

Empirical Impact of Green Credit Policies on ESG Indicators and Financial Performance Based on Fuzzy Sets

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Abstract: As the problem of climate change becomes more and more serious, governments around the world are trying their best to mitigate and adapt to the impact of climate change. As the backbone of national economic development, enterprises also need to play an important role in it. As a bridge to measure the relationship among enterprises, the environment and social responsibility, ESG is extremely important today. Exploring the impact of corporate ESG performance on financial performance can help companies' better address environmental and social issues while ensuring their own business results. This paper aims to conduct an empirical study on the impact of green credit policies on ESG indicators and financial performance based on fuzzy sets. This paper first explains green credit, and then elaborates on intuitionistic fuzzy set theory. Intuitive fuzzy set theory is an extension of fuzzy sets. On the basis of fuzzy set membership degree, it introduces the concept of irrespective of membership degree and hesitation degree, and extends from one-dimensional fuzzy sets to three-dimensional intuitionistic fuzzy sets. Finally, taking Pharmaceutical Technology Co., Ltd. (Company A) as an example, this paper explores the ESG performance of the company, and analyzes the relationship between the ESG performance and financial performance of Company A. The experimental results of this paper show that enterprises can improve the production efficiency of their own equipment based on excellent ESG performance. It ensures the completeness of the production organization and the strength of product delivery. It improves the level of operation and management, and improves the utilization rate of production capacity, thereby enhancing the financial performance of the enterprise, and its overall performance is increased by 30%. Therefore, the excellent ESG performance of Company A has a positive impact on financial performance.

1. Introduction

At present, Environmental, Social and Governance (ESG) has become an important pillar of corporate social responsibility to develop sustainable strategies, affecting the financial performance of enterprises. This paper enriches the theory of corporate social responsibility by examining the

impact of corporate ESG performance on financial performance. Starting from the performance of corporate ESG, this paper studies the impact of corporate social responsibility performance on financial performance from the three dimensions of environment, society and corporate governance. It has prompted China to explore the theory of corporate social responsibility more deeply and thoroughly, and it has provided a certain theoretical reference for future research. In addition, this paper examines the role of technological innovation in the impact process of ESG performance and financial performance. It further enriches the theory of Porter's hypothesis. From the perspective of ESG performance, this paper explores whether companies that apply environmental regulation are more likely to carry out technological innovation, thereby improving their financial performance.

ESG performance can enhance the reputation of the company by promoting the company to actively fulfill its social responsibility and improve the recognition of the company in the minds of society and the media. This article takes Company A as an example to explore the ESG performance of this enterprise. This paper explores these three dimensions and analyzes the relationship between the ESG performance and financial performance of A company. Through good ESG performance, Company A has improved its own financial performance, increasing its overall performance by 30%. Therefore, the positive ESG performance of company A has a positive effect on financial performance.

2. Related Work

Zumente I aimed to assess the relationship between board diversity and ESG disclosure in companies listed on the Nasdaq OMX Baltic Stock Exchange [1]. Btae O M was based on the three proposed classification methods, namely the geographical area of Europe, functional currency, and cluster analysis of the GDP and population of European countries respectively. He conducted statistical comparisons of variables that measure ESG and financial performance of European banks [2]. Much research has focused on the relationship between firms with strong environmental, social and governance (ESG) characteristics and firm financial performance. Giese G discounted three information transmission paths in the cash flow model through the test standard. It calls it the cash flow approach, the special risk approach and the valuation channel, and proposes the link between ESG information in corporate valuation and performance [3]. However, these scholars lack certain technical research on ESG indicators. We found that the exploration of ESG indicators and financial performance based on fuzzy set theory can achieve ideal results. In this regard, we have consulted the relevant literature on fuzzy set theory.

Some scholars also have corresponding research in fuzzy set theory: Zhan J introduced the concept of Z-soft rough fuzzy set, which is an extended concept of soft rough set and rough fuzzy set. He pointed out that this novel concept removes the constraints required by Feng-soft Rough Fuzzy Sets and Meng-soft Rough Fuzzy Sets Full Soft Sets [4]. Yang B developed a systematic method for assessing the risk of water inrush from the coal seam floor using geographic information systems and fuzzy set theory. This method can be a powerful tool for systematically assessing the risk of water inrush from the floor, as the influence of multiple factors can be quantitatively considered depending on the geological and mining conditions [5]. Wang S proposed an image enhancement method based on improved fuzzy sets. This method divides the image into sub-images based on fuzzy membership function rules, and performs image enhancement on the sub-images to achieve effective image sharpening [6]. However, these scholars did not conduct research and discussion on ESG indicators and financial performance based on fuzzy set theory, but only discussed their significance unilaterally.

3. Empirical Method on Impact of Green Credit Policies on ESG Indicators and Financial Performance Based on Fuzzy Sets

ESG is an investment philosophy and corporate evaluation standard that focuses on corporate environmental, social and governance performance rather than financial performance. Figure 1 shows the ESG composition. Through the company's ESG evaluation, investors can objectively evaluate its investment activities by observing the company's ESG performance, as well as the company's (investment object)'s contribution to promoting sustainable economic and social development and undertaking corporate social responsibility [7]. This paper conducts an empirical study on the impact of green credit policies based on fuzzy sets on ESG indicators and financial performance. This paper selects A Pharmaceutical Technology Co., Ltd. (hereinafter referred to as A company) to explore the impact of specific social responsibility behaviors of pharmaceutical manufacturing companies on corporate financial performance. It more intuitively reflects the relationship between the two, and it provides case support for ESG research on pharmaceutical manufacturing companies.



Figure 1: ESG composition

3.1 Green Credit

With the growth of environmental finance, banks, as credit intermediaries between fund suppliers and demanders, have been pushed as the main body to practice low-carbon finance. Under this macro environment and industry development trend, commercial banks' green credit business continues to expand [8].

However, the concept of green credit has not been given a clear definition, and the more popular views mainly include two levels. The first is to support and encourage green industries. Under the guidance of national environmental policies and industrial policies, financial institutions such as banks support the development of green industries by increasing their credit lines, extending their credit terms and providing lower loan interest. The second is to guide and restrict heavily polluting and energy-intensive enterprises. In response to the “two highs and one surplus” industries that are not encouraged by the state, credit institutions such as banks reduce the credit resources of this industry, shorten their credit terms, and impose punitively high borrowing rates [9]. Therefore, under the constraints of these two different main lines, commercial banks cannot only consider short-term speculation when developing green credit business. It has to consider its own sustainable development and shoulder the burden of protecting the environment and guiding the green upgrade of the industry given by the state [10].

Compared with traditional credit, green credit has its own characteristics and times. Green credit is a bank lending in response to the policies formulated by the state. In order to adapt to the new financial environment and economic environment, it promotes the development of green economy [11]. All of these measures can reasonably guide the transformation of enterprises to green

environmental protection and energy saving, so as to reduce ecological pollution and save environmental protection capital. It also attaches importance to the long-term development of the social economy, thereby forming a sustainable economic system. At the same time, in the policy guidance and the bank's green credit behavior activities, it can also help the bank's customers and consumers to form a consumption awareness and financial management awareness of green consumption. It has become an important practitioner of green finance [12].

The meaning of green credit and its industrial structure upgrading mechanism are shown in Figure 2:

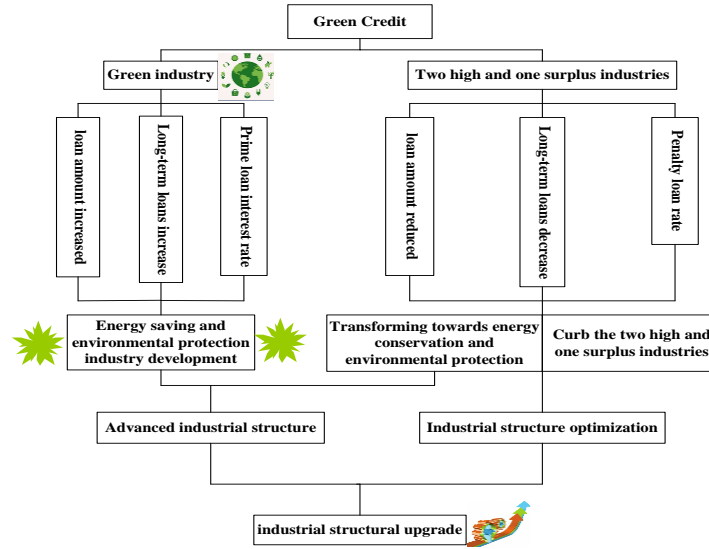


Figure 2: Mechanism of upgrading green credit industry structure

3.2 Overview of Intuitive Fuzzy Set Theory

In our daily affairs, there is often not only one or the other situation, and there may be one or the other due to uncertainty. Scientists have proposed fuzzy set theory to describe the existence of such uncertainty and define this fuzziness with mathematical expressions. Fuzzy set theory has been widely used since it was put forward, because this ambiguity is ubiquitous in our life. For example, it is difficult to use an accurate measure to describe the height, fatness and thinness of the body, the price, etc. [13]. Intuitive fuzzy sets are extensions of fuzzy sets. First of all, this paper sorts out the related concepts of intuitionistic fuzzy sets, including the definition of intuitionistic fuzzy sets and distance measures. It reviews the basic concepts of fuzzy sets, and finally introduces several membership functions commonly used in fuzzy processing [14].

(1) Relevant definitions of intuitionistic fuzzy sets

Intuitive fuzzy sets are extensions of the corresponding definitions based on fuzzy sets, and define new objects and their properties.

Let the universal set R be a non-empty finite set, $A \subseteq R$, and each intuitionistic fuzzy set can be represented by the following:

$$I = \{ \langle a, r_a(a), 1 - o_I(a) \mid a \in A \rangle \} \quad (1)$$

Among them, $r_a(a)$ and $o_I(a)$ represent the membership degree and non-membership degree of element a in A with respect to I , namely $r_a(a), o_I(a) \in [0,1]$, and satisfy the condition

$$0 \leq r_a(a) + o_I(a) \leq 1, \forall a \in A \quad (2)$$

Intuitive fuzzy sets propose a new concept $\pi(a)$:

$$\pi(a) = 1 - r_a(a) - o_I(a) \quad (3)$$

Calling $\pi(a)$ the hesitation or uncertainty of $a \in I$ indicates a lack of awareness that a belongs to I or does not belong. Obviously, for each $a \in A, 0 \leq \pi(a) \leq 1$.

For the intuitionistic fuzzy set I , defining the ambiguity of a in I as $g_i(a)$, which is expressed as:

$$g_i(a) = 1 - |c_I(a)| = 1 - |r_a(a) - o_I(a)| \quad (4)$$

Among them, in the mass distribution theory, the fuzzy set can be transformed into a series of probability distributions.

Assuming that I is a fuzzy set on the finite universe δ , the membership degree of the fuzzy set I is $\{r_1, \dots, r_p\}$, and the mass distribution function of $r_n > r_{n+1}$ and I represents the probability distribution of q_I as:

Based on the mass function, a theorem for transforming fuzzy sets into intuitionistic fuzzy sets can be proposed.

Let D be the probability distribution function on the finite universe δ , the value interval $\{d_1, \dots, d_p\}$, with $0 \leq d_{n+1} \leq d_n$ and $\sum_{n=1}^p d_n = 1$, then if D is the minimum bias distribution of the fuzzy set I , if and only if the following conditions are true:

$$q_I(F_n) = b_n - b_{n+1}, n = 1, \dots, p - 1 \quad (5)$$

$$q_I(F_p) = b_p \quad (6)$$

$$q_I(F_p) = 1 - b_2 \quad (7)$$

Among them

$$F_n = \{a \in \delta | D(a) \geq D_n\} \quad (8)$$

$$b_n = |F_n|d_n + \sum_{m=n+1}^p (|F_m| - |F_{m-1}|) d_m \quad (9)$$

The correlation calculation based on the mass distribution function and the minimum prejudice distribution function realizes the calculation from probability to intuitionistic fuzzy set, and completes the conversion from one-dimensional to three-dimensional functions [15].

(2) Intuitive fuzzy entropy theory

Entropy is a concept in the field of information theory, which is mainly used to describe the average amount of information contained in an object. Some people put forward the concept of fuzzy entropy on the basis of fuzzy set. As an extension of fuzzy set, intuitionistic fuzzy set has been studied by many scholars [16]. Several important definitions of intuitionistic fuzzy entropy will be introduced below.

Intuitive ambiguity entropy is the degree of intuition ambiguity used to describe an intuitionistic fuzzy set. The definition of intuitionistic fuzzy entropy is as follows:

If a mapping $N: IFS(A) \rightarrow [0,1]$ satisfies the following conditions, the mapping is called intuitionistic fuzzy entropy.

$N(I) = 0$ if and only if I is a distinct set.

$N(I) = Cardinal(I) = P$, if and only if every $a \in A$ has $r_I(a) = o_I(a) = 0$.

$N(I) = N(I^S)$, the intuition fuzzy entropy of an intuition fuzzy set is equal to the intuition fuzzy entropy of its complement.

For intuitionistic fuzzy sets I and J , if $I \geq J$, then $N(I) \geq N(J)$.

The formula for calculating the intuitionistic fuzzy entropy is:

$$N(I) = \sum_{n=1}^p \left(1 - (r_I(a_n) + o_I(a_n)) \right) \quad (10)$$

The intuitionistic fuzzy entropy is mainly related to the degree of hesitation, that is, the uncertainty, so this entropy value is also called "uncertainty entropy". If the intuition fuzzy entropy value is small, it means that we know little information about a, and if the intuition fuzzy entropy value is large, it means that we know a lot about a. However, the definition of intuitionistic fuzzy entropy is inconsistent with the definition of entropy of fuzzy sets.

A new axiomatic definition of intuition-fuzzy entropy is:

If a mapping $W:IFS(A) \rightarrow [0,1]$ satisfies the following conditions, the mapping is called intuitionistic fuzzy entropy.

$W(I) = 0$ if and only if I is a distinct set.

$W(I) = 1$, if and only if every $a \in A$ has a $r_I(a) = o_I(a)$.

$W(I) = W(I^S)$, the intuition fuzzy entropy of an intuition fuzzy set is equal to the intuition fuzzy entropy of its complement.

For intuitionistic fuzzy sets I and J, for any $a \in A$, when $r_j(a) \leq o_j(a)$, there are $r_I(a) \leq o_j(a)$ and $o_I(a) \geq o_j(a)$, or when $r_j(a) \geq o_j(a)$, there are $r_I(a) \geq o_j(a)$ and $o_I(a) \leq o_j(a)$, and $W(I) \leq W(J)$.

The calculation formula of the intuitionistic fuzzy entropy given by it is:

$$W(I) = \frac{1}{p} \sum_{n=1}^1 \frac{1-|r_I(a_n)-o_I(a_n)|+\pi_I(a_n)}{1+|r_I(a_n)-o_I(a_n)|+\pi_I(a_n)} \quad (11)$$

If an intuitionistic fuzzy set is a fuzzy set, it conforms to the axiomatic definition of fuzzy entropy, but the intuitionistic fuzzy entropy is mainly related to the fuzziness of the intuitionistic fuzzy set, so it is also called "fuzziness entropy".

(3) Fuzzy set theory

A fuzzy set is an extension of a deterministic set, which can be simply called a fuzzy set or a fuzzy subset. Unlike deterministic sets, the elements in a fuzzy set cannot be uniquely determined to which subset. Characteristic Function:

$$\varphi_I(a) = \begin{cases} 1 & a \in I \\ 0 & a \notin I \end{cases} \quad (12)$$

It also cannot express the membership relationship in the fuzzy set, so the fuzzy set defines the concept of membership function and expresses the fuzzy set with mathematical expressions.

Assuming that A is a domain of discourse with p elements, and there is $A = \{a_1, a_2, \dots, a_p\}$, then the definition of the fuzzy set I with a value in A is:

$$I = \{\langle a, r_I(a) | a \in A \rangle\} \quad (13)$$

r_I represents the degree of membership of I and has $r_I(a) \in [0,1]$.

It can be seen from the definition that if r_I has only two values of $\{0,1\}$, the fuzzy set at this time is transformed into a definite set.

Let I be a fuzzy set on A, and the cardinality measure Q(I) of I is defined as:

$$Q(I) = \sum_{a \in A} r_I(a) \quad (14)$$

Fuzzy sets can be represented in the following ways:

The universe of discourse $R = \{a_1, a_2, \dots, a_p\}$, I is a fuzzy set on the finite set R, and the membership function of I is $r_I(a)$.

Zadeh description method:

$$I = \frac{r_I(a_1)}{a_1} + \frac{r_I(a_2)}{a_2} + \dots + \frac{r_I(a_p)}{a_p} \quad (15)$$

Ordinal notation:

$$I = \{(a_1, r_1(a_1))(a_2, r_1(a_2)), \dots, (a_2, r_l(a_2))\} \quad (16)$$

(4) Fuzzy processing of attributes

There are two main methods of fuzzy processing of attributes. For clear attributes, the membership degree is set to 0 or 1 directly according to the semantic value; for continuous attributes, fuzzy mean clustering algorithm (FCM) is used for fuzzy processing. Among the existing algorithms related to fuzzy systems and clustering, the FCM algorithm is the most commonly used and the technology is quite mature.

It assumes the following datasets:

$$T\{u_n = u_{n,1}, \dots, u_{n,p} | n = 1, 2 \dots P\} \quad (17)$$

$u_{n,m}$ is the m th attribute K_m , the value of $m=1, 2 \dots p$ in the n th instance.

Assuming that the attribute K_m data set is A , if these data are divided into l classes, then there are l corresponding class centers as L . The membership degree of each sample n belonging to a certain class m is r_{nm} , and q is the fuzzy factor, then define an FCM objective function and its constraints as follows:

$$M = \sum_{n=1}^l \sum_{m=1}^p r_n^q(a_m) \|a_m - l_n\|^2 \quad (18)$$

$$\sum_{n=1}^l r_n(a_m) = 1 \quad (1 \leq m \leq p) \quad (19)$$

There are no special requirements for the value of q in theory. Generally, the more commonly used value range of q is $1.1 \leq q \leq 5$, and the value range of q is further limited to $1.5 \leq q \leq 2.5$ by considering the validity of clustering. $q=2$ is the most compact value and it is reasonable to take this value.

4. Experimental Results of Empirical Impact of Green Credit Policies on ESG Indicators and Financial Performance Based on Fuzzy Sets

4.1 Company A ESG Performance

A company has always actively undertaken its social responsibilities, and it attaches great importance to and actively reflects the requirements of various stakeholders. It integrates its corporate social responsibility efforts into every aspect of the business. Since 2017, the company has actively released its social responsibility report for the fourth consecutive year. It fully demonstrates the management and practical achievements of enterprises in environmental, social, corporate governance and employee relations. In addition, the company actively explores and adheres to the industrial application of green chemical technology in the pharmaceutical production process. It also protects the environment and resources in terms of processing technology, manufacturing, transportation and "three wastes" disposal through continuous innovation.

Figure 3 summarizes the ESG performance of Company A from 2018 to 2019. During the two years, the total ESG score of Company A has shown an upward trend. This is due to an upward trend in scores for the environmental, social and corporate governance dimensions. This shows that Proton shares in 2019 paid more attention to the management of the company's environment, society and governance than in 2018. It can be found by comparing the ESG score of Company A with the industry average. Its ESG scores in each dimension and the total score are lower than the industry average, indicating that the ESG performance of A Shares is moderately low among Chinese companies in the same industry. In order to further explore the ESG performance of A company, this paper analyzes the three dimensions in detail as follows.

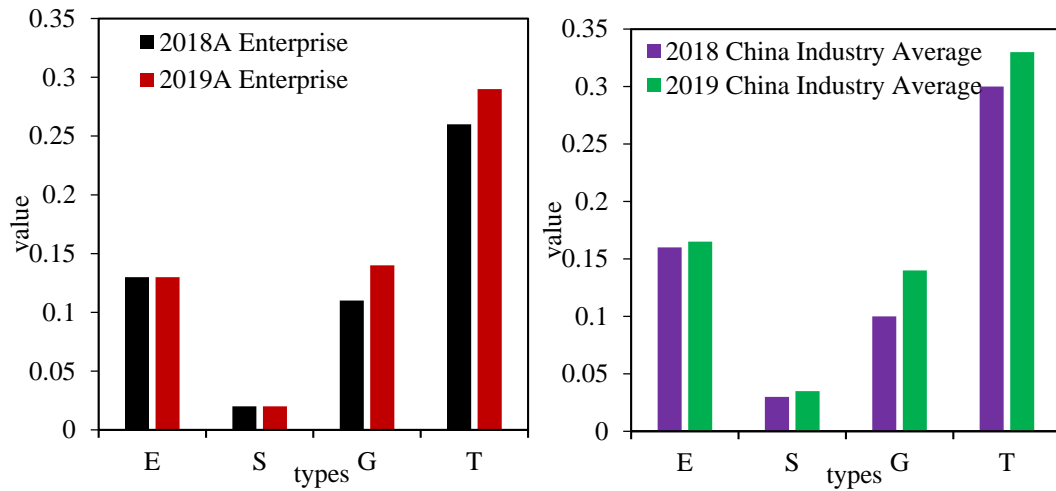


Figure 3: ESG performance of company A in 2018-2019

4.2 Specific Environmental Dimension

Changes in the secondary indicators of the environmental dimension are shown in Figure 4. Among them, A represents the cost of risk management, B represents the opportunity realization cost, C represents the frequency of climate risk monitoring, and D represents the water intensity per unit of income. E is the waste per unit of income, F is the emission target, G is the percentage change in emissions, H is the carbon emission intensity, I is the total number of emission reduction projects, and J is the carbon dioxide saved by emission reduction. The increase in the environmental dimension score was mainly due to the decrease in enterprise A's risk management expenses and opportunity realization costs in 2019. It has achieved better emissions targets, reduced carbon emissions, and effective implementation of enhanced waste management initiatives. According to the A Corporate Social Responsibility Report, the company invested 55.93 million yuan in environmental protection in 2019, an increase of 66.11% from 33.67 million yuan in 2018. The disposal volume of hazardous waste was 7,957 tons, an increase of 132.52% compared with 3,423 tons in 2018.

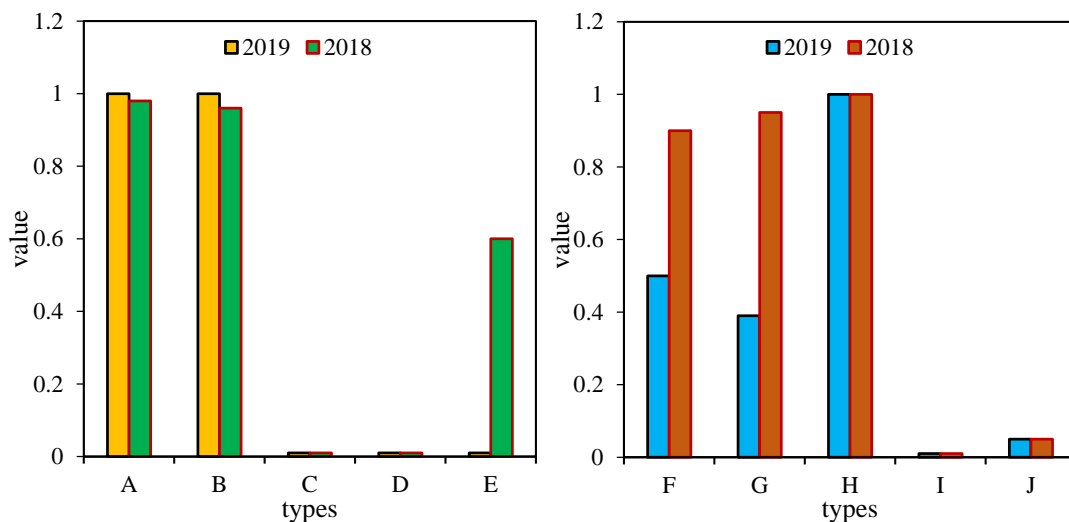


Figure 4: Changes in secondary indicators of the environmental dimension

It can be seen that from 2018 to 2019, Company A has continuously increased the management of environmental governance. By continuously improving the EHS (environment, health and safety)

system, it focuses on the management and control of environmental risks and opportunities. It reduces the cost of enterprise risk management and opportunity realization, and increases the environmental dimension score. By implementing the "source control + end-point governance" strategy, it achieved the 20% emission reduction target. It regularly discloses carbon emission information, formulates emission reduction targets and corresponding emission reduction measures to reduce emissions. It increases the score of its emission-related indicators and reduces its energy consumption, thereby increasing its environmental dimension score. Finally, through the active management of "three wastes", an environmental protection laboratory is established, which rationally disposes of waste water and waste gas, so as to reduce the waste generated by production. The score of the waste indicator per unit of income increases, which in turn increases the score of the environmental dimension.

4.3 Specific Social Dimension

The specific changes of the secondary indicators of the social dimension are shown in Figure 5, and the score of the social dimension increases.

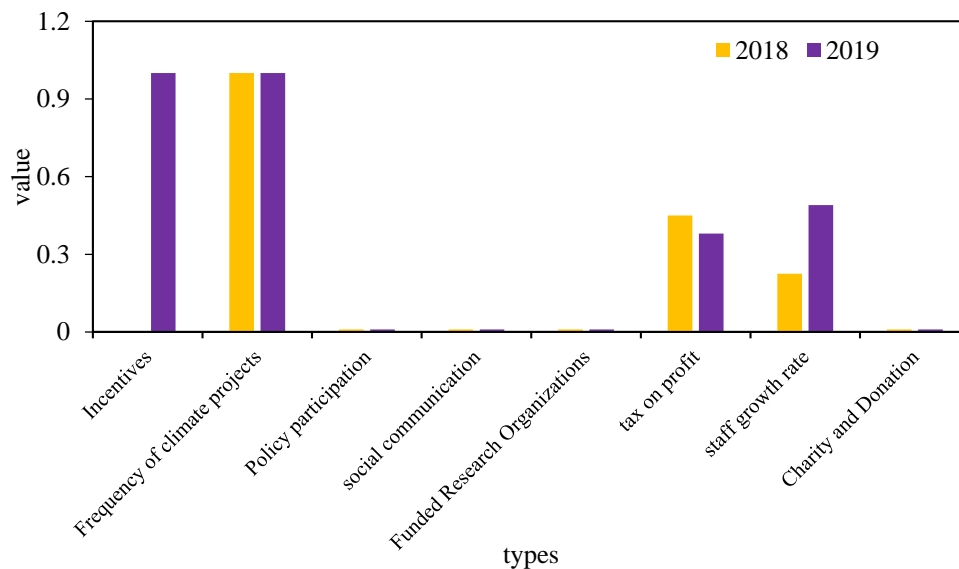


Figure 5: Changes in secondary indicators of social dimension

In order to improve the company's long-term mechanism, the company timely issued an equity incentive plan to attract and retain personnel, and encourage employees to pay attention to the company's long-term profits and development strategies. Following the restricted equity incentive plan launched in 2016, the company will continue to implement the stock option and restricted equity incentive plan in 2019. For the first time, it granted 9.762 million shares including stock options and restricted stocks to 67 senior executives and key personnel of the company. In the future, the company will continue to use a variety of equity incentive tools to provide long-term incentives to employees. In addition, companies adopt a compensation system that combines external compensation levels and ability-based compensation. It links the overall interests of the enterprise with personal interests through the individual performance operating mechanism. It ensures the heterogeneity of employees and corporate goals, so that management can make more accurate decisions. It attracts, motivates and retains talents with fair and market-competitive salaries and benefits, puts people first, and promotes the sustainable development of enterprises. At the same time, the company has also established an annual salary review mechanism based on business conditions, job value, market salary levels and employee performance. It motivates "striver" to earn

more for more work, and corresponds to the corresponding salary grade with career development. In 2019, the wages of employees of enterprises and subsidiaries were much higher than the local minimum wage standards, as shown in Figure 6.

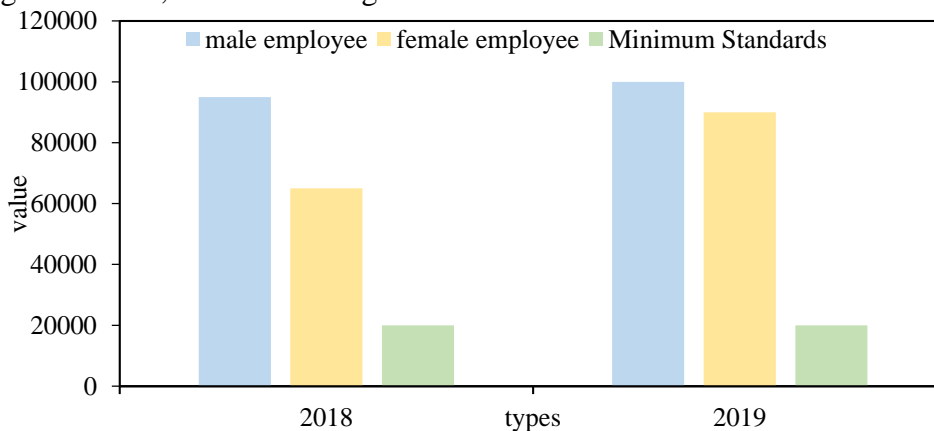


Figure 6: Average annual salary of Company A

4.4 Specific Governance Dimension

The changes in the secondary indicators of the corporate governance dimension are shown in Figure 7. The increase in the corporate governance dimension score is mainly due to the significant implementation of corporate health and wellness policies, the stable effect of employee training, and the steady increase in governance performance. In the Figure, 1 to 6 represent strategic management, board oversight of climate issues, health and wellness policies, employee training, percentage of female employees, and percentage of independent boards.

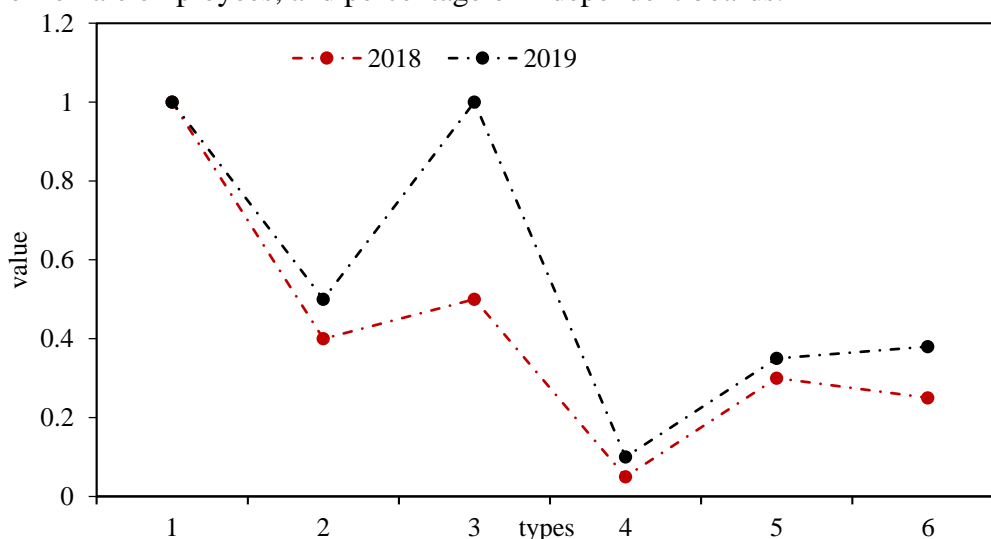


Figure 7: Changes in secondary indicators of governance dimension

In terms of health and safety health policy, the company has established a set of environmental, health and safety (EHS) management systems based on international best practices. It applies the globally accepted industrial hazard and operability study method (HAZOP) to process hazard analysis of various production processes. This paper also performs a hazard-based exposure assessment (SWIFT) for a variety of accessible chemicals. It can also reasonably determine and evaluate hazards based on on-site inspection results and statistical analysis, thereby establishing and implementing appropriate engineering protection, control and emergency measures.

In terms of employee training, the company adheres to the concept of "empowering people and developing together". It combines the needs of enterprise development, business departments and personal development to gradually establish and improve the leadership and management skills training system for managers. In order to ensure that there are continuous high-quality reserve talents at all levels of the enterprise, since 2016, it has launched a talent development project for senior, middle and grassroots cadres and school enrollment. It also forms a training system combining two-line theory and practice with the "online training platform".

In terms of governance performance, governance performance indicators all showed an upward trend. Among them, earnings per share reflect the after-tax profit created by each share, indicating that the company has created more profits. The shareholder's equity ratio is moderate, indicating that the company has guaranteed debt repayment and no excessive debt. Loans are not too risky, and corporate governance performance is good.

To sum up, the ESG performance of Company A in 2018-2019 was good, and the scores of environmental, social and governance dimensions all increased. Among them, the environmental dimension is mainly due to the reduction of enterprise risk management costs and opportunities, the better completion of emission targets, and the effective implementation of measures to strengthen the management of "three wastes". The social dimension is mainly due to the strengthening of incentives by enterprises, strengthening of product quality and safety, and the increase in employee growth rate. The governance dimension is mainly due to the significant implementation of corporate health and wellness policies, the stable effect of employee training, and the steady increase in governance performance. However, according to the secondary indicators, it can be found that the information of each dimension of the enterprise is not fully disclosed. The frequency of corporate climate risk monitoring, unit water intensity, unit income waste intensity, and the number of corporate emission reduction projects in the environmental dimension have not been disclosed accordingly. The social dimension of corporate policy participation, social communication and public welfare donations has not been disclosed, or the disclosure does not meet the standards. The governance dimension does not disclose information on board attendance. This may be the main reason why the ESG performance of Company A is lower than the industry average. Therefore, Company A needs to strengthen the integrity and accuracy of the disclosed information. While actively fulfilling its ESG responsibilities, it must also actively disclose relevant information.

4.5 Financial Performance

Regarding the measurement of corporate A's financial performance, the basis for selecting variables from empirical analysis shows that the return on total assets (ROA) can reflect the effectiveness of the company in terms of capital savings and revenue growth. It can comprehensively display the financial situation of the enterprise. Therefore, this paper selects ROA as the accounting indicator for direct measurement. Table 1 and Table 2 list the basic ROA situation of Proton from 2015 to 2019. On the whole, the ROA of enterprises showed a fluctuating trend from 2015 to 2019. Among them, ROA showed a downward trend in 2017 and 2018, which is due to the continuous promotion of strategic transformation of customer structure since 2017. It has invested a lot of capital and energy from the continuous deepening of the original business to the expansion of new business, and then to the exploration of intelligence. By 2019, the company is committed to continuously improving market attention and recognition. It communicates through the investor hotline, the Shenzhen Stock Exchange interactive platform, organizes performance briefings and online investor exchanges and other activities. It maintains active and proactive communication with investors. In addition, companies are committed to establishing diversified communication channels. It creates a good way for investors to obtain corporate information, and responds

positively to different market voices. Therefore, in 2019, the company's strategic transformation achieved remarkable results, and its performance returned to the growth track.

Table 1: 2015~2017 Company A Share Financial Performance

year	2015	2016	2017
A company shares	4.44%	5.66%	3.32%
Industry average	2.88%	3.91%	3.67%

Table 2: 2018~2019 Company A Share Financial Performance

year	2018	2019
A company shares	2.55%	4.54%
Industry average	0.29%	0.28%

Since ROA is mainly affected by net profit and total average assets, it is necessary to further determine the influencing factors of corporate A's financial performance. This paper then analyzes its net profit growth rate, total asset growth rate and main business income growth rate. The results are shown in Table 3 and Table 4. All three growth indicators for companies declined sharply in 2017. This was mainly due to fluctuations in demand for commercial products such as Johnson & Johnson Anti-Diabetes, a major corporate customer. After 2017, the growth rate of net profit and operating income of enterprises showed an upward trend. Among them, the increase in main business income was mainly due to the continuous diversification of the enterprise's customer service and business orders in terms of marketing transformation, and the widening range of services. Project channels are increasingly enriched, and business model upgrade strategies are constantly evolving. Among them, the pharmaceutical R&D contract outsourcing service organization (CRO) business achieved revenue of nearly 500 million yuan, an increase of about 66% over last year, and the proportion of total revenue increased to 32%. The pharmaceutical contract manufacturing organization (CMO) business achieved a revenue of over 1 billion yuan, an increase of about 21% over last year. The main reasons for the increase in net profit are the increase in orders and sales revenue, as well as the increase in the utilization rate of the core capacity of the company's CDMO, which in turn directly contributed to the rapid growth of the company's net profit.

Table 3: Changes in share growth of A company from 2015 to 2017

year	2015	2016	2017
Net profit growth rate	-4.93%	53.78%	-41.83%
total asset growth rate	28.27%	20.68%	-0.81%
operating income growth rate	36.71%	29.91%	-10.74

Table 4: Changes in share growth of A company from 2018 to 2019

year	2018	2019
Net profit growth rate	17.93%	61.18%
total asset growth rate	53.59%	-9.58%
operating income growth rate	7%	30.93%

Based on the above analysis, it can be found that the financial performance of company A is greatly affected by market fluctuations and customer demand, but overall the financial performance of the company is on the rise. In 2019, the six core measures of the company were carried out in sequence, and major breakthroughs were made in measures such as building a technology platform and marketing transformation, achieving the best level of operating income and net profit since listing five years ago. With the development of the low-carbon economic model, the future development of enterprises in the CDMO industry must strengthen the performance of

environmental and social responsibilities. For Company A, it is still in the critical period of transformation and upgrading, it must grasp the dynamic changes in the market in a timely manner. It accelerates change and improves efficiency to resist the risks brought by market fluctuations.

4.6 ESG Performance and Financial Performance

According to Figure 8, it can be seen that from 2018 to 2019, the ESG performance of company A was basically consistent with the change trend of financial performance, and both showed an upward trend, of which the change in corporate financial performance was larger. By combining the actual situation of the company, it can be found that in 2017, due to the impact of market fluctuations and changes in customer order demand, the performance of company A once declined. However, it quickly realized its own problems and adopted new business expansion and intelligent research measures. It allows the company's business structure to be adjusted and optimized, and it has begun to actively carry out strategic transformation. In addition, in order to alleviate the defects in operation, the company has carried out "equipment battle" and "lean production". It focuses more on the use of environmentally friendly process equipment. It makes the company's financial performance ROA in 2018-2019 show an upward trend. In addition, due to the increase in orders and the gradual optimization of the company's operation and management level, the utilization rate of the company's production capacity has increased, which has promoted the further improvement of the overall gross profit margin.

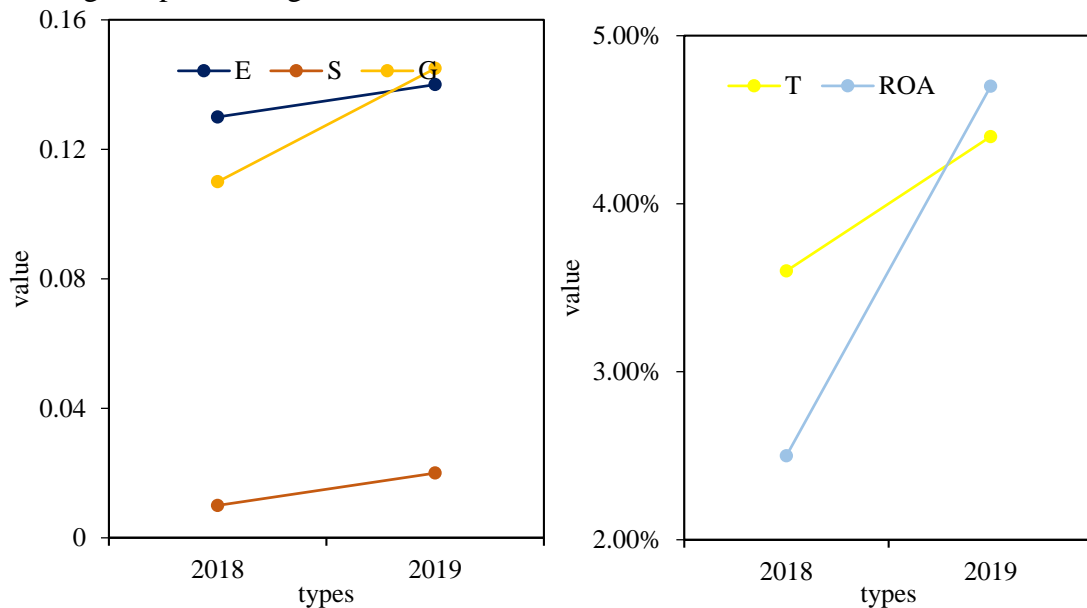


Figure 8: ESG performance and financial performance of company A shares

It can be seen that the process of upgrading equipment and improving the quality of personnel is a manifestation of the company's active fulfillment of ESG responsibilities. Through its good ESG performance, the company has improved the production efficiency of its own equipment and ensured the progress of production organization and product delivery capabilities. It improves the operational and management level and capacity utilization, which in turn improves the financial performance of the enterprise. It improves its overall performance by 30%. The introduction of green credit has raised the threshold for corporate loans. In credit activities, compliance with environmental testing standards, pollution control effects and ecological protection are important prerequisites for credit approval. However, due to the broad scope of the company's ESG performance, we have obscured it. In general, the green credit policy based on fuzzy sets has a

positive impact on Company A's ESG performance and financial performance.

5. Conclusion

The correct performance of ESG responsibilities by enterprises can effectively improve the financial performance of enterprises, thereby enhancing the market competitiveness of enterprises. When choosing ways to undertake environmental responsibilities, companies can choose the correct way to disclose ESG information, which is conducive to environmental protection and the development of the company itself, forming a win-win situation. Second, companies that choose to use ESG need to formulate reasonable policy rules according to their own circumstances. Enterprises in different countries, regions and industries need to have reasonable ESG system constraints. While ensuring the fulfillment of ESG responsibilities, enterprises should always pay attention to fulfillment costs, which should not be too high. Otherwise, if the corporate profits cannot bear the cost of ESG disclosure, the company will suffer losses, bring economic incidental to the company, cannot play a role in improving financial performance, and even have a negative impact on the financial performance of the company.

Through a specific analysis of the ESG performance of company A, this paper finds that companies have actively fulfilled their ESG responsibilities since 2017. It has made its scores in the three dimensions of environment, society and governance have increased, so that the overall ESG score of enterprises has shown an upward trend. However, as a leading company in the CDMO industry, Proton shares also have some indicators that have not been disclosed or disclosed incompletely, making its ESG score lower than the industry average. In addition, although the cost of fulfilling ESG responsibilities is generally high, in the long run, actively fulfilling ESG responsibilities can generate economic benefits. It can be seen from the specific case analysis of company A that the company's investment in environmental, social and governance (ESG) will promote technological upgrading. Enterprises can rely on scientific and technological innovation to realize the deep recovery and recycling of resources and reduce the generation of pollutants from the source. It effectively controls costs, improves employee work efficiency, and enhances social awareness. It can also reduce management costs by strengthening employee training, paying attention to employee rights and interests, attracting and retaining talents. At the same time, through continuous breakthrough exploration and technological innovation, the production efficiency and market competitiveness of A company have been greatly improved, which has promoted the increase of the company's financial performance. To sum up, the active fulfillment of ESG responsibilities by Company A can directly and positively affect the financial performance of the enterprise. It can also indirectly improve the financial performance of enterprises by promoting technological innovation of enterprises to reduce costs and improve the competitiveness of enterprises in the market.

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