

Study on the Impact of Corporate ESG Performance on OFDI Behavior

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Abstract. Against the background of the accelerated internationalization process of enterprises and the extensive penetration of ESG (Environmental, Social and Governance) concepts, this paper empirically examines the impact of ESG performance on enterprises' outward foreign direct investment (OFDI) behaviors and the mechanism of its action based on the panel data of Chinese enterprises in the period of 2009-2021. The results show that corporate ESG performance has a significant positive relationship with OFDI size, with OFDI size (natural logarithm) increasing by about 2.004 units on average for every 1-unit increase in ESG level, and that this positive effect is still robust after controlling for year fixed effects (coefficient 1.299, $p < 0.05$). Mechanism tests show that ESG performance indirectly promotes OFDI by alleviating financing constraints (KZ index): a 1-unit increase in ESG level is associated with a 1.117-unit decrease in the financing constraints index ($p < 0.01$), whereas for every 1-unit decrease in financing constraints, OFDI size increases by 0.155 units ($p < 0.01$), validating a partial mediating effect of financing constraints. In addition, firm size (positive), gearing ratio (negative) and management shareholding (short-term positive and long-term negative) are the key control factors affecting OFDI. The findings provide empirical support for firms to promote their internationalization strategies by enhancing ESG performance and alleviating financing constraints, and also provide a theoretical basis for policy makers to improve ESG guidance mechanisms to promote the high-quality development of corporate OFDI.

Keywords: ESG performance, OFDI size, financing constraints, mediating effect

1. Introduction

With the deepening of global economic integration and the concept of sustainable development, the correlation between enterprises' outward foreign direct investment (OFDI) and their environmental, social and corporate governance (ESG) performance has become a hot topic of concern in both academia and practice. OFDI is not only an important way for enterprises to acquire resources in the international market and to enhance their competitiveness, but also a key embodiment of the globalization of the national economy. However, enterprises face challenges such as resource constraints, financing difficulties and information asymmetry in the process of internationalization, while ESG performance, as a comprehensive indicator of enterprises' sustainable development, may affect their OFDI behavior through signaling, resource accumulation and financial optimization. As

one of the major sources of global OFDI, China's enterprises' practices in the ESG field have received increasing attention, but how ESG drives OFDI behavior and whether there is an intermediary mechanism are still issues that need to be explored.

Existing studies have shown that ESG performance is closely related to firms' financial performance [1], investment decisions [2], and internationalization strategies [3]. However, empirical studies addressing the direct impact of ESG on OFDI are more limited, especially in the context of Chinese firms, and there is a lack of theoretical frameworks and mediation mechanism studies that systematically analyze the relationship between ESG and OFDI. Based on Chinese firms' data from 2009-2021, this paper uses benchmark regression, fixed-effects modeling and three-step mediation effect analysis to verify the positive impact of ESG performance on OFDI and to explore the mediating role of financing constraints (proxied by the KZ index) in it. The findings show that ESG performance significantly promotes OFDI and partly realizes the indirect effect through alleviating financing constraints.

2. Literature review

ESG, as a comprehensive measure of corporate environmental responsibility, social impact and corporate governance, has become an important part of global corporate strategy. With investors and stakeholders focusing on sustainable development, ESG performance not only affects a firm's market reputation and ability to raise capital, but may also shape its internationalization strategy [4]. OFDI, as an important means for firms to enter the international market and acquire technology and resources, is affected by a combination of firms' internal resources, the external environment, and policy factors [5]. In the Chinese context, driven by the "Belt and Road" initiative and green development policies, the scale of OFDI has been growing rapidly, but it faces high financing constraints and information asymmetry, and ESG performance may enhance its OFDI capacity by improving corporate reputation, optimizing resource allocation, and lowering financing costs.

Although existing studies have revealed the positive effect of ESG on OFDI, the following limitations still exist: first, most studies on OFDI focus on scale or decision-making, and the differential impact of entry modes (e.g., greenfield investment and cross-border M&A) is not sufficiently explored; second, the independent role of ESG dimensions (E, S, and G) has not yet been fully verified in the analysis of the mechanism; and third, the sample coverage focuses on A-share listed companies, with fewer studies on non-listed companies and investments along the "Belt and Road" route. Third, the sample coverage focuses on A-share listed companies, and there are fewer studies on non-listed companies and investments along the "Belt and Road". In the future, we can further expand the scope of research, combine micro enterprise data with host country institutional characteristics, and deeply explore the dynamic mechanism and regional heterogeneity of ESG influencing OFDI.

2.1. ESG and corporate behavior

The impact of ESG performance on corporate behavior has been a hot topic of research in recent years. Friede et al. found through meta-analysis that ESG performance is positively related to corporate financial performance, especially in the environmental and social dimensions [2]. Eccles et al. showed that firms focusing on ESG perform better in terms of long term investment returns and risk management [1]. In addition, ESG also influences firms' investment decisions. Bénabou & Tirole indicate that ESG performance supports firm expansion by attracting socially responsible investment (SRI) that reduces financing costs [3]. However, existing studies have mainly focused on

the relationship between ESG and domestic investment or financial performance, and their role in the context of internationalization has been under-explored.

2.2. Factors affecting OFDI

Research on the drivers of OFDI is relatively mature, covering firm characteristics, market environment and policy factors. Dunning's OLI paradigm emphasizes that firm ownership advantages, location advantages and internalization advantages are the core drivers of OFDI [5]. Financial characteristics such as firm size (size), leverage (lev) and profitability (roa) significantly influence OFDI decisions [6]. In addition, the degree of marketization (mh) and growth opportunities (growth) also play an important role in OFDI [7]. In traditional studies, the factors influencing OFDI behavior can be divided into macro and micro levels: macro factors include the host country's institutional environment, market size, and bilateral relations, etc.; and micro factors focus on firm productivity, financing constraints, and internationalization experience. For example, Melitz's trade theory of heterogeneous firms indicates that high-productivity firms are more inclined to carry out internationalization activities [8], while Buch et al. find that financing constraints significantly inhibit firms' OFDI decisions [9].

In recent years, scholars have begun to focus on non-financial factors such as corporate social responsibility (CSR) and ESG performance. Existing studies generally agree that ESG performance is a new type of advantage for enterprises to participate in international competition, and has a significant role in promoting OFDI. On the one hand, ESG reduces the "outsider disadvantage" by enhancing the international image and legitimacy of enterprise [10]; on the other hand, ESG advantages can help enterprises meet the host country's sustainable development requirements and break through trade barriers [11]. Specific to the choice of OFDI entry mode, a study has found through the cross-border M&A data of China's A-share listed companies from 2010-2021, using Probit regression: the higher the ESG level of the enterprise, the more it tends to choose the joint venture mode to enter the host country's market.

2.3. Study on financing constraints

The analysis of mediating mechanism helps to reveal the intrinsic path of the relationship between ESG and OFDI. financing constraints have received widespread attention as key constraints on firms' investment decisions. The KZ index developed by Kaplan & Zingales has been widely used to measure financing constraints [12], and studies have shown that financing constraints significantly inhibit firms from investing [13]. Cheng et al. (2014) found that good ESG performance mitigates financing constraints by attracting external financing and optimizing cash flow management [10]. Firms with good ESG performance are more likely to obtain low-cost financing due to higher information transparency and lower risk [14]. Qiu Muyuan et al. point out that ESG can alleviate corporate capital pressure by reducing the cost of equity and debt financing [15], thus providing financial support for OFDI. Combined with the OFDI context, ESG may indirectly promote corporate overseas investment by lowering the KZ index, but this mechanism has not been fully verified.

In summary, existing studies provide important inspiration for this paper, but there are the following shortcomings: first, there are fewer studies on the direct relationship between ESG and OFDI, especially the lack of empirical evidence based on Chinese firms; second, the theoretical framework of ESG's impact on OFDI has not yet integrated signaling theory, resource base theory, and financial constraint theory; and third, the role of financing constraints as a mediating mechanism

has not been fully explored. This paper aims to fill the above research gaps by systematically verifying the impact of ESG on OFDI and its path based on Chinese firms' data from 2009-2021, using benchmark regression and three-step mediation effect analysis.

Based on the theoretical analysis and literature review, the following research hypotheses are proposed:

H1: Corporate ESG performance has a significant positive impact on OFDI

According to signaling theory, good ESG performance signals "high-quality enterprise" to investors and overseas stakeholders, reduces information asymmetry, and enhances corporate reputation and financing availability; resource-based theory suggests that ESG performance as intangible resources (e.g., brand value, social capital) enhances the international competitiveness of enterprises. Therefore, the better the ESG performance, the larger the OFDI scale of the enterprise.

H2: financing constraints (KZ index) play a partial mediating role in the ESG-OFDI relationship

The theory of financing constraints states that ESG performance mitigates financing constraints by optimizing cash flows and reducing financing costs (i.e., lowering the KZ index). Combined with the high capital demand characteristics of OFDI, ESG-performing firms alleviate financing constraints through some of the above paths, while the alleviation of financing constraints releases OFDI potential, and ESG may play an indirect role through this path. Therefore, the positive impact of ESG on OFDI is partly realized by reducing the KZ index.

3. Models and data

This paper verifies the direct impact of ESG on OFDI and the mediating role of financing constraints by constructing a benchmark regression, fixed effects model, and three-step mediation model. The following is a detailed description of the model and data.

3.1. Variable definitions and data conditions

Table 1. Definition and description of variables

Variable type	variable symbol	Variable Definition
explanatory variable	ln_ofdi	Natural logarithm of firm OFDI size (take absolute values and add 1 to take the natural logarithm to avoid the effect of a value of 0)
Core explanatory variables	esg	Corporate ESG Composite Score
intermediary variable	kz	KZ index (measure of financing constraints)
	size	Firm size (natural logarithm of total assets)
	lev	Gearing ratio (total liabilities/total assets)
	roa	Return on total assets (net profit/total assets)
control variable	growth	Growth rate of operating income ((operating income for the current period - operating income for the previous period)/operating income for the previous period)
	mh	marketability

The sample of this paper covers China's A-share listed companies and some unlisted companies (total 2,827 companies) from 2009 to 2021, and the data sources are as follows: ESG scores are

taken from CSI's ESG rating database; data on OFDI scale are taken from the notes of "Overseas Investment" in the annual reports of the enterprises and the "Statistical Bulletin of China's Outward Foreign Direct Investment" of MOFCOM; financial data are mainly taken from CSMAR database and Wind database; data on marketization degree are taken from the "China Marketization Index - Relative Process of Marketization by Region 2021 Report" compiled by Fan Gang et al. Statistical Bulletin of China's Outward Foreign Direct Investment; financial data are mainly from CSMAR and Wind databases; data on the degree of marketization are adopted from the "China Marketization Index - Report on the Relative Progress of Marketization in Various Regions 2021" compiled by Fan Gang et al. To ensure data quality, the study excludes ST/PT enterprises and samples with missing key variables, and finally obtains 14,442 valid observations. The distribution of the sample covers major OFDI industries such as manufacturing, information technology, energy, etc., which is well represented.

3.2. Benchmark regression model

To test the direct impact of ESG on OFDI, a benchmark model is constructed:

$$\ln_ofdi_{it} = \alpha_0 + \alpha_1 esg_{it} + \sum \beta X_{it} + \mu_{it}$$

where $\ln_ofdi_{it}$ is the natural logarithm of OFDI size of firm i in year t (explanatory variable); esg_{it} is the ESG performance score of firm i in year t (core explanatory variable); X_{it} is the set of control variables, including: firm size (size, natural logarithm of total assets), gearing ratio (lev), return on total assets (roa), growth rate of operating income (growth), and degree of marketization (mh); α_0 is the intercept term, α_1 , β are the coefficients to be estimated, and μ_{it} is the random error term.

3.3. Fixed effects model

To control for year fixed effects (e.g., unobservables in the time dimension such as macroeconomic policies, industry cycles, etc.), year dummy variables are added to the benchmark model:

$$\ln_ofdi_{it} = \alpha_0 + \alpha_1 esg_{it} + \sum \beta X_{it} + \sum \gamma Year_t + \mu_{it}$$

where $Year_t$ is a year dummy variable (2010-2021) and the rest of the variables are defined as in the baseline model.

3.4. Mediating effects model

According to the mediation effect test of Wen Zhonglin et al.^[16], the mediating role of financing constraints (KZ index) is verified and the model is constructed in three steps:

Step 1: Test the total effect of ESG on OFDI (i.e., the baseline model);

$$\ln_ofdi_{it} = \alpha_0 + \alpha_1 esg_{it} + \sum \beta X_{it} + \mu_{it}$$

Step 2: Test the effect of ESG on the mediating variable (KZ index);

$$kz_{it} = \theta_0 + \theta_1 esg_{it} + \sum \delta X_{it} + v_{it}$$

Step 3: Test the joint effect of ESG and mediating variables (KZ) on OFDI;

$$\ln_ofdi_{it} = \phi_0 + \phi_1 esg_{it} + \phi_2 kz_{it} + \sum \lambda X_{it} + \omega_{it}$$

4. Empirical results

4.1. Descriptive analysis

Table 2 reports the descriptive statistics of the main variables. The explanatory variable is the natural logarithm of OFDI ($\ln_ofdi$), which has a mean of 10.413, a standard deviation of 2.352, a minimum value of -1.139, and a maximum value of 21.599, indicating that there is a significant difference in the size of OFDI among the sample firms. The mean value of the core explanatory variable ESG performance (esg) is 0.734, with a standard deviation of 0.053, indicating that the ESG level of the sample firms is higher overall but still has some differentiation. As for the control variables, the mean value of firm size ($size$) is 22.374, the mean value of gearing ratio (lev) is 0.428, the mean value of return on total assets (roa) is 0.046, the mean value of growth rate of operating income ($growth$) is 0.356, the mean value of management shareholding ratio (mh) is 10.957, and the mean value of financing constraint index (KZ) is 1.209. The extreme values and quantile values of each variable are reasonably distributed, and there are no obvious outliers, indicating that the sample data are well represented.

Table 2. Descriptive statistics of the main variables

Variables	Obs	Mean	Std. Dev.	Min	Max.	p1	p99	Skew.	Kurt.
$\ln_ofdi$	14442	10.413	2.352	-1.139	21.599	3.03	14.628	-.877	4.364
esg	14524	.734	.053	.416	.929	.581	.845	-.543	4.2
$size$	14524	22.374	1.379	17.82	28.64	19.97	26.43	.847	4.027
lev	14524	.428	.22	.008	6.348	.053	.888	1.928	42.183
roa	14524	.046	.073	-.858	2.933	-.157	.227	4.107	198.404
$growth$	14524	.356	5.279	-.978	429.036	-.529	2.62	52.801	3569.985
mh	14524	10.957	18.665	0	89.99	0	67.587	1.654	4.568
kz	14241	1.209	2.175	-10.723	14.968	-4.9	6.11	-.343	4.57

4.2. Benchmark regression

Table 3 (benchmark regression) reports the results of the base regression of firms' ESG performance on OFDI behavior. The regression model has $\ln_ofdi$ as the explanatory variable and esg as the core explanatory variable, controlling for $size$, lev , roa , $growth$ and mh . The coefficient of core explanatory variable esg is 2.004 ($p < 0.01$) and is significantly positive at 1% significance level,

indicating that the better the ESG performance of the enterprise, the larger the size of OFDI, which preliminarily verifies the positive facilitating effect of ESG performance on the OFDI behavior of the enterprise. Among the control variables, the coefficient of size is 0.794 ($p < 0.01$), which is significantly positive, indicating that the larger the size of the enterprise, the more capable it is to carry out OFDI; the coefficient of lev is -3.598 ($p < 0.01$), which is significantly negative, indicating that high indebtedness inhibits the OFDI behavior of the enterprise; the coefficient of mh (the proportion of management shares) is 0.009 ($p < 0.01$), which is significant at the significance level, indicating that the better ESG performance of the enterprise, the larger the OFDI scale. ($p < 0.01$), which is significantly positive, indicating that higher management shareholding may enhance OFDI willingness through interest binding. The coefficients of roa (return on total assets) and growth (growth rate of operating income) are not significant, probably due to the fact that the influence of corporate profitability and short-term growth on OFDI is interfered more by other factors (e.g., industry characteristics, investment cycle).

Table 3. Benchmark regression results

VARIABLES	ln_ofdi
esg	2.004*** (0.353)
size	0.794*** (0.016)
lev	-3.598*** (0.102)
roa	0.076 (0.263)
growth	0.004 (0.003)
mh	0.009*** (0.001)
Constant	-7.400*** (0.359)
Observations	14,442
R-squared	0.192

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.3. Fixed effects (year) regression analysis

To control for the effect of time trend on OFDI behavior, Table 4 (Fixed Effects Regression) further adds year fixed effects and is re-regressed using a panel data fixed effects model (FE). The coefficient of the core explanatory variable esg is 1.299 ($p < 0.05$), which is still significantly positive and consistent with the findings of the benchmark regression, indicating that the positive impact of ESG performance on OFDI still holds after controlling for the time effect. Among the control variables, the coefficient of size is 0.6287 ($p < 0.01$), still significantly positive; the

coefficient of lev is -1.9637 ($p < 0.01$), significantly negative, consistent with the direction of the benchmark regression but with a decrease in the absolute value of the coefficient, probably due to the fact that the time fixed effect partially absorbs the impact of macroeconomic fluctuations on liabilities; and the coefficient of mh is -0.0134 ($p < 0.01$), opposite to the direction of the benchmark regression, probably because in the long run, too high a proportion of management ownership may lead to risk aversion and inhibit OFDI expansion.

The coefficients of the year dummy variables (e.g., 2012-2021) are all significantly positive, and rise and then fall over time (reaching a peak of 1.2321 in 2016), reflecting the rapid growth trend of China's corporate OFDI after 2012 and the phased adjustment after 2017, which is in line with the actual policy environment (e.g., the promotion of the "One Belt, One Road" initiative and the tightening of OFDI regulation).

Table 4. Fixed effects (year) regression results

VARIABLES	ln_ofdi
esg	1.2990** (0.5284)
size	0.6287*** (0.0971)
lev	-1.9637*** (0.3567)
roa	-0.6480* (0.3536)
growth	0.0026 (0.0032)
mh	-0.0134*** (0.0051)
year	yes
Constant	-4.3123** (2.0213)
Observations	14,442
Number of firm_id	2,827
R-squared	0.1460

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

4.4. Results of the mediated three-step approach

In order to explore the intrinsic mechanism of ESG affecting OFDI, this paper uses financing constraints (KZ index) as the mediating variable and adopts a three-step test (Table 5). The first step regression: the coefficient of esg on ln_ofdi is 2.004 ($p < 0.01$), which is consistent with the benchmark regression, indicating that the total effect of ESG on OFDI is significant. The second regression step: the coefficient of esg on KZ is -1.117 ($p < 0.01$), which is significantly negative, indicating that the better the ESG performance, the lower the degree of corporate financing

constraints (the smaller the KZ index), supporting the hypothesis that ESG plays a role in alleviating financing constraints. The third step regression: after adding esg and KZ at the same time, the coefficient of esg on ln_ofdi is 1.834 ($p < 0.01$), which is still significantly positive but the coefficient is reduced; the coefficient of KZ on ln_ofdi is -0.155 ($p < 0.01$), which is significantly negative, indicating that financing constraints (KZ) is a partially intermediary variable of ESG affecting OFDI. Combined with the results of the three-step method, financing constraints (KZ) is a partially mediating variable of ESG affecting OFDI, and the ratio of the mediating effect to the total effect is about $(1.117 \times 0.155) / 2.004 \approx 8.6\%$, which indicates that the mechanism of ESG indirectly promoting OFDI through alleviating financing constraints is established.

Table 5. Mediating effects results

VARIABLES	ln_ofdi	kz	ln_ofdi
esg	2.00406*** -0.35799	-1.11689*** -0.30961	1.83382*** -0.35597
kz			-0.15465*** -0.01382
size	0.79433*** -0.01801	-0.28595*** -0.02876	0.74267*** -0.01848
lev	-3.59792*** -0.14137	6.03774*** -0.32658	-2.62840*** -0.17458
roa	0.07581 -0.32219	-8.27072*** -1.2642	-1.22710*** -0.28847
growth	0.00369 -0.00315	-0.0044 -0.00406	0.00339 -0.00283
mh	0.00904*** -0.00106	-0.01532*** -0.00095	0.00682*** -0.00106
Constant	-7.39998*** -0.38157	6.39715*** -0.52102	-6.25787*** -0.39429
Observations	14,442	14,241	14,162
R-squared	0.19174	0.54901	0.19958

Robust standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5. Conclusions and recommendations

Based on the above empirical analysis, corporate ESG performance has a significant positive impact on OFDI behavior, and this impact remains robust even after controlling for time fixed effects. Mechanism tests indicate that ESG performance indirectly promotes the expansion of OFDI scale by alleviating corporate financing constraints (reducing the KZ index). Additionally, firm size, debt-to-equity ratio, and management ownership ratio are important controlling factors influencing OFDI, while the results of the year fixed effects reflect the phased impact of the macroeconomic policy environment on OFDI.

The findings of this study align with existing research: ESG performance promotes firm internationalization through dual mechanisms of “signaling” and “resource acquisition”^[10]. On the one hand, companies with high ESG levels signal “responsibility and sustainability” to the market, enhancing international investor trust; on the other hand, ESG reduces financing constraints, providing financial support for OFDI. Additionally, the study supplements evidence on the role of ESG in the internationalization of emerging market firms, particularly under the “dual carbon” goals, where ESG has become an important soft power in cross-border competition.

Based on the results of empirical analysis, this paper combines the current state of China's and the world's economic development to propose some practical suggestions: at the corporate level, companies should deepen the integration of ESG strategies, incorporating them into the core framework of their internationalization plans, and reduce funding constraints for overseas investments by optimizing ESG information disclosure and the application of green financing tools; investors, based on existing research, should emphasize the long-term value creation logic of ESG, incorporate ESG performance into assessments of a company's overseas potential, and guide capital flows toward high-compliance, low-risk international projects; in terms of policy formulation, it is undoubtedly necessary to promote the synergy between green finance and internationalization strategies, establish a green OFDI certification system, provide specialized policy incentives, and strengthen cross-border green finance cooperation to provide institutional safeguards for enterprises to sustainably “go global.” This study provides empirical evidence for understanding the role of ESG in corporate internationalization strategies and also helps to encourage enterprises, investors, and policymakers to further prioritize and enhance ESG practice levels.

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