

A Study on the Impact of Corporate ESG Ratings on Employment Output from the Configurational Perspective

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Abstract: Strengthening information disclosure through Environmental, Social, and Governance (ESG) practices has been confirmed by both academia and the business world to guide companies in fulfilling their social responsibilities and promoting the prosperity of the labor market. However, previous literature lacks studies on the output pathways and efficiency of corporate ESG ratings. Therefore, this paper takes A-share listed companies in the Shanghai and Shenzhen stock markets from 2009 to 2022 as the research sample. By employing the fuzzy-set qualitative comparative analysis (fsQCA) and Data Envelopment Analysis (DEA) methods, this study verifies the employment output pathways and efficiency of ESG. The analysis focuses on how ESG ratings affect the employment output efficiency of companies in different industries and of different types. The findings indicate that corporate size, wage levels, and ESG ratings can all independently serve as core conditions for employment levels. However, the employment output efficiency of ESG ratings is significantly lower than that of corporate size and wage levels. Moreover, state-owned enterprises exhibit a higher proportion of decreasing returns to scale, with varying returns to scale observed across industries.

Keywords: ESG Ratings, Employment, fsQCA, DEA.

1. Introduction

The concept of ESG (Environmental, Social, and Governance) was first proposed by the United Nations in 2004, placing greater emphasis on environmental protection, corporate social responsibility, and social governance. Since its inception, developed countries in Europe and the United States have led the way in promoting ESG disclosure among domestic companies, establishing comprehensive ESG evaluation systems, and achieving positive outcomes [1]. As an investment philosophy and corporate evaluation standard, ESG focuses more on the comprehensive performance of companies in environmental protection, social responsibility, and governance, rather than solely on financial data. This approach serves as an effective path to reduce employment pressure and achieve sustainable development for Chinese enterprises [2].

ESG has rapidly developed worldwide and has attracted widespread attention from scholars both domestically and internationally. Relevant research mainly focuses on the impact of ESG on corporate performance or corporate value [3]. ESG ratings help alleviate financing constraints [4], enhance financial performance [5], improve corporate value [6], and accelerate the green transition, thereby achieving sustainable development [7]. However, because ESG practices may increase

corporate resource consumption, they could potentially negatively affect financial performance, leading to competitive disadvantages [8]. Currently, scholars primarily examine the impact of ESG on employment from different perspectives. However, whether the implementation of ESG strategies has accelerated employment market output efficiency has not yet been verified. Additionally, the employment output pathways of Chinese listed companies under ESG cannot be simply judged using linear models. Numerous studies focusing on linear discrimination only validate the relationship between explanatory variables and the explained variables. Therefore, building on previous research methods and findings, this study explores the employment output effects, pathways, and efficiency of ESG ratings by utilizing data from A-share listed companies in the Shanghai and Shenzhen stock markets from 2009 to 2022, employing both fuzzy-set qualitative comparative analysis (fsQCA) and Data Envelopment Analysis (DEA).

2. Theoretical Analysis

2.1. The Output Effects of ESG Ratings on Labor Force

Human resource management is a crucial aspect of ESG governance, and corporate ESG disclosure can effectively promote labor employment output. Companies with ESG advantages can optimize the structure of employment skills during their active fulfillment of social responsibilities [9], thereby enhancing employment levels [10]. Companies implementing ESG programs possess advantages such as being environmentally friendly, socially responsible, and having standardized governance, which helps attract job seekers, especially young employees, further increasing the scale of talent recruitment [11]. Companies with strong ESG performance are better able to retain employees and reduce talent turnover rates [12].

According to the theory of economies of scale, production costs decrease as production scale expands, thereby gaining cost advantages and forming specialized production [13]. Therefore, when companies reach a certain production stage, they often choose to expand their production scale to improve economic benefits, which in turn enhances employment levels. On the other hand, the endogenous growth theory indicates that the economy can achieve sustained growth through endogenous mechanisms without relying on external forces. This theory emphasizes that human capital is an important driving force for economic growth [14]. Companies with good ESG performance pay more attention to enhancing human capital and technological innovation. They attract and retain employees by establishing fairer compensation and benefits systems as well as performance incentive policies, promoting endogenous economic growth, further expanding production and operations, and thereby increasing labor demand [15].

2.2. Labor Signals Released by Corporate ESG Ratings

The signaling theory [16] posits that in a market with information asymmetry, corporate ESG disclosure can send signals of being “active ESG actors” to the market, thereby enhancing investors’ and job seekers’ confidence in the company’s sustainable development, resulting in economic benefits [17]. Compared to private enterprises, state-owned enterprises are more capable of conveying a responsible corporate image through ESG disclosure, which attracts more job seekers and further expands employment scale [18]. Additionally, the theory of financing constraints suggests that information asymmetry and transaction costs are the two main causes of financing constraints. As “quasi-governmental entities,” state-owned enterprises integrating ESG issues benefit from being perceived as sustainable development companies that bring long-term benefits to shareholders and society, thereby enhancing investor confidence and significantly alleviating financing constraints. By actively practicing ESG information disclosure, state-owned enterprises seek larger financing investments, further expanding employment scale and creating more job opportunities.

3. Methodology Selection

3.1. fsQCA

Traditional regression analysis methods focus on exploring linear relationships between independent variables, dependent variables, and mediating variables, neglecting the interactive matching effects of antecedent conditions on outcome variables. Therefore, this study employs fuzzy-set qualitative comparative analysis (fsQCA) to select appropriate antecedent conditions for measurement based on fundamental regression results, deepening the explanation of the output pathways of ESG advantages. In fsQCA, data calibration is a necessary process for assigning case memberships. This study utilizes the direct calibration method, setting the 95th percentile, 50th percentile, and 5th percentile of the explained variable, core explanatory variables, and control variables as points of complete membership, crossover, and complete non-membership, respectively. The calibration results are shown in Table 1.

Table 1: Calibration Results

variable	Obs	5%Q	50%Q	95%Q
Inemploy	36,327	5.704	7.556	9.888
ESG	36,327	2.250	4.000	5.750
size	36,327	20.362	21.952	24.648
age	36,327	1.000	9.000	25.000
wage	36,327	7.555	9.644	11.112
soe	36,327	0.000	0.000	1.000

The result variable Inemploy_{it} represents corporate employment, indicated by the logarithm of the number of employees in publicly listed company i in year t . The conditional variables include company size size , measured by the natural logarithm of total assets; company age age , measured by the difference between the current year and the year the company was established; and company wage level wage , measured by the logarithm of the ratio of employee compensation to the number of employees. The ownership type soe is coded as 1 if the company is state-owned and 0 otherwise. In addition, this study controls for firm fixed effects φ_i and year fixed effects μ_t , with ε_{it} representing the random error term.

3.2. Data Envelopment Analysis (DEA)

Data Envelopment Analysis (DEA) is a method for evaluating the efficiency of decision-making units of the same type and calculating their relative efficiency, commonly applied to input-output efficiency problems. The fuzzy-set qualitative comparative analysis (fsQCA) has computed the output pathways of ESG employment advantages in publicly listed companies; this study continues to analyze the output pathways of ESG employment advantages based on fsQCA and basic regression. Since the scale returns of ESG employment advantages in listed companies may vary, this study selects the BCC model in DEA. Under the condition of variable returns to scale, the comprehensive technical efficiency of the ESG advantages of listed companies can be divided into pure technical efficiency and scale efficiency. Each indicator's values are distributed between 0 and 1. If the comprehensive technical efficiency, pure technical efficiency, and scale return efficiency are all equal to 1, it indicates that DEA is effective and that the ESG employment output effect of the listed company is good, demonstrating full compliance with corporate social responsibility. If the comprehensive technical efficiency and scale efficiency are both less than 1 while pure technical efficiency equals 1, DEA is weakly effective, indicating that the ESG employment output of the listed company is average and

that resource allocation to solve employment issues through ESG is unreasonable. If all three efficiencies are less than 1, it indicates that the listed company has not addressed employment issues through ESG allocation and has failed to fulfill corporate social responsibility.

3.3. Data Sources

This study uses A-share listed companies from China's Shanghai and Shenzhen stock exchanges as the research sample. The data is sourced from the CSMAR database and the Wind database, covering the period from 2009 to 2022. To avoid the influence of abnormal samples, this study follows existing research practices by excluding financial industry data (due to the special nature of the asset-liability structure and regulatory policies), excluding data from listed companies at risk of delisting, discarding samples with critical variable omissions, and eliminating samples that do not comply with accounting standards.

4. Results

4.1. fsQCA Analysis Results

According to the research steps of the fuzzy-set qualitative comparative analysis (fsQCA), it is necessary to test whether there are individual conditional variables that influence the occurrence of outcomes. If the consistency of an individual condition is below 0.9, it is considered that there is no necessity condition for the occurrence of the outcome. Since total asset utilization and debt-to-asset ratio were found to be unrelated in the basic regression results, these variables were excluded from the fsQCA analysis. This study sets the sample frequency threshold at 1 and the original solution consistency threshold at 0.8.

Table 2: Necessity Analysis of ESG Employment Advantage Conditional Variables

conditional variable	Consistency	Coverage
ESG	0.632107	0.715030
~ESG	0.688417	0.632770
size	0.846609	0.830019
~size	0.507601	0.533199
age	0.722121	0.717828
~age	0.561574	0.581311
wage	0.630725	0.658683
~wage	0.699889	0.689936
tobinQ	0.652396	0.595869
~tobinQ	0.668074	0.761672
soe	0.678490	0.768097
~soe	0.756533	0.694957

Note: “~” represents “not” in logical operations.

This study employs the fsQCA 4.0 software to conduct a necessity analysis of the data, as shown in Table 2. The conditional variables for ESG employment advantages are all below the threshold of 0.9, indicating that there are no necessary conditions for the occurrence of the outcome. This suggests that the employment advantages of ESG do not rely on a single conditional variable but are the result of the combined effects of multiple conditional variables.

Table 3: Configurations Closely Related to ESG Employment Advantages

variable	The output path of ESG employment advantages			
	1	2	3	4
ESG				●
size		●		
age				
wage			●	★
tobinQ	★			
soe	★	★	★	★
consistence	0.835121	0.891743	0.815404	0.836911
Original	0.576099	0.678882	0.589403	0.456684
coverage				
Unique coverage	0.005996	0.013206	0.010939	0.013334
Coverage of				
solutions		0.735423		
Coverage of				
solutions		0.768437		

Note: ● indicates the presence of a core condition, ★ indicates the absence of a core condition, and a blank space indicates that the condition may or may not exist.

As shown in Table 3, a total of four configurations affecting the output path of ESG employment advantages were obtained through the calculations, with a consistency of 0.768437 and a coverage of 0.735423. This indicates that all related configurations have a high degree of consistency. The output of ESG employment advantages is categorized into economies of scale, talent attraction, and ESG types. Among these, enterprise size, wage levels, and ESG ratings can all serve as core conditions for employment levels.

4.2. Further DEA Analysis

Due to the relatively large sample size, this study mainly selects sample data from 2022 to compare the differences in comprehensive technical efficiency, pure technical efficiency, scale efficiency, scale effects, and DEA effectiveness between the ecological protection and environmental governance industry and the manufacturing industries of computers, communications, and other electronic equipment, as well as chemical raw materials and chemical products. Additionally, this study examines the output situation of ESG employment effects in state-owned enterprises. Furthermore, enterprise size, wage levels, and ESG ratings are used as input variables to measure the efficiency of the three output paths for employment levels based on the fsQCA analysis results.

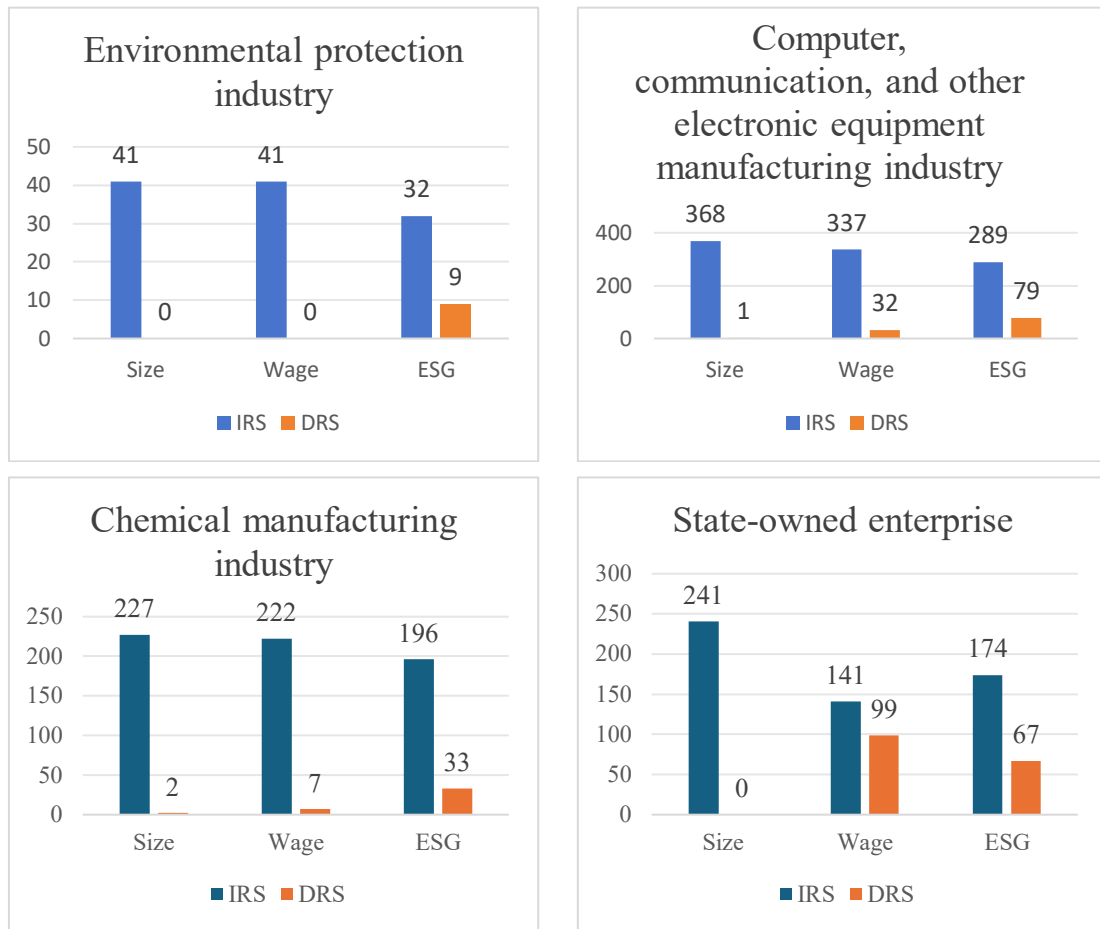


Figure 1: Changes in Scale Returns

As shown in Figure 1, IRS represents increasing returns to scale, while DRS represents decreasing returns to scale. When the ESG rating is used as the main input variable, the data identified as firms with decreasing returns to scale begin to increase in the DEA model, especially among state-owned enterprises.

5. Conclusions and Management Implications

After the COVID-19 pandemic, China's economy has been sluggish, leading to large-scale layoffs in enterprises while universities continue to expand enrollment, resulting in a high number of job seekers and prominent structural employment issues. As the largest economic entity responsible for addressing employment and livelihoods, does the social responsibility consciousness reflected in ESG ratings by enterprises have actual significance for promoting employment? This study takes A-share listed companies in China's Shanghai and Shenzhen stock markets from 2009 to 2022 as the research sample, utilizing fuzzy-set qualitative comparative analysis (fsQCA) and Data Envelopment Analysis (DEA) to evaluate the employment output effects of ESG ratings. The following key conclusions were drawn: ESG ratings help improve employment levels, but their output efficiency is relatively low, far below the economies of scale output effects. This indicates that listed companies have not effectively addressed employment issues or fulfilled their social responsibilities through ESG configuration. The implications for enterprise management and reform are as follows:

(1) Strengthen Human Resource Management. As major contributors to GDP, enterprises should actively fulfill their social responsibilities and enhance corporate governance levels [19]. Optimizing

recruitment processes and standards, establishing scientific performance evaluation mechanisms, reasonably formulating compensation and benefit policies, and motivating employees' work enthusiasm and creativity can improve employee work efficiency and satisfaction, thereby promoting corporate development and enhancing employment levels [20]. At the same time, developing innovative environmental technologies and integrating ESG into various business operations can create more ESG-related positions and improve employment rates [21].

(2) Accelerate State-Owned Enterprise Reform. Since 1978, China's state-owned enterprise reform has been moving towards marketization, diversification, and modernization. However, due to the institutional drawbacks inherent in state-owned enterprises, the reform effects over nearly 50 years have not been significant [22]. One of the major issues that must be addressed in the current state-owned enterprise reform is how to adapt to the trends of the times and keep pace with the development of China's socialist market economy. First, introduce shareholding systems. The shareholding system is one of the corporate organizational forms adopted by many developed countries. Marx once pointed out that the shareholding system is one of the production methods leading human society to a new stage of development [23]. Introducing a shareholding system in state-owned enterprises, focusing on fulfilling corporate social responsibilities, and enhancing employee compensation and benefits can effectively address issues of low efficiency and insufficient work enthusiasm. Second, introduce asset management methods to reduce the asset-liability ratio of state-owned enterprises. Influenced by the planned economy period, Chinese state-owned enterprises typically exhibit high asset-liability ratios and low asset appreciation rates. Although multiple policies have been implemented to alleviate the asset-liability pressures on state-owned enterprises, excessively high asset-liability ratios continue to hinder their development [24]. By learning from the advanced practices of developed countries, introducing professional asset management institutions or teams, and performing asset allocation and diversified investment according to enterprise needs and market conditions, maximum asset appreciation and benefits can be achieved.

(3) Improve the ESG Rating System. As a benchmark and model for developing countries globally, China should accelerate the improvement of ESG information disclosure standards, enhance the ESG indicator evaluation system, and strengthen ESG supervision of enterprises. Formulating green development policies and regulations, encouraging enterprises to practice environmental protection concepts, promoting green economic development, and actively addressing global energy shortages [25] and environmental crisis issues are crucial. Learning from the advanced experiences of developed countries, establishing employment and human rights protection policies, focusing on the working environment, physical health, and compensation of the employed population, can enhance the positive employment effects of ESG, increase employee happiness and sense of gain, and narrow income gaps [26].

The limitations of this study lie primarily in the insufficient richness of sample data, as the Huazheng Company has not disclosed specific ESG indicators and rating methods, which may overlook the impact of the rating method on research results. Additionally, analyzing data from only one rating agency may lack rigor. Currently, China's rating standards are inconsistent, the evaluation process is opaque, the evaluation indicators are subjective, and the evaluation results are distorted [27]. Future research could consider integrating data from multiple authoritative rating agencies, comparing ESG indicator details across different companies, and selecting variables that have a more significant impact on corporate employment to further explore the employment output effects of ESG ratings.

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