.01 < p < = 0.05$ , the significance is \*\*, and when  $0.05 < p < = 0.1$ , the significance is \*.

From Table 3, the results show that the performance of ESG during the outbreak of COVID-19 in 2020 has a positive and significant relationship with the change of sales revenue, that is, the better the performance of ESG in 2020, the higher the proportion of the increase in sales revenue or the smaller the proportion of the loss. As for whether the performance of ESG remains above last year's level and whether enterprises disclose social responsibility reports in accordance with GRI reporting guidelines, there is no statistically significant relationship with the change range of sales revenue in 2020. Analysis of the reasons, the companies disclose ESG social responsibility report is used to convey information to stakeholders or to enhance the impression of stakeholders, but COVID-19 has a very strong impact on the world when enterprises help the community. The public will feel stronger than usual, so it is widely praised, and at the same time, it improves the goodwill of consumers. At this time, whether enterprises still have written report disclosure is not as important as before for consumers.

The empirical results in Table 4 are similar to those in Table 3. The change of earnings per share in 2020 has a positive and statistically significant relationship with the performance of ESG in that year. The reason may also be due to the contribution of sales revenue, but the impact of COVID-19 in 2020 is comprehensive and strong, so the profit in the income statement does not represent the inflow of cash.

Table 5 shows that the better ESG performances in the current year, the more adverse it will have

on the change of free cash flow. However, the unrelenting performance of ESG and the active disclosure of social responsibility reports following GRI reporting guidelines have a positive and statistically significant effect on the change of free cash flow in the current year. That is, the implementation of ESG invests a considerable degree of capital cost, so it has a negative and significant impact on the change of free cash flow; However, if we can continuously invest in ESG to make stakeholders keep a good impression on the enterprise, and actively and immediately disclose the implementation results of the enterprise ESG to stakeholders, all external stakeholders will give priority to such enterprise returns in times of crisis, such as the support of operating income, the preferential treatment given by suppliers, and the grace conditions offered by the bank and the subsidies by the government.

Tables 6 to 8 discuss the changes of enterprises recovering from the pandemic from the third quarter of 2020 to the third quarter of 2021. However, it can be seen from the empirical results that the implementation results of ESG in 2020 do not significantly help the performance recovery after the epidemic. The reason should be that in the second half of 2020, the pandemic had been gradually controlled, and all social and economic activities have been on the right track. At this time, the intensity of CSR activities will gradually reduce, and the feeling of the public is not so obvious. Enterprises also focus on the main business activities of the company, so the ESG performance in 2020, has little effect on the performance recovery in 2021.

**Table 4. The empirical results of model (2) \_the year 2019 and 2020 (N= 3740)**

	<b>Coefficient</b>	<b>t</b>	<b>Significance</b>	<b>VIF</b>
(constant)	-4.687	-5.736	0.000***	
ESG20	0.386	5.344	0.000***	1.656
NOREG	-0.067	-0.283	0.777	1.252
GRI	-0.087	-0.297	0.766	1.275
IND	0.108	0.391	0.696	1.029
DEBT	-3.910	-9.607	0.000***	1.382
SCALE	0.278	4.067	0.000***	1.839
AGE	-0.023	-1.692	0.091*	1.081
STATE	0.224	1.385	0.166	1.165
F value	23.356	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code. Note 2: when  $p < = 0.01$ , the significance is \*\*\*, when  $0.01 < p < = 0.05$ , the significance is \*\*, and when  $0.05 < p < = 0.1$ , the significance is \*.



**Table 5. The empirical results of model (3) \_the year 2019 and 2020 (N = 3740)**

	<b>Coefficient</b>	<b>t</b>	<b>Significance</b>	<b>VIF</b>
(constant)	3.792	1.667	0.096*	
ESG20	-0.563	-2.797	0.005***	1.656
NOREG	1.646	2.487	0.013**	1.252
GRI	1.756	2.166	0.030**	1.275
IND	-0.430	-0.560	0.576	1.029
DEBT	-2.330	-2.057	0.040**	1.382
SCALE	0.368	1.929	0.054*	1.839
AGE	-0.116	-2.995	0.003***	1.081
STATE	-0.265	-0.590	0.555	1.165
F value	3.746	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code.

Note 2: when  $p \leq 0.01$ , the significance is \*\*\*, when  $0.01 < p \leq 0.05$ , the significance is \*\*, and when  $0.05 < p < 0.1$ , the significance is \*.

**Table 6. Empirical results of model (4) \_the third quarter of 2020 and the third quarter of 2021 (N = 3740)**

	<b>Coefficient</b>	<b>t</b>	<b>Significance</b>	<b>VIF</b>
(constant)	0.615	7.020	0.000***	
ESG20	0.004	0.476	0.634	1.533
NOREG	0.019	0.732	0.464	1.124
GRI	0.019	0.624	0.533	1.289
IND	-0.038	-1.297	0.195	1.027
DEBT	0.021	0.486	0.627	1.355
SCALE	-0.020	-2.836	0.005***	1.808
AGE	-0.005	-3.647	0.000***	1.079
STATE	0.041	2.390	0.017**	1.161
F value	3.471	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code.

Note 2: when  $p \leq 0.01$ , the significance is \*\*\*, when  $0.01 < p \leq 0.05$ , the significance is \*\*, and when  $0.05 < p < 0.1$ , the significance is \*.

**Table 7. Empirical results of model (5) \_the third quarter of 2020 and the third quarter of 2021 (N = 3740)**

	<b>Coefficient</b>	<b>t</b>	<b>Significance</b>	<b>VIF</b>
(constant)	-1.808	-2.532	0.011**	
ESG20	-0.091	-1.518	0.129	1.533
NOREG	0.262	1.259	0.208	1.124
GRI	-0.393	-1.559	0.119	1.289
IND	-0.422	-1.772	0.076*	1.027
DEBT	-1.850	-5.373	0.000***	1.355
SCALE	0.279	4.794	0.000***	1.808
AGE	-0.010	-0.848	0.397	1.079
STATE	0.357	2.566	0.010***	1.161
F value	6.123	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code.

Note 2: when  $p \leq 0.01$ , the significance is \*\*\*, when  $0.01 < p \leq 0.05$ , the significance is \*\*, and when  $0.05 < p < 0.1$ , the significance is \*.

**Table 8. Empirical results of model (6) \_ The third quarter of 2020 and the third quarter of 2021 (N = 3740)**

	<b>Coefficient</b>	<b>t</b>	<b>Significance</b>	<b>VIF</b>
(constant)	-1.157	-0.655	0.513	
ESG20	-0.149	-1.004	0.315	1.533
NOREG	-0.787	-1.527	0.127	1.124
GRI	-0.390	-0.625	0.532	1.289
IND	-0.018	-0.030	0.976	1.027
DEBT	-4.196	-4.922	0.000	1.355
SCALE	0.370	2.572	0.010	1.808
AGE	-0.006	-0.216	0.829	1.079
STATE	0.148	0.429	0.668	1.161
F value	3.591	Significance	***	

Note 1: refer to 3 Methodology for the description of variable code. Note 2: when  $p \leq 0.01$ , the significance is \*\*\*, when  $0.01 < p \leq 0.05$ , the significance is \*\*, and when  $0.05 < p \leq 0.1$ , the significance is \*.

## 5. DISCUSSION

The influence brought by COVID-19 is hitherto unknown, it is also a good time to verify the function of CSR. In the past, many studies have found that CSR has a positive impact on business performance [3,4,5,6,7,8,9,10,11,12]. Some studies have also pointed out that CSR is a long-term investment, so the utility cannot work very quickly, but has a deferred effect [27]. Even though some studies hold that CSR is not directly related to business performance, however, through the disclosure of social responsibility reports, information can be conveyed to stakeholders, enabling enterprises to interact well with the external environment and improve business performance [19]. Nevertheless, the sample period of these studies is quite different from that of COVID-19. Although the research hypothesis of this paper is based on the previous research, the research conclusion is partially different from the previous research. First of all, regardless of the performance of CSR before the covid-19, the implementation of CSR during the COVID-19 can help the immediate protection of sales revenue and earnings per share, and during the COVID-19, the disclosure of the social responsibility report did not play an obvious role in resisting business performance damage, indicating that during the COVID-19, The dissemination of CSR performance information is very fast and more impressive. In terms of free cash flow, there is no doubt that the implementation of CSR requires a lot of money, which will seriously affect the disposable funds of enterprises. However, this paper finds that if the performance of CSR is in progress compared with the previous year and enterprises actively disclose social responsibility reports, it will help to protect the free cash flow of enterprises, that is

to say, Among the many factors of cash inflows and outflows, such as the support of bank loans and the government's subsidy and preferential policies, the information dissemination of social responsibility report still has an important function, that is, individuals or institutions have different information receiving sources. Therefore, the disclosure role of the social responsibility report must be different according to the information received. In addition, this study found that the performance of CSR during the COVID-19 has no deferred effect on the recovery of business performance after the COVID-19, indicating that the consumption habits of the whole economic environment may have changed after the COVID-19, the government's subsidies, and preferential policies have ended, also the attention of all sectors of society to the performance of CSR during the COVID-19 has also decreased sharply. Previous studies were based on the operation of a normal economic environment, while this paper provides a breakthrough view for the study of CSR. People's behavior in special events is different from that in usual times, and whether the disclosure method or framework of social responsibility report should be revised [28,29], which can be used as a reference for future scholars.

## 6. CONCLUSIONS AND RECOMMENDATIONS

This paper selects Chinese A-share listed companies that have been ESG rated by the Sino-Securities Index from 2019 to the third quarter of 2021 as a sample and uses the OLS method for empirical analysis. Based on the results, the research findings are summarized as follows:

(1) The performance of ESG during the pandemic has a significant effect on resisting the impact of the epidemic on sales revenue and earnings per share.

(2) During COVID-19 period, the performance of ESG showed a negative significant relationship with the change of free cash flow of the company. However, if ESG's performance remains above the level of the previous period and takes the initiative to disclose social responsibility reports in accordance with GRI reporting guidelines, it will have a positive and significant impact on the change of enterprise free cash flow.

(3) The performance of ESG during the pandemic period has no significant effect on the performance recovery of the company after the epidemic, including the improvement of sales revenue and earnings per share, and the increase of free cash flow.

Based on the above research findings, this paper puts forward the following corresponding suggestions:

For enterprises, CSR is not deeply felt by the public under usual circumstances, but at the critical moment, in addition to giving help to those in need, it is equivalent to a long-term investment in corporate advertising. The number of enterprises across the country is so large that the public can't always remember any action of each enterprise so clearly. Moreover, if there is a negative impression, it will bring a very deep memory to the public. Although there is no specific mandatory implementation standard for CSR, as long as enterprises try their best to implement it when they have spare power, the focus is to make continuous and slow progress. The scope of ESG covers a wide range; enterprises should establish a systematic implementation strategy for the implementation of ESG. On the basis of the original institutional framework, enterprises can introduce ESG matters into the company's management system by combing and comparing the ESG evaluation system or ESG information disclosure requirements item by item. Although the amount of disclosure is gradually increasing, there is still a large gap between quantitative disclosure and qualitative disclosure. We should ensure the authenticity and measurability of the data and ensure the implementation of the ESG concept in the company's daily operation. On the basis of establishing and improving the ESG compliance obligation management system, the enterprise

strengthens the management system of ESG bonus matters according to the characteristics and actual situation of its own industry and business. In this way, we can see the results in the long term, which will benefit both enterprises and stakeholders.

For the state and ESG rating agencies, listed companies are a very important part of the national economic system. Enterprises bear social responsibility and can help the state share part of the support to the society when the country is in crisis. Therefore, there should be a more rigorous management system for the social responsibility requirements of listed companies. Driven by multiple factors of policy, supervision, and listed companies, the domestic ESG asset management market is in the early stage of low-scale and high growth. ESG is a development concept pursuing the maximization of comprehensive economic, environmental and social value, It can effectively guide important participants in the market to create economic value, pay attention to social and environmental issues such as scientific and technological innovation, carbon neutralization, rural revitalization, and common prosperity, promote internal metabolism of enterprises, and then promote sustainable economic and social development. According to the requirements of ESG rules, enterprises first need to formulate and improve the strategy, internal management system, and system of ESG. In addition to building the enterprise ESG strategy and management system, listed companies also need to issue ESG reports and fulfill the obligation of ESG information disclosure. In order to ensure that ESG reports are effectively concerned, listed companies should disclose with reference to internationally-recognized reporting frameworks, such as GRI's sustainable development reporting standards, and should take into account the relevant requirements of the exchange. COVID-19 has brought troubles to global economic development. Enterprises expect to achieve sustainable growth of performance through ESG, improve brand strength and maintain the continuous leadership of the global market. Increasing ESG investment and doing a good job in sustainable product innovation and upgrading are effective ways to improve sustainable income.

## DISCLAIMER

The products used for this research are commonly and predominantly use products in our

area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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