

An Empirical Study on the ESG Performance of Enterprises and High-Quality Development of Talents

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Abstract: The concept of ESG (Environmental, Social, and Governance) has been widely expanded worldwide. Most studies focus on the concept of sustainable development itself. However, the intersection between ESG and talent-related concepts remains an under-explored area. Such gaps hinder people's awareness of ESG and the timely implementation of relevant regulations that could improve efficiency and effectiveness. This study aims to answer the following questions: How does ESG performance influence an enterprise's high-quality talent structure? Based on the A-share listed company data from CNRDS (2010 - 2023), through regression analysis and group regression, the main findings are as follows: For average employee salary (a talent structure index), E and S scores show negative correlations (E significant, S not)—possibly because employees value working environment and social responsibility over salary. Small enterprises' average salary is more sensitive to S's negative impact and G's positive impact due to limited resources and incomplete management. For the proportion of postgraduate employees (another talent index), E and S scores show significant negative correlations, possibly because companies prioritize ability over academic credentials. Large enterprises' postgraduate proportion is more sensitive to E's negative impact due to shifted strategic priorities; S harms small enterprises' proportion but benefits large ones (resource constraints). Small enterprises' postgraduate proportion also sees a more pronounced positive effect from G (unsound management). This research offers policy recommendations to enhance city competitiveness, optimize talent structures, and promote ESG practices in enterprises, fostering high-quality development.

1. Introduction

The Environmental, Social, and Governance (ESG) concept represents a set of criteria that socially conscious investors use to select investments to identify companies with the potential for more sustainable and ethical practices, said ESG and Corporate Financial Performance Dr. Friede, Management and Sustainability professor Busch at the University of Hamburg, and Capital Markets and Management professor Bassen at the University of Hamburg [1]. Professor Du from the Institute of Economic and Social Development, Nankai University argues that the concepts of "environment," "social responsibility," and "high-quality development" advocated by the Chinese government in recent years have promoted the transformation of the urban economy to diversified goals, including industrial restructuring, innovation-driven development, and coordinated development of regions,

rather than simply pursuing GDP growth, with the Talent Power Plan, which refers to a strategic concept aimed at fostering national strength and competitiveness by developing a robust, high-quality talent pool [2].

This research aims to conduct a comprehensive and in-depth examination of “An empirical study on ESG performance of enterprises and high-quality development of urban talents.” Due to the rise of carbon dioxide emissions and global warming, the green industry has become a future trend in international economic development. Thus, ESG is capturing the attention of all enterprises and governments, and is viewed as a fundamental key to achieving environmentally friendly production. “Green transformation (GT) and environmental, social, and corporate governance (ESG) elements have become the internal driving forces of corporate modernization” [3]. Enterprises play a crucial role in the urban economy, particularly in Shanghai, Jiangsu Province, and Zhejiang Province, which are highly concentrated areas for talent development. As society attaches importance to sustainable development, the ESG performance of enterprises is increasingly regarded by job seekers as a crucial factor in choosing an employer. Firms with positive CSP (corporate social performance, similar to the social index) reputations have a competitive advantage in attracting quality job seekers, as these firms are perceived as more attractive employers due to their socially responsible practices, concluded to Greening, D. W., & Turban, D. B. [4]. A company's ability to attract and retain talent is influenced by its environmental, social, and governance (ESG) performance, particularly in terms of the number of talent and the optimization of its talent structure. Therefore, analyzing how the ESG performance of enterprises influences the structure of talent employment can help cities assess their own economic strength and development potential more accurately.

Accordingly, this research will develop an empirical study on the ESG performance of enterprises and the high-quality development of urban talents. Collection of ESG performance data of listed companies in major cities (prefecture-level cities) in Shanghai, Jiangsu Province, and Zhejiang Province, employee information of listed companies (including structural data such as education level, salary, and number of employees), and urban public data will be used in conjunction.

This study aims to examine the causal relationship and the duration and degree of its impact on the high-quality development of urban talents. This will enable city managers to propose more targeted policy suggestions and help enterprise managers understand the talent selection trends, thereby improving the talent structure and promoting high-quality development. The southeast coast of China should use this advantage to promote the improvement of enterprises in ESG and form a virtuous circle, thus enhancing the city's comprehensive competitiveness.

2. Literature review

Environmental, Social, and Governance (ESG) is an index that speculates on the potential for more sustainable and ethical practices [1]. Talents are high-performance employees, high-potential individuals, or personnel in key positions developed through the organization's management, training, and development processes [5]. The relationship between environmental, social, and governance (ESG) performance and talent attraction has become a focus, as it can drive innovations and high-technological development, particularly under the advocacy of Talent Power. Cities and countries compete globally, relying on highly skilled people to drive economic growth, innovation, and sustainability.

2.1. ESG Performance and Talent Attraction

A growing body of literature suggests that companies with strong ESG performance are more attractive to high-caliber talent. In early 2000, Greening, D. W., & Turban, D. B. indicate that firms with positive CSP (Corporate Social Performance, similar to the Social index) reputations have a

competitive advantage in attracting quality job applicants due to their socially responsible practices [4]. Recent research has shown that individuals, especially young talents, are more likely to be influenced by non-economic factors like sustainability, social responsibility, and ethical management [6]. They employed a methodology that involved surveying employees across organizations engaged in CSIs to gauge perceptions of CSIs, job satisfaction, and turnover intentions, as well as conducting interviews, which will also be included in this research paper. "The Impact of Corporate Sustainability on Organizational Processes and Performance" examines how corporate sustainability practices can influence organizational performance by enhancing talent attraction, innovation, and corporate resilience. High-quality talent attraction and competition amid market volatility rates seem to be higher for companies that value ESG (environmental, social, and governance) performance [7]. Therefore, the impact of ESG performance on talent attraction is evident and has been proven for over twenty years, making it an indisputable truth in this field.

2.2. ESG as a Catalyst for Urban Talent and City Development

The broader developmental goals of urban regions can be achieved with the help of ESG performance. By providing better working conditions and supporting community initiatives, companies can foster employee loyalty and productivity, which in turn positively impact the economic landscape of urban areas. Talent can drive the firm to make innovations, foster motivation, and facilitate long-term development [8]. In addition, enterprises with ESG performances, which means they have taken perfectly standardized actions to protect the environment, can enhance residents' living conditions and positively influence long-term development [9]. Besides, by integrating ESG concepts into urban policies and planning, cities can promote ecological protection, restoration, and revitalization of sustainable urban development [10]. As a result, from many perspectives, ESG serves as a catalyst for urban talent development in various ways.

2.3. ESG Performance affected by talents

Knowledgeable, high-quality talent makes a significant contribution to a company's ESG performance. "Strategic Talent Management: A Review and Research Agenda" reviews the core elements of strategic talent management and analyzes how high-quality talent can improve a company's competitive advantage and productivity by optimizing its resource allocation [11]. "The higher education agglomeration would improve the firm's ESG performance. This effect is more prominent in SOEs and high-tech firms" [12]. Zhang, Xu, and Lin concluded by using data collected near skill development education schools that governments should provide advanced educational and research facilities to strengthen talent cultivation and scientific innovation capabilities. Specifically, the significant positive correlation between human capital management effectiveness (rational employee allocation) and firm ESG performance suggests that talent management strategies can promote sustainable business development [13]. Thus, talent does bring positive effects, especially in terms of employee structure and economic growth.

2.4. Summary

The literature on ESG performance and urban talent development highlights a complex and interdependent interrelationship. Good ESG practices help enhance a company's reputation and attractiveness to talent, foster a sustainable urban environment, and support the development of its talent. Additionally, talents can enhance the employee structure and economic performance, including ESG performance, thereby giving companies greater potential for long-term development. With the Talent-first Strategy and ESG initiatives gradually becoming integral to urban development,

enterprises and urban areas can reap positive economic benefits. However, scholars like Friede proposed that about 30% of studies have found no or a negative correlation between ESG and financial performance [1]. Some companies may nominally improve working conditions through ESG, but the actual impact is limited and can even mask long-term problems related to labor rights, according to Dean Ahmad [14]. Therefore, the impact of ESG on the economic sector remains unresolved.

Although ESG performance often enhances a company's overall reputation and employee satisfaction, very few studies have directly linked ESG performance to talent development with empirical data. In urban settings, the importance of ESG practices in attracting, upskilling, and retaining top talent has not been sufficiently studied. There is a lack of systematic, theoretical, and empirical research on the impact of ESG on talent management and performance evaluation within enterprises, which also hinders the government's ability to improve talent-related regulations based on ESG. Most of the research focused on ESG and sustainability, such as “The New Road to Sustainability: Higher Education Agglomeration and Firm ESG Performance” and “Does ESG Performance Promote High-Quality Development of Enterprises in China? The Mediating Role of Innovation Input,” which analyze data and then conclude the results [12]. This research paper, “An empirical study on the ESG performance of enterprises and high-quality development of urban talents,” will utilize the collected data and analyze the regression line to further elucidate the fundamental relationship between ESG performance and talent development.

3. Method

3.1. Data

In this paper, ESG, E, S, and G scores are selected as independent variables. High-quality talent development is set as the dependent variable, which can be indicated and measured by the proportion of employees holding postgraduate degrees among the total number of employees. The province and industry fields are set as control variables. To evaluate enterprises' ESG performance and the high-quality development of talents, this paper analyzes data from the Chinese Research Data Services Platform (CNRDS), a comprehensive, open, and platform-based data platform for Chinese economic, financial, and business research. The CNRDS feature database keeps pace with academic hotspots and frontiers, providing feature research data that is unavailable in the market or challenging to obtain. The basic library refers to key literature in various fields and integrates the most basic data that may be used in academic research. The CNRDS database contains ESG ratings and scoring data of A-share listed companies from 2007 to 2023. Given the delays in policy development and the large amount of missing data, this research will analyze the ESG, E, S, and G scoring data of A-share listed companies from 2010 to 2023, which were calculated and collected from CNRDS after cleaning (i.e., deleting) the invalid data containing incomplete information.

3.2. Variables

The independent variables in this paper are the scores of “ESG,” “E,” “S,” and “G,” respectively, from the CNRDS database. “E” stands for environmental, “S” stands for social, and “G” stands for governance, and each of them is measured and graded by institutions of CNRDS. “E” is graded based on the performance of enterprises in dealing with climate change, resource utilization efficiency, pollution prevention, and control, measured by hard metrics including data of various types of energy consumed in the process of production and operation, carbon dioxide, methane, and other greenhouse gas emissions of enterprises; and the utilization efficiency of raw materials, water resources, and other resources under particular investment. “S” grading mainly considers the actions of enterprises in

social issues such as the protection of employees' rights and interests, product quality and safety, maintenance of community relations, and participation in public welfare undertakings, measured by indicators including the number of employees, employee turnover rate, employee training input, and employee compensation and welfare level; Fulfillment of social responsibility in the supply chain; and contribution in community development. The “G” scoring analysis evaluates corporate governance by examining shareholder rights protection, board independence, the transparency of information disclosure, the effectiveness of internal controls, and related factors. The score is calculated based on indicators such as board size, the proportion of independent directors, the diversity of professional backgrounds, ownership concentration, and the level of executive compensation, including the extent to which pay is linked to performance. The comprehensive ESG score is calculated by processing and weighting these various indicator data. The scoring framework comprises three primary indicators: environmental, social, and governance indicators.

Fourteen second-level indicators, which are mostly mentioned above, are then refined into 39 third-level indicators. Part of the tertiary indicators are dummy variables, such as whether the enterprise has a clear carbon emission target; if it does, it is recorded as 1, and if not, it is recorded as 0. Quantifiable indicators, such as energy consumption and wastewater discharge, will be scored according to the enterprise's actual data and the industry's average level. Each metric is assigned a specific weight based on its significance. Then, the weighted values of all relevant metrics are summed up to obtain the final ESG score, with a higher score signifying better ESG performance. The higher the score, the better the company's performance on ESG. It is worth considering that ESG risks and opportunities differ by industry: the weight of environmental indicators in high-polluting sectors will be increased so that the score is more in line with the actual situation of enterprises.

The dependent variable is the high-quality talents of enterprises, which is indicated by the proportion of employees holding postgraduate degrees among the total number of employees and the average salaries of employees in companies. Postgraduate education gives these employees a solid theoretical foundation, practical ability in specific fields, and a strong ability for scientific research and innovation. The proportion of employees holding postgraduate degrees in the total number of employees in enterprises reflects the attractiveness and competitiveness of enterprises to high-quality talent to some extent [15]. The average salary received by employees can reflect the scales of the enterprises and the motivation employees may have due to more resources being allocated to the salary treatment of employees, which can provide better economic return expectations and practice platforms for the research talents [16].

Control variables include provinces and industry domains, which can have a significant impact on the impact of independent variables on dependent variables. In this study, since Jiangsu, Zhejiang, and Shanghai are the key regions that promote high-quality development, and data is often scarce and incomplete, these three regions are selected as the control variables to be studied. Two dummy variables, Shanghai and Zhejiang Province, were used to judge the regional influence. The industrial sector is often another critical factor that influences research. Because of the extensive pollution of traditional manufacturing enterprises, all fields are divided into manufacturing fields (1) and non-manufacturing fields (0) to set dummy variables (Virtual industry code). Since ESG scores measure metrics based on significance, this division can be seen as the difference between businesses focusing on E scores and others. After cleaning up the invalid values, the sample size is now 10090.

Thus, models can be used to set employees' average salaries based on independent variables: the E score, the S score, the G score, the ESG score, and the dependent variables. Betas here are constant for each variance. Epsilons are error terms, considering slight errors not contained in the formula.

$$AverageSalary = \beta_0 + \beta_1 E + \beta_2 controls + \varepsilon_1$$

$$AverageSalary = \beta_3 + \beta_4 S + \beta_5 controls + \varepsilon_2$$

$$AverageSalary = \beta_6 + \beta_7 G + \beta_8 controls + \varepsilon_3$$

$$AverageSalary = \beta_9 + \beta_{10} ESG + \beta_{11} controls + \varepsilon_4$$

Similarly, models based on independent variables, such as the E score, the S score, the G score, and the ESG score, as well as dependent variables, such as the proportion of employees holding postgraduate degrees, can be established.

$$Postgraduate\ proportion = \beta_{12} + \beta_{13} E + \beta_{14} controls + \varepsilon_5$$

$$Postgraduate\ proportion = \beta_{15} + \beta_{16} S + \beta_{17} controls + \varepsilon_6$$

$$Postgraduate\ proportion = \beta_{18} + \beta_{19} G + \beta_{20} controls + \varepsilon_7$$

$$Postgraduate\ proportion = \beta_{21} + \beta_{22} ESG + \beta_{23} controls + \varepsilon_8$$

3.3. Limitation

Other factors may influence the outcome of this research; however, some factors, such as corporate culture, are more challenging to quantify than systematic ESG data. Moreover, since some data are missing, a limitation of this paper is that it focuses on the situation in Shanghai, Jiangsu Province, and Zhejiang Province, and the industry classification is rough, only divided into manufacturing and non-manufacturing industries. Research findings may be complex to generalize to other regions and more finely segmented industries, which limits the scope and value of research findings.

This study focuses more on the relationship between the significant variables rather than the overall predictive power of the model. To pursue universality, quantitative research is not as in-depth as qualitative research. Thus, although the independent variable has limited explanatory power compared to the dependent variable, it will still provide valuable insights into both academic and practical implications.

4. Result

4.1. Descriptive Statistical Analysis

Table 1 Descriptive Statistics of Variables

Variables	Number	Mean value	Standard deviation	Minimum	Maximum
ESG score	10090	25.580	10.864	0	75
E score	10090	17.373	18.797	0	93
S score	10090	23.601	11.971	0	85
G score	10090	23.140	11.474	0	90
Proportion of employees with postgraduate degrees	10090	0.031	0.525	0	0.71
The average salary payable to the staff in ten thousand yuan	10090	3.583	7.951	0	260.490

Regarding classification variables, ESG, E, S, and G scores show different value ranges and centralized trends, which can be seen from Table 1. ESG score ranges from 0 to 75, with an average

of 25.58. E score ranges from 0-93, with an average of 17.373; the S score ranges from 0 to 85, with an average of 23.601; the G score ranges from 0-90, with an average of 23.140. These scores assess companies across different dimensions, including environmental, social, and governance, and reflect the variations in company performance in various aspects.

Regarding personnel and salary variables, the "Proportion of employees with postgraduate degrees" refers to the percentage of employees holding postgraduate degrees, ranging from 0.00 to 0.71, with a low average proportion of 0.031. "The average salary payable to the staff in ten-thousand yuan" is calculated from the average salary payable to the staff in ten-thousand yuan. The valid sample size of all variables is 10090, ensuring the statistical results are representative.

4.2. Independent sample T-test

Table 2 Independent sample T-test: The average salary of employees payable in ten thousand yuan

Employee size	Number of cases	Mean value	Standard deviation	Mean standard error	F value of the Levene test for the variance equation	T
0.00: less than the average number of employees	5015	3.7262	8.694	0.123	0.983	1.797*
1.00: greater than or equal to the average number of employees	5075	3.4418	7.138	0.100		

N=10090; Significance: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

To conduct group analysis, the SPSS calculation shows that 1475 is the median number of employees among all companies collected. Through the Levene test of the variance equation in Table 2, it can be seen that the two groups divided by the number of employees (0.00 is less than the average number of employees, 1.00 is greater than or equal to the average number of employees) have no significant difference in the variance of the average salary payable to employees (10,000 yuan) ($F = 0.983$, $\text{Sig.} = 0.322 > 0.05$). Thus, the variance of the two samples is equal. Secondly, based on the above conclusions, the further T-test found that there was no significant difference in the average salary payable between the two groups ($t = 1.797$, $P = 0.072 > 0.05$) and the group of 0.00 employees (mean = 3.7262) and the group of 1.00 employees (mean = 3.4418). Therefore, it cannot be concluded that there is a significant difference between the two groups regarding the average salary payable to employees.

Table 3 Independent sample T-test: The proportion of postgraduate talents

Employee size	Number of cases	Mean value	Standard deviation	Mean standard error	F value of the Levene test for the variance equation	T
0.00: less than the average number of employees	5015	0.038	0.062	0.0009	165.903***	11.917***
1.00: greater than or equal to the average number of employees	5075	0.025	0.040	0.0006		

N=10090; Significance: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

Firstly, through the Levene test of the variance equation in Table 3, it can be seen that the two groups divided by the number of employees (0.00 is less than the average number of employees, 1.00 is greater than or equal to the average number of employees) have significant differences in the variance of the proportion of postgraduate talents ($F = 165.903$, $\text{Sig.} = 0.000 < 0.05$). This indicates that the variance of the two groups of samples is not equal. Secondly, we should refer to the T-test results of "no assumed equal variances" because the variances are not equal. There is a significant difference in the proportion of postgraduate talents between the group of staff size 0.00 (mean = 0.038) and the group of 1.00 (mean = 0.025) ($t = 11.917$, $P = 0.000 < 0.05$). Therefore, the two groups significantly differ in the proportion of postgraduate talent.

4.3. Regression Analysis

Table 4 Regression analysis of the average salary payable to the staff in ten thousand yuan

Variable	The average salary payable to the staff in ten thousand yuan				
	Model1	Model2	Model3	Model4	Model5
Constant	-333.303***	-341.170***	-352.905***	-299.425***	-328.287***
Year	0.168***	0.172***	0.178***	0.151***	0.165***
Virtual industry code	-3.049***	-3.033***	-3.126***	-2.557***	-3.060***
Zhejiang Province	-0.033	-0.034	-0.052	-0.119***	-0.033
Shanghai	1.269***	1.269***	1.236***	1.248	1.273***
E score		-0.002			
S score			-0.025***		
G score				0.053***	
ESG score					0.003
R ²	0.048	0.048	0.050	0.053	0.048
F	128.689	102.968	106.085	114.004	102.927

N=10090; Significance: * P < 0.10, ** P < 0.05, *** P < 0.01

Table 4 presents the regression analysis of the average salary payable to the staff in ten thousand yuan. From the perspective of independent variables, the coefficient of the E score is negative and insignificant in some models. The coefficient of the S score is negative and significant in some models. If E and S are high, especially S, talents may not have harsh salary requirements. They believe there will be a better working environment and a sense of social value, which in turn attracts talent, resulting in a lower average salary. The coefficient of the G score is positive and significant in some models. A well-governed enterprise exhibits characteristics of standardized management, rational decision-making, and transparent operations. These can effectively improve efficiency, achieve profitable growth, and provide more resources to raise salaries. The ESG score coefficient is positive and insignificant in some models. Good overall ESG performance can enhance corporate image and reputation, attract talent, and prompt enterprises to raise salaries. However, environmental investment is challenging in showing economic benefits in the short term, while social responsibility activities have little direct impact on wages, and different industries exhibit varying sensitivities to ESG. These factors make the relationship insignificant. At the model fitting index level, the value of R² ranges from 0.048 to 0.053, indicating that the model has a low explanatory power for the dependent variables and a limited overall interpretability. The F-value is between 102.927 and 128.689, which is immense, indicating that the model has significant explanatory power; that is, the independent variable has a particular ability to explain the dependent variable jointly.

Table 5 Regression analysis of the proportion of employees with postgraduate degrees

Variable	The proportion of employees with postgraduate degrees				
	Model1	Model2	Model3	Model4	Model5
Constant	-0.258	-1.043***	-0.353	-0.210	-0.523*
Year	0.000	0.001***	0.000	0.000	0.000**
Virtual industry code	-0.025***	-0.023***	-0.025***	-0.024***	-0.024***
Zhejiang Province	0.000	0.000	0.000	0.000	0.000
Shanghai	0.014***	0.014***	0.013***	0.013***	0.013***
E score		-0.0002***			
S score			-0.0001**		
G score				0.0001	
ESG score					-0.0002**
R ²	0.076	0.078	0.077	0.076	0.077
F	207.850	172.759	168.076	166.806	168.4110

N=10090; Significance: * P < 0.10, ** P < 0.05, *** P < 0.01

Table 5 shows the regression analysis of the proportion of employees with postgraduate degrees. In some models, the coefficient of the E score is negative and significant. Companies' increased commitment and performance to the environment has led to a change in recruitment strategies, perhaps focusing more on professional skills related to the environment rather than academic qualifications. When companies with good environmental performance attract talent, other factors, such as the work environment, are more attractive than educational qualifications. The coefficient of the S score is negative and significant. Companies may invest more in social responsibility and consider employees' practical abilities and social responsibility more important than academic qualifications. The G fraction coefficient is small and not significant. Enterprises with good corporate governance tend to pay more attention to comprehensive ability when recruiting talent; however, there is no apparent correlation between the two. The coefficient of the ESG score is negative and significant. When companies perform well in ESG, their talent needs and hiring strategies are more diverse and multifactorial. They do not rely solely on talent with postgraduate degrees. Regarding the model fitting index, the value of R^2 ranges from 0.076 to 0.078, indicating that the dependent variables are interpreted differently and that the overall interpretation ability is limited. An enormous F-value indicates that the model as a whole has significant explanatory power; that is, the independent variables collectively have a specific ability to explain the dependent variable.

4.4. Grouping regression

Table 6 The average salary payable to the staff in ten thousand yuan Impact of E score on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	-271.315***	-418.691***
Year	0.137***	0.210***
Virtual industry code	-2.892***	-3.170***
Zhejiang Province	-0.139	0.061
Shanghai City	1.792***	0.678***
E score	-0.0002	-0.004
R^2	0.042	0.059
F	45.094	64.613

N=10090; Significance: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

According to the data in Table 6, there is a significant difference between the two groups in the impact of the E score on the average salary. For enterprises with less than 1475 employees, the influence coefficient of the E score on the average wage is -0.002 (in ten thousand yuan), which is not statistically significant. For companies with 1475 employees or more, the E score has a coefficient of -0.004 (in 10,000 yuan) on the average salary, which is also not statistically significant. This result may be related to the size of the company and the availability of related resources. In general, smaller companies may rely more heavily on green practices to attract and retain talent, and are therefore more sensitive to changes in E scores. However, in the data of this study, the effect of E grade on the average salary of employees in such companies is not apparent. In contrast, larger companies may have relatively stable pay structures and systems that are less sensitive to changes in E scores, which is also reflected in the data: E scores do not significantly impact the average wages of their employees.

Table 7 shows a clear difference between the two groups in the impact of S scores on average salary. For companies with fewer than 1475 employees, the coefficient of influence of S score on the average salary is -0.041 (unit: ten thousand yuan) and reaches a statistically significant level (labeled

***, $P < 0.01$). For companies with 1475 employees or more, the influence coefficient of the S score on the average salary is -0.009 (unit: ten thousand yuan), which is not statistically significant. In the talent competition, small companies may be more susceptible to the impact of S practice and social responsibility due to limited resources and opportunities, so a change in S score can significantly affect the average salary. A large company's change in S score has no noticeable impact on its average salary, due to its scale and mature salary system.

Table 7 The average salary payable to the staff in ten thousand yuan Impact of S score on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	-303.976***	-402.965***
Year	0.154***	0.202***
Virtual industry code	-2.947***	-3.254***
Zhejiang Province	-0.143	0.053
Shanghai City	1.750***	0.665***
S score	-0.041***	-0.009
R ²	0.045	0.059
F	48.565	64.756

N=10090; Significance: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

Table 8 The average salary payable to the staff in ten thousand yuan Impact of G score on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	-236.605***	-361.460***
Year	0.119***	0.181***
Virtual industry code	-2.256***	-2.827***
Zhejiang Province	-0.274	0.020
Shanghai City	1.768***	0.651***
G score	0.073***	0.040**
R ²	0.049	0.063
F	53.514	68.283

N=10090; Significance: * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$

As can be seen from the data in the Table 8, there are differences between the two groups in the impact of the G score on average salary. For companies with fewer than 1475 employees, the coefficient of influence of G score on average salary is 0.073 (unit: 10,000 yuan), which is statistically significant. For companies with 1475 employees or more, the influence coefficient of the G score on the average salary is 0.040 (unit: 10,000 yuan), which is also statistically significant. Small companies may have a more direct and noticeable impact on employee compensation regarding G performance, such as management norms, and improving the G score can significantly affect the average salary. However, large companies are relatively mature in their governance structure and other aspects, and a change in the G score can still have a significant positive impact on the average salary, albeit with a relatively small effect.

Table 9 The proportion of employees with postgraduate degrees Impact of E scores on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	0.178	-2.216***
Year	-0.0006	0.001***
Virtual industry code	-0.034***	-0.013***
Zhejiang Province	-0.000171	0.001
Shanghai City	0.013***	0.013***
E score	-0.000150***	-0.000171***
R ²	0.096	0.068
F	108.397	74.210

N=10090; Significance: * P < 0.10, ** P < 0.05, *** P < 0.01

As shown in Table 9, there is a significant difference between the two groups in the influence of the E score on the proportion of employees with postgraduate education. For companies with fewer than 1,475 employees, the influence coefficient of the E score on the proportion of postgraduate education among employees is -0.000150, which is highly significant. For companies with 1475 or more employees, the effect of E rating on the proportion of employees with postgraduate degrees is also substantial, with a coefficient of -0.000171. In practice, large companies may have a more direct and prominent impact on the educational composition of their employees, with an increase in E scores significantly reducing the proportion of employees holding postgraduate degrees. Smaller companies may be more focused on personal development, but changes in E scores still significantly reduce the percentage of employees with postgraduate degrees, by a smaller amount.

Table 10 The proportion of employees with postgraduate degrees Impact of S score on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	0.621	-1.297***
Year	-0.000	0.001***
Virtual industry code	-0.035***	-0.014***
Zhejiang Province	-0.000	0.001
Shanghai City	0.120***	0.014***
S score	-0.0002***	0.00007
R ²	0.096	0.064
F	108.598	69.704

N=10090; Significance: * P < 0.10, ** P < 0.05, *** P < 0.01

As shown in Table 10, there are differences between the two groups in the impact of the S score on the proportion of employees with postgraduate education. For companies with fewer than 1475 employees, the coefficient of influence of S score on the proportion of employees with postgraduate degrees is -0.0002, which is relatively significant. This means a higher S score and a significantly smaller decline in the proportion of employees with postgraduate degrees in such companies. For companies with 1475 employees or more, the influence coefficient of the S score on the proportion of employees with postgraduate education is 0.00007, which is not statistically significant. The performance of small companies in S aspects, such as social responsibility practice, may have a more

direct and noticeable impact on the composition of employees' academic qualifications, and the change in S score can significantly affect the proportion of employees with postgraduate education.

Table 11 The proportion of employees with postgraduate degrees Impact of G score on different enterprise size groups

Variables	Number of employees	
	(1) Less than the median number of employees 1475	(2) Greater than or equal to the median number of employees 1475
Constant	0.912***	-1.231***
Year	-0.000***	0.001***
Virtual industry code	-0.033***	-0.013***
Zhejiang Province	-0.001	0.001
Shanghai City	0.012***	0.013***
G score	0.0023***	0.0001
R ²	0.096	0.064
F	108.336	70.514

N=10090; Significance: * P < 0.10, ** P < 0.05, *** P < 0.01

As shown in Table 11, for companies with fewer than 1475 employees, the influence coefficient of the G score on the proportion of employees with postgraduate education is 0.0023 and significant. This suggests that the increase in G score will result in a considerable and slight increase in the proportion of postgraduate degrees among employees of such companies. For companies with 1475 or more employees, the G-score has a statistically insignificant effect of 0.0001 on the percentage of employees with postgraduate degrees. Small companies may influence the composition of employees' academic qualifications in terms of G performance, such as corporate governance norms, and the improvement of G score can significantly impact the proportion of employees with postgraduate education. Large companies themselves are relatively mature in terms of governance structure, etc. The change in G score has no significant impact on the proportion of postgraduate education of their employees, and the impact on the degree is relatively small.

5. Conclusion

The excavation of “An empirical study on ESG performance of enterprises and high-quality development of urban talents” is the goal of this research. The ESG scores (E, S, and G) were selected as independent variables, and the proportion of postgraduate students in the enterprise and the average employee salary of 10,000 yuan were dependent variables. Regression analysis was carried out, and group analysis was carried out according to the scale of the enterprise. This paper utilizes and analyzes the ESG scores of A-share listed companies from 2010 to 2023 in the CNRDS database, along with their corresponding employee information.

For the first dependent variable, the average employee salary, the coefficient of E score in the model is negative and insignificant. The coefficient of the S score is negative and significant in the model. The coefficient of the G score is positive and significant in some models. The ESG score coefficient is positive and insignificant in some models. In the statistical data, the adverse effect of the E score on the average wage of enterprises is not apparent, and there is no significant difference in size or scale. The average salary of small enterprises is more sensitive to the adverse effect of the S score. Average wages in small businesses also have a more direct positive impact on G scores.

For the second dependent variable, the proportion of postgraduates among employees, the coefficient of E score is negative and significant in the model. The coefficient of the S score is negative and significant in the model. The G score coefficient is small and not significant. The

coefficient of the ESG score is negative and significant in the model. The proportion of postgraduate students in large enterprises is more sensitive to the negative influence of the E score. The S score harms the proportion of postgraduate students in small enterprises but has a positive effect on the proportion of postgraduate students in large enterprises. The positive effect of the G score on the proportion of postgraduate students in small enterprises is more prominent.

This study has enriched the theoretical research on the relationship between ESG scores and urban talent indicators, revealing the differentiated impact of scores on talent in three dimensions. It provides data for urban development and corporate staffing. It provides a better reference for investors to fully consider the impact of ESG factors when evaluating enterprise value. Different ESG dimensions have different influences on talent structure. Small enterprises can optimize their governance structure to enhance their wage competitiveness. Big companies can amplify the appeal of social responsibility to highly educated talent by disclosing their talent development plans.

Future research could examine dynamic tracking, specifically analyzing ESG factors in relation to talent changes from a long-term perspective, with a focus on the impact of specific periods. This approach would involve comparing trends from 2010 to 2015 and 2015 to 2020, with a more precise classification of industries tailored to research purposes. Additional influencing factors can be identified, and qualitative results may be obtained through the analysis of numerous quantitative studies. Expanding urban boundaries beyond the southeast coast of China and comparing coastal areas with inland areas can generate broader fitness. It is also possible to take an international perspective and conduct statistical comparisons between countries to obtain more general results.

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