

Analysis of the Impact of Enterprise Environmental, Social and Governance Performance on High-quality Development: Taking Industrial and Commercial Bank of China as an Example

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Abstract: ESG (Environmental, Social and Governance) advocates the transformation of enterprises from the pursuit of their own interests to the pursuit of social value maximization, which is highly consistent with the high-quality development goals, and is an effective starting point for enterprises to practice the new development concept and promote high-quality development. Under the “Dual Carbon” target, China has successively issued a series of measures to support the development of ESG. However, due to the short development time, the current domestic ESG standards are not unified, and the degree of improvement also needs to be improved. The mechanism of how to use ESG performance to promote high-quality development is not clear. This paper discusses the mechanism of the ESG performance on high-quality development in the three dimensions of environment, society and governance. Research shows that in the financial industry, for large financial institutions such as industrial and Commercial Bank of China, social responsibility has the highest weight of social responsibility, indicating that the performance of banks and financial institutions in the social level is much attention. The weight of environmental and corporate governance dimensions is relatively low, but still important. Financial institutions need to consider their environmental impact and sustainability while pursuing economic benefits. Corporate governance responsibility involves the internal governance structure, transparency, compliance, and risk management of the company, which are key factors in maintaining long-term stability and trust.

Keywords: ESG; High-quality Development;

Evaluation System

1. Introduction

In the context of globalization, high-quality development has become the core driving force for promoting sustainable economic and social progress. ESG concept, as a new standard to measure corporate social responsibility and sustainable development ability, advocates the transformation from the maximization of their own interests to the maximization of social value, which is highly consistent with the goal of high-quality development. Qian et al. clarified that under the background of “Dual Carbon Strategy”, ESG concept has huge space and value in the future development in China, and is an important helper to promote the construction of ecological civilization and green economy ^[1]. In recent years, the Chinese government actively response to the “Dual Carbon” goal, through a series of policies to support the development of ESG, such as SASAC to improve the quality of holding listed Enterprises work plan, put forward the 2023 governmental holding listed Enterprises ESG special report disclosed the goal of “complete coverage”, it marks the ESG is gradually become an important part of enterprise evaluation and social evaluation.

Nevertheless, the development of ESG in China is still in its infancy, faced with challenges such as inconsistent standards and ambiguous implementation mechanism. According to the survey results of “ten hot spots and ten pain points of 2023” released, there are still 70% of enterprises that do not know “what ESG is”, and 60% of enterprises have no idea about “how to do ESG”, “how to deal with ESG rating” and “how to achieve carbon peak and carbon

neutral” [2]. Academics and business has begun to pay attention to and research ESG evaluation system, mechanism and its enterprise value, financing cost, innovation performance, but the existing research focused on theory, the lack of systematic empirical analysis, especially in ESG how to promote the development of high quality path and mechanism, is still a lack of related research.

This study is based on machine learning method, build financial ESG evaluation system, through entropy method, combined with domestic enterprise ESG report and financial data, to explore the internal link between ESG performance and high quality development, through the quantitative analysis of ESG indicators and enterprise performance, market response and social influence, aims to provide empirical basis for Chinese enterprises how to optimize ESG performance to promote high quality development and strategy, in order to reveal the key role and potential obstacles, provide reference for policy makers and enterprise management.

2. Evaluation System Construction

As the core of the modern economic system, the healthy, stable, efficient and innovative development of the financial industry is crucial to promoting high-quality economic development. On the one hand, high-quality financial system can support and promote high-quality economic development; on the other hand, high-quality economic development requires the financial industry to continuously improve its quality and efficiency to better serve the real economy and social needs. Zhang and Wei show that among listed companies in the financial industry, there is a significant positive correlation between ESG and company value, and the positive impact of ESG of SOE on enterprise value is more significant [3]. Yang et al. suggested that the securities market put more emphasis on the enterprise ESG report disclosure system, promote the improvement and development of ESG investment concept, promote the better development of the financial industry, and improve the performance of enterprise ESG [4].

Based on the perspective of enterprise innovation, Li et al. studied the internal mechanism of ESG performance and its three dimensions to promote enterprise performance improvement so as to achieve high-quality

development [5]. According to the “Dual Carbon Strategy”, Zhang and Ma built the ESG “101” framework to clarify the relationship between ESG and high-quality development [6]. In the index construction of the financial industry, some scholars extracted the index of building a financial power from seven dimensions: economic foundation, sovereign currency, governmental bank, financial institutions, international financial center, financial supervision and financial talent team, to form an index system of building a financial power [7]. Some scholars have established a comprehensive evaluation index system for financial development, including financial development environment, financial development scale, depth of financial development and efficiency of financial development [8]. In this paper, on the basis of the existing research, from the environment, social, corporate governance three dimensions, build our national conditions, objective and comprehensive assessment, index forecast value stable enterprise ESG performance evaluation index system, including 19 subject indicators. For understanding and subsequent analysis, the quantitative variable definitions and units used in this paper are listed (Table 1), and the qualitative variable definitions and their corresponding symbols (Table 2). The index system includes 19 thematic indicators and 35 key indicators as shown in Table 3.

3. Research Design

3.1 Data Source

Considering the national conditions of different countries and the particularity of their industries, the focus of ESG will also vary. Therefore, this paper selects the Industrial and Commercial Bank of China Co., Ltd. with sound ESG disclosure in the financial field as the research object, and adjusts and assigns the indicators in the above ESG comprehensive evaluation system according to the characteristics of this enterprise.

3.2 Data Processing

Considering the national conditions of different countries and the particularity of their industries, the focus of ESG will also

vary. Therefore, this paper selects the financial sector of ESG disclosure sound industrial and commercial bank of China co., LTD. As the research object, according to the enterprise in 2020-2023 CSR or ESG related report, to the CSMAR, China securities network and the

company's website for the data acquisition channels, through text analysis, data extraction and manual the original data of the indicators, the ESG comprehensive evaluation system of the corresponding adjustment and empowerment.

Table 1. Variable Declaration

Key Metrics	Symbol	Units
Total carbon emissions	CER	wT CO ₂
Water consumption	AWC	wT
Electricity consumption	AEC	MWh
Natural gas consumption	OPAN	wNm ³
Green Financial Products (Industrial Loans)	GreenFin (IL)	BYuan
Green Financial Products (Bond Underwriting)	GreenFin (UB)	Pcs
The amount of overseas green bonds issued	GreenBond	BDollar
The total amount of public welfare and charity investment	CharTotal	wYuan
Social contribution per share	PERSVC	Yuan
Hours of community service	CSTime	whour
Number of activities	Act	wpcs
Number of public education thematic activities	PE	PCS
The cumulative number of annual public education activities	PEA	Freq
Employee training input	Train	Day/per
Total number of employees employed	TE	Per
Gender ratio of all employees employed	STA	%
Gender ratio of senior management hired	SSR	%
Gender ratio of middle-level and above managers hired	ESR	%
Customer satisfaction	CUSAR	%
Fixed asset turnover ratio	FAT	Freq/year
Earnings per share	EPS	Yuan
Cost-to-income ratio	CIR	%
Non-performing loan ratio	NPL	%

Table 2. Variable Declaration

Key metrics	symbol	Key metrics	symbol
Proportion of independent directors	Indep	green house gas emission	GHG
Risk management system	ERM	resource consumption	RES
Salary incentive policy	ICEP	environmental conservation	EP
Anti-corruption regime	ABAC	environment effects	EIA
Consumer rights protection mechanism	CPLmech	community investment	CCIP
Transparency of information disclosure	IDT	product liability	CPD
Environmental dimension	E	relation	LTR
Social dimension	S	Customer satisfaction	CSR
Corporate Governance Dimension	G	operation capacity	CO
Overall score	CS	finance	FD
Environmental policies and emission reduction targets	CEPGeco	credit risk	CR
Investor Relations	IR	structure	Struct
Service chain	SerChain	product service	PSP
Social responsibility	CSR	Corporate governance risks	CGRM
anticorruption	ICAC	Compensation incentive	ICE
information disclosure	IDFD	Customer complaint governance	CCRP

(1) The data in this Table 4 are compiled by Microsoft Excel according to the CSMAR and

the annual report and social Responsibility report issued by the Industrial and

Commercial Bank of China.

Table 3. Evaluation Index System of ESG

dimension	topic	Key metrics	attribute	attribute
E	GHG	CER	Quantitative	contrarian
	RES	AWC	Quantitative	contrarian
		AEC	Quantitative	contrarian
		OPAN	Quantitative	contrarian
	EP	GreenFin (IL)	Quantitative	positive
		GreenFin (UB)	Quantitative	positive
		GreenBond	Quantitative	positive
	EIA	CEPGeco	Qualitative	positive
S	CCIP	CharTotal	Quantitative	positive
		PERSVC	Quantitative	positive
		CSTime	Quantitative	positive
		Act	Quantitative	positive
	CPD	PE	Quantitative	positive
		PEA	Quantitative	positive
		Train	Quantitative	positive
	LTR	IR	Qualitative	positive
		TE	Quantitative	contrarian
		STA	Qualitative	positive
		SSR	Qualitative	positive
		ESR	Qualitative	positive
	CPD	SerChain	Qualitative	positive
	CSR	CSR	Qualitative	positive
	CUSAR	CUSAR	Quantitative	positive
		CCRP	Quantitative	contrarian
G	CO	FAT	Quantitative	positive
	FD	EPS	Quantitative	positive
		CIR	Quantitative	positive
	CR	NPL	Quantitative	contrarian
	Struct	INDrate	Qualitative	positive
	CGRM	ERM	Qualitative	positive
	ICE	ICEP	Qualitative	positive
	ICAC	ABAC	Qualitative	positive
		CPLmech	Qualitative	positive
	IDFD	IDT	Qualitative	positive

Table 4. Statistical Table of ICBC ESG Evaluation Index Information (2020-2023)

Key metrics	2023	2022	2021	2020
CER	202.98	202.13	216.26	206.36
AWC	2461.69	2553.82	3156.56	3186.44
AEC	2446767	2394577	2490746	2345794
OPAN	2884.97	2840.83	3457.72	3206
GreenFinPro(IL)	54000	39785	24806	18457
GreenFinPro(UB)	95	108	67	10
GreenBond	199	26.8	130.6	98.3
CharTotal	13535	12863	11481	25298
PERSVC	3.64	3.15	2.79	2.77
CSTime	34	18.5	21	15.37
Act	1.3	1.3	2	0.65
PE	7	6	6	5
PEA	218417	257029	186712	86441

Train	10.8	12.03	9.61	2.7
TE	419252	427587	434089	439787
STA	103.96	98.93	97.20	98.61
SSR	10	10	9.09	9.09
ESR	45.54	44.49	38.64	36.86
CUSAR	90.81	90.43	86.8	86.4
CCRP	20.49	23.84	19.95	14.1
FAT	2.93	3.28	3.43	3.4
EPS	1.02	1.01	0.98	0.89
CIR	26.96	26.05	23.97	22.3
NPL	1.36	1.38	1.42	1.58
INDRate	0.33	0.33	0.33	0.33

(2) The data in this Table 5 are collected and sorted out the news about ICBC of China Securities Network through Python technology, extracted all the text content, and used it as a data pool of negative news indicators for subsequent feature word screening. And then, by *The Gri Sustainable Development Report Standards, IFRS S1 S2, The China Corporate Social Responsibility Report Guidelines, The Social Responsibility Guidelines, The*

Environmental Social And Governance Reporting Guidelines, SASB references further build index keyword word library, and the bank annual report, the social responsibility report the information disclosure report classification collects the word frequency and form the final plus word frequency, to build the index system of the enterprise.

Table 5. Statistical Table of ICBC ESG Evaluation Index Information (2020--2023)

dimension	topic	Key metrics	2023	2022	2021	2020
E	EIA	CEPGeco	1	1	1	1
S	LTR	IR	1	1	1	1
	CPD	SerChain	1	1	1	1
	CSR	CSR	1	1	1	1
G	CGRM	ERM	1	1	1	1
	ICE	ICEP	1	1	1	1
	ICAC	ABAC	1	1	1	1
		CPLmech	1	1	1	1
	IDFD	IDT	1	1	1	1

3.3 Model Building

This paper refers to the research of Yang ^[9] and Su ^[10], and matches the enterprise data with the ESG index score. The specific calculation process is as follows:

The raw data matrix X is composed of m samples, n indicators,

$$X = \{x_{ij}\}_{m \times n} = \begin{pmatrix} x_{11} & x_{12} & \cdots & x_{1n} \\ x_{21} & x_{22} & \cdots & x_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ x_{m1} & x_{m2} & \cdots & x_{mn} \end{pmatrix} \quad (1)$$

Step 1: standardize the original data. The standardized data is a preprocessing step, whose purpose is to standardize the original data group, eliminate the dimensional difference of each index, and compress the value of each index within the [0-1] interval. So that data from different dimensions or different ranges can be compared and analyzed at the same scale.

For the forward indicator standardization:

$$Z_{ij} = \frac{x_{ij} - \min(X_{ij})}{\max(X_{ij}) - \min(X_{ij})} \quad (2)$$

For the reverse index standardization:

$$Z_{ij} = \frac{\max(X_{ij}) - x_{ij}}{\max(X_{ij}) - \min(X_{ij})} \quad (3)$$

In order to prevent the standardized 0 value from affecting the subsequent operation, all the indexes are translated, namely:

$$Z'_{ij} = Z_{ij} + 0.00001 \quad (4)$$

In Step two, calculate the entropy value. The calculation of the entropy value involves calculating the probability of each index, and then calculating the entropy value using the formula. Therefore, the value gravity of the j index and the i sample is calculated first:

$$P_{ij} = \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} \quad (5)$$

Where P_{ij} is the probability of the i th sample under the j th index.

Then calculate the entropy of j item:

$$E_j = -\frac{1}{\ln(m)} \sum_{i=1}^m P_{ij} \ln(P_{ij}) \quad (6)$$

In Step 3, calculate the coefficient of variation:

$$D_j = 1 - E_j \quad (7)$$

In Step 4, calculate the weight of the evaluation index j:

$$W = \frac{D_j}{\sum_{j=1}^n D_j} \quad (8)$$

Step five, calculate the comprehensive score. The calculation of the comprehensive score involves the calculation of each index score, and then adds all the weighted index values to get the comprehensive score. Calculate the index score first:

$$S_i = W_j \times P_{ij} \quad (9)$$

Then calculate the composite score:

$$CS_j = \sum_{j=1}^n W_j P_{ij} \quad (10)$$

Finally, it is concluded that the weight of the enterprise ESG evaluation index of ICBC from 2020 to 2023 is obtained. After testing, the sum of the weight value of each index is equal to 1, as shown in Table 6. According to the obtained weight of enterprise ESG evaluation index, the comprehensive score of ICBC enterprise ESG evaluation index from 2020 to 2023 is calculated, as shown in Table 7.

Table 6. ICBC ESG Evaluation Index Weight

Key indicators	E_j	D_j	W
CER	0.784	0.216	0.029
AWC	0.563	0.437	0.058
AEC	0.721	0.279	0.037
OPAN	0.746	0.254	0.034
GreenFinPro(IL)	0.665	0.335	0.045
GreenFinPro(UB)	0.775	0.225	0.03
GreenBond	0.746	0.254	0.034
CEPGeco	1	0	0
CharTotal	0.457	0.543	0.073
PERSVC	0.495	0.505	0.068
CSTime	0.603	0.397	0.053
Act	0.745	0.255	0.034
PE	0.75	0.25	0.033
PEA	0.776	0.224	0.03
Train	0.787	0.213	0.028
IR	1	0	0
TE	0.709	0.291	0.039
STA	0.608	0.392	0.052
SSR	0.5	0.5	0.067
ESR	0.681	0.319	0.043
SerChain	1	0	0
CSR	1	0	0
CUSAR	0.61	0.39	0.052
CCRP	0.705	0.295	0.039
FAT	0.784	0.216	0.029
EPS	0.784	0.216	0.029
CIR	0.738	0.262	0.035
NPL	0.786	0.214	0.029
INDrate	1	0	0
ERM	1	0	0
ICEP	1	0	0
ABAC	1	0	0
CPLmech	1	0	0
IDT	1	0	0

4. Analysis of the Evaluation Results

4.1 Index Weight Analysis

Among the three dimensions, the weight of

social responsibility is the largest, accounting for 0.6114, which not only reflects its social role and public expectations as a large financial institution, but also reflects investors, regulators, the public and the high

expectations of stakeholders for the performance of banks at the social level. Second for environmental responsibility 0.2673, corporate governance responsibility 0.1213, although the two weight is low, but still important, industrial and commercial bank in the pursuit of economic benefits at the same time, also need to consider its environmental impact and sustainability, corporate governance responsibility involves the company's internal governance structure, transparency, compliance and risk management, these are the key factors to maintain long-term stability and trust. This shows that the responsibility performance of

social responsibility in the financial field is more important than other dimensions. Among the 19 criteria, community investment and social relations have the largest weight, respectively 0.2273 and 0.2007, because the samples selected in this paper are Industrial and Commercial Bank of China, which carry more social expectation and public concern than other categories of industries; followed by resource consumption and environmental protection issues, accounting for 0.1297 and 0.1088 respectively, which reflects the increasing attention to the effective use of resources and environmental protection in the financial sector, especially for large banks.

Table 7. Comprehensive Score of ICBC ESG Evaluation Index

Index	2023	2022	2021	2020
CER	0.01	0.011	0	0.008
AWC	0.031	0.027	0.001	0
AEC	0.006	0.013	0	0.019
OPAN	0.013	0.015	0	0.006
GreenFinPro (IL)	0.025	0.015	0.005	0
GreenFinPro (UB)	0.011	0.012	0.007	0
GreenBond	0.017	0	0.01	0.007
CEPGeco	0	0	0	0
CharTotal	0.009	0.006	0	0.058
PERSVC	0.046	0.02	0.001	0
CSTime	0.036	0.006	0.011	0
Act	0.008	0.008	0.017	0
PE	0.017	0.008	0.008	0
PEA	0.01	0.013	0.007	0
Train	0.009	0.011	0.008	0
IR	0	0	0	0
TE	0.021	0.012	0.006	0
STA	0.036	0.009	0	0.007
SSR	0.033	0.033	0	0
ESR	0.02	0.018	0.004	0
SerChain	0	0	0	0
CSR	0	0	0	0
CUSAR	0.026	0.024	0.002	0
CCRP	0.008	0	0.009	0.023
FAT	0	0.008	0.011	0.01
EPS	0.011	0.01	0.008	0
CIR	0.016	0.013	0.006	0
NPL	0.011	0.01	0.008	0
INDRate	0	0	0	0
ERM	0	0	0	0
ICEP	0	0	0	0
ABAC	0	0	0	0
CPLmech	0	0	0	0
IDT	0	0	0	0
E	0.113	0.092	0.023	0.04

S	0.28	0.169	0.075	0.088
G	0.038	0.041	0.032	0.01
CS	0.43	0.302	0.13	0.138

4.2 Comprehensive Score Analysis

In the comprehensive score, the scores in 2020 and 2021 were low, at 0.138 and 0.13, respectively. Considering the various restrictions caused by the epidemic, the impact on the environmental and social dimensions, and it is difficult to carry out various activities, resulting in low scores. Despite its environmental and social constraints, its corporate governance scores have remained stable over the two years. This shows that companies are still able to maintain good internal management and ensure compliance when responding to the challenges posed by the outbreak. Starting from 2022, the scores of various indicators have rebounded, and the comprehensive score in 2023 is the highest at 0.43, which means that with the epidemic gradually under control, enterprises begin to return to normal operation status and pay new attention to ESG related issues.

5. Conclusion and Recommendations

Research shows that in the financial industry, for large financial institutions such as industrial and Commercial Bank of China, social responsibility has the highest weight of social responsibility, indicating that the performance of banks and financial institutions in the social level is much attention. This involves not only the relationship of banks with clients, but also the contribution to the community, support for vulnerable groups and the promotion of social justice and equality. Although environmental responsibility is underweighted than social responsibility, its importance cannot be underestimated. As the global focus on climate change and environmental issues increases, the position of environmental responsibility in the financial field is also rising, and it is necessary to continue to optimize its environmental management strategies, such as reducing resource consumption, promoting green financial products and services, and taking measures to protect the ecological environment. This helps to enhance the market competitiveness and long-term sustainability of the banks. Based on the conclusion of this study, the following suggestions are proposed:

(1) Financial institutions should take the initiative to assume their social responsibilities

and contribute to the construction of a more inclusive and fair society through community investment, fair loans, financial education and other means. For large financial institutions such as Industrial and Commercial Bank of China, they should balance economic benefits with social and environmental responsibilities when formulating strategic plans, so as to achieve the harmony and unity of the three. This means that while pursuing profit maximization, we should also pay attention to social contribution and environmental impact to ensure the long-term sustainability of corporate activities and positive social effects.

(2) Financial institutions should take actions to reduce their carbon footprint, and at the same time guide funds to sustainable development projects through green financial products and services, such as green bonds and green loans, to help environmental protection and address climate change. As an industry giant, it has the responsibility and ability to lead the ESG trend in the financial sector, and to drive the whole industry to a more responsible and sustainable direction through the demonstration role. This includes, but is not limited to, setting industry standards, participating in public policy discussions, and sharing best practices.

(3) To balance economic benefits and social responsibility, financial institutions must balance the impact on the society and the environment while pursuing economic benefits. This means that the ESG factor is taken into account in business decisions, and sustainability is integrated into strategic planning and day-to-day operations to achieve a win-win situation between economic benefits and social responsibility.

(4) Large financial institutions have the unique potential to lead the ESG practice of the industry. By accelerating institutional innovation and governance modernization, they can not only promote the sustainability of their own businesses, but also stimulate positive changes in the entire industry. The establishment of a sound stakeholder participation mechanism will further

enhance the transparency of operations and ensure that the decision-making process is inclusive of multiple voices, which will help to build a more fair and open corporate culture. This will not only inspire people in the industry to follow suit, but also improve the resilience and resilience of the entire financial system, showing a stronger resilience in the face of economic fluctuations and environmental challenges.

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