Development Economics of China
2025, VOL. 9, NO. 8, 26-32
DOI: 10.47297/wspdecWSP2515-797305.20250908

Research on ESG Rating Divergence and Firm Performance

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ABSTRACT
Along with society's emphasis on green development ESG rating arises at the historic moment, ESG rating can react in a certain extent, the green development of the enterprise, help enterprise green economic development, but in practice, ESG rating also have some differences, brought actual ESG rating activity. The factors that cause the divergence of ESG rating include the differences between different institutions, and affect the performance of enterprises from different aspects. Previous literature has also proved that it is important to understand the relationship between ESG rating divergence and enterprise performance, which is conducive to the balance between green development and economic benefits.

KEYWORDS
ESG rating; ESG rating divergence; Enterprise performance

1 Introduction

1.1 Research Background

In the context of trade globalization, export is a key factor driving China's economic growth, while ESG (environmental, social and governance) rating has become an important standard to measure the credit quality and sustainability of enterprises, providing new opportunities for the international development of enterprises. At the same time, China's green development strategy has also boosted the wide application of ESG rating, and more and more enterprises have begun to improve ESG rating standards. However, different rating agencies for the same company ESG rating differences, lead to investors and other stakeholders is hard to get effective information, and international trade protectionism, such as carbon tariffs, ESG new rules such as make more serious challenges facing China's export trade. In addition, the differences in ESG ratings are mainly caused by the differences in rating standards (such as the scope of indicators, measurement methods, etc.), the differences in attribute sets of different rating agencies, and the social and cultural background.

1.2 Theoretical significance

Research on ESG rating divergence and enterprise performance is conducive to in-depth understanding of ESG rating divergence caused by different factors, and exploring the role of factors such as the quality of enterprise information disclosure in the impact of ESG rating divergence on enterprises. For example: the quality of information disclosure by information asymmetry, unscramble the channel such as space, readability, standard fitment effect ESG rating differences. Low-quality disclosure exacerbates divergence due to insufficient information, while high-quality disclosure may also amplify divergence due to differences in interpretation if there is no unified standard. The methodological differences of rating agencies affect ESG rating differences through scope differences, measurement differences, weight differences and other factors. In addition, the differences in data collection sources (such as MSCI relying on self-reported data, while China Securities focusing more on government regulatory information) and data processing technologies (such as missing values processing and standardized methods) further amplify the rating divergence. These factors together lead to the phenomenon of "same company, different ratings". Clarifying the role of these factors is conducive to building a strategic framework of "rating difference management" for enterprises. Through selective disclosure, third-party certification, investor communication and other means, the divergence can be transformed into an opportunity to enhance organizational resilience, and finally realize the paradigm upgrade from compliance response to value creation.

It is beneficial to explore the impact of ESG rating divergence on enterprise performance caused by different reasons, and explore the impact of different degrees of ESG rating divergence on enterprises. The reasons for different ESG rating disagreements vary, such as: Different rating agencies have significant differences in the scope of ESG evaluation (such as environmental, social and governance issues covered), measurement methods (how to quantify the same concept) and weight allocation (the importance of each dimension). Among them, measurement differences and scope differences are the main driving factors, while weight differences have relatively little impact; Information disclosure: non-standard ESG information disclosure (such as vague or scattered disclosure) increases the interpretation difference of rating agencies, leading to rating divergence, while high level of information disclosure may aggravate the divergence; Influenced by enterprise characteristics, enterprises with large scale, complex business or lack of credit rating usually have higher ESG rating divergence; The lack of unified standards and theories, and the lack of common theoretical basis and comparability among rating agencies lead to inconsistent rating results. These divergent ESG ratings caused by different reasons will have different impacts on enterprise performance, which needs to be further studied.

Research on ESG rating divergence and corporate performance can understand the impact of the relationship between ESG rating divergence and corporate performance on corporate financing and corporate green innovation. The impact of ESG rating divergence on corporate performance and green innovation behavior is mainly transmitted through three mechanisms: financing constraints, human capital quality and R&D investment, and ultimately affects corporate financing capacity and green innovation capacity. ESG rating divergence may lead to the aggravation of financing constraints. Due to the signal failure, rating divergence makes it difficult for investors and banks to judge the true ESG level of enterprises, resulting in the decline of trust in the capital market, the reduction of green credit, and the increase of financing difficulty. Many empirical results also show that the greater the ESG rating divergence is, the more serious the corporate financing constraints are, especially in the high rating divergence group. The impact of ESG rating divergence on corporate green innovation is twofold. On the one hand, ESG rating divergence may lead to financial constraints, which further leads to the reduction of green R&D investment. Also can cause brain drain, ESG rating differences to cause a decline in confidence in employees, and lead to lower quality of human capital; Some studies also show that ESG rating disagreement will lead to information asymmetry and make enterprises reduce their investment in green technology. On the other hand, ESG rating divergence will also have a forcing effect on corporate performance: ESG rating divergence may cause the market and investors to question the green innovation of enterprises, thus prompting enterprises to respond with green innovation as a "strategic signal" under pressure; Within the enterprise, ESG rating disagreement will also damage the performance of senior executives. In this case, the management will repair the reputation through green innovation and relieve the pressure of performance. Therefore, the impact of ESG rating divergence on corporate financing and green innovation needs to be analyzed more carefully according to the specific situation.

1.3 Practical Significance

It can promote the improvement of ESG rating methods, such as unifying the dimensions of ESG rating, unifying different rating agencies, and increasing the degree of information disclosure. Driving ESG rating method improvement need to systematically work at multiple levels. First of all, a unified core indicator system covering the three dimensions of environment, society and governance should be formulated through collaboration between an interdisciplinary expert committee and global regulators. Key issues such as carbon emission intensity, labor rights in supply chains and board independence should be detailed into quantifiable, verifiable and horizontally comparable indicators, and differentiated weights should be set for the industry. To avoid the distortion caused by "one-size-fits-all". Secondly, it is necessary to establish a rating agency governance alliance with the participation of stock exchanges, central banks, China Securities Regulatory Commission and other parties. It is mandatory for mainstream rating agencies to disclose their methodology, data sources and update frequency, and accept third-party audits regularly. At the same time, it is necessary to introduce a dynamic competition mechanism, link the rating quality with market access and research funding, and gradually eliminate the institutions with opaque models and excessive differences in results. Finally, legislation should be adopted to require listed companies to disclose ESG original data in the form of digital reports, and blockchain storage technology should be adopted to ensure that the information cannot be tamper with. An open source data platform should be developed simultaneously to allow investors, academia and media to call the underlying data for re-analysis in real time, thus forming a closed loop of "disclosure-verifications" and forcing enterprises to improve the granularity and authenticity of data.

For example, understanding the impact of ESG rating disagreement and enterprise performance on enterprises is conducive to enterprise financing, enterprise operation and enterprise green innovation. In-depth analysis of the dynamic relationship between ESG rating disagreement and enterprise performance can inject multiple momentum into the development of enterprises. When the management systematically sorts out the different conclusions given by different rating agencies, it can accurately identify the blind areas of the market's perception of its own environmental, social and governance practices, and then optimize the carbon emission management, improve the employee welfare system, and strengthen the independence of the board of directors. Such targeted improvement not only directly improves the operation efficiency of enterprises, but also significantly reduces the financing cost. Because banks and bond investors generally regard ESG performance with similar ratings and continuous rise as a signal of risk decline, they are willing to offer more favorable interest rates and longer maturities. At the same time, the information disclosure gap reflected by the rating divergence encourages enterprises to establish a more transparent and traceable digital ESG data system, which, once coupled with the research and development process, can inspire innovation in green product design, low-carbon process innovation, circular economy model exploration and other aspects. A virtuous cycle of "data disclosed-performance improvement-green innovation-capital favor" can be formed, which can win a sustainable first-move advantage for enterprises in the fierce competition.

2 Research content

2.1 Existence and characteristics of ESG rating disagreement

Existing studies have generally confirmed the widespread existence of ESG rating disagreement. Through a systematic literature review, Xiao Hongjun and Ding Fengru (2024) pointed out that ESG rating divergence is mainly manifested in three forms: ESG comprehensive rating divergence of a single enterprise, ESG dimensions (E, S, G) rating divergence, and rating differences between industries. The comparative study of 14 famous ESG rating agencies at home and abroad by Wang and Zhang (2024) further revealed that the differences in index system, weight allocation and data sources of rating agencies are the technical reasons for the rating divergence. From the perspective of time, Peng Shuai (2024), based on the research of A-share listed companies from 2014 to 2022, found that as the number of subjects participating in ESG rating increased, the rating divergence phenomenon showed an increasing trend. It is particularly noteworthy that industry-specific information disclosure policies have a moderating effect on rating divergence. The empirical study of Wang et al. (2024) shows that industry-specific information disclosure can significantly inhibit ESG rating divergence, especially in the "G" (governance) dimension and heavy polluting enterprises.

2.2 Research on the impact of ESG rating divergence on enterprise performance

2.2.1 Impact on corporate financial performance

ESG practices reshape the logic of corporate value creation from non-financial dimensions and profoundly reshape the underlying logic of corporate value creation. It breaks through the previous single perspective of measuring corporate value only by financial data such as revenue and profit, and integrates the impact of enterprises on the ecological environment, the fulfillment of responsibilities to stakeholders (employees, communities, consumers, etc.), as well as the standardization and transparency of internal governance structure into the core framework of value creation. It promotes enterprises to upgrade their value model from short-term profit orientation to long-term sustainable development orientation. The direct evidence of Zheng (2024) shows that ESG information disclosure improves corporate performance by promoting investment in technological innovation. ESG information disclosure is not a simple "compliance cost" or "image project", but can alleviate financial constraints by reducing information asymmetry between enterprises, external investors and creditors. At the same time, ESG information disclosure can send a positive signal to the market that enterprises pay attention to long-term risk management and control and sustainable development, so as to effectively promote enterprises' innovation investment in technology research and development, process innovation and other fields. This kind of technological innovation investment driven by ESG information disclosure is further transformed into the enterprise's product competitiveness, production efficiency and market share expansion, and finally has a significant positive impact on enterprise performance (such as profitability and market value). Moreover, this effect has obvious enterprise heterogeneity characteristics: for state-owned enterprises, their natural attributes in resource acquisition, policy response and social responsibility make it easier for ESG information disclosure to gain market trust, and the implementation efficiency of technological innovation investment is higher; However, high-tech enterprises themselves take technological innovation as the core driving force for development, and the financing convenience and market reputation advantages brought by ESG information disclosure can more accurately match the capital needs of their R&D investment and the market transformation needs of innovation achievements. Therefore, the effect of ESG information disclosure on improving performance by promoting technological innovation is more prominent in the two types of enterprises.

2.2.2 Double-edged sword effect of ESG rating divergence

The impact of ESG rating disagreement on enterprise performance is contradictory. On the one hand, Wang et al. (2024) found that divergence will aggravate financial constraints, and ESG rating divergence will aggravate the uncertainty of market information environment. Due to the lack of a unified "benchmark", external investors, creditors and other stakeholders are difficult to accurately judge the real ESG performance of enterprises, which may increase the risk premium requirements for enterprises out of risk aversion, or doubt the sustainable development ability of enterprises, thus tightening credit conditions, raising the financing threshold, and ultimately aggravating the financing constraints of enterprises. The negative effect it is more serious in non-state enterprises, compared with stronger resource acquisition ability, information transparency by tighter policy constraints of state-owned enterprises, the non-state-owned enterprises itself in financing market bargaining power is weak, ESG rating differences of information chaos "avoid objects" are more likely to make it a market, further enlarge the financing predicament; On the other hand, Chen et al. (2024) confirmed that ESG rating divergence can reduce the cost of debt by forcing the improvement of information disclosure and green innovation. When the rating results of different agencies are significantly different, in order to eliminate market misunderstanding and prove the authenticity and effectiveness of their ESG practices to the outside world, enterprises will tend to take the initiative to improve the quality of ESG information disclosure, such as adding more detailed details of ESG practices, increasing quantitative data disclosure, and improving the timeliness and transparency of disclosure. At the same time, rating divergence may also force enterprises to invest more resources in substantive ESG actions such as green technology research and development and environmental protection project implementation, so as to consolidate the "hard power" of ESG performance by improving green innovation capability. These positive changes forced by disagreements can send signals to creditors that enterprises' risk control ability is improved and their long-term development stability is enhanced, thus helping enterprises reduce debt financing costs and forming positive support for enterprise performance. This contradiction implies that ESG divergence may have a threshold effect -- moderate divergence generates incentives, while excessive divergence leads to market failure. When the divergence is within the "moderate" range, it can break the "path dependence" of enterprises in ESG practice, stimulate enterprises to take the initiative to improve information disclosure and increase the motivation of green innovation through external pressure. At this time, the divergence plays the role of "incentive and constraint", and ultimately has an indirect positive impact on enterprise performance. However, when the divergence exceeds a certain "threshold" and enters a state of "excess", the market will fall into serious information confusion -- the large difference in the results of different ratings will lead to the failure of stakeholders to form a basic consensus on the ESG performance of enterprises and the loss of basis for risk judgment, which will further lead to market failures such as hesitant investment decisions and credit contraction. At this time, the negative impact brought by divergence will dominate and cause damage to enterprise performance. The existence of this threshold effect also provides an analytical perspective with more explanatory power to understand the complex impact of ESG rating disagreement.

2.3 Impact on corporate financing costs

As the concept of global sustainable development is deeply integrated into the capital market, ESG (environmental, social and governance) rating has become an important reference indicator for investors to evaluate the long-term value and risk of enterprises. However, due to the significant differences between different rating agencies in index system construction, data source selection, weight assignment logic and other aspects, the same enterprise will often obtain different or even contradictory ESG rating results. The impact of this phenomenon of "ESG rating divergence" on corporate financing activities is attracting extensive attention from the academic and practical circles. The impact of ESG rating divergence on corporate financing activities has been verified from multiple research perspectives. In the research published in 2024, Wang Ren et al. took Chinese A-share listed companies from 2015 to 2022 as the research sample and systematically examined the relationship between ESG rating divergence and corporate financing constraints through empirical analysis. The research results show that ESG rating divergence will significantly aggravate the degree of financing constraints faced by enterprises. When the ESG rating results of a certain enterprise in the market show large differences, both financial institutions in the debt financing market and investors in the equity financing market will increase their risk assessment of the enterprise due to the increase of information asymmetry. As a result, they will take a more cautious attitude in credit approval, interest rate pricing, investment decision-making and other links, which will eventually lead to the increase of financing difficulty and financing cost. Further analysis from the perspective of enterprise heterogeneity shows that this impact has obvious differentiation characteristics: compared with state-owned enterprises, non-state-owned enterprises are more strongly affected by ESG rating divergence. This is mainly because state-owned enterprises usually have stronger policy endorsement and credit foundation, and investors have a relatively high risk tolerance for them, while private enterprises rely more on market evaluation for credit qualification, and the information confusion caused by rating divergence will further weaken their financing bargaining power. At the same time, enterprises not held by ESG funds are also more susceptible to the negative impact of rating divergence. As professional institutions focusing on sustainable investment, ESG funds' shareholding behavior itself has a "signal transmission" effect, which can release positive signals of enterprises' ESG performance to the market and offset the information noise caused by rating divergence to a certain extent. However, for enterprises lacking the support of this signal, the market doubts caused by rating divergence are difficult to be alleviated, and the financing constraints are more prominent. In the analysis of the transmission channel of the influence mechanism, the study further reveals that ESG rating divergence mainly acts on corporate financing activities through three paths: first, it damages corporate reputation. Inconsistent rating results may cause the market to question the authenticity and effectiveness of ESG practices, and weaken the credibility of enterprises in the stakeholder group. The second is to weaken investor confidence. In the face of ambiguous and conflicting ESG rating information, it is difficult for investors to accurately judge the sustainable development ability and potential risks (such as environmental violation risks, social responsibility disputes, etc.) of the enterprise. For the consideration of avoiding uncertain risks, they will reduce the capital investment or require higher risk compensation for the enterprise, resulting in the narrowing of corporate financing channels. The third is to induce the suspicion of "greenwashing". When there are differences in the ESG ratings of enterprises, some market participants may suspect that enterprises conduct "greenwashing" through selective disclosure, data beautification and other ways to cover up their real ESG risks. This suspicion will trigger the focus and scrutiny of regulators and investors, increase the financing frictional cost of enterprises, and ultimately intensify financing constraints [6].

However, Chen et al. (2024) put forward different opinions from the perspective of debt financing cost. Taking listed companies in a specific range as research samples, they found through empirical tests that ESG rating divergence does not simply exacerbate the financing pressure of enterprises, but in some situations, such divergence may form an "external pressure" on enterprises, forcing enterprises to take positive countermeasures: On the one hand, in order to alleviate the evaluation differences caused by information asymmetry, enterprises will take the initiative to optimize ESG information disclosure strategies, and send clearer and more reliable ESG practice signals to the market by increasing the details of disclosure content, improving the verifiability of data, and standardizing the form of disclosure. On the other hand, in order to fundamentally improve their ESG performance and reduce rating disputes, enterprises will increase investment in green innovation, such as research and development of environmental protection technology, development of low-carbon products, and promotion of green transformation of production processes, so as to enhance core ESG competitiveness. The improvement of ESG information disclosure quality and green innovation level can effectively reduce creditors' concerns about sustainable business risks. The improvement of information disclosure quality can reduce the information gap between creditors and enterprises, and reduce the cost of information search and the difficulty of risk assessment in credit decision-making. The enhancement of green innovation capability means that enterprises have more advantages in coping with environmental protection policy regulation and adapting to the trend of green development, and have higher long-term business stability. In the end, these positive changes will be reflected in the debt financing market, which is reflected in the lower pricing of credit interest rates for enterprises by financial institutions, thus reducing the cost of debt financing for enterprises and forming a "self-help effect" triggered by rating divergence. Further heterogeneity analysis shows that this "self-rescue effect" has obvious situational dependence: first, it is more prominent in high-pollution industries. Enterprises in high-pollution industries are faced with stricter environmental policy constraints and higher environmental risks, and their ESG performance (especially the environmental dimension) is concerned by the market. In order to avoid this concern translating into a sharp rise in financing costs, enterprises in high-pollution industries have stronger motivation to take the initiative to resolve rating disagreements by improving the quality of ESG information disclosure and the level of green innovation, so as to prove their risk management and control ability and transformation determination to creditors, so the "self-rescue effect" is more significant. Secondly, the self-rescue effect is more significant in regions with poor financial ecological environment. Regions with poor financial ecological environment usually have problems such as low information transparency, insufficient credit market competition, imperfect institutional constraints, etc. Creditors face higher information risk and transaction cost in credit decision-making, and are more sensitive to the risk signals of enterprises. When enterprises in these regions are faced with ESG rating divergence, in order to break the financing disadvantage caused by poor information environment, enterprises will be more active to improve ESG performance to send positive signals to creditors, so as to enhance their credit attractiveness, so that the "self-help effect" can be more fully reflected in such regions [7]. This controversial finding suggests that the economic consequences of ESG rating divergence may be conditional, and future research needs to examine the boundary conditions in more detail.

2.4 Impact on enterprise innovation performance

Most studies have found that ESG rating divergence has an inhibitory effect on corporate innovation, especially green innovation. The empirical study by Huang et al. (2024), based on the 2009-2022 data, shows that the rating divergence significantly inhibits corporate innovation activities through the channels of increasing financing constraints, increasing operational risks and reducing external supervision, and this "crisis effect" is more obvious in the enterprises with poor information quality and non-high-tech enterprises.

Similarly, Li and Ye (2024), Zhen and Wenxiang (2024) verified the negative impact of ESG rating divergence on green innovation efficiency and green innovation, respectively. Liu Jianguo and Li Xinyang (2024), on the other hand, focused on the sustainability of green technology innovation and found that rating divergence harms the long-term sustainability of innovation by exacerbating management myopia and financing constraints.

It is worth noting that Dong et al. (2024) proposed different action mechanisms. Their study found that under certain conditions (such as high media attention and good digital foundation), ESG rating divergence may promote corporate green innovation through a "forced mechanism", which provides a new perspective for understanding the complex impact of rating divergence.

2.5 Impact on audit and operation

The impact of ESG rating disagreements has gone beyond investment and financing to corporate operations and external supervision. In 2024, Ge Shilong and other scholars focused on the key link of external supervision -- audit behavior, revealing the internal correlation between ESG rating disagreement and audit opinion, providing a new empirical basis for understanding its cross-field impact. Based on A sample of A-share listed companies, this study finds that ESG rating disagreement significantly increases the probability of auditors issuing non-standard audit opinions. Non-standard audit opinion usually means that the auditor believes that the company's financial statements are subject to the risk of material misstatement or its ability to continue as a going concern is uncertain. It is an important way for the auditor to signal the company's risk to the market. The core mechanism why ESG rating disagreement affects the type of audit opinion is that it intensifies the risk level of the enterprise through multiple paths, and then increases the risk perception and audit adjustment tendency of the auditor. First, it intensifies the operational risk. Inconsistent ESG ratings may reflect ambiguous areas or potential defects in environmental compliance, social responsibility fulfillment or corporate governance structure. If these problems are not solved in time, they may lead to a chain reaction such as policy punishment, supply chain disruption and consumer boycott, which directly threatens the normal production and operation order of enterprises and leads to increased fluctuations in business performance. Second, it magnifies reputational risks. ESG rating divergence can easily lead to market doubts about the authenticity of ESG practices of enterprises. Whether it is negative media coverage, distrust of stakeholders, or negative evaluation from the public, it will damage the reputation capital accumulated by enterprises over the long term. However, reputation damage will not only affect the brand value of enterprises, but also indirectly lead to customer loss, partner withdrawal and other problems, which further aggravate the business uncertainty of enterprises. The third is to enhance the risk of accounting information. ESG rating divergence often stems from inadequate, non-standard or inconsistent ESG information disclosure of enterprises, and such defects in information disclosure may extend to the field of financial accounting -- if enterprises have problems such as selective disclosure and data beautification in ESG information disclosure, auditors may be more alert to the authenticity and integrity of their financial statement information. If the enterprise has the potential risk of accounting information fraud or misstatement, the auditor may be more alert to the authenticity and integrity of the financial statements. It is worth noting that the study also finds a key moderating factor that can weaken the above negative impact -- auditors' ESG industry expertise. Auditors with ESG industry expertise typically have greater ESG domain expertise, a more mature ESG risk assessment framework, and a deeper understanding of sector-specific ESG practice standards and regulatory requirements. In the face of ESG rating divergence, such auditors can more accurately identify the source of divergence (whether it is due to the difference in rating agencies' indicators, or the enterprise's own ESG practices or information disclosure), and more objectively assess the actual risk level behind the divergence, rather than simply amplifying the risk perception due to the existence of divergence. At the same time, they can also carry out targeted verification of ESG-related risks through more effective audit procedures, so as to reduce the risk misjudgment caused by information asymmetry or lack of professional ability, and finally alleviate the positive impact of ESG rating disagreement on the probability of issuing non-standard audit opinions to a certain extent. To build a more effective risk communication bridge between enterprises and the market.

2.6 Supply chain spillover effect of ESG rating divergence

In the research on the cross-subject impact of ESG rating disagreement, supply chain, as the core network of the association between enterprises, has become an important effect transmission field. In their innovative research in 2024, Zhao Yunhui et al. extended the research perspective from the enterprise itself to the upstream of the supply chain for the first time, revealing the negative spillover effect of ESG rating disagreement at the supplier level on the focus enterprise (namely, the core procurement enterprise in the supply chain), which is specifically manifested as significantly reducing the operational resilience of the focus enterprise -- that is, when the enterprise is faced with internal and external shocks, The ability to maintain normal operation and quickly restore stability. Based on the empirical analysis of the data of supply-chain related enterprises, this study finds that when the main suppliers of the focal enterprise face large ESG rating divergence, the uncertainty caused by such divergence will be transmitted to the focal enterprise through three key channels, thus weakening its operational resilience. First, it will increase the negative publicity of the focal enterprise. Supplier of ESG rating differences easy to cause the media and the public on the reality of the ESG practice questions, and focus on enterprise as depth binding partners and suppliers, may be involved in related public opinion because of "correlation effect" discussion, even be labeled as "supply chain ESG risk-sharing" label, negative public opinion, their exposure to rise. Negative publicity will not only damage the brand reputation of the focus enterprise, but also lead to chain reactions such as consumer boycott and regulatory attention, which will interfere with the normal operation rhythm. Second, it will aggravate the difficulty of obtaining funds for the focal enterprises. Divergent ESG ratings of suppliers may cause them to face problems such as intensified financing constraints and reduced operational stability, thus affecting their supply capacity to the focus enterprises (such as failure to purchase raw materials and organize production on time due to tight capital chain). In order to maintain the continuity of the supply chain, the focal enterprise may need to prepay for goods in advance, increase inventory reserve or find alternative suppliers, which will occupy a large amount of working capital of the enterprise and lead to the increase of its own capital turnover pressure. At the same time, when evaluating the credit risk of the focal enterprise, financial institutions may also take the ESG risk of its suppliers into consideration, raise the threshold of credit approval, and further aggravate the difficulty of obtaining funds for the focal enterprise. Third, it will lead to the overall instability of the supply chain. Divergent ESG ratings reflect potential risks in suppliers' environmental compliance, fulfillment of social responsibilities or governance structures, which may lead to production disruptions (such as being ordered to stop production due to environmental violations) and reduced performance capabilities (such as insufficient capacity due to labor disputes). As a key link in the supply chain, the instability of suppliers will directly lead to the delay of raw material supply, the fluctuation of procurement cost, and even the stagnation of production plan of the focus enterprise, which will seriously weaken the anti-risk ability of the supply chain, and then reduce the operational resilience of the focus enterprise. However, the study also finds that two characteristics of the focal enterprise can effectively mitigate the negative spillover effect: first, high supply network centrality. High supply network centrality means that the focal firm is in the core position in the supply chain network, and has more supplier choices and stronger bargaining power. When some suppliers have risks due to ESG rating differences, the focal enterprise can quickly switch to other cooperative suppliers to reduce the dependence on a single high-risk supplier, thus reducing the possibility of supply chain disruption and buffering the impact of negative effects on its own operation resilience. Second, a large market share. Focal enterprises with large market shares usually have stronger brand influence and market voice. On the one hand, their stable market demand and profitability can provide suppliers with more reliable cooperation expectations, and to a certain extent alleviate the operating pressure faced by suppliers due to ESG rating disagreements; On the other hand, their strong market position also gives them more resource advantages (such as sufficient capital reserves and mature emergency management system) in dealing with supply chain fluctuations, which can more effectively resolve the operational impact brought by supplier risk transmission and maintain the stability of their own operations.

3 Conclusions

The conclusions of the study are as follows. Firstly, ESG rating divergence has universal and multi-dimensional characteristics, which is reflected not only in the comprehensive score difference of individual enterprises, but also in the three dimensions of environment, society and governance and the difference between industries. The root cause of ESG rating divergence is the difference in index system, weight and data source, and it is aggravated with the increase of rating subjects. Second, the impact of ESG rating divergence on enterprise performance shows a double-edged effect. Disagreement aggravates financial constraints by damaging reputation, weakening investor confidence and inducing suspicion of greenwashing, which is especially unfavorable for non-state-owned enterprises, enterprises not held by ESG funds and those with poor information quality. However, in the context of high-pollution industries, areas with weak financial ecology, high media attention and good digital foundation, divergence can force information disclosure optimization and green innovation, reduce debt costs and improve performance, suggesting that moderate divergence leads to incentives, and excessive divergence leads to failure. Third, the differences of innovation performance is given priority to with inhibition, as by financing constraints, the management risk and external supervision weakening hinder the green innovation, and damage its sustainability, crisis effect in the information quality is poor, high and new technology enterprise more prominent; Under certain conditions, media attention and the level of digitalization can stimulate green innovation through a forced mechanism. Fourth, the negative effect of disagreement has been extended to audit and supply chain, which is reflected by the increased probability of auditors issuing non-standard opinions, and the mitigation effect of auditors' ESG expertise. Supplier divided by negative reports, capital availability and supply chain management unstable weaken focus toughness, and supply network centricity and market share can weaken the spillover effect.

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