

Research on the Impact of ESG Information Disclosure on the Value of Pharmaceutical Manufacturing Enterprises-- Empirical Evidence from A-share Listed Companies

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ABSTRACT

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In today's society, we need to participate in the construction and protection of the national ecological environment. As one of the important forces of national economic development, enterprises need to practice the goal of "carbon peak and carbon neutrality". Among them, Environment, Society, and Corporate Governance (ESG) is an important basis for evaluating the relationship between enterprises, environment, and social responsibility. Exploring the impact of ESG information disclosure on enterprise value can help enterprises make better decisions and help people have more understanding when making investment decisions. Based on the fact that the pharmaceutical manufacturing industry has various physical and chemical processing products, and as an advanced technology intersection industry, its environmental activities and control occupy an important part of major enterprises in the country, this article selects 121 pharmaceutical manufacturing enterprises from 2016 to 2022 as research objects. Based on their enterprise value and ESG reports, a regression model is constructed, and STATA17 is used to analyze the relationship between ESG information disclosure and the value of pharmaceutical manufacturing enterprises. The following conclusions are drawn: Good ESG information disclosure is positively correlated with corporate value; Financing constraints can

enhance the promoting effect of ESG information disclosure on corporate value; Compared to enterprises before the national policy reform, ESG information disclosure of enterprises after the national policy reform is more conducive to promoting enterprise value; ESG information disclosure can enhance corporate value through the mediating role of profitability.

Keywords: ESG information disclosure ; enterprise value; pharmaceutical manufacturing enterprises.

1. Introduction

In recent years, the concept of Environmental, Social, and Governance (ESG) has gained significant attention in both academic and business circles, particularly concerning its impact on enterprise value. Initially proposed by the United Nations in 2004, ESG focuses on sustainable development through three main dimensions: environmental stewardship, social responsibility, and effective corporate governance. ESG serves as both an indicator and framework for evaluating a company's sustainability and has been increasingly integrated into investment decision-making processes. By 2006, the United Nations Principles for Responsible Investment included ESG considerations, further embedding the concept into global capital markets. The rise of national concerns about sustainable development, climate change, and green energy usage has driven the importance of ESG in assessing corporate performance and attracting investors.

The pharmaceutical manufacturing sector, characterized by high technical content and significant economic impact, has become a focal point for ESG practices. Pharmaceutical manufacturing involves complex processes of creating new drugs through physical or chemical transformations of raw materials. This industry not only plays a crucial role in healthcare but also presents unique challenges and opportunities for implementing sustainable practices. Given the industry's significant environmental footprint and the extended lifecycle of drug development, integrating ESG principles is essential for enhancing long-term value and sustainability.

Enterprise value, a multifaceted concept, encompasses the future revenue potential of a company and its ability to create economic value. Theoretical frameworks often define enterprise value as the present value of expected free cash flows, discounted at the company's weighted average cost of capital ([Mohammad et al.,2024](#); [Al-Oraini et al.,2024](#)). This reflects a company's ability to generate sustainable profits and manage risks. Various indicators, such as return on total assets (ROA), economic added value (EVA), and Tobin's Q, are used to measure enterprise value, each highlighting different aspects of a company's financial health and market position.

2. Definition of relevant concepts

2.1 Definition of ESG

In 2004, the United Nations first proposed the ESG concept, advocating the company to pursue sustainable development from the three aspects of environmental, social and enterprise management. Among them, ESG is the acronym of Environmental , Social and Governance , which is an indicator and framework to evaluate enterprise sustainability. In 2006, the United Nations Organization for The Principles of Responsible Investment included the ESG concept in the consideration of investment decisions, and this concept has increasingly become a major basis

for evaluating the investment value of companies in foreign capital markets. In recent years, With increasing national concerns about sustainable development, global climate change, and the use of green energy, The ESG philosophy allows investors to invest, Will also be used in the business environment, society, Corporate governance as considered as an important indicator, Whether enterprises can insist on protecting the environment, Fulfill the social responsibilities, Maintaining corporate governance, Insist on the disclosure of ESG information has also become part of the imperative, so, With the goal of "carbon peak, carbon neutral", Better practice of the ESG, To attract more investors, Optimize the sustainable development process, Has been concerned by more and more pharmaceutical manufacturing enterprises, And guide this. At present, there are many kinds of ESG evaluation agencies in China, both commercial and non-governmental ones (such as environmental protection agencies). Zhao W.Q.& Liao X.Y.(2021) pointed out that in 2015, We released China's first ESG evaluation system, which is similar to the internationally accepted pyramid structure. It includes three levels: the first is the environment, society and corporate governance, the second is 13 sub-issues, and the third is more than 200 indicators. The second and third levels are designed and improved according to the actual situation of our country. At present, ESG has received more and more attention in the fields of enterprise environment, society and governance (Fei et al.,2024). However, its essence is how to create long-term value, how to achieve the right strategic choice through the internal mechanism, and the avoidance of risks.

2.2 Definition of pharmaceutical manufacturing enterprises

Pharmaceutical manufacturing refers to the process of producing new drugs through physical or chemical changes of raw materials, in which both commonly used western medicine production, veterinary drug raw materials and sanitary materials. Pharmaceutical manufacturing enterprise is an industry with great characteristics and one of the highest technical content. The drugs successfully registered in China have 20 years of patent protection period, during which it can continue to obtain huge profits at high premium. Meanwhile, Liu S.N.(2017) suggested that a drug is a very tedious process, with high trial and error cost and long development cycle and large investment. The marketing cycle of new drugs is usually more than 10 years, and it is difficult for enterprises to accurately predict the market demand. At the same time, it is difficult to achieve the next step of transformation. To sum up, the pharmaceutical manufacturing enterprises have various types of physical and chemical processing products. As an industry with the intersection of advanced technologies, their environmental activities and control occupy an important part of the major enterprises in the country, so i decided to take the pharmaceutical manufacturing enterprises as the goal.

2.3 Definition of enterprise value

According to the analysis of Han X.Y. (2023), theoretically, there are many definitions of enterprise value, and the most common is the theory of financial value. The value of a company is the revenue that the company can create in the future^{Error! Reference source not found.}. From this definition, it can be seen that the value of the enterprise is the present value of the expected free cash flow as the discount rate with its weighted average cost of capital. It is closely related to the financial decision of the enterprise, and reflects the time value, risk and sustainable development ability of the enterprise's capital. Corporate value is also the current value of the cash flow generated by the enterprise in the future, including interest, dividends and equity. The so-called economic value refers to the

future income, including not only cash flow, such as interest, dividends, shares, etc.; but also non-cash flows, such as fixed assets, inventory, intangible assets, goodwill, etc. At the same time, the value of the company was evaluated, including cash flow and other indicators (reflecting the sustainable development of the company), operating profit (profit margin, profitability compared with the same industry), revenue scale (based on market share), liabilities, etc. Through the above indicators, it can reflect the basic situation, scale, value, health degree and healthy development expectations of a company (Zhang R.Q. , 2015). This article also agrees with this statement, which decided to use the indicators mentioned in the appeal for analysis. Finally, Wang F.L.(2023) ,believed that if an enterprise has a high-quality value management system, it can bring a lot of benefits and advantages to the enterprise. It can not only make the development of the enterprise more stable, but also establish a sound internal communication mechanism, enhance the cohesion of the enterprise, so that every employee can invest in the development of the company, better cooperate with the management, so that the company can continue to develop (Shao et al.,2024). In this way, to maintain the company's sustainable development and vigorous vitality. To promote the development of the company.

3. Research hypothesis

3.1 ESG information disclosure and Enterprise Value

Through past literature research, for ESG information disclosure and the relationship between enterprise value of a comprehensive analysis, can be found, based on the analysis of the object, influencing factors, time or analysis, the conclusion includes three aspects: ESG information disclosure and a significant positive correlation between enterprise value, ESG information disclosure and significant negative correlation between enterprise value, and ESG information disclosure has no relationship with enterprise value. Many studies have pointed out that companies with higher ESG scores will also have higher corporate value, but some scholars believe that social responsibility is not directly related to corporate value, on the contrary, there may be a negative correlation between the two. Among them, scholar Yue S.Z. et al. (2021) conducted empirical analysis of the financial data of 14 listed agriculture and forestry companies from 2013 to 2018. The conclusion that enterprise value and the quality of CSR information disclosure are positively drawn. Aboud & Diab (2018) conducted an empirical analysis of listed companies in Egypt and China, found that ESG information disclosure has a significant promotion effect on the value of the company. Xu M.Y. et al. (2021) adopted panel regression and took China's A-share listed companies as the research object, which found that the better the overall performance of ESG, the more conducive to the improvement of enterprise value. However, some scholars believe that there is no correlation relationship between the two through analysis. Griffin et al. (1997) discussed the relationship between the company's social responsibility status and the return on investment and profit growth, and pointed out that there was no significant correlation between ESG information disclosure and enterprise value. At the same time, some scholars have analyzed the negative correlation between the two through research. For example, Sassen et al.(2016) analyzed the impact of E, S, and G, on the risk of European enterprises. Through this analysis, it is found that the higher the ESG information disclosure level of listed companies, the lower the value of the company; Xu J.L. et al.(2020) conducted an empirical study on the financial status of listed companies in Chinese manufacturing enterprises. The conclusion that the information disclosure level of Chinese manufacturing enterprises is negatively correlated with the company value is drawn. Based on the above discussion, this paper believes that ESG information

disclosure can enhance the value of enterprises, by helping enterprises to build a fair and transparent image, so as to attract more investors and obtain more cooperative resources from the market, thus constructing hypothesis H1.

H1: Good ESG information disclosure is positively correlated with enterprise value.

3.2 The moderation effect of financing constraints

Financing constraints limit the capital allocation and strategic choices of enterprises, which tend to focus their attention on familiar industries or products rather than venturing into high-risk areas. Listed companies also pay more attention to the flow and stability of funds. The better the ESG performance, the more investment projects and financing channels can be obtained, which in turn drives the profitability and development of the company, and enhances its value. At the same time, companies with greater financing constraints have lower external debt ratios, and their capital structure focuses more on internal capital flows. Their capital accumulation and reinvestment strategies will also focus more on sustainable development, promoting environmentally conscious investors to offer higher premiums to companies with higher ESG ratings, thereby reducing financing costs and enhancing corporate value(San et al.,2022). Moreover, such enterprises mainly rely on their surplus funds, self raised funds, dividend reinvestment, etc. However, the cost of external financing is relatively high and can fluctuate due to market conditions and the company's own credit. In this context, Zheng C.M. et al. (2021) found that improving a company's social responsibility performance and actively disclosing ESG information can help alleviate information asymmetry with investors and other stakeholders, thereby reducing internal and external financing costs and enhancing the company's corporate value. Based on this, the hypothesis H2.

H2: Financing constraints can strengthen the promoting role of enterprise ESG information disclosure on enterprise value.

3.3 Heterogeneity of the policy environments

In 2018, China Securities Regulatory Commission issued the revised version of the Governance Standards for Listed Companies, which made more adjustments and plans in terms of the system and promoted more companies to pay attention to the role of ESG information disclosure on the growth of enterprises. Referring to Xu G.H. et al. (2022) on the relationship between ESG information disclosure and enterprise value. Using the policy environment as a heterogeneity analysis. This paper decided to use this method also, with 2018 as the before and after the node. Lin P et al. (2023), through the analysis of listed companies in key industries from 2011 to 2018, found that a good policy environment can promote the technological innovation of enterprises, so as to improve the long-term production efficiency of enterprises and promote the value growth of enterprises. This effect happens especially for high-growth and high-spending companies. Nian T.T. (2021) takes advantage of the large sample data of Shanghai-listed companies from 2013-2018. The impact of the regulatory system on corporate social responsibility and corporate performance is effectively tested. This analysis found that it has a certain positive impact on the value of the company. Based on the above studies, this paper believes that the reform of national policy is conducive to encouraging and promoting enterprises to implement various measures to conduct ESG information disclosure. Therefore, this paper puts forward hypothesis H3.

H3: Compared with the enterprises before the national policy reform, the ESG information disclosure of the

enterprises after the national policy reform is more conducive to promoting the enterprise value.

3.4 The intermediary effect of profitability

The profitability of an enterprise, that is, the ability of the company to use various economic resources to obtain profits, is the specific performance of the operating results of each link of the company. It also reflects the market competitiveness of the company, the ability to obtain cash, etc. It is an important indicator for the company to measure the value of a company and reflects the business performance of the enterprise. In general, when a company's profitability increases, its market position increases, the stock price rises, and thus its corporate value increases. Liu Q.J. et al. (2023) studied the data of listed forestry companies in 2013-2020 by constructing a panel data model. ESG information disclosure was found to have a positive impact on the profitability of the company. Since the enterprise needs to assume certain social responsibilities in operation, investors and partners will pay attention to their ESG information disclosure when absorbing funds; In the meantime, Wu Y.T. et al. (2023) takes the data of all A-share listed companies in China in 2016-2021 as the research sample. The study found that profitability was positively associated with company value. That improving profitability helps improve the value of the company. As a result, ESG can ultimately improve corporate value by improving corporate profitability. Based on the above analysis we propose the hypothesis H4.

H4: ESG information disclosure can enhance the enterprise value through the intermediary role of profitability.

4. Research design

4.1 Sample selection and data sources

First of all, from the perspective of convenient, complete, representative, at the same time, since 2016, the pharmaceutical manufacturing enterprises to ESG information disclosure of concern is more and more high, the government also to the direction of the supervision, in the end, chose the Chinese pharmaceutical manufacturing enterprises of 121 listed companies (2016-2022) as a research object, including ESG evaluation index from Hua Zheng corporate social responsibility rating, other data from WIND database and so on. The following adjustments were made for the initial data:

(1) For enterprises with incomplete data, it may have a negative impact on the analysis of data, and enterprises with incomplete data will be excluded.

(2) ST-type enterprises have a strong incentive, enterprises in financial difficulties in the financial performance and other enterprises have a significant difference, which will have a certain impact on some analysis results, the ST, ST listed companies to be excluded.

(3) 847 observations were obtained from 121 companies, and STATA17 was used for this empirical analysis.

4.2 Variable-definition

Interpreted variables: By summarizing past research reports, many scholars use economic added value EVA, Tobin Q value, or return on total assets ROA to represent enterprise value. but, For the Tobin Q value, Compared with the capital markets in western countries, As China's capital market is still developing lightly, The stock price is

more volatile, Still need more time and space to cover the shortfall, Relevant regulations and regulations are not perfect, These uncertainties make it difficult for the Tobin Q value to accurately reflect the company's value; at the same time, The added value of economic law, as an absolute data, Heterogeneity errors may occur when comparing different time periods or different companies; Based on the above analysis, final, The ROA (return on total assets) is selected as the explained variable, at the same time, ROA contains financial leverage, Make the data even more convincing. ROA is calculated as: company net profit / average total assets.

Interpretive variables: This paper selects Huazheng's corporate social responsibility rating represents ESG information disclosure. The system is rated four times a year, and the higher the ESG score, the better the performance of ESG information disclosure.

Mediation variable: This paper refers to the study of profitability by Jiang W.C.et al. (2016). According to the Statistical Yearbook of China's High-tech Industry. Use earnings per share (EPS) as a proxy for profitability. Earnings per share comes directly from the financial summary of the listed company's annual report.

Adjustment variable: This paper refers to the study of Zhao T.T. (2023) on financing constraints as a regulating variable in enterprise R & D investment. The KZ index was selected as the regulatory variable.

Control variables: Based on previous empirical studies, enterprise size (SIZE), income tax rate (ITR), capital intensity (CAP), Tobin Q value (TobinQ), operating income growth rate (Growth) and current ratio (Liquid) are selected as control variables.

Changes in the income tax rate (ITR) can affect changes in enterprise value. Deng L.C. (2019) research and analysis concluded that the corporate income tax rate will reduce the new investment of enterprises. However, because the new investment is sufficient to spend on fixed assets, intangible assets and other long-term funds, the reduction of the new investment will increase the enterprise value of the current period. So there is actually a positive correlation between the enterprise value and the income tax rate.

Operating income growth rate (Growth) is the ratio of the difference between the ending operating income and the initial operating income to the initial operating income. This index is mainly used to measure the growth of an enterprise. The higher the index, the better the operation quality of the enterprise, the better the market prospect of the product, and the greater the competitiveness in the industry. According to Z.Y.Y. (2019), the analysis of competitiveness and enterprise value showed a significant and positive correlation.

The current ratio (Liquid) is the ratio of current assets to current liabilities, a measure of whether a company's current assets can be converted into cash to pay its debts before they mature. Generally speaking, the higher the ratio, the better the asset liquidity and the stronger the short-term solvency; otherwise, the weaker. At the same time, according to Lv J.J. (2013) research learned. Enterprise value is positively correlated with the solvency of enterprises. Therefore, the increase of the current ratio will also lead to the increase of enterprise value.

The Tobin Q value (Tobin Q) is usually the ratio of the market value of the enterprise to the total assets, which can reflect the expectation of the capital market on the future cash flow and growth ability of the enterprise. The higher the Tobin Q value, the better the market expectation of the enterprise, the higher the enterprise value will be.

Enterprise Scale (SIZE) The larger the size of an enterprise, the more large-scale procurement, production and sales, thus increasing the value of the company.

Capital density (CAP), according to the research and analysis of Zou J.(2021), for pharmaceutical manufacturing enterprises, the higher the capital intensity, will further increase the expenses of enterprises, resulting in the cost of enterprises always maintained at a relatively high level. In this way, a sticky behavior that triggers or increases costs. At the same time, according to the study of Liu M.J. (2022), the cost stickiness of enterprises in the growth period will play a significant role in promoting the enterprise value. For enterprises in the mature stage, the impact of cost stickiness on enterprise value is not significant. In enterprises in recession, the existence of cost stickiness has a significant inhibitory effect on the improvement of enterprise value. Therefore, the direction of influence should be further tested.

At the same time, for the heterogeneity analysis, in order to explore the impact of national policy reform, this paper selected the policy release time (2018) as the index for grouping. The main variables in this article are defined in Table 1.**Error! Reference source not found.**

1Table 1 Primary variable definitions

Type of variable	Variable name	Variable symbol	Variable-definition
Explained variable	All capital earnings rate	ROA	Net income / average total assets
Explanatory variable	ESG grade	ESG	ESG total score
Controlled variable	Income tax rate	ITR	Income tax expense / total profit
	Increase rate of business revenue	Growth	Operating income of this year / previous year-1
	Current ratio	Liquid	Current assets / current liabilities
	Tobin Q value	Tobin Q	(Market value of tradable shares at the end of the year + market value of non-tradable shares + total amount of liabilities) / book value of the total production of the company
	Company size	SIZE	Natural logarithm of the annual total assets
	Capital-intensity	CAP	Total assets / operating income
Mediator variable	Earnings per share	EPS	Directly from the listed company's annual report financial summary
Dummy variable	Policy release time	TIME	0 before the issuance of the Corporate Governance Code. and 1 otherwise

Regulated variable	Financing constraints	KZ	KZ index number
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4.3 Model building

Benchmark regression model:

$$ROA_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ITR_{it} + \beta_3 Growth_{it} + \beta_4 Liquid_{it} + \beta_5 TobinQ_{it} + \beta_6 SIZE_{it} + \beta_7 CAP_{it} + \varepsilon. \quad (1)$$

Regulatory effect model:

$$ROA_{it} = \varphi_0 + \varphi_1 ESG_{it} + \varphi_2 KZ_{it} + \varphi_3 KZ * ESG_{it} + \varphi_4 ITR_{it} + \varphi_5 Growth_{it} + \varphi_6 Liquid_{it} + \varphi_7 TobinQ_{it} + \varphi_8 SIZE_{it} + \varphi_9 CAP_{it} + \varepsilon. \quad (2)$$

In the model, if the φ_1 take part in φ_3 Significant, then the regulatory effect exists.

Mediator effect model:

Refer to the mediation effect proposed by Wen Z.L. et al. (2014), Further explore whether profitability can become a part of the influence mechanism of ESG performance on enterprise value. This paper selects the mediation effect model, based on the model (1), sets the following model to analyze the intermediary effect of profitability:

$$EPS_{it} = \alpha_0 + \alpha_1 ESG_{it} + \alpha_2 ITR_{it} + \alpha_3 Growth_{it} + \alpha_4 Liquid_{it} + \alpha_5 TobinQ_{it} + \alpha_6 SIZE_{it} + \alpha_7 CAP_{it} + \varepsilon. \quad (3)$$

$$ROA_{it} = \gamma_0 + \gamma_1 ESG_{it} + \gamma_2 EPS_{it} + \gamma_3 ITR_{it} + \gamma_4 Growth_{it} + \gamma_5 Liquid_{it} + \gamma_6 TobinQ_{it} + \gamma_7 SIZE_{it} + \gamma_8 CAP_{it} + \varepsilon. \quad (4)$$

If H4 holds, then α_1 in model (3) should be greater than 0, indicating that ESG information disclosure will improve the profitability of the enterprise. The model (4) adds the profitability variable on the basis of (3), if the formula is sub-type γ_1 and γ_2 Significant, it indicates that ESG has a partial intermediary role of profitability in the impact of enterprise value, if only γ_2 Significant, then the profitability has a complete intermediary role.

5. Empirical analysis

5.1 Descriptive statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Code	847	61	34.95	1	121
Year	847	2,019	2.001	2,016	2,022
ROA	847	0.0576	0.0725	-0.332	0.247
ITR	847	0.152	0.174	-1.009	1.051
CAP	847	2.517	1.616	0.876	15.63

SIZE	847	22.26	0.927	20.06	25.04
TobinQ	847	2.480	1.546	0.803	9.817
Growth	847	0.127	0.294	-0.658	3.303
Liquid	847	3.178	2.659	0.366	17.62
KZ	847	0.643	2.005	-6.632	6.389
EPS	847	0.495	0.764	-1.856	5.790
ESG	847	71.76	5.716	51.83	85.87

Table 2 shows the descriptive statistical results. Among sample enterprises, while the lowest of ROA is -0.332 and the maximum value is 0.247, indicating the market value assessment standards for different companies; In the ESG score, the highest score is 85.87 and the lowest value is 51.83 and the average is 71.76. The data in the table indicates that the overall environment of China's pharmaceutical manufacturing enterprises, social responsibility and the information disclosure of corporate governance still need to be improved.

2Table 2 Descriptive statistics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
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EPS	847	0.495	0.764	-1.856	5.790
ESG	847	71.76	5.716	51.83	85.87

5.2 Correlation analysis

After correlation analysis of table 3, it can be found that the empirical model of explanatory variables: the ESG information disclosure of China's pharmaceutical manufacturing companies and explained variables: the correlation coefficient between return on total assets (ROA) is 0.408 and is significant at 1% level, so it can confirm the H1: Good ESG information disclosure and positive correlation with enterprise value. In addition, from the relationship between the variables, the income tax rate (ITR) and Tobin Q value (TOBINQ), capital intensity (CAP)

and enterprise size (SIZE), operating income growth rate (Growth), current ratio (Liquid), earnings per share (EPS), financing constraints (KZ) and return on total assets (ROA) at the level of 1%, including capital intensity (CAP) and financing constraints (KZ) negative correlation, the rest of the elements are positive correlation.

3Table 3 Correlation analysis

	ROA	ESG	ITR	CAP	SIZE	TobinQ	Growth
ROA	1						
ESG	0.408***	1					
ITR	0.109***	-0.00900	1				
CAP	-0.295***	-0.180***	-0.112***	1			
SIZE	0.156***	0.236***	0.097***	0.0160	1		
TobinQ	0.310***	0.129***	-0.0420	-0.0180	-0.240***	1	
Growth	0.341***	0.072**	0.0400	-0.175***	0.0400	0.169***	1
Liquid	0.283***	0.170***	-0.0360	0.110***	-0.169***	0.296***	-0.0500
KZ	-0.590***	-0.277***	-0.0200	0.238***	-0.062*	0.0410	-0.125***
EPS	0.715***	0.396***	0.0560	-0.218***	0.394***	0.201***	0.255***
	Liquid	KZ	EPS				
Liquid	1						
KZ	-0.386***	1					
EPS	0.089***	-0.406***	1				

5.3 Regression analysis

The regression analysis was used to explore the relationship between ESG information disclosure and the value of pharmaceutical manufacturing enterprises, with the conclusions drawn in Table 4. According to this table analysis, the ESG coefficient is 0.003 and is significant at the level of 1%, so good ESG information disclosure can enhance the value of the enterprise. The empirical results support H1: a positive relationship between good ESG information disclosure and enterprise value presentation.

Table 4 Regression analysis 1

VARIABLES	(1) ROA
ESG	0.003*** (8.30)
ITR	0.032*** (2.88)
Growth	0.062*** (9.27)
Liquid	0.007*** (8.85)

TobinQ	0.010*** (7.01)
SIZE	0.014*** (6.14)
CAP	-0.010*** (-8.17)
Constant	-0.501*** (-10.06)
Observations	847
R-squared	0.421

5.4 Regulation effect test

H2 results for the regulatory effect test are shown in (1) of Table 5, both coefficients between ESG and KZ * ESG all positive numbers, which can be considered that the financing constraints can strengthen the main effect; at the same time, Grouping all the samples according to the financing constraint median, When the KZ is located above the median of the annual sample, The group is as 1, At this point, the level of financing constraints is high, Otherwise, take 0; As it can be found in (2) and (3), The ESG information disclosure and ROA of the high financing constraint group presented a regression coefficient of 0.003, ESG disclosure and ROA for the low financing constraint group presented a regression coefficient of 0.002, It is clear that financing constraints can indeed affect the relationship between enterprise ESG information disclosure and enterprise value, Moreover, the positive relationship is more obvious with the improvement of financing constraints. Therefore, it can be analyzed that the more financing constraints enterprises are subject to, it will also promote the enterprise value of ESG information disclosure. The empirical results support H2: Financing constraints can strengthen the promoting effect of enterprise ESG information disclosure on enterprise value.

Table 5 Modulatory effects

VARIABLES	(1)	(2)	(3)
	ROA	ROA (Financing constraint = 0)	ROA (Financing constraint = 1)
ESG	0.002*** (5.23)	0.002*** (4.70)	0.003*** (5.16)
ITR	0.034*** (3.62)	0.008 (0.41)	0.040*** (3.05)
Growth	0.047*** (8.12)	0.047*** (6.30)	0.065*** (6.87)
Liquid	0.001 (0.84)	0.003*** (4.02)	0.004** (2.23)
TobinQ	0.015***	0.016***	0.009***

	(12.39)	(10.36)	(4.18)
SIZE	0.012***	0.012***	0.013***
	(6.21)	(4.96)	(3.91)
CAP	-0.004***	-0.009***	-0.006***
	(-4.02)	(-5.71)	(-3.72)
KZ *ESG	0.000**		
	(2.21)		
KZ	-0.041***		
	(-3.84)		
Constant	-0.359***	-0.344***	-0.494***
	(-8.24)	(-6.38)	(-6.71)
Observations	847	423	424
R-squared	0.587	0.472	0.339

5.5 Analysis of heterogeneity

In Table 6, after the release of the revised version of the national policy in 2018, the ESG coefficient was changed from 0.002 before the release to 0.003 after the release. For this group of data, the group difference was analyzed, and the P-value of 0.068 was less than 0.1 in Fisher's Permutation test, indicating that the group difference test, that is, the size of coefficients can be directly compared. After the policy change, good ESG can promote the improvement of enterprise value, so H3: the ESG information disclosure after the national policy reform can better enhance the enterprise value than the enterprise before the national policy reform, which has been proved. Reason may be in the government requires the charge of enterprise information disclosure, the enterprise will arrange the national policy requirements more carefully into their various goals, to change the way of the company operates more, and get the more trust from consumers, because consumers will be more willing to fair, fair, transparent company investment.

Table 6 shows the tests of heterogeneity

VARIABLES	(1)	(2)
	ROA (Prior to the policy release)	ROA (After the policy release)
ESG	0.002*** (3.80)	0.003*** (7.30)
ITR	-0.093*** (-4.04)	0.042*** (3.35)
Growth	0.025*** (3.50)	0.085*** (8.63)
Liquid	0.007*** (7.21)	0.007*** (6.46)
TobinQ	0.006***	0.009***

	(3.50)	(5.27)
SIZE	0.014***	0.014***
	(4.38)	(4.94)
CAP	-0.014***	-0.008***
	(-7.85)	(-5.41)
Constant	-0.363***	-0.531***
	(-4.98)	(-8.68)
Observations	242	605
R-squared	0.494	0.434

5.6 The intermediary effect of profitability

First, In Table 7, (2) indicates the impact of ESG performance on profitability, The regression coefficient of ESG was 0.029, And were significant at the level of 1%, That ESG information disclosure helps companies improve their profitability; (3) reflects the intermediary role of profitability in ESG information disclosure to promote enterprise value, The regression results indicated that, The coefficients of both ESG and EPS are positive, It proves that profitability plays a partial intermediary role between ESG information disclosure and enterprise value, ESG information disclosure can increase the value of an enterprise by improving its profitability, which Supporting H4. This may be because ESG performing enterprises tend to pay more attention to the process of their business activities and profits, so as to release the signal of smooth operation, because it will allow them to gain mutual benefit with investors, increase the circulation and popularity in the market; in addition, good ESG performance will make the enterprise more willing to strict with their arrangements at all levels, so as to gain more investors from investors, increase profitability and indirectly enhance the value of the enterprise.

Table 7 The mediation effect

VARIABLES	(1) ROA	(2) EPS	(3) ROA
ESG	0.003*** (8.30)	0.029*** (7.31)	0.001*** (4.69)
ITR	0.032*** (2.88)	0.029 (0.23)	0.030*** (3.47)
Growth	0.062*** (9.27)	0.421*** (5.72)	0.039*** (7.15)
Liquid	0.007*** (8.85)	0.024*** (2.76)	0.006*** (9.01)
TobinQ	0.010*** (7.01)	0.106*** (7.15)	0.004*** (3.23)
SIZE	0.014*** (6.14)	0.332*** (13.43)	-0.005** (-2.42)
CAP	-0.010***	-0.076***	-0.006***

	(-8.17)	(-5.59)	(-5.89)
EPS			0.056***
			(22.49)
Constant	-0.501***	-9.198***	0.014
	(-10.06)	(-16.88)	(0.32)
Observations	847	847	847
R-squared	0.421	0.373	0.639

5.7 Endurance test

5.7.1 Tool variable method

In order to alleviate the influence of causal interference and the possible problem of missing variables, referring to Zhang Z. (2022), this paper selects the mean of ESG performance in the enterprise registration place in the same industry and the same city in the same year as the tool variable. Meanwhile, the least squares method was used to test the robustness of the conclusion. Because of regional policies and cultural environment, it is highly related with the ESG performance of urban enterprises, and on the other hand, this tool variable rarely affects each enterprise's decision to improve its own enterprise value. Therefore, theoretically, this is an ideal tool variable. The non-identifiable test and weak instrumental variable test showed that in the Anderson canon LM statistic, the p value is less than 0.01, so the null hypothesis "insufficient instrumental identification" was rejected; Meanwhile, the Cragg-Donald Wald F statistic was 132.626 greater than 10, indicating that there is no weak instrumental variable problem. Secondly, the endogeneity test was conducted. As shown in Table 8, the ESG and mean coefficient were 4.067, significantly positive, that is, the selection of instrumental variables passed the correlation test, and mean was the qualified instrument variable. Secondly, the 2 SLS regression was performed by means. As shown in (2) in Table 8, the regression coefficient between ESG and ROA was significantly positive and 0.003 at the 1% statistical level, which is consistent with the previous study results.

Table 8 Two-stage regression of the instrumental variables

VARIABLES	(1) ESG	(2) ROA
mean	4.067*** (11.52)	
ESG		0.003*** (3.08)
ITR	-1.335 (-1.37)	0.032*** (2.87)
Growth	0.376 (0.64)	0.062*** (9.31)
Liquid	0.353*** (5.22)	0.007*** (7.90)
TobinQ	0.340***	0.010***

	(2.85)	(6.68)
SIZE	1.728***	0.014***
	(9.12)	(4.86)
CAP	-0.695***	-0.010***
	(-6.51)	(-7.21)
Constant	16.593***	-0.501***
	(3.77)	(-8.94)
Observations	847	847
R-squared	0.278	0.421
Cragg-Donald Wald F statistic	132.626	132.626

5.7.2 The lagged explanatory variable

This paper is ESG information disclosure of pharmaceutical manufacturing enterprise value, proved the ESG information disclosure the better, the better the enterprise value, but also may be because the enterprise increased for the value of the enterprise, meet the needs of all aspects, so as to improve ESG information disclosure, reverse cause correlation problems, reference Sun X.C. (2023), decided to explanatory variables (ESG) lag phase L_1 ESG then performed the regression analysis. Use this method to alleviate the possible endogeneity problem between the two. The results of the lag phase are shown in Table 9, according to (1), L_1 ESG and ROA is 0.003 and significant; (2) show EPS and L_1 The ESG is 0.034 and significant; in (3), the coefficients of L_1 ESG and EPS are positive, demonstrating that profitability is a partial intermediary between ESG disclosure and enterprise value; in (4), the coefficients of $KZ * L_1$ ESG and L_1 ESG are all positive and significant, proving that financing constraints can strengthen the main effect. The above results are consistent with the previous study. Therefore, the hypothesis mentioned above is still valid, even if endogeneity is considered.

Table 9 lags behind the one-stage regression analysis

VARIABLES	(1) ROA	(2) EPS	(3) ROA	(4) ROA
L_1 ESG	0.003*** (8.96)	0.034*** (8.44)	0.001*** (4.64)	0.002*** (6.84)
ITR	0.029*** (2.68)	0.006 (0.05)	0.029*** (3.33)	0.033*** (3.54)
Growth	0.060*** (8.95)	0.396*** (5.42)	0.038*** (6.99)	0.045*** (7.91)
Liquid	0.007*** (9.26)	0.025*** (2.98)	0.006*** (9.32)	0.001 (0.90)
TobinQ	0.009*** (6.78)	0.102*** (6.89)	0.004*** (3.17)	0.014*** (12.20)
SIZE	0.013***	0.318***	-0.005**	0.011***

	(5.66)	(12.86)	(-2.46)	(5.55)
CAP	-0.010***	-0.071***	-0.006***	-0.004***
	(-7.92)	(-5.26)	(-5.85)	(-3.61)
EPS			0.056***	
			(22.11)	
KZ *ESG				0.000***
				(2.60)
KZ				-0.044***
				(-4.31)
Constant	-0.496***	-9.205***	0.016	-0.363***
	(-10.08)	(-17.14)	(0.35)	(-8.53)
Observations	847	847	847	847
R-squared	0.428	0.385	0.639	0.596

5.8 Robustness test

5.8.1 Replacement by the explanatory variable.

In order to investigate the robustness of the study results, the explanatory variable ROA (return on total assets) by ROE (return on equity), the results are shown in Table 10, comparing Table 4 and Table 7, the results of the variables and the initial verification conclusion, and the ESG coefficient is 0.005, significant in the specified range, and the intermediary effect remains stable, and the regulation effect of financing constraints is still established, so the results of this paper is robust.

Table 10 Robustness Test 1

VARIABLES	(1) ROE	(2) EPS	(3) ROE	(4) ROE
ESG	0.005*** (7.43)	0.029*** (7.31)	0.002*** (3.73)	0.002*** (3.46)
ITR	0.078*** (4.01)	0.029 (0.23)	0.075*** (4.80)	0.082*** (4.77)
Growth	0.099*** (8.39)	0.421*** (5.72)	0.059*** (6.08)	0.075*** (7.15)
Liquid	0.006*** (4.61)	0.024*** (2.76)	0.004*** (3.67)	-0.003** (-2.48)
TobinQ	0.012*** (5.09)	0.106*** (7.15)	0.002 (1.03)	0.021*** (9.50)
SIZE	0.021*** (5.41)	0.332*** (13.43)	-0.010*** (-2.85)	0.018*** (5.25)
CAP	-0.018*** (-8.47)	-0.076*** (-5.59)	-0.011*** (-6.29)	-0.009*** (-4.40)

EPS			0.095*** (21.25)	
KZ *ESG				0.001*** (5.07)
KZ				-0.125*** (-6.39)
Constant	-0.770*** (-8.82)	-9.198*** (-16.88)	0.102 (1.25)	-0.503*** (-6.31)
Observations	847	847	847	847
R-squared	0.349	0.373	0.577	0.498

5.8.2 Remove the control variable

Regression analyses were performed only for the explained and explanatory variables. Thus, (2) of Table 11 can be obtained, and by comparing (1) of Table 11, namely the original experimental data results, it can be concluded that the ESG coefficient is 0.005 and still significant within the specified range, so the empirical study results in this paper are stable.

Table 11 Robustness Test 2

VARIABLES	(1) ROA	(2) ROA
ESG	0.003*** (8.30)	0.005*** (12.98)
ITR	0.032*** (2.88)	
Growth	0.062*** (9.27)	
Liquid	0.007*** (8.85)	
TobinQ	0.010*** (7.01)	
SIZE	0.014*** (6.14)	
CAP	-0.010*** (-8.17)	
Constant	-0.501*** (-10.06)	-0.314*** (-10.93)
Observations	847	847

R-squared	0.421	0.166
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6. Conclusion and suggestion

Using the data of 121 pharmaceutical manufacturing enterprises, the following conclusions: good ESG information disclosure presents a positive relationship with enterprise value; financing constraints can enhance the value of ESG information disclosure, perhaps because the external debt ratio will decrease, the capital structure will pay more attention to the internal capital flow and the internal cash flow of the enterprise, and the capital accumulation and reinvestment strategy will pay more attention to the sustainable development. The stronger the environmental awareness of enterprises, Attracted more environmentally conscious investors, Corporate equity financing costs will also be reduced, Improve the enterprise value; Better ESG information disclosure of enterprises than those before the national policy reform, Perhaps because of the government regulations for the collation and publication of corporate information, The company will incorporate more detailed national policy requirements into its own goals, therefore, More and more companies are changing their business models; The ESG can improve its profitability, And then will affect the enterprise value, Profitability acts as an intermediary, This is due to the fact that ESG better disclosure companies tend to pay more attention to the process of their own business activities and the gains achieved, In this way, This will win the company and investors, Improve its circulation and visibility in the market, It is also beneficial to the development of the company; at the same time, Good ESG disclosure will also enhance the company's reputation, Make companies more willing to arrange themselves at all levels, To get the trust of more investors, Thus enhancing profitability and indirectly increasing the value of the company. Based on the above analysis, some suggestions are given.

6.1 Suggestions made at the government level

Based on the conclusion of H3, the effective policy advocacy will increase the ESG information disclosure of various enterprises, so as to better enhance the enterprise value. Therefore, the government should strengthen the system construction of ESG information disclosure in the pharmaceutical manufacturing industry, and complete the relevant policies as soon as possible, so as to improve the transparency of enterprise information disclosure. For example, in terms of environment, the government can increase the supervision of ESG information disclosure and increase the punishment cost for illegal enterprises to ensure the necessary disclosure obligations; meanwhile, the government in all aspects, so as to ensure a good environment to maintain the operation of ESG information disclosure system. Guide listed companies to make more standardized disclosure.

To promote the healthy development of the environmental protection system, on the other hand, the government should promulgate and implement a good incentive system. ESG enterprises, such as IPO listing, green credit, compensation for procurement, bidding, tax reduction, and those that disclose false information or fail to disclose poor information and ESG rating shall be punished in accordance with the law.

6.2 Suggestions are made at the enterprise level

Based on H4, Profitability plays an intermediary role in ESG information disclosure and enterprise value, to this end, Enterprises should be familiar with the current ESG evaluation and certification standards and evaluation methods, Establish a sound ESG management system, Set practical ESG goals, And to ensure that they can promote

increased profitability; The company can conduct social responsibility evaluation and certification through a third-party organization, Obtain an authoritative social responsibility evaluation report; Publish information on environmental, social responsibility and other aspects related to promoting profitability, To the company's assets, Monitor and summarize profit income, And through the company's website or other media published. At the same time, the company can also write social responsibility information into the annual report and share corporate social responsibility performance with shareholders.

Based on H2 can know, financing constraints can strengthen enterprise ESG information disclosure of enterprise value, so, the company should listen to the government issued policy arrangement, strengthen self management and strategic planning, by improving the ESG performance to alleviate the financing constraints, and by improving ESG information disclosure to the market and the external stakeholders development promising signal, to reduce the company's equity and debt financing costs, alleviate financing constraints caused by information asymmetry.

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