

Environmental, Social and Governance Performance and Overseas Earnings of Chinese Enterprises — The Chain Multiple Intermediary Model Test Based on Financing and Supply Chain Toughness

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Abstract: With the rise of anti-globalisation and protectionism, there has been significant pressure on the overseas operations of Chinese enterprises, so they need to promote the application of ESG. The way ESG performance affects the foreign earnings of Chinese enterprises is the topic of this paper. As shown in the results, ESG performance can strengthen the stability of the supply chain and reduce financial constraints through other means to increase foreign earnings, and it is also possible that a decrease in financing constraints will enhance supply chain resilience gradually. According to the results of heterogeneity analysis, it can be determined that companies without overseas directors, those in highly competitive industries and non-state-owned enterprises are positively associated with the development of exports. This paper studies the correlation between the ESG performance of foreign companies and their development, and puts forward some theoretical and practical suggestions for Chinese enterprises.

Keywords: ESG performance; financing constraints; supply chain toughness; overseas income of Chinese companies; multiple intermediary effects

1. Introduction

Between January 2019 and December 2024, the United States The Bureau of Industry and Information Technology (BIS) added almost 1,000 Chinese enterprises to the Entity List through 40 different lists. Therefore, the ESG performance of Chinese companies operating abroad has become an issue of attention. Academia and industry have not reached an agreement on the economic effects of ESG, and little empirical study has been conducted on Chinese enterprises specifically. Based on the panel data of A-share listed companies from 2012 to 2023, this paper examines the effect of ESG performance on overseas earnings and investigates the reasons for such an effect. We have found that ESG enhances foreign earnings in two ways: the first is an independent effect, and the second is through a chain of causation; that is to say, a reduced financing constraint helps improve the stability of the supply chain. According to the results of the heterogeneity test, the positive effect of ESG on financial performance is relatively larger for companies without overseas directors, those in high-competition industries and non-state-owned enterprises. The results have provided some theoretical and practical support for Chinese enterprises in the face of trade restrictions and helped to enhance the overseas economic power of China.

2. Research Assumptions

ESG performance refers to the results of a company's environmental, social and governance (ESG) work (Bassen & Kovacs, 2008). Good ESG disclosure can improve the transparency of the company, reduce information asymmetry, and thus increase the overall quality of information for all related parties (Eccles and Audra, 2011; El Ghouli and Weiss, 2002). According to the theory of stakeholders, a company should consider the interests of all groups involved, and based on extensive studies, ESG is often correlated with the financial performance of enterprises (Friede et al., 2015). ESG helps a company gain the favor of the market abroad, thereby raising funds and getting preferential treatment in cross-border business. Therefore we propose:

H1: A good ESG level will increase the export revenue of the company.

Supply Chain Resilience is the ability to withstand and recover from all kinds of disruptions. In the face of information asymmetry, high-quality enterprises can use ESG (Lins et al., 2017) to show that they have good product quality and ethical behaviour; thus, trust is established and cooperation among all parties involved (Flynn et al., 2010; Brusset and Teller, 2017) will be achieved to ensure stable operations. Enhance the efficiency and reduce the expenses of overseas business. Therefore:

H2: Enhance the stability of the overseas supply chain and promote foreign revenue.

Financing constraints are due to the market's lack of supply and are therefore more expensive for the company. ESG disclosure can solve the problems of adverse selection and moral hazard in the supply of funds by lending (Cheng & Zhu,

2014; Zhu, 2014). Good media coverage and a strong brand can reduce some of the restrictions to a certain extent (Dyck & Zingales, 2004; McWilliams et al., 2006). Therefore:

H3: A company with good ESG performance has a lower cost of foreign borrowing.

Fund Support for All Links in the Supply Chain. A good ESG rating can lower the cost of borrowing for the company and attract more investments. Based on the New Trade Theory, there are substantial and protracted financing needs for the fixed export costs of Melitz (2003) and Chaney (2016). ESG will reduce the risks listed above and help the company export more freely. Therefore:

H4: Good ESG performance can lower the financing cost and improve the stability of the foreign-income supply chain.

The two mediating paths are not independent; rather, they are connected in a chain and can collectively reduce borrowing costs, improve the stability of the supply chain, boost overseas profit, etc. The two paths are connected to form a single model, and Financing Constraints (FC), Supply Chain Toughness (Chain), ESG Performance (ESG) and Overseas Income (Orev) are all related.

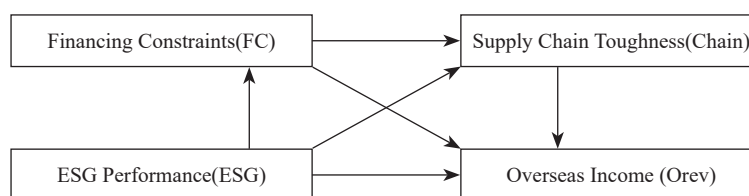


Figure 1. Study Model

3. Research Design

3.1 Selection of Sample and Data Source

A-share listed companies from 2012 to 2023 are the research objects of this paper. The starting year was 2012; at that time, China had begun to recover from the global financial crisis, and more regular data on foreign currency income became available. The data in this paper are from the CSMAR database, Wind Financial Terminal and China Research Data Service Platform (CNRDS). The following are the selection criteria for the sample companies: (1) Exclude companies that do not meet the listing conditions; (2) Exclude financial sector companies; (3) Exclude companies with zero or abnormal overseas earnings. Finally, there are 3,465 companies and more than 20,000 firm-year observations. All continuous variables are winsorised at the 1st and 99th percentiles to reduce the effect of outliers. The range of all variables in the descriptive statistics is reasonable.

3.2 Selection and Measurement of Variables

3.2.1 Explained Variables (Orev)

Overseas earnings refer to the natural logarithm of the income from overseas business activities, and it includes export revenue, income generated by overseas subsidiaries and branches, etc. It is to some extent an index of the extent of internationalisation and operating capacity.

3.2.2 Main Explanatory Variable (ESG)

The annual ESG score of Wind indicates the level of a company's ESG, and more than 20,000 data points from all corners will be gathered through big data analysis, manual verification, a double-check system, and so on. In China, according to local policies and the situation of the market, 62 industries have been divided into two groups for scoring.

3.2.3 Intermediary Variables

Supply-chain Toughness (Chain). In line with Zhang and Gu (2024), we take the natural logarithm of the ratio of accounts receivable and prepayments to core revenue. This is a bad sign; a small value indicates that the amount of capital occupation is relatively small and the upstream-downstream connection is stable, so it is relatively stable.

Financing constraints(FC). We use the SA index (Hadlock and Pierce, 2010), which is calculated as $SA = -0.737 \times \text{Size} + 0.043 \times \text{Size}^2 - 0.04 \times \text{Age}$; Size is the logarithm of total assets and Age is the number of years listed. SA is used in absolute value form.

3.2.4 Control Variables

Control variables include firm size, which is the logarithm of total assets; leverage, which is the debt-to-asset ratio; return on assets; board size; proportion of independent directors; CEO duality; Tobin's Q; firm age, which is the logarithm

of years since establishment; largest shareholder ownership; capital intensity, which is total assets per employee; and the logarithm of one plus the number of directors with overseas work experience.

3.3 Model Specification

First of all, to analyse the effect of ESG performance on the impact of enterprises' overseas income (1), if the model (1) in model (1) is used, and the regression coefficient α_1 of ESG on OREV is positive, it can be concluded that good ESG performance may promote the growth of a company's overseas income.

$$Orev_{it} = \alpha_0 + \alpha_1 ESG_{it} + \sum Control + \sum year + \sum Industry + \mu_{it} \quad (1)$$

A chain of multiple intermediate effects model will be employed in this paper to study the mediating paths that affect the overseas income of enterprises. According to the inspection process of the chain of intermediaries, a model (2) of the effect of ESG performance on financing constraints has been constructed. If the ESG in the model (2) is negative for the FC regression coefficient β_1 , it can be concluded that high ESG performance may reduce corporate financing. Further expand the model (3) and model (4) based on model (2) to determine if ESG performance can strengthen the chain intermediary effect of supply chain toughness and thus boost overseas income by reducing corporate financing constraints. Effect Model:

$$FC_{it} = \beta_0 + \beta_1 ESG_{it} + \sum Control + \sum year + \sum Industry + \mu_{it} \quad (2)$$

$$Chain_{it} = \eta_0 + \eta_1 ESG_{it} + \eta_2 FC_{it} + \sum Control + \sum year + \sum Industry + \mu_{it} \quad (3)$$

$$Orev_{it} = \varphi_0 + \varphi_1 ESG_{it} + \varphi_2 FC_{it} + \varphi_3 Chain_{it} + \sum Control + \sum year + \sum Industry + \mu_{it} \quad (4)$$

Model (2), model (3) and model (4) are a group of multiple equations. Model (2) Research on the Link between ESG Performance and Corporate Financing Constraints. Model (3) The Effect of Inspection and Financing Constraints on Supply Chain Toughness under the Control of ESG Performance; Model (4) Inspection of the Impact of Supply Chain Toughness on Enterprises' Overseas Income under the Control of ESG Performance and Corporate Financing Constraints. The two kinds of intermediary effects in the above-mentioned chain multiple intermediary models are independent intermediary effects and chain intermediary effects. The sum of the independent intermediary effect and the chain intermediary effect is the total intermediary effect. Among them, the independent intermediary effects are "ESG performance → supply chain toughness → enterprise overseas income" and "ESG performance → financing constraints → enterprise overseas income", and the corresponding effects of the two independent intermediaries are $\eta_1\varphi_3$ and $\beta_1\varphi_2$, respectively; there is also a chain intermediary effect of "ESG performance → financing constraints → supply chain toughness → enterprise overseas income", and its magnitude is $\beta_1\eta_2\varphi_3$.

4. Empirical Results and Analysis

4.1 Model Regression Results

Return to the model (1) - (4), and the result is shown in Table 1.

Table 1. Benchmark Regression

Variable Type	(1)	(2)	(3)	(4)
	Orev	FC	Chain	Orev
ESG	0.014*** (0.002)	-0.001*** (0.000)	-0.004*** (0.001)	0.012*** (0.002)
FC			0.482*** (0.056)	-0.748*** (0.141)
Chain				-0.253*** (0.018)
Control Variable	Yes	Yes	Yes	Yes
Year Control	Yes	Yes	Yes	Yes
Industry Control	Yes	Yes	Yes	Yes

Variable Type	(1)	(2)	(3)	(4)
Constant	14.491*** (0.623)	3.395*** (0.026)	-4.307*** (0.324)	16.230*** (0.789)
Observations	22,510	22,510	22,510	22,510
R-squared	0.124	0.841	0.055	0.135
Number of id	3,465	3,465	3,465	3,465

Note: ***, **, and * are at 1%, 5%, and 10%, respectively; the level of the brackets is stable T value, which is the same.

Table 1 is the regression results of models (1) to (4). In model (1), the ESG coefficient is positively and significantly correlated with overseas income at the 1% level; that is to say, the company's good ESG performance has helped improve its image abroad, reduce trade obstacles and address information asymmetry. As shown in Model (2), good governance and reporting will help reduce the information asymmetry of the top management team to some extent and thus lower financing costs. As shown in Model (3), ESG can help improve the stability of the supply chain positively; financing constraints have a negative impact on this stability, and thus it can be concluded that ESG can distribute financial resources among all links of the supply chain. As shown in Model (4), ESG is positively correlated with overseas income, and both financing constraints and the negative supply chain toughness indicator are negative, but all are at the 1% significance level. Based on the above results, it can be concluded that ESG reduces financing constraints, strengthens the resilience of the supply chain, and thus increases overseas income. Both the direct and the indirect effects have been verified.

4.2 Robustness Test

Stability Tests are the first. Zhang Shushan is the founder of Resilience. Stability: Decrease the amount of funds occupied by customer deposits through reduction in the scale of accounts receivable and strengthens cooperation; maintain a good relationship with these customers. Recovery: Due to a large difference in supply and demand volatility, the recovery will be slow; otherwise, if there is too great a performance deviation, it will also be a small recovery. The four indices form Chain1-Entropy Weighting; the larger Chain1, the more robust it is. Model (5) is the performance deviation, which is regressed on firm size, leverage, growth rate, age and board, along with firm and year fixed effects. The remainder is the actual-theoretical deviation.

$$Perform=\beta_0+\beta_1Size+\beta_2Lev+\beta_3Growth+\beta_4Age+\beta_5Board+Firm+Year+\varepsilon \quad (5)$$

Table 2. Inspection

Variable Type	(1)	(2)	(3)	(4)
	Orev	FC	Chain1	Orev
ESG	0.004** (0.002)	-0.001*** (0.000)	0.00029*** (0.000)	0.004** (0.002)
FC			-0.029*** (0.008)	-0.843*** (0.140)
Chain1				0.559*** (0.108)
Control Variable	Yes	Yes	Yes	Yes
Year Control	Yes	Yes	Yes	Yes
Industry Control	Yes	Yes	Yes	Yes
Constant	1.307** (0.629)	3.456*** (0.029)	0.522*** (0.050)	3.888*** (0.836)
Observations	19,874	19,874	19,874	19,874
R-squared	0.256	0.842	0.172	0.260
Number of id	3,100	3,100	3,100	3,100

The supply chain toughness indicators are positive indicators this time. The results of the model (4) are still the same as above. It has been found that the two paths of ESG performance can increase the two paths of corporate financing constraints and enhance the toughness of the supply chain. Chain action path.

4.3 Heterogeneity Analysis

4.3.1 Heterogeneity of Overseas Background Directors

Morgan H M et al. pointed out that the overseas background of executives is positively correlated with internationalisation. Enterprises with overseas-background directors = 1, without = 0. For firms with overseas-background directors, the total ESG effect on overseas earnings is 0.019 and significantly so at the 1% level. Decrease the financial constraint by 0.001 and increase the robustness of the supply chain by 0.003; both are at the 1% significance level. The direct effect is still 0.017 at 1%, and it is fully mediated. For firms without such directors, the total effect is 0.008 at 1%, but the effect on financing constraints is negligible and insignificant, and the effect on supply chain toughness is only 0.003 at 10%. The first one immediately drops to 0.006 at 5%. Therefore, the chain mediation of financing constraints and supply chain toughness is more pronounced in companies with overseas directors.

4.3.2 Heterogeneity of Industry Competition Degree

HHI index measures market concentration: $HHI = \sum (X_i/X)^2$. A small HHI is a relatively open market. Enterprises with an HHI above the median are in the eased competition group (1), and those below the median are in the fierce competition group; in less competitive industries, the ESG total effect is 0.011 at 1%, the reduction in financing constraints is 0.001 at 1%, and the improvement of supply chain toughness is 0.007 at 1%; the direct effect is 0.010 at 1%, so all mediation paths are valid. Due to the high competition in the industry, the total effect at 1% is only 0.016, and although it reduces financing constraints by 0.000 at 5%, its impact on supply chain resilience is insignificant and cannot be relied upon; the direct effect at 1% is 0.015. Therefore, the supply chain path is not used in the fierce competition, and ESG works directly.

4.3.3 Enterprise Ownership Heterogeneity

Non-state-owned enterprises have relatively more information asymmetry than state-owned enterprises; thus, the negative effect of financing constraints on the ESG performance of non-state-owned enterprises may be more pronounced, and the total ESG effect of state-owned enterprises was 0.004 and failed to meet the threshold of statistical significance. ESG can reduce the cost of debt by 0.000 at 10% and enhance supply chain resilience by 0.005 at 1%, but the direct impact is only 0.003 and thus negligible. The general effect of non-state-owned enterprises is 0.004 at the 5% level; that is to say, it reduces financing constraints by 0.001 at the 1% level and enhances the resilience of the supply chain by 0.002 at the 5% level, and the direct effect is 0.003 at the 10% level. Due to the relatively high information asymmetry and lack of funds, the non-state-owned enterprise has been unable to close the indirect path.

5. Conclusion and Revelation

ESG has achieved universal consensus and now promotes high-quality development around the world. The Development of ESG in China is relatively early at present. Based on the data of A-share listed companies from 2012 to 2023, we investigate the mediating effects and find that ESG can enhance overseas income through the strengthening of corporate reputation, reduction of trade barriers and addressing of information asymmetry. ESG can assist in widening financing for the entire supply chain by reducing financing restrictions and the problem of adverse selection through good governance, and at the same time, it will improve the utilisation efficiency and operating efficiency of resources. It has been determined that there is a sequential mediation effect, and therefore, a lower ESG level will result in higher financing costs and a decrease in the stability of the supply chain and foreign revenue. The chain effect is relatively strong in companies where the directors have left the country for work, and it is relatively weak in highly competitive industries and relatively strong for non-state-owned enterprises. Based on the above results, we propose that policymakers promote the implementation of ESG and build capacity; banks should consider the ESG performance of borrowers in their credit decisions, offer preferential loan terms, and develop supply chain finance. Specific measures can be taken to provide financial subsidies, tax incentives and other support for companies that do not have overseas directors, are in competitive industries or are non-SOEs, etc., to reduce financing difficulties, strengthen resilience and drive further development abroad.

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